

Introduction

“Perhaps it will be here, at the junction of the world’s greatest ocean and the world’s greatest archipelago, that we will eventually find man’s oldest watercraft” hypothesised Rhys Jones, an eminent Australian archaeologist (Jones 1976:261).

I understand and even share his enthusiasm, as Oceania is the region where, for millennia, seafaring and boating of all kinds were an essential part of life for many communities. Man’s oldest watercraft however, is and probably will remain, elusive due to the peculiar nature of the evidence. Occasionally we uncover the most direct records from the past, but the bulk of evidence concerning boating is like a palimpsest of shadows. The oldest watercraft may not be as tangible as we would wish. In Aboriginal Australia the evidence of watercraft, beyond ethnographic records of the 18th and 19th centuries, is rather vague and the reliable chronological markers cannot yet be established.

In this article I look at some evidence of Indigenous boat use on the east coast of Australia, in the broader context of Oceania, and pose a few questions about their chronology. The oldest watercraft is a good starting point because it demonstrates the inferential and elusive nature of evidence. Oceania includes part of the Old World – Southeast Asia – to which *Homo erectus*, an early human, arrived about 1.7 million years ago. It looks as though nothing but a relatively narrow sea channel (35-100 km wide) prevented them from moving further east, across the bio-geographical boundary that separates Southeast Asia from the landmass of Australia and New Guinea. The prerequisite for subsequently populating the eastern parts of Oceania was, it is assumed, watercraft capable of about 100 km, or longer, sea journeys (Chappell 1993; Bowdler 1995, Allen and O’Connell 2008). The current evidence suggests such journeys from Sunda, (what is now Southeast Asia) to Sahul, (Australia and New Guinea) across the Weber/Wallace Line, or rather human ‘settlement’ in this border zone, became possible about 44,000-50,000 years ago. However we don’t know how these early boats were constructed or what materials were used. We don’t even know for certain at which geographical points these crossings took place (see Allen and O’Connell 2008).

While there are some actual boats and their graphic representation in an archaeological context in Oceania (Lape *et al.* 2007), the main body of evidence for the prehistory of indigenous watercraft is circumstantial. The insular nature of our region, combined with archaeological evidence of human arrival, occupation and occasionally abandonment of different islands, provides a wealth of circumstantial evidence. Exchanging goods, sharing cultural and linguistic traits, propagating domesticated plants and animals casts light on how and when different people ventured on sea voyages and often kept contact across the sea, some distances short and some incredibly long (Bellwood and Koon 1989, Spriggs 2009).

Early anthropologists examined boats of our region and speculated about the origin of the watercraft, local communities and their links across the seas (Davidson 1935; Haddon and Hornell 1937). They plotted the technical and stylistic traits of the boats and attempted to infer how, through diffusion, they were propagated throughout the region. Their method, however, is confined to a shallow chronological perspective.

Oceania

The oldest inferred watercraft of 44,000-50,000 years ago, was sufficient to bring numerous ‘immigrants’ to Sahul, but was presumably not capable of supporting colonisation of the Pacific

¹ Presented at the “Nawi - Exploring Australia’s Indigenous Watercraft Conference” held by the Australian National Maritime Museum in Sydney on 31 May and 1 June 2012

Islands at that time. Those early settlers travelled on land and probably by coastal navigation to occupy the entire Sahul landmass in a relatively short time. By 40,000 years ago the main parts of this land were occupied and a little later Tasmania (then part of the mainland). The Solomon Islands and Buka Island, some 180km distant from the then occupied New Ireland and New Britain, were reached about 30,000 years ago. This was nearly three times the distance of the initial crossing from Sunda to Sahul. The new island communities must have retained, and in time replaced, their boats as it was vital to keep the connection with other people for the long term viability of the islands' populations. Again, we don't know how, or from what materials, these boats were made.

The situation had changed in the second millennium before the Common Era, when people sailed to distant Pacific islands. About 3,500 years ago they reached Marianas Islands, some 2,300 km of open sea from The Philippines. By about 3,000 years ago Vanuatu, Fiji and New Caledonia were colonised, with Tonga and Samoa a bit later, about 2,700-2,900 years ago. This colonising enterprise of Pacific islands was essentially tropical in character. Until the second millennium of the Common Era only islands located around or north of the 20th parallel were colonised. People had not yet ventured into the cold waters of the South Pacific at that time.

The timing of this courageous expansion correlates broadly with increasing control, manipulation and long-distance propagation of food resources, plants and animals, across the tropical belt from East Africa to western Oceania (Fuller *et al.* 2011; Bellwood 2011). These long voyages required a suitable vessel. We don't know if such a vessel had its equivalent in canoes known in the recent past. But there is a high probability that canoes of this region retained some characteristics of ancient boats, not stylistic but functional. The major functional requirement of sea-going canoes was to prevent waves washing over them. This was achieved by building an elevated and/or upturned bow and stern which helped waves to lift the boat. Keeping the sides of the boat (gunwales) high above the water was also very helpful. The chances are that a canoe of this period was a dugout fitted with an outrigger or double outrigger, as well as an elevated or upturned bow and stern. It is likely these canoes had sails rigged to allow sailing against the wind, even if such sailing in a boat without a keel is inefficient. Archaeological records show that a dugout canoe was known in the lower Yangzi River in China as early as 8,000 ago and was probably part of the standard equipment of farming communities at that time (Jiang and Liu 2005). It is probable the dugout canoe was adopted in South-East Asia together with agriculture (Rolett *et al.* 2000, Green 2000; Bellwood 2011:375).

Both historical sources and modern experiments demonstrate that dugout boats with outriggers are strong and perfectly suited to long-distance ocean journeys. They could and actually did allow for human contact and communication between Southeast Asia and Melanesia to the north and the Australian mainland to the south. But the long distance voyages that resulted in populating all major and many small Pacific islands required more than a suitable boat. They required organisational means, food supplies and skills in promulgating them, as well as reasons to justify such complex, costly and risky adventures. In short, these long distance travels and colonising efforts appear to be a product of agrarian civilisation (Spriggs 2009; Bellwood 2011).

Australia

Australia was never truly isolated from other regions of Oceania, but from the mid-Holocene it became more peripheral to the profound cultural changes and accelerating maritime activity that swept through the tropical regions of the Old World and resulted in the spectacular venture of colonising the entire Pacific (Bowdler 1993:133-134). The presence of non-native cultivates such as bananas, taro and yams in north Australia, indicates incipient experimentation with horticulture through the Holocene (Yen 1995; Denham *et al.* 2009). It suggests that northern Australia, like its Melanesian and south-east Asian neighbours, was on a similar trajectory towards the mode of living where crop cultivation was to become a central part of subsistence (White and O'Connell 1982; Yen 1995).

The dynamics of this experimentation probably changed when, due to post-glacial sea level rise, completed about 7,000 years ago, Australia and New Guinea were separated. Sunda was transformed into insular Southeast Asia which was to adopt the agriculture of the Neolithic type, marked by the introduction of rice cultivation about 4,000 years ago (Higham *et al.* 2011). New Guinea was consolidating its old, home-grown form of horticulture. Australia was left on the margin of such momentous changes. It is likely for a combination of cultural, social and environmental reasons that Indigenous Australians did not fully embrace plant cultivation. However it was probably at this point that the apparent dichotomy between food producers in Southeast Asia and Melanesia on one hand, and the foragers in Australia on the other, began to amplify (O'Connell and Allen 1995). As a result indigenous Australia appears more conservative, changing in a more measured way, integrating cultural innovations into traditional systems rather than opting for a complete remake.

Northeast Australia

Northeast Australia has cultural and human affinities with Melanesia rooted in the common history of its original Sahul population. However the links were maintained and some influence felt after New Guinea and Australia were separated. Introduction of a dog (dingo) to mainland Australia about 4,000 years ago is a prominent example. It coincided with the adoption of Neolithic-type agriculture in Southeast Asia, the beginning of long distance sea travels and, by implication, the origin of the Pacific-style dugout canoes. It is likely that significant Melanesian cultural influence in northeast Queensland had its roots in this period. The strongest circumstantial evidence of this influence so far is marked by the appearance of Lapita culture in southern Melanesia and Torres Strait. About 2,500 – 2,900 years ago, the people accustomed to horticulture and equipped with long-distance sailing technology, via connection to the larger Lapita complex, landed on Australia's doorstep in Torres Strait (McNiven *et al.* 2011). The ethnographic records of the 18th and 19th century show that Cape York Aboriginal people adopted various items of Melanesian material culture, including iconic bark cloth, shell tools and fish hooks, grind-stone tool technology, the harpoon, some Melanesian-style shell ornaments, smoking pipes and drums. It is possible, in this context, that some variants of dugout canoes in Cape York had a long history, dating back to at least the first millennium before the Common Era, if not earlier. Although a variety of canoe types suggest the process of borrowing and adapting to local conditions and needs has continued, mixing elements from further afield, including Indonesia and east Melanesia (Haddon and Hornell 1937:193).

Cultural borrowing proceeded mainly from north to south (Davidson 1935). Below Cairns and above Bundaberg at the time of European contact, the typical watercraft was a bark canoe, constructed by stitching together up to three sheets of bark, such as the canoe from Archer River collected in about 1900 by Dr Roth, the first Protector of Aborigines in Queensland. This method of construction bears the mark of outside influence, but its nature is ambiguous. Different variants of such canoes are prevalent along Arnhem Land, the Gulf of Carpentaria, and along the east Queensland coast, where the Asian and Pacific influence (respectively) is most expected and visibly felt. This influence could have inspired the construction of a seaworthy canoe, even if sea travel was infrequent. These canoes were made by using indigenous materials and methods, such as bark and stitching, well embedded in the native technology. Working bark is more economical than hollowing a tree trunk for the hull. Importantly, it could be handled by a single person. The bark was moulded and stitched to form a raised bow and stern (about 75cm high) – just enough to venture to sea in calm conditions. Dr Roth observed that one-sheet bark canoes from Archer River in Queensland “took just over a day to build and this included stripping bark from the tree” (Khan 1993:25). Labour constraints in a hunter-gatherer mode of existence and its social organisation could act as strong filters for borrowing from other cultures. Diffusion never occurs in a vacuum. Queensland bark canoes of historical times may represent an old lineage of watercraft which allowed people to travel a 10 km distance to

Whitsunday Island, or a similar distance to Great Keppel Island from at least 8,000 years ago onwards (Barker 1991; Rowland 1982, 1985; 2012).

In 1898, at the Endeavour River near Cooktown, Dr Roth observed and recorded how bark was made into artefacts:

a sheet of bark was removed from the tree. ... The outer layer of the bark was picked and peeled off with a kangaroo–bone skewer. The ends ... were made ready for pleating by thinning down the thickness of the bark using sharply pointed bone skewers. The ends were then warmed over a fire. Two fine cuts were made across the inside of the bark to allow the fold to be pleated. After a second heating, the ends were now ready for pleating. A ... sharply pointed ironwood peg was pushed through the pleats to hold them in place. (Khan 1996:115)

This was not a canoe but a bark container, used for honey and water, also “babies and other objects were carried across creeks ... by being pushed along in front of a swimmer. ... Larger ones were used to carry the corpses during ... burial ceremonies” (Khan 1996:115). This and similar types of bark containers are known from different regions of Australia, and were made almost exactly the same way as the bark canoes from the coast of southeast Australia. They provide an interesting technological parallel to bark canoes and strongly suggest the well-entrenched indigenous traditions that were used for the canoes in the south, but replaced by stitching both ends in the north. It is even possible to speculate that the folded-ends (or pleated as Roth called it) technology predates the stitching-ends technique.

Southeast Australia

South of the Gold Coast in southeast Queensland, a typical coastal canoe was made from a single sheet of bark, with both ends folded in a manner similar to bark containers (described above). Folded-ends bark canoes of this region bear the characteristics of adaptation to enclosed coastal waters and are not designed to face the surf and waves. Although occasionally people would venture to the ocean while fishing (Tench 1789), sea-travel as such was not practised in southeast Australia. South of the Queensland border there are few near-shore islands that would offer coastal foragers opportunities attractive enough to undertake the risk of sea journeys. On the other hand, the littoral zone is dotted with over 130 smaller and larger coastal lakes, bays and estuaries with rich marine food resources. This fit between the boat’s design and environmental conditions, strongly points to a native, and probably quite ancient, origin of the bark canoe of this region.

If the idea of dugout or stitched-ends canoes was ever introduced to coastal communities of southeast Australia, it was not embraced. Unless there was a need or desire to travel on the sea, these canoes were not needed and economy of labour would act against such adoption. The bark canoe with folded ends can be made by one person in a matter of hours and easily within a day (David Payne personal communication 2012). Such bark canoes, well embedded in local culture and adjusted to foraging needs, could provide a strong incentive against the adoption of northern-style watercraft or their derivative. The bark canoes of coastal southeast Australia could chronologically coincide with the stabilisation and maturing process of the coastline after about 7,000 years ago (Haworth *et al.* 2004, Lewis *et al.* 2007). Formation of new coastal lakes, bays and estuaries with rich littoral resources, would induce people to re-fashion their foraging strategies and equipment in the areas that were previously inland. This process could have resulted in archaeologically visible development of the coastal economy. In addition, more frequent occurrence of wood-working tools and the appearance of ground-edge stone hatchets (Attenbrow 2003:155) would suggest technological means for producing bark canoes.

Yet people living along the southern section of the east coast were clearly not deprived of the influence from other cultures of Oceania, directly or indirectly. Sometime around 1,000 years ago the shell fish-hook, most likely inspired by the Pacific prototype, appeared along the east coast from Port Macquarie on the NSW north coast as far south as the Victorian border (Attenbrow *et al.* 1998; Attenbrow 2010). This happened just before the first humans settled in New Zealand in about 1,200-1,300 AD, indicating some form of contact between Pacific Islanders or even Maori ancestors themselves. It looks as though around this time Pacific sailors ventured to explore the cooler waters of the Tasman Sea (Anderson 2005, Spriggs 2009). This impression is reinforced by at least intermittent visits to the remote Norfolk Island commencing 700 years ago (Specht 1984; 1993, Anderson and White 2001). In 1789, on his first visit to Norfolk Island, Governor Philip Gidley King observed not only Polynesian style adzes, but also remnants of a canoe and a banana grove for good measure – all important elements of long distance seafaring in the Pacific. While Melanesian visits to Norfolk Island were more equivocal, Polynesian and Melanesian-type adzes have been found on the east coast of Australia, although always in disturbed context and they have not yet been properly researched (Thorpe in 1929).

Tasmania

Further south, Tasmania, isolated for some 10,000 years, shows no discernible cultural influence of any kind from the Pacific, or even mainland Australia in this period (Jones 1877, Porch and Allen 1995). In addition, pre-contact Tasmania displayed the most conservative cultural traits, an impression that prompted some extreme opinions, expressed by ordinary observers, as well as scholars and even Charles Darwin himself (Darwin 1839). Perhaps the word 'conservative' is not the best description, but I use it here in a purely technical sense. The first humans who settled in Australia were culturally and physically adapted to a tropical climate. When expanding and gradually filling the southern regions of Sahul, those ancestors of Tasmanians made quite significant adjustments in order to adapt to the very cold conditions of the last glacial maximum on the southernmost tip of Australia. The Holocene climatic amelioration caused the separation of Tasmania from the mainland (Porch and Allen 1995). In consequence Tasmania missed out on cultural borrowings and changes visible in the mainland, especially in northern Australia.

It is intriguing that Tasmanian canoes, made of bundles of bark or reed, with distinctly raised and pointed bows and sterns, were designed for sea travel (Jones 1976:246). Yet the common use of these canoes would hardly justify their maritime design. Tasmanians visited some offshore islands within 3 km distance (6 km distance was the extreme, relatively recent case, Bowdler 1995:949). Ethnographic observations in early colonial times allowed the reconstruction of the living strategies of Tasmanian people. They involved extensive and frequent travelling, especially along the west, south and south-east coast. These travels required crossing the river estuaries and, on occasions, visiting close offshore islands. Data collated by Jones, Bowdler and others suggest that in the mid- to late Holocene, Tasmanians would follow similar patterns. As Bowdler (1995) observed, there is quite a good fit between ethnographical data and archaeological evidence for the late Holocene of land and islands' use, and therefore it is possible to infer that Tasmanians used boats for at least a few millennia.

Use of Hunter Island (in the north-west) 2,500 years ago and, to some extent, Bruny Island (south-east) 6,000 years ago, could be taken as chronological markers. The short distance (1.5km) to Bruny Island would in theory allow swimming across the D'Entrecasteaux Channel, but the assumption of boat use is within reason. This would place the antiquity of boat use in Tasmania somewhere between 2,500 and 6,000 years ago.

The Tasmanian boats are sometime referred to as rafts (Jones 1976). But the overall design implies that this craft is actually a proper canoe (even if it is not a vessel – a large container, as all other canoes are). This canoe is ingenious in its simplicity and an almost organic concept of construction.

The central bundle of reed or coiled bark is flanked by two extra bundles to stabilise the craft (equivalent to a double outrigger) and the ends are tied and upturned to form a maritime-shaped bow and stern. The other enormous advantage is that such a canoe could be constructed by one person in a day, as was observed and recorded by Robinson, Freycinet and others in the early decades of the 19th century (Jones 1976:240-243). Ethnographic Tasmanian canoes carried 4 to 6 people and in extreme cases recorded by Robinson 7 to 8 people with “their dogs and spears” (Plomley 1966:379). Unless other evidence comes to light, it is possible to surmise that the design of these canoes, as described by Robinson and others (Plomley 1966, Jones 1976), is of considerable antiquity.

And why did Tasmanians not adopt the bark canoe of the south-east Australian type with tied ends? There may be several reasons, including the possibility that those bark canoes were devised sometime after the formation of Bass Strait, about 10,000 years ago (Porch and Allen 1995). There is certain alluring simplicity to this pattern that the part of former Sahul most distant and remote from the cultural ferment of the tropical north in the Holocene, was most conservative and deeply rooted in the old tradition.

Conclusions

In conclusion I propose a tentative chronology for the four major canoe forms of eastern Australia. Those forms seem to represent different cultural and technological traditions rather than logical evolution from one to other. Dugout canoes of Cape York could have been adopted, from the north, between the first millennium before the Common Era and the second millennium of the Common Era. However the range of Melanesian cultural borrowing and their integration to local cultures suggest that it was earlier in this period, and may even extend further to contacts with pre-Lapita people in Torres Strait. Some variants of Queensland bark canoes designed for sea journeys must predate dugout canoes, because they (or their earlier prototypes) facilitated visits to offshore islands from at least about 8,000 years ago (Rowland 2012). Bark canoes with folded ends along the coast of south east Australia seem also to be quite old, as their forms and associated technology are well entrenched in the cultural tradition of this region. It is possible that this type of canoe has its roots in the period around or after the current coastline was formed and stabilised about 7,000 years ago. Absence of any bark canoes in Tasmania could imply that south-east Australian coastal canoes would be younger than the separation of Tasmania from the mainland. And Tasmanian canoes may be considerably older, as Tasmanians were unable (or unwilling?) to borrow the idea of bark canoes from their mainland brothers.

And I would like to float the possibility that the Tasmanian-style canoe built from a reed bundle, may have had a tropical precursor where bamboo was used instead of reed, making such a canoe a formidable watercraft, unparalleled in its simplicity and durability, capable of completing a long sea journey. A canoe made of bamboo bundles, of completely different, more contemporary form and design, displayed in the Fiji Museum in Suva, gives credence to the use of bamboo for boat construction. Furthermore, a bamboo raft of unspecified design was suggested to facilitate regular contact between Taiwan and mainland China around 4,000-3,600 years ago (Rolett *et al.* 2000; Donohue and Denham 2010:238). The bamboo raft is evoked as a potential watercraft of the earliest sea travels in north-western Oceania (Horridge 2006:145; Allen and O’Connell 2008:37). Bamboo is used in the experimental replications of prehistoric seafaring (Bednarik 2002). In addition it is possible to imagine the technological evolution from a small bamboo raft to a Tasmanian-style canoe, as it would follow natural logical progression. Combining and tying single-bundle rafts together provides a short path towards the simple but robust maritime-style canoe.

If such an ancient bamboo canoe existed, it could possibly make sea journeys across the Weber/Wallace Line as well as to the Bismarck Archipelago and the Solomon Islands. Bowdler (1995) suggested the possibility that ancient tropical mariners, who first sailed to Sahul and ventured to

near Oceania, had abandoned their boats when in Australia because they may not have been suited to this new environment. A hypothetical bamboo canoe of Tasmanian design would offer an alternative explanation. These boats were abandoned in Australia because of the lack of superior raw material, replaced at some stage by native bark canoes along the east coast and eventually sturdy dugouts in the north, but possibly retained in 'conservative' Tasmania, although constructed from inferior material, severely restricting the range of their travelling (Jones 1976:246-248).

"Man's oldest watercraft" may never be physically uncovered, but Jones could be right in pointing to our region of the world. It is likely that such watercraft were conceived and eventually replaced and forgotten in north-western Oceania. However, it is possible that its concept and design have survived in the furthestmost remote outpost of Aboriginal homeland – Tasmania, as an example of "extremely ancient type" (Edwards 1965:89; Jones 1976:263).

It appears that the foragers used boats predominantly to facilitate their quest for food (e.g. dugong and turtle hunting: Thompson 1934, Mitchell 1996; fishing from canoe: Tench 1789; Hunter 1793). Their social and cultural arrangements were to keep the population stable. They observed carefully delineated homeland boundaries and followed specific protocol for crossing these boundaries. If they took new unoccupied territory, it would have been via organic and slow processes, where growth could occur by splitting and realigning the original subgroups or clans, predominantly driven by searching for food resources (Allen and O'Connell 2008). In contrast, food producers could colonise and rapidly expand, bringing their domesticated plants and animals for propagation in colonised lands. Their quest was not for food, but predominantly for land, which meant they could rapidly increase their population level. Farmers could expand "by design" via rapid colonial enterprise – as it occurred in the Pacific and is well exemplified by the Maori ancestors who settled in New Zealand (Anderson 2005), or indeed massive European colonial enterprises that commenced only a few centuries later.

ACKNOWLEDGMENTS

I wish to thank David Payne (Australian National Maritime Museum) for his inspiration and numerous conversations that help to conceive this article, Val Attenbrow (Australian Museum) for her comments and generous help in finalising the draft and Penny Dadswell-Zylstra (Australian Museum) for proof reading and editorial assistance.

BIBLIOGRAPHY

Allen, J. and J. F. O'Connell. 2008. Getting from Sunda to Sahul. In G. Clark, F. Leach and S. O'Connor (eds), *Islands of Inquiry: Colonisation, Seafaring and the Archaeology of Maritime Landscapes. Papers in Honour of Atholl Anderson*, pp: 31-46. Terra Australis 29. Canberra: ANU EPress.

Anderson, A. 2005. Subpolar settlement in south Polynesia. *Antiquity* 79 (306): 791-800.

Anderson, A. and P. White 2001. Prehistoric settlement on Norfolk Island and its oceanic context. *Records of the Australian Museum*, Supplement 27: 135–141.

Attenbrow, V. 2003. *Sydney Aboriginal Past: Investigating the archaeological and historical records*. Sydney: University of New South Wales Press.

Attenbrow, V. 2010. Aboriginal fishing on Port Jackson, and the introduction of shell fish-hooks to coastal New South Wales, Australia. In: P. Hutching, D. Lunney and D. Hochuli (eds) *The Natural History of Sydney*, pp.16-34. Mosman, NSW: Royal Zoological Society of New South Wales.

Attenbrow, V.J., R. Fullagar, and C. Szpak. 1998. Stone files and shell fish-hooks in southeastern Australia. In R. Fullagar (ed) *A Closer Look: Recent Australian Studies of Stone Tools*. Sydney University Archaeological

Methods Series 6, pp.127–48. Archaeology Computing Laboratory, School of Archaeology, University of Sydney.

Barker, B. C. 1991. Nara Inlet 1: Coastal resource use and the Holocene marine transgression in the Whitsunday Islands, central Queensland, *Archaeology in Oceania* 26: 102-9.

Bednarik, R. G. 2002. The maritime dispersal of Pleistocene humans. *Migration and Diffusion* 3 (10): 6-33.

Bellwood, P. 2011. Holocene population history in the Pacific region as a model for worldwide food producers dispersal. *Current Anthropology* 52 (4):363-378.

Bellwood, P. and P. Koon. 1989. Lapita colonists leave boats unburned: The question of Lapita links with Island Southeast Asia. *Antiquity*, 63 (240): 613–622.

Bowdler, S. 1993. Views of the past in Australian prehistory. In: M. Spriggs, D. E. Yen, W. Ambrose, R. Jones, A. Thorne and A. Andrews (eds) *A Community of Culture: The People and Prehistory of the Pacific*, pp. 123-138. Occasional Papers in Prehistory No 21, Australian National University, Canberra.

Bowdler, S. 1995. Offshore island and maritime explorations in Australian prehistory, *Antiquity*, 69 (266): 945-958.

Chappell, J. 1993. Late Pleistocene coasts and human migration in the Austral region. In: M. Spriggs, D. E. h, W. Ambrose, R. Jones, A. Thorne and A. Andrews (eds) *A Community of Culture: The People and Prehistory of the Pacific*, pp. 43-48. Occasional Papers in Prehistory No 21, Canberra: Australian National University.

Darwin, C. 1989 [1839]. *Voyage of the Beagle*. London: Penguin Books.

Davidson, D. S. 1935. The chronology of Australian watercraft, *Journal of the Polynesian Society* 44: 193-207.

Denham, T., M. Donohue and S. Booth 2009, Horticultural experimentation in northern Australia reconsidered. *Antiquity* 83 (321): 634–648.

Donohue, M. and T. Denham. 2010. Farming and language in Island Southeast Asia: Reframing Austronesian history. *Current Anthropology* 51 (2): 223-256.

Edwards, R. C. 1965. Aboriginal watercrafts on the Pacific coast of South America. *Ibero-Americana* 47.

Fuller, D.Q., N. Boivin, T. Hoogervorst, and R. Allaby. 2011. Across the Indian Ocean: the Prehistoric Movement of Plants and Animals. *Antiquity* 85 (238): 544-556.

Green, R.C. 2000. Lapita the cultural model for intrusion, integration and innovation. In: A. Anderson and T. Murray (eds) *Australian Archaeologist: Collected papers in Honour of Jim Allen*, pp. 372-392. Canberra: Coombs Academic Publishing, ANU.

Higham, C.F.W., X. Guangmao and L. Qiang. 2011. The prehistory of a Friction Zone: first farmers and hunters-gatherers in Southeast Asia. *Antiquity* 85 (328): 529-543.

Haddon, A. C. and J. Hornell 1937 *Canoes of Oceania: The canoes of Melanesia, Queensland and New Guinea*. Vol 2. Honolulu: Bishop Museum.

Haworth, R.J., R.G.V. Baker and P.J. Flood. 2004. A 6000 year-old fossil dugong from Botany Bay: inferences about changes in Sydney's climate, sea levels and waterways. *Australian Geographical Studies* 42 (1): 46–59.

- Horridge, A. 2006. The Austronesian conquest of the sea – upwind. In: P. Bellwood, J. Fox and D. Tryon (eds) *The Austronesians: Historical and comparative perspectives*, pp. 143-160. Canberra. ANU Press.
- Hunter, J. 1793 (2005). An Historical Journal of the Transactions at Port Jackson and Norfolk Island. The Project Gutenberg eBook <http://www.gutenberg.org/files/15662/15662-h/15662-h.htm> [accessed 27/05/2012]
- Jiang, L. and L. Liu. 2005. The discovery of an 8000-year-old dugout canoe at Kuahuqiao in the Lower Yangzi River, China, *Antiquity* 79 (305): <http://antiquity.ac.uk/ProjGall/liu/index.html> [accessed 27/05/2012]
- Jones, R. 1976. Tasmania: aquatic machines and off-shore islands. In G. de G. Sieveking, I. H. Longworth and K. E. Wilson (eds) *Problems in Economic and Social Archaeology*, pp. 235-263. London: Duckworth.
- Jones, R. 1977. Man as an element of a continental fauna: the case of the sundering of the Bassian bridge, In J. Allen, J. Golson and R. Jones (eds) *Sunda and Sahul: prehistoric studies in Southeast Asia, Melanesia and Australia*, pp. 317-386. London: Academic Press.
- Khan, K. 1993. Catalogue of the Roth Collection of Aboriginal Artefacts from North Queensland, Volume 1. *Technical Reports of the Australian Museum* 10.
- Khan, K. 1996. Catalogue of the Roth Collection of Aboriginal Artefacts from North Queensland, Volume 2. *Technical Reports of the Australian Museum* 12.
- Lape, P. V., S. O'Connor and N. Burningham. 2007. Rock art: A potential source of information about past maritime technology in the South-East Asia-Pacific region. *The International Journal of Nautical Archaeology*, 36 (2): 238–253.
- Lewis, S.E., R. A.J. Wüst, J.M. Webster and G.A. Shields. 2007. Mid-late Holocene sea-level variability in eastern Australia. *Terra Nova* 20 (1): 74–81.
- McNiven, I.J., B. David, T. Richards, K. Aplin, B. Asmussen, J. Mialanes, M. Leavesley, P. Faulkner and S. Ulm. 2011. New direction in human colonisation of the Pacific: Lapita settlement of south coast New Guinea. *Australian Archaeology* 72:1-6.
- Mitchell, S. 1996. Dugong and dugouts, sharp-tacks and shellbacks: Macassan contact and Aboriginal marine hunting on the Cobourg Peninsula, north western Arnhem Land. In: I. Glover and P. Bellwood (eds) *Indo-Pacific Prehistory: The Chiang Mai Papers, Vol 2*. Bulletin of the Indo-Pacific Prehistory Association 15: 181-191.
- O'Connell, J. and J. Allen. 1995. Human reaction to the Pleistocene-Holocene transition in greater Australia: A summary. *Antiquity* 69 (265): 855-862.
- Plomley, N.J.B. 1966. Friendly mission: the Tasmanian journals and papers of George Augustus Robinson, 1829 – 1834, Hobart: Tasmanian Historical Research Association.
- Porch, N. and J. Allen. 1995. Tasmania: archaeological and paleo-ecological perspectives. *Antiquity* 69 (265): 714-732.
- Rolett, B. V., W. Chen and J. M. Sinton. 2000. Taiwan, Neolithic seafaring and Austronesian origins. *Antiquity* 74 (283): 54–61.
- Rowland, M.J. 1982. Further radiocarbon dates from the Keppel Islands. *Australian Archaeology* 15: 43-48.
- Rowland, M.J. 1985. Further radiocarbon dates from Mazie Bay, North Keppel Island. *Australian Archaeology* 21: 113-118.

Rowland, M.J. 2012. Watercraft use in the Great Barrier province, Queensland. Paper presented at *Nawi – Exploring Australia’s Indigenous Watercraft Conference* at Australian National Maritime Museum, Sydney 31 May – 1 June 2012.

Specht, J., 1984. The prehistoric archaeology of Norfolk Island. *Pacific Anthropological Records* No. 34. Honolulu: Bishop Museum.

Specht, J., 1993. Additional evidence for pre-1788 visits by Pacific Islanders to Norfolk Island, southwest Pacific. *Records of the Australian Museum Supplement* 17: 145–157.

Spriggs, M. 2009. Oceanic Connections in Deep Time. *Pacificcurrents* 1 (1): 7-27.

Tench, W. 2006 (1789). A Complete Account of the Settlement at Port Jackson. The Project Gutenberg EBook <http://www.gutenberg.org/files/3534/3534-h/3534-h.htm> [accessed 27/05/2012]

Thompson, D. 1934. The dugong hunters of Cape York. *The Royal Anthropological Institute of Great Britain. Royal Anthropological Institute of Great Britain and Ireland* 64: 237–263.

Thorpe, W.W. 1929. Evidence of Polynesian culture in Australia and Norfolk Island. *Journal of the Polynesian Society* 38(2): 123-126.

White, J.P. and J.F. O’Connell. 1982. A Prehistory of Australia, New Guinea and Sahul. Sydney: Academic Press

Yen, D.E. 1995, The Development of Sahul agriculture with Australia as bystander. *Antiquity* 69 (265): 831-847.

	<p>Stitched-ends canoe from Clump Point, Cardwell, Queensland: Australian Museum E13452.</p> <p>Photo: Ric Bolzan</p>
	<p>Folded-ends canoe, Kempsey, New South Wales, made by Albert Woodlands in 1938: Australian Museum E45964.</p> <p>Photo: Stuart Humphreys</p>
	<p>19th century model of Tasmanian canoe.</p> <p>Adapted from photo by: J.W. Beattie, Hobart</p>