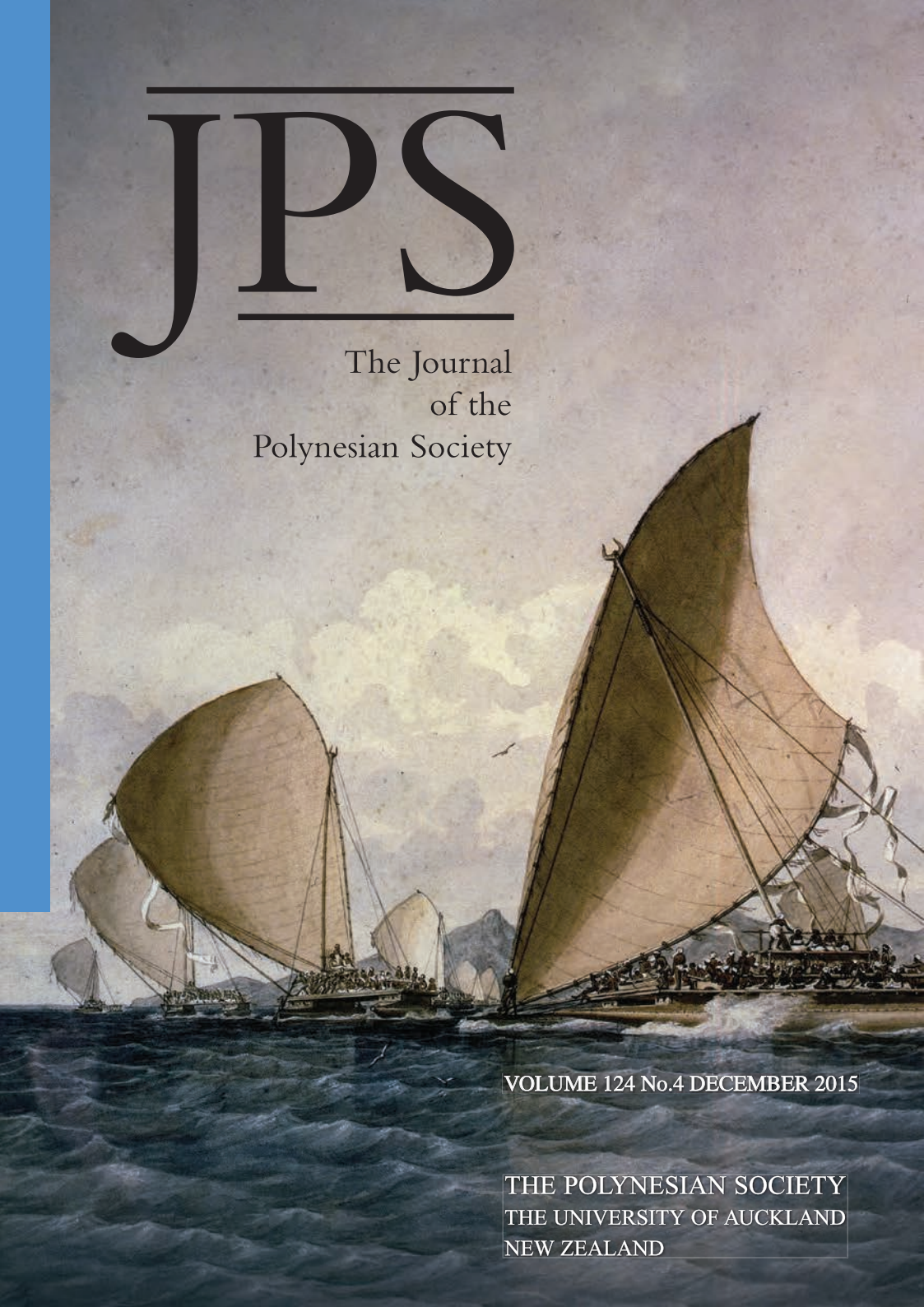


JPS

The Journal
of the
Polynesian Society

VOLUME 124 No.4 DECEMBER 2015

THE POLYNESIAN SOCIETY
THE UNIVERSITY OF AUCKLAND
NEW ZEALAND



WORDS FOR CANOES: CONTINUITY AND CHANGE IN OCEANIC SAILING CRAFT

ANNE DI PIAZZA

Aix-Marseille Université

Centre national de la recherche scientifique (CNRS)

École des hautes études en sciences sociales (EHESS)

Centre de recherche et de documentation sur l'Océanie (CREDO)

Historically canoes are something of an enigma in the Pacific. They are extensively documented from the first contact period up to the present, but there is no widespread agreement pertaining to their design and technological innovations through time. Their few archaeological remains are not sufficiently informative, rendering such a topic challenging but, as developed below, historical linguistics can help to reconstruct Proto-Oceanic (POc), Proto-Central Pacific (PCP) and Proto-Polynesian (PPN) canoes. Pawley (2007: 26) has written:

More than 20 terms for canoe parts and associated items are attributable to POc (Pawley and Pawley 1994). These include names for parts of a five-piece built-up hull, end pieces, projecting parts of the outrigger complex, platform, sail, boom of sail, steering oar, paddles, bailers, rollers for beaching and launching canoes, and anchors, indicating that POc speakers built substantial ocean-going outrigger canoes.

Such lexical evidence supplements the paucity of archaeological data of pre-contact canoes but more importantly allows relative dating of technological innovations. By tracing the histories of cognates and/or semantic fields related to the canoe complex, we can learn a great deal about continuity and change in maritime history. This idea is not new. Geraghty (1994), Lynch (1994), Osmond (2003), Osmond *et al.* (2003), Pawley (2007) and Pawley and Pawley (1994) have used historical linguistics to reconstruct aspects of the canoe complex and the maritime environment.

My approach combines observations on canoe technology with historical linguistics. Starting with the geographical distribution of the main types of sailing canoes in Remote Oceania at European contact, I selected technological traits that differentiate these types and that are marked by widespread terms, describing the rigging, steering devices and the way they change direction. Then, based on earlier work by historical linguists, I used the distribution of these lexical terms, as well as their reconstructed protoforms to analyse where and when new words appeared or shifts in meaning occurred to discuss the history of navigation.

The shunting Oceanic lateen rigged canoe will be shown to be the vessel type of PCP speakers. Whether this canoe type was used by POc speakers is less clear. While the shunting manoeuvre is attested, no terms referring to a specific rig were found. The tacking Oceanic spritsail rigged canoe will be demonstrated to be a recent innovation attributed to Proto-Polynesian (PPN) speakers and was probably the vehicle used for the settlement of East Polynesia, some 800 years ago.

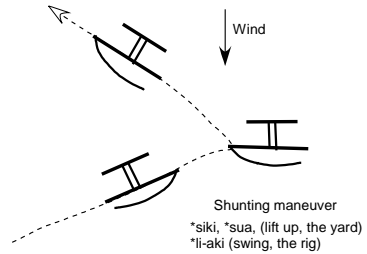
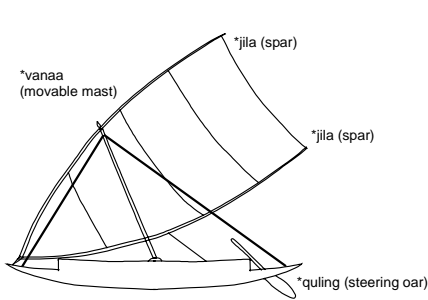
Although ocean-going double canoes are often thought of as the quintessential voyaging craft, they will not be discussed here since no specific shared terms differentiate their sailing rigs or manoeuvres from those of outriggers. The only term that marks them is ‘doubled’ as in Fijian *drua* (twin) and PPN **rua* (two) (Pawley 2007: 27). There is also no evidence for their existence during the early Oceanic settlement period, that is, during the time of POc.

TWO SCHOOLS OF NAVIGATION IN OCEANIA AND THEIR GEOGRAPHICAL DISTRIBUTIONS

From the beginning of European observations, from the 16th century on, we have a good picture of the geographical distribution of two schools of navigation, defined by their manner of coming about¹ (shunting versus tacking) and their sail rigs (Oceanic lateen versus Oceanic spritsail) (Doran 1981, Haddon and Hornell 1975, Neyret 1974). Shunting is generally associated with the three spar Oceanic lateen rig and is found throughout Micronesia, Western Polynesia and in scattered locations in Island Melanesia (Fig. 1). There the prevailing canoe type is a single outrigger whose rig is characterised by a triangular sail laced to two spars, a yard and a boom. Its apex is socketed at the bow of the hull and the yard is held up by a movable mast raked towards the bow. The entire rig is shifted from one end of the hull to the other when shunting, using the mast as a crane to carry the weight of the rig. Tacking is generally associated with the Oceanic spritsail rig. This rig is found throughout Eastern Polynesia and parts of West Polynesia (notably Samoa), on two Polynesian outliers, Anuta and Tikopia, and perhaps in Tonga.² This rig also uses a triangular sail, laced between two spars. The after spar is known as the sprit and the forward one is a functional mast stepped on the forward outrigger crossbeam, well back from the bow.

There are some exceptions to these generalisations. Shunting canoes with Oceanic spritsails were found on the east coast of New Caledonia, Ouvéa in the Loyalties and on the Belep Islands to the north (Haddon and Hornell 1975, Neyret 1974), in northern and central Vanuatu (Di Piazza 2014), as well as in the Tuamotus. There was also an unusual double canoe type, the *tongiaki*, rigged with an Oceanic lateen sail that came about by tacking; this was known from Tonga, first described off the island of Niuaotupapu, and perhaps from Samoa.³

Shunting Oceanic lateen rigged canoe



Tacking Oceanic spritsail rigged canoe

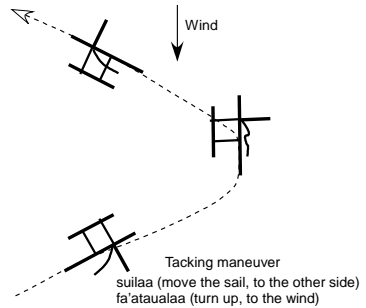
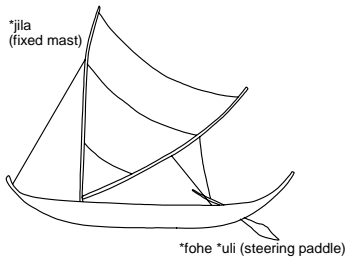


Figure 1. Reconstructed POc (*jila, *quling), PCP (*vanaa, *tuku, *sua, *siki, *li-aki) and PPN (*fohe *uli, *suati, suilā, fa'ataualā) terms for canoe parts (modified after Fig. 2 in Di Piazza 2014).

DISTRIBUTION AND MEANINGS OF FOUR TRAITS THAT DISTINGUISH THE SHUNTING OCEANIC LATEEN FROM THE OCEANIC SPRITSAIL

Among technological traits that distinguish these two schools of navigation, four specific terms found in various Oceanic languages are here considered. They refer to:

- masts (movable versus fixed);
- stays (running fore and back-stays);
- steering devices (steering oars versus steering paddles);
- methods of coming about (shunting versus tacking).

Movable Mast Versus Fixed Mast

In a lateen rigged shunting canoe, the mast is stepped in a socket on the centre cross beam and is raked toward the forward part of the vessel. It is raised to vertical and raked toward the other end of the canoe during the manoeuvre using the fore and aft stays. In a spritsail rigged canoe the forward spar is a functional mast and it remains fixed in a vertical or nearly vertical position during the manoeuvre, but is generally lowered when the sail is struck.

Reflexes of **jila* and **vanaa* allow inferences about the two rig types. After Pawley and Pawley (1994: 351), reflexes of **vanaa* mean mast in PCP, although this protoform might be older since the word is present in Mota (northern Vanuatu). However, there the sense is somewhat different: “a boom with forked end stepped on the foot of the mast” (Pawley and Pawley 1994: 351). The POLLEX (Polynesian Lexicon) online database (Greenhill and Clark 2011) lists additional cognates for **vanaa* in both West and East Polynesia (see Appendix 1). I noted cognates for **vanaa* in New Caledonia (*pena* on Nakety and *pana* on Île des Pins), both meaning mast (Neyret 1974 [I]: 30) as well as on Efate in central Vanuatu where *fāla* means yard (Macdonald 1894: 29), although the latter reference may be unreliable. The New Caledonian forms may be Polynesian loans (Lynch pers. comm. 2015), and if so **vanaa* is therefore only reconstructible to PCP.

Wherever **vanaa* has been recorded as meaning ‘mast’ (Fiji, Tonga, Samoa, Niue, Tokelau, East Uvea, East Futuna and New Caledonia), the rig in use is the three spar Oceanic lateen, therefore a movable rather than a fixed mast.

Reflexes of **jila* have meanings that range from yard, to mast, to boom. Pawley and Pawley (1994: 350-51) noted that in POc **jila* refers to one of the spars supporting the sail, either the yard or the boom, with reflexes from the Admiralty Islands to Tonga. They further noted that **jila* in the sense of a fixed mast “... is confined to certain parts of Polynesia and this sense probably represents a post-PPN innovation” (Pawley and Pawley 1994: 351). Their parts of Polynesia include Samoa, Tikopia, Mangaia, Tahiti and New Zealand.

Looking further into the distribution of this word allows confirmation and clarification of their hypotheses (see Appendix 2). In the West (Tokelau, Tuvalu, Tonga, Samoa), **jila* designates the two spars laced to the sail but not to the third spar (the movable mast). While throughout East Polynesia (Cook Islands, Societies, Tuamotus, Hawai‘i, New Zealand), in the Polynesian outlier of Tikopia, as well as in central and northern Vanuatu, where only the Oceanic spritsail is used, reflexes of **jila* refer to the forward spar (the mast).

This shift in meaning of **jila* from ‘spar’ (yard and/or boom) to ‘mast’ seems to reflect both a linguistic and technological innovation where the term for yard (the forward spar) of a lateen sail becomes the referent for the

functional mast of the spritsail rig, that is, the fixed forward spar that need not be raked when coming about. The distribution of these reflexes indicates that the innovation occurred before the settlement of East Polynesia, and probably after the Tongic/Samoic breakup. In Samoa (as well as Tonga, Tokelau, Tuvalu), **jila* (with qualifiers) refers to both the upper and lower spars of the lateen rig, for example in Samoan *tilatū* and *tilalalo* (Krämer 1995 [II]: 296).

The paired lexemes **vanaa* and **jila*, as movable ‘mast’ and ‘yard(s)’, date to at least PCP. In East Polynesia, the only places where they occur together, indeed the only places where **vanaa* occurs at all, are Tahiti and the Tuamotus. There *tira* (as throughout East Polynesia) is the functional ‘mast’ and *fanaa* the spar hoisted vertically against it. Seagoing canoes in those two groups (as well as those from Manihiki in the Cook Islands) appear to be the only Polynesian canoes that had a fixed mast independent from the sail assembly (Haddon and Hornell 1975 [I]: 79-91, 129-32, 186-89).

In all cases **jila* designates the most forward “stick” of both Oceanic lateens and spritsails. In the western regions **vanaa* is the spar that the **jila* is raised onto; in Tahiti and in the Tuamotus their functions seem to have been reversed and it is the *tila* that the *fanaa* is hoisted onto.

Stays (Fore and Back Running Stays)

On an Oceanic lateen canoe, the fore and aft stays are running, that is they are adjusted each time the canoe shunts. The forestay is slackened while the backstay is pulled. On tacking canoes, there is no backstay. It would interfere with the manoeuvre, but there is generally a “fixed” forestay. In both rigs, there are shrouds or lateral stays. On a tacking canoe these are fixed to the outrigger on one side and to a balance beam on the other. They need not be adjusted during the manoeuvre. On an Oceanic lateen rigged canoe, the shrouds are only attached on the outrigger (windward) side, the other side being left free for the swinging of the rig.

According to Pawley and Pawley (1994: 351), the PCP noun **tuku* means a running stay (Fiji, Tonga), a forestay (Samoa), a shroud (Tokelau) and may be cognate with PCP **tuku*, ‘let go, slacken’. Apropos their first sense, it appears that in West Polynesia and Fiji *tuku* indicates the running fore and aft stays required to manoeuvre the Oceanic lateen sail when shunting (see Appendix 3). Qualifiers may be added to **tuku* to differentiate the forward and aft stays, for example Samoan *tu‘umua*, *tu‘umuli*. Such is also the case in Fiji and Pukapuka.⁴

In the second sense, as a verb ‘to let go or slacken’, we find it in Fiji (*tuku-ca*) with the meaning to release the stay or the halyard, in New Caledonia (*toukou*) ‘to release the stay’, in Efate (*tuku nalai*) ‘to lower the sail’ (see Appendix 3). These cognates seem to be older than PCP as they are found

in New Caledonia and Vanuatu, although borrowings from Polynesia cannot be ruled out. Releasing the forestay is the first step for shunting the Oceanic lateen sail, allowing a crewman to lift the tack of the sail out of its socket. The distribution of **tuku* suggests a long history for the shunting lateen, at least to PCP and perhaps to POc.

Steering Devices (Steering Paddles Versus Steering Oars)

On shunting lateen canoes, the steering oar is long and heavy and is held in place by some kind of a pivot, either a horizontal bar, a wooden fork and/or a rope fixed to the centre outrigger beam. In use, it rests against the off (downwind) side of the hull. The oar needs to be transferred to the other end of the deck during the manoeuvre. It may be unhooked and carried across by the helmsman or, when fixed with a cord, it may simply be dropped in the water where it floats to the new stern. Tacking spritsail canoes are steered by a relatively lightweight (steering) paddle, held in the hands and shifted from one side to the other during the manoeuvre.

According to Pawley and Pawley (1994: 352), **quli(n,ŋ)* ‘steering oar’ and ‘to steer’ are part of the Proto Malayo-Polynesian (PMP) sailing complex. In both senses it is found as far east as Fiji. In the Polynesian subgroup, PPN **fohe* ‘paddle’ followed by a qualifier designates a steering paddle as opposed to a steering oar. The qualifier is either a cognate of ‘to steer’ as in Samoa, Tonga, Hawai‘i and the Tuamotus (thus **fohe* **ʔuli*) or of ‘helmsman’ as in Tahiti (*hoe faʻatere*), Anuta (*poē pakaterevaka*), New Zealand (*hoe whakatere*) and the Tuamotus (*hoe hakatere*) (see Appendix 4).

The semantic shift from **quli(n,ŋ)* to **fohe* **ʔuli* appears to be a PPN innovation. The western limit of the latter usage is in Tonga and Samoa, although it is not clear whether it applied to tacking or shunting canoes or both.

Methods of Coming About (Shunting Versus Tacking)

To come about by shunting, the canoe is turned broadside to the wind with its outrigger to windward then brought to a stop. The lower end of the forespar (the tack) is lifted or “uprooted” from its socket on the bow and the entire rig is carried or shifted from the bow to the stern (which now becomes the bow). The canoe now heads off “backward” in the other direction. To come about by tacking, the bow of the canoe is pivoted through the wind and the boom swings to the other side of the canoe (like western craft).

Several non-cognate terms seem to have been applied to different “stages” of the shunting manoeuvre. At least three of these words meaning ‘to come about’ appear to be related to the concept of ‘uprooting’ (*cavu*, **sua*, **li-aki*). According to Geraghty (1994: 69), *cavu* means both ‘uprooting’ and ‘coming about’ in Fijian. He further noted that in shunting a canoe, the foot of the yard

has to be lifted up, hence uprooted. One finds the same concept in Tonga and Samoa where *sua* has both meanings: coming about and uprooting (see Appendix 5). The use of **sua* to refer to uprooting the sail may be more widespread than these three Central Pacific examples since among Oceanic languages in general, POC **suar* carries the meaning of ‘to turn over, to root up, to lever up, as soil with stick when weeding’ (see POLLEX entries [Greenhill and Clark 2011]).

Another PPN lexeme, **li-aki*, has different meanings, among which some are clearly related to navigation. In Kiribati, *riaki* means to shunt and in Pukapuka it means to put up sail (Geraghty 1994: 69). Since KIR *riaki* was probably borrowed from one of the Samoic languages (SAM, TVL, TOK), it is likely that SAM *lia ‘i* meant ‘to come about’ (Geraghty 1994: 69). This specialised usage (see Appendix 5) may well derive from its more general meaning ‘to swing or throw’ or ‘to uproot’ widespread in West Polynesia (POLLEX [Greenhill and Clark 2011]). Both ‘to swing’ and ‘to uproot’ seem appropriate to describe the shunting manoeuvre, with the yard “swinging” from the masthead, while the tack is “uprooted” from the foredeck (see above).

Another POC word, **sigi* appears to have a similar usage where its general meaning ‘to lift up’ when applied to navigation signifies ‘to come about’. This is found in West Uvea, Samoa and Tonga, although in the latter two cases the word for sail is added to the verb **sigi*. Thus Samoan *si ‘ilā* and Tongan *hiki lā* describe the action of lifting up the sail assembly when coming about (see Appendix 5).

Samoa is the sole language where three terms for coming about may well distinguish tacking (*suilā, fa ‘ataualā*) from shunting (*si ‘ilā*, see above) (Krämer 1995 [II]: 314). The morphological analysis of *suilā* is probably *sui* ‘to substitute, to exchange, to change’ and *lā* ‘sail’. This is perhaps a reference to moving the sail from one side of the canoe to the other in tacking. *Tauualā* means to ‘luff, to turn up, to keep close to the wind’. When tacking, the canoe is effectively put as close to the wind as possible (in opposition to putting the wind on the beam when shunting).

Besides our four widespread technological terms (masts, stays, steering devices, methods of coming about), there are other more localised lexemes that inform us about the history of navigation. One such are the rails found on shunting canoes that connect each end of the hull to adjacent corners of the lee platform in Samoa and Fiji, which served as walkways during the shunt. Geraghty (1994: 64) noted that this rail is called *vavatā* in Samoa and *ivāvādā* in Fiji and that since “only in Fijian is the word morphologically analyzable... it is most likely that the term was coined in Fiji, and borrowed into Samoa”. Another localised term refers to the platform or beam which extends from the side of the hull opposite the outrigger structure in tacking canoes, known by

reflexes of *suati* in Tikopia (Feinberg 1988: 63), Anuta (Feinberg 1988: 62), Samoa (Krämer 1995 [II]: 306) and Tuvalu⁵ (Haddon and Hornell 1975 [I]: 303). It serves as a support for one or more crew members to counterbalance the forces on the outrigger float in tacking canoes. Analogous features are found on tacking outrigger canoes in Tahiti, as well as on the *tongiaki* double canoe where the beam extends outboard on both sides, although no word for these seem to have been recorded.

RECONSTRUCTING ANCESTRAL CANOES

Clearly, ancestral canoes cannot be said to have been preserved through lexemes in any simple or direct ways. Nevertheless, our body of four technological traits and their associated lexical terms allows correlations of canoe types to particular stages of Oceanic languages. The shunting Oceanic lateen rigged canoe is attributed to Proto-Central Pacific and the tacking Oceanic spritsail rigged canoe to Proto-Polynesian (Fig. 1). PCP vessels were fitted with three spars: a stick or mast (**vanaa*) whose function was to hoist the sail, an upper and lower spar (**jila*) laced to the sail, as well as with running fore and aft stays (**tuku*) which helped to swing the rig. They were directed by specialised steering oars (**quli*) rather than paddles. To come about, their rig had to be uprooted (**sua*), the tack uplifted (**siki*) and the whole sail assembly swung (**li-aki*) aft. PPN canoes were steered with paddles (**fohe* **uli*) rather than oars, had balance beams (**suati*) opposite the outrigger and tacked by moving the sail from one side to the other (*suilā*) or turning up (to the wind) (*fa'ataualā*). After the breakup of PPN, canoes carried an Oceanic spritsail on a fixed mast (**tila*). Whether this innovation occurred earlier is unknown.

At European contact there were at least two more localised canoe types: (i) shunting canoes with Oceanic spritsails in parts of New Caledonia, Vanuatu and the Tuamotus; and (ii) tacking double canoes with Oceanic lateens (*tongiaki*) from Tonga, Niuatoputapu and perhaps Samoa. Among these poorly known types, the best extant vocabulary is that of Layard (n.d.) for the butterfly spritsail of central and northern Vanuatu (Di Piazza 2014). For Atchin, off the northern coast of Malakula, he noted that:

The sides of the V [sail] are laced to bamboo spars ... respectively the 'outrigger [forward] spar' a-tsem, and the 'lee [aft] spar' tsorta. The rigging consists of six ropes, called talin na-mban 'sail ropes'. Of the three ropes on either spar, one, called nav, might well be termed 'stay' being made fast on the outrigger side..., and [one] on the lee side..., while the two others, rev-rev, acting as sheets, are made fast respectively to the fore and after thwarts. The steering paddle is called no-wosh na'ak wala, to come about ra tseme. (Layard n.d.: 8, 136b)

According to John Lynch (pers. comm. 2015), the term for ‘forward spar’ (*a-tsem*) is derived from POC **saman* ‘outrigger float’. The other Atchin words for canoe parts, such as stays, steering paddle and coming about, are not cognate with PCP lexemes. While the larger canoes of this type always shunt, smaller ones can also tack (Di Piazza 2014). This fact along with the peculiar way the sail is handled might explain why Atchin canoe lexicon is so different.

While detailed reconstruction is possible for the PCP stage onward, the only terms that allow inferences about the rig in use by POC speakers are ‘spar’ (**jila*) and ‘steering oar’ (**qulinj*). The latter indicates that Lapita canoes were probably shunting. Since the shunting Oceanic lugsail is the only rig known from Manus to the Trobriands, it may well be the best model for an early Lapita canoe. Whatever the case, we are on firmer ground 300 years and 3,000 km further away at the eastern end of Lapita (PCP), where shunting Oceanic lateen sails are attested.

* * *

Technological development is often portrayed as a linear process, for which it is assumed that progress is a matter of a more advanced technology replacing a simpler and older one. This is probably what has led certain authors to hypothesise that the “primitive” two spar (spritsail) rig is older than the three spar Oceanic lateen rig. Similarly, that the “simple” tacking manoeuvre precedes the shunting manoeuvre. Yet the history of our reconstructed canoes suggests otherwise. PCP navigators appear to have been using shunting lateen rigged canoes. And only later on, in West Polynesia (Tonga or Samoa), a new rig, the Oceanic spritsail and its associated tacking manoeuvre was invented. This invention presumably took place during the long pause, before East Polynesian settlement some 800 years ago.

The long coexistence of these two navigational traditions in Samoa (and probably Tonga) right up to European contact, suggests that the new technology was not replacing the old, nor did it necessarily derive from the old. Only a few terms seem to be interchangeable between the two types, and when they were (**jila*, **vanaa*, **quli*), it was with new meanings, emphasising the discontinuity between these two traditions.

NOTES

1. “Coming about” is here used as a generic term to refer to changing direction by either tacking (that is turning the bow through the wind as in Western craft) or shunting. In shunting, the sail along with the spars is carried to the opposite end of the boat. The bow becomes the stern and the boat sails in the other direction.

2. Sources are rare on Tonga. There tacking canoes rigged with an Oceanic spritsail are known only from a sketch and two aquatints based on it by John Webber from Cook's third voyage (Dodd 1972: 21, 134).
3. According to Haddon and Hornell (1975 [I]: 241), the Samoan *va'a tele* was similar to the Tongan *tongiaki*, although very little is known about it. The peculiarities of the *tongiaki* consisted of the absence of a halyard with the yard resting directly on the head of the mast, the tack suspended by ropes between the hulls and a mast stayed to a long crossbeam.
4. For Pukapuka, the terminology for 'stay' is consistent with the Oceanic lateen rig but the only description known dates to the 1930s, when a European rig was in use (Macgregor 1935). In Samoa, *tu'u* is associated with the lateen rigged *'alia* canoe (Krämer 1995 [II]: 291-96). The author knows of no vernacular data referring specifically to stays on Samoan spritsail rigged canoes.
5. After Haddon and Hornell (1975 [I]: 303), the word *tuati* was remembered by Tuvaluans, although its meaning had been forgotten. Since balance beams are apparently specific to tacking canoes, it may be that such canoes were once known there.

ACKNOWLEDGEMENTS

This paper has benefited from valuable comments from linguists Alexandre François, Paul Geraghty, John Lynch, Claire Moyses and Andrew Pawley, all of whom I would like to thank here. Without them this paper could not have been written.

REFERENCES

- Académie Tahitienne, 1999. *Dictionnaire Tahitien-Français*. Fare Vana'a, Papeete: STP Multipress.
- Best, Elsdon, 1976. *The Maori Canoe*. Dominion Museum Bulletin 7. Wellington: Government Printer.
- Buck, Peter [Te Rangi Hiroa], 1976. *The Material Culture of the Cook Islands*. New York: AMS.
- Churchward, Maxwell, 1959. *Tongan Dictionary*. London: Oxford University Press.
- Codrington, Rev. Robert and J. Palmer, 1896. *A Dictionary of the Language of Mota, Sugarloaf Island, Bank's Islands, with a Short Grammar and Index*. London: Society for Promoting Christian Knowledge.
- Collocott, Ernest E.V., 1925. Supplementary Tongan vocabulary; Also notes on measuring and counting, proverbial expressions and phases of the moon. *Journal of the Polynesian Society* 34 (3): 193-213.
- Di Piazza, Anne, 2014. The Vanuatu 'butterfly sail': A Polynesian Oceanic spritsail in Melanesia. *Asian Perspectives* 53 (2): 156-61.
- Dodd, Edward, 1972. *Polynesian Seafarings*. New York: Dodd, Mead and Company.
- Doran, Edwin, 1981. *Wangka: Austronesian Canoe Origins*. College Station, Texas: A & M University Press.

- Dordillon, Msg. René, 1857. *Essai de grammaire de la langue des îles Marquises*. Valparaiso: Imprimerie du Commerce.
- Emory, Kenneth, 1975. *Material Culture of the Tuamotu Archipelago*. Pacific Anthropological Records 22. Honolulu: Bernice P. Bishop Museum.
- Feinberg, Richard, 1988. *Polynesian Seafaring and Navigation. Ocean Travel in Anutan Culture*. Kent, Ohio: The Kent State University Press.
- Geraghty, Paul, 1994. Linguistics and central Pacific sailing technology. In J. Morrison, P. Geraghty and L. Crowl (eds), *Science of Pacific Island Peoples. Ocean and Coastal Studies*. Vol. 1. Suva: Institute of Pacific Studies, The University of the South Pacific, pp. 59-72.
- Gillett, R., J. Ianelli, T. Waqavakatoqa and M. Qica, 1993. *Traditional Sailing Canoes in Lau. Na camakau mai na yatu Lau*. Suva: Institute of Pacific Studies.
- Greenhill, Simon and Ross Clark, 2011. POLLEX-Online: The Polynesian Lexicon Project Online. *Oceanic Linguistics*, 50 (2): 551-59.
- Haddon, Alfred and James Hornell, 1975. *Canoes of Oceania*. 3 vols. Bernice P. Bishop Museum Special Publication 27, 28 and 29. Honolulu: Bishop Museum Press.
- Handy, Craighill, 1932. *Houses, Boats and Fishing in the Society Islands*. Bernice P. Bishop Museum Bulletin 90. Honolulu.
- Holmes, Tommy, 1981. *The Hawaiian Canoe*. Hanalei: Editions Limited.
- Hazlewood, David, 1872. *A Fijian and English and an English and Fijian Dictionary*. Edited by James Calvert. London: Sampson Low, Marston and Co.
- Krämer, Augustin, 1995. *The Samoa Islands. An Outline of a Monograph with Particular Consideration of German Samoa*. Vol. II. *Material Culture*. Honolulu: University of Hawai'i Press.
- Layard, John W., n.d. Canoe. Unpublished manuscript, MSS 84. Mandeville: Special Collections Library, University of California, San Diego.
- Lynch, John, 1994. Melanesian sailors on a Polynesian sea: Maritime vocabulary in southern Vanuatu. In A.K. Pawley and M.D. Ross (eds), *Austronesian Terminologies: Continuity and Change*. Pacific Linguistics C-127. Canberra: ANU Press, pp. 298-300.
- MacDonald, Rev. D., 1894. *The Asiatic Origin of the Oceanic Languages: Etymological Dictionary of the Language of Efate (New Hebrides)*. London: Melville, Mullen and Slade.
- Macgregor, Gordon, 1935. *Notes on the Ethnology of Pukapuka*. Honolulu: Bernice P. Bishop Museum Press.
- Mariner, William, 1817. *An Account of the Natives of the Tonga islands, in the South Pacific Ocean with an Original Grammar and Vocabulary of Their Language*. London: J. Murray.
- Neuret, Jean-Marie, 1950. Notes sur la navigation indigène aux îles Fiji. *Journal de la Société des Océanistes* 6: 5-31.
- 1974. *Pirogues océaniques*. Paris: Association des Amis des Musées de la Marine.
- Osmond, Meredith, 2003. Navigation and the heavens. In M. Ross, A. Pawley and M. Osmond (eds), *The Lexicon of Proto Oceanic. The Culture and Environment of*

- Ancestral Oceanic Society. Vol. 2. The Physical Environment.* Canberra: ANU Press, pp. 155-92.
- Osmond, Meredith, Andrew Pawley and Malcom Ross, 2003. The seascape. In M. Ross, A. Pawley and M. Osmond (eds), *The Lexicon of Proto Oceanic. The Culture and Environment of Ancestral Oceanic Society. Vol. 2. The Physical Environment.* Canberra: ANU Press, 91-118.
- Pawley, Andrew, 2007. The origins of Early Lapita culture: The testimony of historical linguistics. In S. Bedford, C. Sand and S.P. Connaughton (eds), *Oceanic Explorations: Lapita and Western Pacific Settlement.* Terra Australis 26. Canberra: Australian National University, pp. 17-49.
- Pawley, Andrew and Medina Pawley, 1994. Early Austronesian terms for canoe parts and seafaring. In A.K. Pawley and M.D. Ross (eds), *Austronesian Terminologies: Continuity and Change.* Pacific Linguistics C-127. Canberra: ANU Press, 329-61.
- Pratt, George, 1862. *Samoan Dictionary: English and Samoan, and Samoan and English with a Short Grammar of the Samoan Dialect.* London: Missionary Society's Press.
- Rabone, Rev. Stephen, 1845. *Vocabulary of the Tonga Language Arranged in Alphabetical Order to Which is Annexed a List of Idiomatical Phrases.* Vavau: Wesleyan Mission Press.
- Stimson, J. Frank, 1932. Songs of the Polynesian voyages. *Journal of the Polynesian Society* 41 (3): 181-201.

APPENDICES

Abbreviations

ADM	Admiralty Islands	POc	Proto-Oceanic
CNV	Central Northern Vanuatu	PPN	Proto-Polynesian
EFU	East Futuna	PUK	Pukapuka
EUV	East Uvea	RARO	Rarotonga
FIJ	Fiji	ROT	Rotuma
KAP	Kapingamarangi	SAM	Samoa
KIR	Kiribati	TAH	Tahiti
KWN	Kwamera (Tanna)	TIK	Tikopia
LEN, WSN, LEN, SWT	North Tanna, Whitesands, Lenakel, South-West Tanna	TOK	Tokelau
MANG	Mangaia	TONG	Tonga
MARQ	Marquesas	TUA	Tuamotu
NC	New Caledonia	TUV	Tuvalu
NUK	Nukumanu	WFU	West Futuna
NZ	New Zealand	WO	Western Oceanic
PCP	Proto-Central Pacific	WUV	West Uvea

Appendix 1: ?PEO **pana*, PCP **vanaa*

- MOTA *pane*, the boom (Codrington and Palmer 1896: 2); *pane/i*, boom with forked end stepped on the foot of the mast (Pawley and Pawley 1994: 351)
- EFATE *fāla*, a ship's yards (because they are fixed across or on the mast) (Macdonald 1894: 29)
- NC (Nakéty) *pena*, mâ; (Ile des Pins) *pana*, mâ (Neyret 1974 [I]: 30)
- WFU *fana*, mainmast (POLLEX [Greenhill and Clark 2011])
- WUV *fanaa*, mâ (POLLEX [Greenhill and Clark 2011])
- FIJ *i-vanaa*, mast (Pawley and Pawley 1994: 351)
- SAM *fanaa*, mast (Pawley and Pawley 1994: 351, POLLEX [Greenhill and Clark 2011])
- TONG *fanaa*, mast (Pawley and Pawley 1994: 351, POLLEX [Greenhill and Clark 2011])
- EUV *fanaa*, mast (POLLEX [Greenhill and Clark 2011])
- EFU *fanaa*, mast (POLLEX [Greenhill and Clark 2011])
- NIUE *fanaa*, mast (POLLEX [Greenhill and Clark 2011])
- TOK *fanaa*, mast (Pawley and Pawley 1994: 351, POLLEX [Greenhill and Clark 2011])
- TUA *fana*, yard (Emory 1975:138); *fanaa* yard of sea-going canoe (POLLEX [Greenhill and Clark 2011])
- TAH *fana*, vergue (POLLEX [Greenhill and Clark 2011])

Appendix 2: POC **jila*, PPN **tila*

- ADM Seimat *sil*, boom of a sail, Ninigo *sil*, booms of triangular sail, Penchal *cil*, sheet of sail, Lou *e/sil* horizontal support for sail (Pawley and Pawley 1994: 350)
- WO Tuam *na/sila*, yard or boom of sail (Pawley and Pawley 1994: 350)
- TAKUU *tila*, gaff of a canoe sail (POLLEX [Greenhill and Clark 2011])
- CNV Mota *pane sila*, projecting boom of a sail, Paamese *a/sil*, mast (Pawley and Pawley 1994: 350)
- EFATE ? (Neyret's list is not clearly attributed to any particular language) *tira tok*, vergue servant de mâ, *tiré viséik*, gui (Neyret 1974 [I]: 36); *tere*, the mast (of a canoe or ship) (Macdonald 1894:197), SOUTH EFATE *na/tir*, mast (Lynch pers. comm. 2015)
- EMAE *tira*, mast (POLLEX [Greenhill and Clark 2011])
- IFIRA-MELE *tira*, mast (POLLEX [Greenhill and Clark 2011])
- NTN,WSN,LEN,SWT *tila*, mast (Lynch 1994)
- KWM *tira*, mast (Lynch 1994)
- NGUNA *tira*, mast (POLLEX [Greenhill and Clark 2011])
- FIJ *sila*, sheet of a sail (Pawley and Pawley 1994: 350); (Lau) *karikari sila*, lower sail spar (Gillet *et al.* 1993: 80)
- SAM *tila*, mast, yardarm, sprit, spar of sail, mast (Pawley and Pawley 1994: 350, (POLLEX [Greenhill and Clark 2011]))

- TIK *tira*, mast or spar of sailing canoe (Pawley and Pawley 1994: 350, (POLLEX [Greenhill and Clark 2011])
- SIKAIANA *tila*, mast (POLLEX [Greenhill and Clark 2011])
- TONG *sila*, yard, for a sail to hang from, as a verb, shorten the sheet of a sail (Pawley and Pawley 1994: 350); *jilalalo*, the lower sprit or yard in a canoe; *jilatuu*, the upper sprit or yard in a canoe (Rabone 1845)
- WUV *tila*, mât (POLLEX [Greenhill and Clark 2011])
- NUK *tila*, yard (POLLEX [Greenhill and Clark 2011])
- EUV *tila toka*, mât dressé (Neyret 1974 [I]: 36)
- EFU *tila*, yardarm (POLLEX [Greenhill and Clark 2011])
- PUK *tila*, yard of sail, mast (Pawley and Pawley 1994: 350, (POLLEX [Greenhill and Clark 2011])
- MANG *tira*, mast (Pawley and Pawley 1994: 350, (POLLEX [Greenhill and Clark 2011])
- RARO *tira*, mast (POLLEX [Greenhill and Clark 2011])
- MANIHIKI *tira*, mast (Haddon and Hornell 1975 [I]: 194)
- TONGAREVA *tira*, mast (Haddon and Hornell 1975 [I]: 194), *tila*, mast (POLLEX [Greenhill and Clark 2011])
- AITUTAKI *tira*, mast (Buck 1927: 270)
- TOK *tila lalo*, mast boom, *tila lunga*, mast yard (Haddon and Hornell 1975 [I]: 251)
- TUV *tila tu*, yard (Haddon and Hornell 1975 [I]: 303); *tila*, mast (POLLEX [Greenhill and Clark 2011]). Note that an upper sprit is a forward spar (or mast) and not a boom
- TAH *tira*, mast (Pawley and Pawley 1994: 350, (POLLEX [Greenhill and Clark 2011]))
- TUA *tira*, mast, yardarm (Emory 1975: 138, (POLLEX [Greenhill and Clark 2011]))
- HAW *kia*, mast, the base of the mast (Holmes 1981: 175)
- NZ/MAORI *tira tuu*, yard of a sail, upper sprit, mast of a canoe (Pawley and Pawley 1994: 350, (POLLEX [Greenhill and Clark 2011])). Note that an upper sprit is a forward spar (or mast) and not a boom; *tiratu*, *titoko* (Haddon and Hornell 1975 [I]: 212)

Appendix 3: PCP *tuku

- EFATE *tuku nalai*, lower the sail (of a canoe) (MacDonald 1894: 205)
- MOTA *tug*, to loosen, slacken, untie (Codrington and Palmer 1896: 228)
- MALIGO *tig*, to loosen, untie (Codrington and Palmer 1896: 217)
- NC (Ile des Pins) *toukou*, laisser filer l'étai; (Nakéty) *toukou*, laisser filer l'étai (Neyret 1974 [I]: 30)
- KAP *tuku*, lower sail (POLLEX [Greenhill and Clark 2011])
- FIJI *tuku-ca*, to let go, to slack a rope; in the Bau dialect this word is chiefly used of slacking the stay, in tacking a canoe, or of slacking the haulyard [halyard] (Hazlewood 1872: 138); (Lau) *tuku*, stay (Gillet *et al.* 1993: 39); *tuku*, running stays (Pawley and Pawley 1994: 351), *uthu i mua*, running stays which form respectively forestay and backstay of mast (Haddon and Hornell 1975 [I]: 336).
- SAM *tu 'u*, stay; *tu 'umua*, forestay; *tu 'umuli*, aft stay (Krämer 1995 [II]: Figs 29, 293, 295); *tuu*, to set free, to let go (Pratt 1862: 212).

- TONG *tuku*, rope attached to the top of a *kalia* mast (Churchward 1959: 508); *tuku*, running fore and backstays of mast, also as a verb to slacken or to let go (Haddon and Hornell 1975 [I]: 273, Pawley and Pawley 1994: 351); *tukulolo*, lower (sail) (Collocott 1925: 207).
 EUV *toukou*, laisser filer l'étai (Neyret 1974 [I]: 30). [?]*uli*
 TOK *tuku*, guy rope of traditional sail, fastened to the outrigger (Pawley and Pawley 1994: 351)
 PUK *tukuku mua*, forestay; *tukuku muli*, after stay (Haddon and Hornell 1975 [I]: 253).

*Appendix 4: POC *quliŋ, PPN *[?]uli*

- ADM Lou (Manus) *kuli/p*, steering oar (Pawley and Pawley 1994: 351)
 WO Kiriwina *kuliga*, steering oar; Molima *kuliga*, steering oar, to steer; Tami *gul*, steering paddle; Gedaged *ulu/m*, rudder, steering; Yabem *ŋa/goliŋ*, rudder (Pawley and Pawley 1994: 352)
 MOTA *turwose*, steering paddle (Codrington and Palmer 1896: 2)
 LUANGIUA *hoe ulu*, steering paddle (POLLEX [Greenhill and Clark 2011])
 FIJ *uli*, steering oar, to steer (Pawley and Pawley 1994: 351, (POLLEX [Greenhill and Clark 2011])
 TONG *fohe 'uli*, rudder, steering oar (Pawley and Pawley 1994: 351)
 SAM *foe/uli*, rudder (Pawley and Pawley 1994: 351)
 MARQ Both terms *ui/uki* and *hoe* are found for steering oar (Dordillon 1857: 168, 425, 426). Whether they used in compound remains in question.
 NZ/MAORI *hoe whakaterere*, *hoe whakahaere*, steering oar (Best 1976)
 TUA *uri hoe*, steering paddle (Emory 1975: 184, citing Stimson 1932: 195), *hoe hakaterere* (Emory 1975: 167)
 TAH *hoe fa'atere*, gouvernail (Académie Tahitienne 1999)
 ANUTA *poe pakaterevaka*, steering paddle (Feinberg 1988: 195)
 HAW *hoe uli*, steering paddle (Handy 1932: 173)

*Appendix 5 : PCP *sua, PPN *li-aki, POC *siki*

- ROT *sua*, to tack about, change from one tack to another; *ua*, to lever up (Churchward 1959: 523)
 SAM *sua*, to tack (of a boat or a ship), to plough up; *suasua*, to root up (Pratt 1862)
 TON *hua*, to tack, to row, to skudd, to root or turn up the earth (Rabone 1845)
 SAM *lia'i*, to root up, to pull up (Pratt 1862)
 TOK *liaki*, uproot, swing, throw (POLLEX [Greenhill and Clark 2011])
 TUV *liaki*, shake, swing (Geraghty 1994: 69)
 KIR *riaki*, to tack (Geraghty 1994: 69)
 PUK *liaki*, put up sail (mentioned as borrowed in (POLLEX [Greenhill and Clark 2011])
 WUV *siki*, faire des bordées (POLLEX [Greenhill and Clark 2011])
 SAM *si'ilā*, put about (Pratt 1862)
 TOK *hiki*, to lift (a canoe) (POLLEX [Greenhill and Clark 2011])
 TONG *higgi la*, tack about; *higgi*, to raise, to lift, to heave (Mariner 1817: 404)

ABSTRACT

This article aims to reconstruct prehistoric Oceanic canoes by analysing four technological traits and their associated lexical terms: masts (movable versus fixed), stays (fore and back running stays), steering devices (steering paddle versus steering oars) and method of coming about (shunting versus tacking). By tracing the histories of cognates and/or semantic fields related to these terms, the study demonstrates that the shunting manoeuvre was known at the Proto-Oceanic stage, but no specific rig type can be reconstructed for that time period. The canoe of the Proto Central Pacific speakers used the shunting Oceanic lateen rig. The tacking Oceanic spritsail rigged canoe was a later Proto Polynesian innovation and served for the settlement of East Polynesia.

Keywords: Oceanic canoes, historical linguistics, maritime history, Oceanic lateen, Oceanic spritsail

CITATION AND AUTHOR DETAILS

Di Piazza,¹ Anne, 2015. Words for canoes: Continuity and change in oceanic sailing craft. *Journal of the Polynesian Society* 124(4): 445-460; DOI: <http://dx.doi.org/10.15286/jps.124.4.445-460>

¹ Correspondence: Aix-Marseille Université, CNRS, EHESS, CREDO-UMR 7308, 13003 Marseille, France. Email: anne.dipiazza@pacific-credo.fr