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DÉCOUVERTE, APPROPRIATION ET ÉMERGENCE DES SYSTÈMES SOCIAUX TRADITIONNELS

SPATIAL DYNAMICS IN OCEANIA

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Canoes of Atchin (Vanuatu) Based on John Willoughby Layard's Work

Anne Di Piazza

Abstract: This paper draws heavily on John Willoughby Layard's important typescript entitled "Canoes" stored at the University of California, San Diego, dedicated to coastal and sea-going canoes, their manufacture, usage and consecration. It consists of drafts for a chapter of a monograph John Willoughby Layard was working on about the people and culture of Atchin, a small island off the northeast coast of Malakula (Vanuatu). The current author notes that these canoes were rigged with an Oceanic spritsail and had the particularity of tacking through the wind when they were of small size (coastal) and of shunting when they were larger (sea-going). The author hypothesizes that the Oceanic spritsail and its associated tacking maneuver were borrowed from the Polynesian maritime tradition, likely via one of the Solomon outliers, while its balance platform likely came from Micronesia.

Keywords: Vanuatu, canoes, Oceanic spritsail, traditional navigation.

Les pirogues d'Atchin (Vanuatu) d'après les enquêtes de John Willoughby Layard

Résumé : Cet article repose très largement sur un important tapuscrit intitulé « Canoes » écrit par John Willoughby Layard conservé à l'université de Californie, San Diego, et consacré aux pirogues côtières et de pleine mer, à leurs techniques de construction, à leurs usages et à leurs rituels. Il s'agit de différentes versions d'un chapitre devant être intégré à la monographie que John Willoughby Layard prévoyait d'écrire sur les habitants et la culture d'Atchin, une petite île de la côte nord-est de Malakula (Vanuatu). Le présent auteur souligne le fait que ces pirogues gréées avec une voile à livarde océanienne ont la particularité de remonter au vent de manière amphidrome lorsqu'elles sont de petite taille et de manière monodrome lorsqu'elles sont de grande taille. L'auteur poursuit en faisant l'hypothèse que cette voile à livarde et sa manœuvre monodrome sont un emprunt au monde maritime polynésien, fait peut-être via les « outliers » de l'archipel des Salomon, tandis que la plateforme à balancier serait d'origine micronésienne.

Mots-clés : Vanuatu, Pirogue, voile à livarde océanienne, navigation traditionnelle.

Presented herein are observations taken from an unpublished typescript conserved at the University of California, San Diego, written by John Willoughby Layard, entitled "Canoes". This document of 169 pages (including various versions of certain parts), is remarkable for the information it contains on traditional naval architecture of central Vanuatu, Malakula[1] and its offshore Small Islands,[2] notably Atchin (fig. 1). Before examining this document in detail, I will briefly contextualize its author, a British anthropologist and psychoanalyst, and his work, then review his description of canoes and lastly discuss the singularity of these vessels from central and northern Vanuatu within the Pacific maritime traditions. I will conclude that its rig, the Oceanic spritsail and its manner of coming about was borrowed from Polynesia, perhaps from one of the Solomon outliers while its balance platform is more likely to have come from Micronesia.

JOHN WILLOUGHBY LAYARD: BIBLIOGRAPHICAL ELEMENTS

John Willoughby Layard's (1891–1974) biography has been recently compiled by H. Geismar and A. Herle (Geismar and Herle, 2010) in a masterful book entitled *Moving Images. John Layard, fieldwork and photography on Malakula since 1914*. The following section is largely drawn from this work. J. W. Layard studied at King's College, Cambridge where he completed a degree in modern

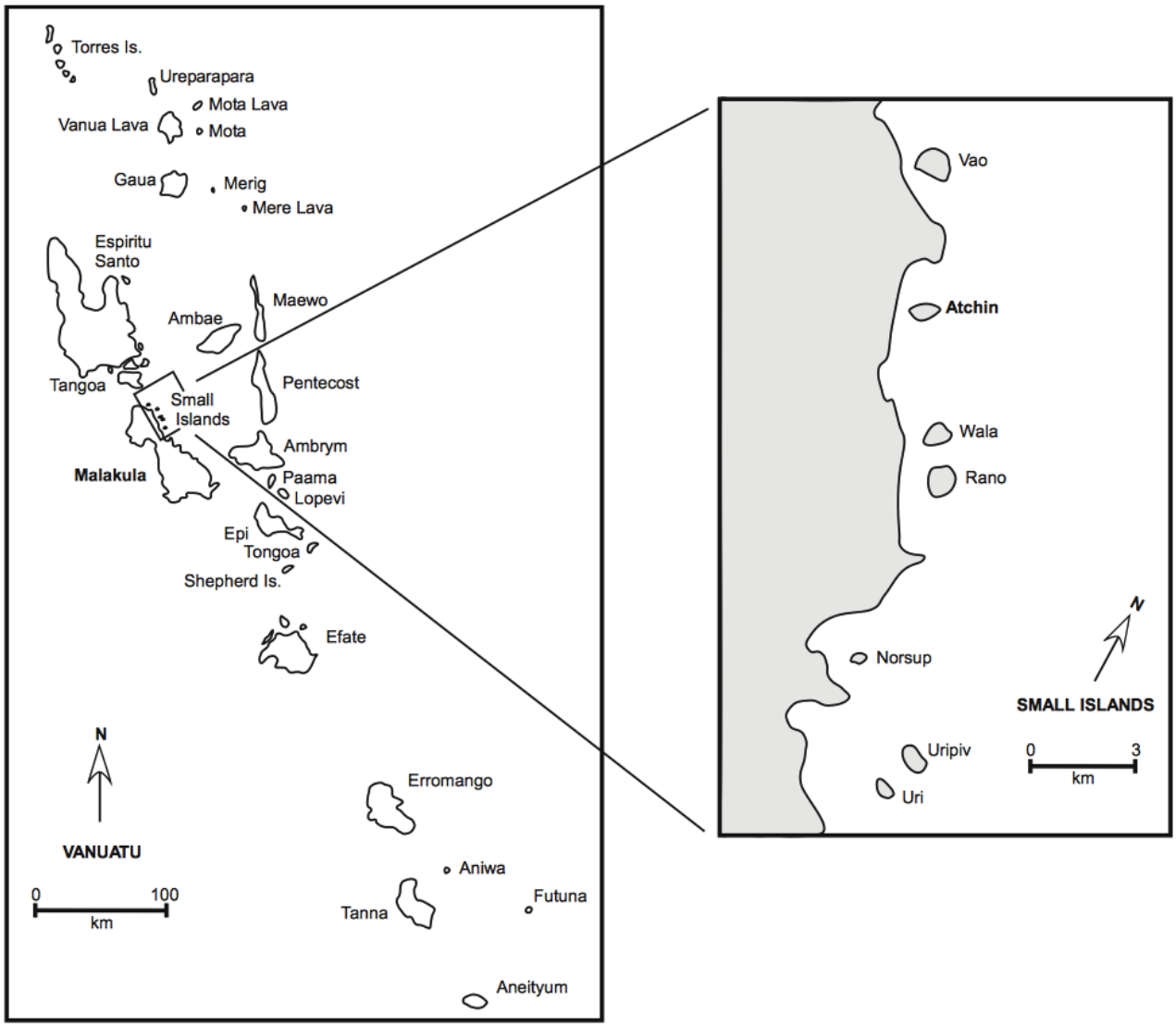

Fig. 1 – Vanuatu archipelago with the small islands off the northeast coast of Malakula (after www.worldatlas.com).
***Fig. 1** – L'archipel de Vanuatu avec les petites îles au large de la côte nord-est de Malakula (d'après www.worldatlas.com).*

languages and while still an undergraduate, he joined an anthropological discussion group where he encountered W. H. R. Rivers and A. C. Haddon, two important figures in the foundation of modern ethnology who encouraged him to pursue a fourth year in anthropology.

In 1914, John Willoughby Layard, with W. H. R. Rivers, A. C. Haddon, B. Malinowski and others journeyed to Australia to attend the BAAS (British Association for the Advancement of Science) meeting. Originally, A. C. Haddon—assisted by J. W. Layard—had planned to continue on to New Guinea to conduct an ethnographic survey, but the outbreak of war and the unavailability of the expected naval transport cancelled their plans. W. H. R. Rivers then decided to carry out an anthropological investigation in Vanuatu, accompanied by J. W. Layard. The New Hebrides Resident Commissioner suggested that they work along the north coast of Malekula. "The native culture was there to be found in its purest state" (Langham, 1975, p. 237). As noted by H. Geismar (Geismar, 2006, p. 528), J. W. Layard and W. H. R. Rivers were also "attracted to Malakula after their encounter with the monumental collections made by Swiss ethnologist Felix Speiser, who [had] travelled through the archipelago in 1910–1912". J. W. Layard himself wrote:

> The natives' memories are also kept green by the numerous megalithic monuments which form their most striking memorial. It was the then barely known existence of such monuments, first published by Speiser (1913) that attracted the late Dr. W. H. R. Rivers and myself to Malekula. These monuments, which include dolmens, monoliths, stone-platforms, cairns, and circles, primarily and to this day still associated with mortuary ritual, reach their highest development in connection with the great sacrificial rite called Maki, the name given in these islands to a socio-religious hierarchy corresponding to the Mangke of the Big Nambas, based on identification with the ancestors and with a mythical hawk (Layard, 1936).

Upon disembarking on Atchin, the ambiance was tense. H. Geismar (Geismar, 2009, p. 208) noted that "the Atchin community had recently had a violent altercation with a despotic Irish trader" (see Layard, 2008;[3] Monnier, 1991; Geismar, 2009). Previous violence between locals and foreign traders had resulted in punitive visits by the navy, to devastating effect. In his auto-biography, J. W. Layard describes how the two anthropologists based themselves upon their arrival in an abandoned Roman Catholic Mission and how they were, at first, scrupulously avoided by local people (Layard, 2010). After a few days, W. H. R. Rivers left for Tangoa, a small island south of Santo, while J. W. Layard remained on Atchin for the best part of a year, traveling briefly to the neighboring islands of Vao, Oba (now Ambae), and to South-West Bay on Malekula (Langham, 1975, p. 237). J. W. Layard (along with B. Malinowski working in the Trobriand Islands at the same time), thus became a pioneer of long term fieldwork, collected detailed and accurate early ethnological data about customary life in Vanuatu as attested by his important *Stone men of Malekula*, a monograph on Vao based on only a few weeks of fieldwork. Originally this volume should have been followed by three others on Atchin, Wala and Rano, as well as the remaining 'Small Islands' of Uripiv, Uri and Norsup (Huffman, 2010, p. 211).

John Willoughby Layard's fieldnotes and unpublished manuscripts are held in the Mandeville Special Collections Library, University of California at San Diego (MSS 84; see http://libraries.ucsd.edu/speccoll/testing/html/mss0084.html#abstract for more details). He donated his collection of artifacts and photographs [4] to the Cambridge Museum of Archaeology and Anthropology.

Among these documents, the one entitled "Canoes" contains a list of the names of the winds, a tale of a disastrous sailing expedition to Pentecost, a technical description of two types of canoes (coastal and sea-going), an ethnographic analysis of rites accompanying the manufacture of a long distance-canoe, as well as two drawings of canoes. These documents[5] are not field notes, but a chapter for a monograph on Atchin in preparation. He noted in *Stone men of Malekula* (Layard, 1942) that his brief descriptions of canoes would be much more detailed in his forthcoming Atchin volume.

DESCRIPTION AND USAGE OF SEA-GOING AND COASTAL CANOES AFTER J. W. LAYARD

Shortly after J. W. Layard's arrival on Atchin, the "inauguration rite for a canoe" occasioned by the purchase of a European whale boat by the village of Emil Parav, incited him "to enquire into the making of a real canoe" (UCSD, MSS 84, Box 48, folder 13). It is reasonable to hypothesize that he took such an interest in canoes because he was a student of A. C. Haddon, who would become the grand specialist on Pacific canoes. But since the construction of the large sea-going canoes had ceased, J. W. Layard had a "trustworthy native who had often sailed in them" build a model of one (UCSD, MSS 84, Box 48, folder 13; Geismar and Herle, 2010, p. 84, photo no. 98790). This finely made model sea-going canoe possesses all features characteristic of the type: sewn on wash-strakes, fore and aft symmetry with a 'bow' piece and figure-head at each end, outrigger booms placed together amidships, platforms on the outrigger booms on both sides of the hull (fig. 2). A departure from the original is the material of the sail, made from the fibrous bases of coconut petioles rather than woven pandanus mats. This

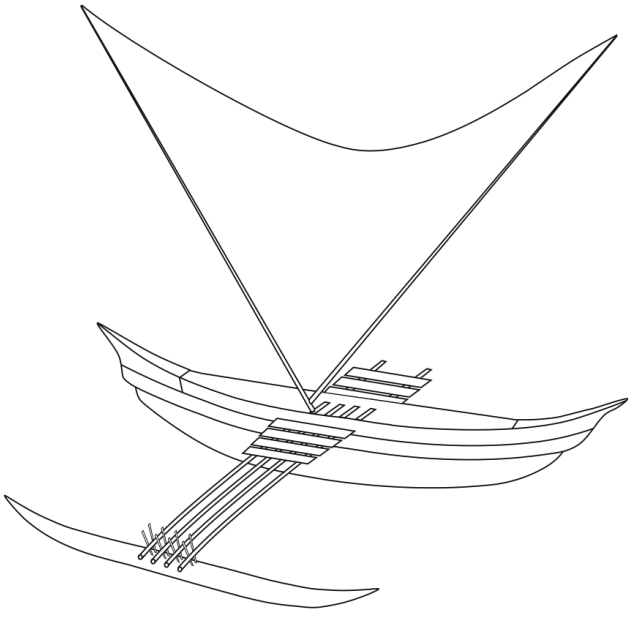

Fig. 2 – Sketch of a model sea-going canoe from Atchin based on a photograph by J. Layard.
***Fig. 2** – Dessin d'une maquette de pirogue de haute mer d'après une photographie de J. Layard.*

model appears to have been decorated for the consecration ritual presumably connected with its manufacture, presentation or offering. It is decorated with pandanus leaf pennants tied to the spars, and with *Cycas* fronds at their tips and on the figure heads at both bows.

According to J. W. Layard:

> …There are two kinds of canoes in the small islands: (i) The ordinary coastal canoe in everyday use, for crossing over to the mainland [Malekula], and short journeys up and down the coast, and (ii) the large sea-going canoes for use in trading and ceremonial expeditions to Santo, Oba, Ambrim and other islands within a radius of about eighty miles. These have now gone out of use, and white man's whale boats are used instead. The main function of long-distance canoes is trade in pigs, the sacrificial animals without which no rite can be performed. This takes them chiefly to the islands of Pentecost and Ambrim, though other islands may of course be visited. They are also war canoes in this sense only that the fighting is occasioned almost exclusively by the trade in pigs. The fighting tendency is well brought out by the sham marauding scenes enacted on the maiden trip.
>
> The outstanding difference in construction between the two kinds of canoe lies not so much in their size, as in the arrangement of the outrigger booms.
>
> i) The coastal canoe has three booms, the two after booms being close together and at some distance from the fore boom.
>
> ii) The sea-going canoe is double ended and has four booms equi-distant and close together amidships. The sea-going canoe also has two tiers of wash-strakes as opposed to the coastal canoe which has at most one but usually none at all…The sail is symmetrical in plan and V-shaped (the angle of the V being rather less than a right angle) with concave upper side… (UCSD, MSS 84, Box 48, folder 13). Whereas the coastal canoes have only one bow and can therefore be paddled or sailed in only one direction, these sea-going canoes have bows at either end, so that they can sail either way (MSS 84, box 31, folder 6).

As can be seen, J. W. Layard's data is descriptive. He does not use these canoes as evidence for tracing migration patterns, evolution or diffusion; notions that he had probably been taught at Cambridge; A. C. Haddon and W. H. R. Rivers being both advocates of cultural diffusion. At the time, the anthropological discipline was understood as an evolutionary and/or historical reconstruction of the migrations of people based on a comparative analysis and distribution of physical types, languages, material culture and customs (Geismar and Herle, 2010, p. 76–77). For Haddon,[6] the distribution and evolution of canoe and rig types throughout Oceania was to be correlated to historical movements of people. A. C. Haddon, in collaboration with James Hornell, a fisheries specialist, published the classic work *Canoes of Oceania* in three volumes between 1936 and 1938. It is still the basic reference today. In volume II, in the "New Hebrides" chapter, the data on Atchin come from the catalog prepared by J. W. Layard for the Cambridge Museum "to describe the models he gave to the museum and supplemented by numerous photographs" (Haddon, 1937, p. 27–32). The catalogue was apparently extracted from his unpublished monograph for the building and inauguration rites of sea-going canoes.

Haddon stated that "The [Atchin] sail is a simple kind of Oceanic spritsail similar to that which was formerly used in New Zealand" (Haddon, 1937, p. 30), and in their conclusion that "…there can be no doubt that when the proto-Polynesians entered the Polynesian area from Micronesia, probably soon after the beginning of the Christian era, their vessels were rigged with simple triangular spritsails" (Haddon and Hornell, 1938, p. 55). Haddon and Hornell appear thus to consider the Atchin sail as a relic of a proto-Polynesian Oceanic spritsail.

BUILDING A SEA-GOING CANOE

Following John Willoughby Layard's description, the procedure of building a canoe may conveniently be divided into four parts:[7]

– Work done on mainland Malakula: whence suitable trees are found upon the mainland, the ground is cleared, communion rites and calling upon the ancestors of the village and in particular of the owners of the ground on which the tree is felled are held. Bark and branches are removed, the preliminary hollowing of the log begins, the ends of the dug-out both fore and aft are undercut. These works are done by the five Atchin villages in rotation.

– Transporting the rough dug-out to the small island: a communion rite is held, the owners praying to their ancestors that the removal may prove easy and successful. A feast of pudding, coconuts and bananas preceded the beginning of the work, each visiting party hauling at the rope in turn, singing specific songs. On arrival at the shore of Atchin, a prized pig is killed by the chief canoe owner as well as other pigs. These are presented to the workers. Dances are accomplished, yams are aligned for all half-villages who have labored and mats are presented to each individual worker.

– Assembling the parts of the canoe: the dug-out is left for about a month to dry, while the outside then the inside are further trimmed. Pigs are killed and sacrificial signals are sounded on slit gongs. The bow and stern along with the lower wash-strakes are made, tested and attached. They are followed by the outrigger booms and float. The half-finished canoe is buried in the sand to half its height in order to insure its immobility. All villages assist. The completed outrigger is attached to the canoe, the wings of a sea-gull [8] are attached to the boom insuring that "the canoe may fly like a gull before the wind" (UCSD, MSS 84, Box 48, folder 13). A leaf is also tied, "… leaves of this kind being seen to float upon the water and said to be the resting-places of these fish when on their flights" (UCSD, MSS 84, Box 48, folder 13). Yams are aligned for each of the half-villages. Each worker is

presented with a mat. Pigs are killed and sacrificial signals sounded on the gongs. The remaining work on the canoe is presumably done by men of the home village and includes the assemblage of the thwarts, the main upper wash-strakes, the fore and after upper wash-strakes, the outrigger platforms, the main figure-heads, the fore and after platforms, the bow and stern strakes with their subsidiary figure-heads. Yams, mats, sacrificial signals and pigs accompany all occasions.

– The inauguration rite after the purchase of a whale boat: the day before the inauguration rite the strips of matting plaited by the women are sewn together by the old men to complete and set up the sail in the dancing ground. Yams are aligned for each half-village, two pigs are killed and puddings of pounded breadfruit and banana are cooked. To make the ceremony more magnificent than ever, a scraggy bullock, taking the place of a full circle-tusker, was sacrificed. Dances and killing of pigs and the bullock are executed on appointed nights following the rotation of the villages. On each of these appointed nights, yams and mats are presented to the guests and two more pigs are killed in honor of the two halves of the dancing village.

As stressed already by Nancy Munn, in her paper on Gawan canoes of the Massim, building canoes is not simply a technological procedure, but involves "developmental symbolic processes that transform both socially significant properties or operational capacities of objects, and significant aspects of the relation between persons and objects, between the human and the material worlds" (Munn, 1977, p. 39). Canoes are given a "soul through identification with the chief sacrificial tusker whose title is assumes. Since the owner, i.e. the sacrifice, himself takes the same title, it is clear that this rite is in fact another form of Maki [grade taking ceremony], in which not only the man, but also the canoe, takes on the rank of the sacrificed boar, and the two are, in this respect, identical" (Layard, 1942, p. 469).

ATCHIN CANOES IN A LARGER PERSPECTIVE

Let us now consider the data collected by John Willoughby Layard in a larger perspective, that of the distribution of canoe types and rigs in the Pacific. To understand just how unusual are the canoes of central and northern Vanuatu,[9] sometimes monodrome (tacking),[10] sometimes amphidrome (shunting),[11] one needs to review the major types of sail rigs that existed in Oceania and their geographical distribution (Di Piazza, 2014a and 2014b).

In the west, in island Melanesia, Western Polynesia (although see discussion about Samoa and Tonga below) and Micronesia, the prevailing canoe type is the shunting single outrigger with an Oceanic lateen sail. This rig is characterized by a triangular sail with its apex stepped at the bow of the hull. It uses three spars, a yard, a boom and a movable mast raked towards the bow. The entire rig will be shifted to the other end of the hull during each shunt. In the East, in Eastern Polynesia (as well as in Samoa and maybe Tonga) [12] tacking canoes carry Oceanic spritsails. This rig also uses a triangular sail, but attached between two spars, a sprit and a functional mast positioned at the forward end of the canoe but well back from the bow. Samoa lies at the frontier between these two traditions. It is the only archipelago where the eastern and western rig co-existed with their respective maneuvers. Indeed this archipelago appears to be where the tacking Oceanic spritsail was innovated and from where it spread to East Polynesia, as argued elsewhere (Di Piazza, 2014).

There are a few exceptions to the distribution of these eastern and western traditions. On the Polynesian outliers of Tikopia and Anuta within Melanesia tacking canoes use Oceanic spritsails (Feinberg and George, 2008), that is a sail and a maneuver from the East. On the east coast of New Caledonia, Ouvea in the Loyalties and on the Belep islands to the north, there are shunting canoes with Oceanic spritsails (Haddon and Hornell, 1975) that is a sail from the East and a maneuver from the West. On Tonga and the Niua group, there was a type of large double canoe, the *tongiaki*, rigged with an Oceanic lateen that came about by tacking (Haddon and Hornell, 1975). Thus it used a western sail and an eastern maneuver. As in Samoa, they probably also had small tacking outriggers with Oceanic spritsails.

Atchin canoes have the particularity of using a Polynesian sail rig such that it can use maneuvers, shunting and tacking. To the knowledge of the author, this rig is the only one that allows such freedom of utilization, incorporating the advantages of both methods. The Atchin rig seems to have simplified the shunting maneuver. Rather than carry the tack from one end to the other, the boom swings around the mast and the mast foot is shifted forward slightly along a longitudinal bar or moved from closely spaced crossbeam to another. In some cases, the rig may simply be inclined forward, leaving the position of the mast foot unchanged. In the case of small (often one-man) canoes, in gentle conditions, even this simplified shunting procedure may be dispensed with and they come about by tacking. Sailing with the outrigger float to leeward where it may be forced under water by an unexpected gust of wind is always risky. If this risk is acceptable in good weather when conditions are conducive to re-righting the small canoes, it would not be the case with the much heavier sea-going canoes.

THE ATCHIN CANOE: A POLYNESIAN/MICRONESIAN HYBRID IN A MELANESIAN WORLD

Stuart Bedford and Matthew Spriggs (Bedford and Spriggs, 2008) discussed Northern Vanuatu as a

Pacific crossroads. They reviewed inter-archipelagic interactions between northern Vanuatu and the southern Solomon Islands, northern New Caledonia, Fiji and western Polynesia from the initial human colonization some 3000 years ago up to the present. About Polynesia, they concluded that:

> Northern Vanuatu is thus currently rather a void in the story of Polynesian influence on island Melanesian societies. It may be that Polynesian influences have been masked or replaced by recent sociopolitical developments and cultural practices associated with the spread of the grade-taking political system throughout northern Vanuatu (Bonnemaison, 1996, p. 200–216)… Investigation of the history of the grade-taking system and its associated material culture will help to shed light on this issue (Bedford and Spriggs, 2008, p. 100–101).

As discussed above, Atchin canoes carry a strong Polynesian signature. The geographical distribution of this canoe type suggests that the central and northern Vanuatu region may have been a node in a network including Polynesian islands, most probably the nearby Polynesian outliers, such as Tikopia or Anuta whose canoes tack through the eye of the wind and carry Oceanic spritsails.

J. W. Layard also told us that Atchin sea-going canoes are associated to the grade taking ritual (Maki) as well as gong-raising (Layard, 1928). He noted that:

> The close connection both with the Maki and with the rite of gong-raising is clear from the similarity of ceremonial pattern in all three rites [the third being the inauguration of a sea-going canoe or a whale boat]… (UCSD, MSS 84, Box 48, folder 13).

With Atchin canoes, the 'polynesianisation' of an artefact has neither been 'masked', nor 'replaced' but integrated into a grade taking socio-political system, integrated into a maritime tradition. The Atchin people have certainly borrowed a sail rig and its maneuver from the East but they also have innovated upon it. The butterfly sail is a variety of the Oceanic spritsail but the deeply hollow head and the two highly raked spars make it a unique example.[13] Atchin canoes are the sole craft designed to incorporate technological traits that render both the tacking and shunting maneuvers possible. The vocabulary related to this artefact is also particular. The Atchin terms for the spars *(a-tsem* or *tsorta)*, the stays *(nav* or *rev-rev)*, the steering paddle *(no-wosh na'ak)*, or the maneuver *(ra-tseme)*, are not shared with other Oceanic languages, which use reflexes of **fana* or * *jila*, **tuku*, **foe uli*, **sua* or **siki* or **li-iaki*.

Another architectural trait that makes the Atchin canoe a cosmopolitan vessel, binding different traditions, is the presence of two platforms, one on the outrigger (to windward) and one to leeward. The leeward platform, acting as a lever to counterbalance the weight and therefore drag of the outrigger float, is found throughout Micronesia (except Kiribati). The Atchin platform strongly resembles Micronesian platforms in that it extends far to leeward. Platforms are also present in parts of Melanesia (Fiji, Santa Cruz, Isle of Pines and the Loyalties) although they do not extend far from outboard (Haddon and Hornell, 1975; Neyret, 1974). It may be that in Melanesia the platform is mainly used as a walkway to aid carrying the tack of the lateen sail aft when shunting. While this type of balance platform is associated with the Oceanic lateen and the shunting maneuver, an analogous feature (a balance plank or narrow platform opposite the outrigger) is known from three cases of tacking canoes in Polynesia: the *tipairua* from Tahiti, the *iatolima* and *soatau* from Samoa (Haddon and Hornell, 1975). It differs from the Oceanic lateen rigged balance platform in that it supports the starboard shroud(s). It also allows crew members to counterbalance the wind forces and prevent the outrigger from being submerged. The canoes from central and northern Vanuatu appear to have incorporated borrowings from more than one region, adding complex external influences into the development of Melanesian naval architecture.

CONCLUSION

This review of J. W. Layard's typescript was intended to present unpublished documents and a type of high seas canoe that disappeared just before the arrival of J. W. Layard on Atchin in 1914, but not forgotten. In 1980, an Atchin canoe sailed nearly 1,300 miles in ten days to Papua New Guinea to participate to the Third Festival of Pacific Arts held in Port Moresby. This canoe, named Vanuatu, was 45 feet long and 15 feet across the outrigger and hull (Huffman, 2010, p. 237). In 1995, Tilley assisted to the building and launching of coastal canoes specially made for the visit of the heads of the 'Melanesian Spearhead Group' for the ninth annual meeting of the presidents of the different Melanesian countries on Wala.

> The six traditionally designed and crafted canoes were being built to carry the politicians over to Wala Island from the mainland. The canoes had to be 'correct' in every detail and conform to the dictates of kastom. The fame of Wala was at stake (Tilley, 2002, p. 22).

More than 80 years after the 'claimed' disappearance of large Atchin canoes, the master canoe builders have successfully kept part of their ancient art alive, by continuing to build and use their smaller coastal sailing canoes. This highlights the fact that more humble craft, which serve for daily routine voyages of cabotage, are now the sole vehicles for the conservation and transmission of this endangered maritime *savoir-faire*. Endangered in the sense that J. W. Layard, did indeed record the last first-hand knowledge of the great sacred canoes that were at the heart of an intricate and spiritually charged cosmos.

NOTES

(1) Since Independence, in 1979, the official spelling of 'Malekula' has become 'Malakula'. 'New Hebrides' is used when quoting or paraphrasing pre-Independence texts.

(2) Off the northeastern side of Malakula is a group of islands called the Small Islands, amongst them Vao, Atchin, Wala, Rano, Norsup, Uripiv and Uri.

(3) Layard, 2008 should read Layard, 2010.

(4) The original glass-plate negatives were donated by his son, Richard Layard to the Museum in 2003.

(5) This document is cataloged under the title "Unpublished Atchin Book : notes and drafts, 'Canoes' (includes comparative vocabulary, drawings and vocabulary for winds)" at UCSD.

(6) In 1900, A. C. Haddon originally trained as an evolutionary biologist, had been appointed the first lecturer in Ethnology at Cambridge, following his participation in the 1898 Cambridge Anthropological Expedition to the Torres Strait (Haddon 1901–1936).

(7) Whether sacrifices and feasting (killing of pigs, offering yams and mats, eating special puddings, sounding gongs) are practiced after each major event is not explicit in the text.

(8) This may be a tern (*Sterna* spp.) as there are no gulls (subfamily *Larinae*) in the Pacific.

(9) This canoe type was used on Mota in the Banks islands (Codrington, 1891), on Malekula (Somerville, 1894), on Vao (Speiser, 1996), on Tangoa, an islet off Espiritu Santo (Edge-Partington, 1898 cited by Haddon and Hornell, 1975, vol. II, p. 37), presumably on Efate (Somerville, 1894), Pentecost (Hardacre, cited by Haddon and Hornell, 1972, vol II, p. 34) and Santo (Neyret, 1974).

(10) Tacking canoes have dedicated bows and sterns and their outriggers will thus be alternatively on the windward and leeward side. Their hulls are symmetrical port and starboard. When sailing to windward, the sail swings from one side of the mast to the other as in European craft.

(11) Shunting canoes always keep the outrigger, and thus one side of the hull, to windward. When changing direction to windward, the sail is shifted from one end of the canoe to the other by pivoting the mast from forward to aft. The bow becomes the stern and vice versa. Their hulls are symmetrical fore and aft, and sometimes asymmetrical windward to leeward with fuller forms to windward.

(12) 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, p. 21 and 134).

(13) The butterfly sail resembles the Hawaiian crab claw rig in regards to its hollow head but the latter has its forward spar (or mast) vertical.

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