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UNDERSTANDING ISOLATION AND CHANGE IN ISLAND HUMAN POPULATIONS THROUGH A STUDY OF INDIGENOUS CULTURAL PATTERNS IN THE GULF OF CARPENTARIA

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Abstract

This paper presents a set of hypotheses to explain the cultural differences between Aboriginal people of the North and South Wellesley Islands, Gulf of Carpentaria and to characterise the relative degree and nature of their isolation and cultural change over a 10,000-year time-scale. This opportunity to study parallelisms and divergences in the cultural and demographic histories of fisher-hunter-gatherers arises from the comparison of three distinct cultural groupings: (a) the Ganggalida of the mainland, (b) the Lardil and Yangkaal of the North Wellesley Islands, and (c) the Kaiadilt of the South Wellesley Islands. Despite occupying similar island environments and despite their languages being as closely related as for example, the West Germanic languages, there are some major differences in cultural, economic and social organization as well as striking genetic differences between the North and South Wellesley populations. This paper synthesizes data from linguistics, anthropology, archaeology, genetics and environmental science to present hypotheses of how these intriguing differences were generated, and what we might learn about early processes of marine colonization and cultural change from the Wellesley situation.

Keywords: Australian Aboriginal prehistory, comparative anthropology, cultural change, Ganggalida, island archaeology, island populations, Kaiadilt, Lardil, Wellesley Islands, Yangkaal

Introduction

This paper presents a set of hypotheses to explain well-described cultural differences between Aboriginal people of the North and South Wellesley Islands in the Gulf of Carpentaria in terms of shifts in the relative degree of their isolation and cultural divergence over a 10,000-year time-scale. These two clusters of islands present separate cultural-geographic contexts, facilitating high-resolution studies of cultural diffusion from a larger-scale mainland cultural complex to geographically-removed island cultures. In a broader theoretical framework, this case study contributes to continuing debate concerning the ways in which cultural reproduction occurs through processes of diffusion and cultural adaptation or rejection of outside influences.

This opportunity to study parallels and divergences in the trajectory of linguistic, cultural and genetic histories by groups of fisher-hunter-gatherers arises from the comparison of three distinct cultural groupings: (a) the Ganggalida of the mainland, (b) the Lardil and Yangkaal of the North Wellesley Islands, and (c) the Kaiadilt of the South Wellesley Islands (Fig. 1). Despite occupying similar island environments and despite their languages being as closely related as, for example, the West Germanic languages, there are some major differences in cultural, economic and social organization as well as striking genetic differences between the North and South Wellesley populations. This paper synthesizes data from linguistics, anthropology, archaeology, genetics and environmental science to present hypotheses of how these intriguing differences were generated, and what we can learn about early processes of marine colonization and cultural change from the Wellesley situation.

For some time archaeologists have recognized that evidence concerning the Aboriginal occupation of offshore islands offers intriguing possibilities for better understanding the critical biogeographical and cultural factors necessary for successful and enduring colonisation (eg Jones 1977). Some islands, such as Tasmania, have populations with a long and successful history of isolation. Others, such as Kangaroo Island, had no Aboriginal population at the time of European settlement but were occupied in the remote past, in Kangaroo Island's case for over 10,000 years following insulation (O'Connor 1992). Still others again, such as the western islands of Torres Strait, were abandoned shortly after insulation, only to be re-occupied in the last few millennia

(David *et al.* 2004). Koolan Island off the Kimberley coastline in north-western Australia has evidence for occupation from about 28,000 years ago, prior to the last glacial maximum (LGM), then a period of abandonment during the LGM, followed by re-colonisation from 10,500 years ago (O'Connor 1999). Others, particularly along the Queensland coast, have evidence of initial occupation ranging from the early to the late Holocene (Robins 1984; Barker 1991; McNiven 1991; Hall 1999; Ulm *et al.* 1995). There is also a gradation in the degree of isolation between islands and the mainland. The Tasmanians and the Tiwi of Bathurst and Melville Islands appeared to have had no contact with the mainland. The Keppel Islanders off the central Queensland coast had limited contact with mainlanders and were physically, culturally and linguistically distinct from them (Rowland 1999). Other islanders, such as those from the sand islands of Moreton Bay and from Fraser Island, had almost continual contact with the mainland.

David *et al.* (2004:74) argue there were "systematic territorial and sea-based expansions across much of northeastern Australia during the mid-Holocene", a development some scholars tie to wider processes of socioeconomic intensification during the last 5,000 years (eg Lourandos 1997). However, in a synthesizing paper that attempted to identify consistent patterns in the Aboriginal occupation of Australian offshore islands, Bowdler (1995: 956) concluded that:

The currently perceived pattern of mid- to late-Holocene island usage suggests that human behaviour is not necessarily explicable in terms of models derived from either common sense, or the behaviour of other animal species. There appears to be no relationship between the time of occupation of an island and its distance from the mainland, its relationship to other islands, the area of the island, or any combination of these. The most obvious cultural corollary to island exploitation is the presence of watercraft and an orientation towards marine resource exploitation by the source population on the adjacent mainland.

Our view is that generalizations such as Bowdler's and David *et al.*'s are hampered by a lack of detailed archaeological and ethnographic information about many of the islands in question. Island studies around the continent are producing useful and interesting results which are beginning to remedy this situation (eg O'Connor 1992, 1999; Veth 1999; Veth *et al.* 2000), but the South Wellesley Islands have not seen any extensive archaeological investigation even though they have an iconic status in Australian debates about the nature of island occupation and insularity owing to Norman Tindale's pioneering anthropological studies with the Kaiadilt, as detailed below.

The island setting of the two cultural groupings

The Wellesley Islands, some 15 in number, are located in the southern Gulf of Carpentaria. The largest, Mornington, is 65 km long and 7 to 26 km wide. Along with various smaller surrounding islands, it is home to the Lardil people. It is linked to the mainland by a number of smaller 'stepping-stone' islands. These intervening islands, home to the Yangkaal people, approach the mainland at Bayley Point. There is clear visibility between these islands at all seasons, with easy crossings (max 3.5 km of open sea) even in the days of traditional transport by timber rafts (*walbu* in Lardil, *walbu* in Yangkaal), made by lashing together buoyant logs with hibiscus rope.

Figure 1. Wellesley Islands and the mainland coast showing the territories of the four Aboriginal study groups.

East from Bayley Point lies a second group of islands, the South Wellesleys, dominated by the largest island, Bentinck, and home to the Kaiadilt people. The sea gap between the mainland and the South Wellesleys is more substantial than for the North Wellesleys, and presented enough challenges to traditional raft watercraft (*walbu* in Kaiadilt) that the voyage to and from the South Wellesleys was not undertaken lightly. However, oral accounts by those born in traditional times (pre-1945) suggest that some individuals would have undertaken the return voyage across a 10.5 km stretch of open sea up to three or four times in the course of a lifetime (Evans 2005). Visibility between Bentinck Island and the mainland is confined to favourable locations and weather conditions, though columns of bushfire smoke were readily visible when groups carried out seasonal burning. Along this journey route and situated close to the mainland lies Allen Island, jointly owned by the Kaiadilt, Yangkaal and the mainlanders (Ganggalida/Yukulta). A clear effect of contemporary geography and watercraft limitations is that the North Wellesleys were in relatively frequent contact with the mainland, while contacts between the South Wellesleys and the mainland were less common.ⁱⁱ

All islands in the region are low-lying, and are at the semi-arid margin of the monsoonal tropics. All resident groups designate the marine environment as distinctive from inland areas. For example the Lardil people of Mornington Island classify their land and seas into two categories, 'inside country' and 'outside country' (Memmott 1983: 34). The 'inside country' consists of what can be termed the interior land systems, consisting of tussock grasslands, open low eucalypt woodlands and scrublands. This landscape is distinct from the relatively more recently formed coastal land systems, which are known among the Lardil people as 'outside country'. The coastal areas are made up of tidal flats, sand-based cheniers and beach ridges, and interspersed cliffs, boulder beaches, offshore wave-cut platforms and reefs. It is in the outside country that the most intense geographic naming and boundary-making occurs, reflecting the concentration of food and freshwater resources, sacred sites and campsites.

As a result, the economy of all Wellesley Island groups is adapted to beach and strand fishing, augmented by the hunting of turtle and dugong in the shallow waters and small shoals and islands. It reaches some distance out to sea. Indeed, so rich are these resources that Tindale suggested

(1977:249) the population density in the South Wellesleys to be "one of the highest known for a living stone tool-using people depending on foraging for their existence".

Environmental historyⁱⁱⁱ

The Wellesley Island region has seen substantial changes to its coastline since 10,000 years ago when the now Gulf of Carpentaria was merely a large inland lake (Lake Carpentaria), cut off from the Arafura Sea and Torres Strait by low-lying savanna, and occupying only half the area of the current Gulf. At that time the Wellesley Islands would have been low hills in dry country, a couple of hundred kilometres inland. Rapidly rising seas in the early Holocene breached first the Arafura land corridor (around 8.5 ka), then the Torres Strait (by around 6 ka), converting Lake Carpentaria (see Fig. 2) and its surrounds into a shallow Gulf. At the peak relative sea level, around 5.3 ka the Wellesleys would have been partially submerged, and substantially further from the mainland than at present. The subsequent fall in sea level would have restored them to their current offshore-island status from around four millennia ago.

These sea-level changes suggest to us a three-phase working scenario in which,

- (a) the terminal Pleistocene inhabitants of the area would have originally adapted to inland riverine living as the area would have been within the semi-arid zone in the last glacial (Lambeck & Chappell 2001);
- (b) after the last glacial maximum, rising seas passed through today's levels about 7,000 ka and continued to rise until about 5,300 ka then fall perhaps 1.7 m between 5,000 and 3,400 ka; the Wellesleys Islands, so created were well-offshore, but would still have potential for occupation during the mid-Holocene;^{iv} and
- (c) following a reduction of the relative sea-level over the last few millennia, the Wellesleys would have increased slightly in surface area, with some additional smaller islands providing potential opportunities for recolonization from the mainland.

Figure 2. The typical fish trap of the Wellesley Islands with a single-wall and layout adjusted to substrate contour; located outside a fringe of mangroves, Allen Island (Photo by Connah & Jones of the University of New England 12/5/82.)

If we view these changes from the perspectives of people living in the region through those ten millennia, they suggest a movement of riverine and littoral-adapted peoples from an original coastal habitat (phase a) at a couple of hundred kilometres to the north, on the southern shores of the (then) Lake Carpentaria, to places either south of the current coastline or on the emergent islands (phase b), moving northward again and in some cases out to the islands in phase (c). Unfortunately, a dearth of relevant archaeological data means we have no substantial material corroboration of, or dates for, the above sequence, which is simply inferred from the environmental history.

The following critique of ideas about the Wellesley Islands and the timing of physical isolation and human responses will identify the areas with potential, using a number of cross-linking strands of genetic, linguistic, anthropological, archaeological and environmental research. Each strand is seen as having individual significance but they also are being deliberately integrated within an ongoing research programme to provide synergistic outcomes. Although common in the Pacific (eg Kirch 2000), integrated approaches such as this are still rare in Australia (though see McConnell & Evans 1997 for a valuable initial foray).

The relative isolation of the island groups from one another gives us a chance, unusual in the Australian setting, to observe largely independent historical developments in groups sharing a common ancestry. This makes it easier to distinguish the inherited from the diffused than is the case in most other parts of south Sahul. Because movement into the islands almost certainly proceeded by colonization by people who were littoral/riverine dwellers exploiting the inner seas rather than

ocean-goers making long voyages, it is a helpful point from which to think about earlier population movements around northern Sahul (Evans 2002, 2005).

Previous arguments about Wellesley Islands occupation and isolation

The Kaiadilt were studied by the anthropologist Norman Tindale and colleagues from the South Australian Museum in the early 1960s. Tindale came to regard the Kaiadilt as a relict population which had remained *in situ*, but isolated, since the mid-Holocene, maintaining watercraft technology and littoral exploitation strategies that had not changed substantially since the first human colonization of Australia:

A possibility exists that the Kaiadilt are descendants of a very old people who occupied a niche along the unattractive shores of the Sahul Shelf as far back as the later stages of the last glaciation and found refuge on their island by retreating south as the gradual filling of the Gulf of Carpentaria proceeded during the Flandrian events between 10,000 and 6000 years ago. (Tindale 1977: 254.)

This investigation resulted in a range of influential papers on the significance of this group to the study of the microevolution of human populations, using genetic, cultural and other data (Curtain *et al.* 1966; Tindale 1962a,b, 1977; Simmons *et al.* 1962, 1964). Tindale's data and arguments, for instance, figure prominently in discussions about Aboriginal isolation and colonisation (eg in Jones 1979; Kirk 1981; Birdsell 1993; Bowdler 1995; Flood 1996; White 1997). Tindale's own statements about the Kaiadilt became increasingly extreme over time and culminated in the statement that the Kaiadilt may well compare with the Wadjak people of Pleistocene Java, of whom, he thought, may be relict survivors (Tindale 1981: 1795). Tindale's case for acute isolation was based on eight lines of evidence, most resulting from a comparison with the Lardil of Mornington Island and, indirectly, with the Ganggalida of the mainland coast. His first two (and seemingly most persuasive) pieces of evidence were the distinctive physical characteristics and the blood type of the Kaiadilt; the remaining evidence was largely cultural in its nature, and comprised the distinct Kaiadilt language, their distinct territorial organisation, their lack of a sub-section system, their unique male initiation rituals, their unique, impoverished material culture and their raft travel.

Preliminary analysis of these arguments by some of the current authors (Memmott 1982; Evans 2002, 2005), has revealed, however, that many are not well founded, as the following examples will show.

The genetic evidence

The most persuasive argument of Tindale and his colleagues during the 1960s and 70s was the evidence concerning differences in genetic markers between the Kaiadilt and the other Aboriginal groups. However, a more recent review of the genetic evidence (White 1997; Evans 2002) confirms that whereas the Kaiadilt are an aberrant population genetically, it is now a naive interpretation of these data to place the group as the earliest branching-off from the wider Australian population, as in Tindale's 1977 model. With very small population sizes, the increased contribution of founder effects and genetic drift implies that trees constructed to show genetic distance cannot be taken as direct reflections of phylogeny. A small founding population (of, say, a dozen) would inevitably contain a skewed selection of genes from the original coastal population, and in a small population never exceeding about 150 (particularly given extended polygamy resulting in some men having 15 wives) there is ample scope for drift. This means that the genetic differences are also compatible with the proposition of recent settlement of the South Wellesleys by a small founding population.

The linguistic perspective

The study area incorporates four languages: Lardil, Yangkaal, Ganggalida (or Yukulta) and Kayardild (the language of the Kaiadilt group). Their linguistic classification has been progressively refined by O'Grady *et al.* (1966), Keen (1983) and Evans (1985, 1995), who group them together as the Tangkic languages (*tangka* means person in all four languages). These authors have shown the extent and nature of the diversification of these languages based on the assumption that they derived from a common language, which has been termed 'Proto-Tangkic'.

Figure 3. Map of southern end of Sweers Island in the vicinity of inspection Hill and MacDonald Point showing environmental units with Aboriginal geography and the location of two fish trap sites at Ngathald and Kabbar. Note the use of party walls and undulating walls in the trap designs. (Source: Map of Ringurrung by Paul Memmott 1982 made with Darwin Moodoonathi and Arthur Paul.)

The internal classification of the Tangkic languages^{vi} is relevant to building a broad chronology of the separation and divergence of the individual languages and to assessing the staging of colonization into the Wellesley Islands. Evans argues (1985, 1995) that the Lardil language diverged first from the original Proto-Tangkic language and has undergone the most drastic changes: Yangkaal and Kayardild separated later from Ganggalida in a similar way and remain as two dialects of one language. Ganggalida remained the most conservative language, retaining the most attributes of Proto-Tangkic. It is thus the 'odd one out', but relates more closely to Kayardild than Lardil. The fact that the Yangkaal people were never isolated and their language developed in a similar way to Kayardild suggests that isolation is not a key determinant factor in understanding processes of change and/or cultural retention amongst the Kaiadilt people. Preliminary taxonomic and phylogenetic analysis of lexicon shared with other Australian languages tells us Yangkaal was interacting with surrounding languages but that Kaiadilt was more isolated and developed in different ways. Evans has established many loan words which point to settlement from the west. From preliminary linguistic findings we can say the isolation theory of the Kaiadilt does not appear sound. Based on the linguistic chronology, Evans (1985: 20) has estimated that the Kaiadilt migrated to the South Wellesleys between 1000 and 500 years ago, corresponding with the separation of the Kaiadilt language. Archaeological and other corroborating evidence is required to test these estimates. Although such evidence is likely to be limited, a lack of early dates from a

number of sites would support the argument, particularly if coupled with geomorphological evidence as was the case with the investigation of Bayley Point on the adjacent mainland (Robins *et al.* 1998).

There is a further striking difference between the Lardil and Yangkaal groups on the one hand and the Kaiadilt and Ganggalida on the other. The Lardil and Yangkaal people possessed an additional special language, known as *Demiin* (Damin), used by second-degree initiates,^{vii} which is marked both by a range of exotic phonological features such as clicks, ejectives, ingressive lateral fricatives, and by an extreme degree of semantic compression and abstraction, rendering the entire vocabulary of each of the ordinary languages with around 150 lexical elements in *Demiin*. Grammatically the two registers are identical, except for slight differences in the form of some suffixes.^{viii} Local tradition attributes the origin of *Demiin* to an ancestral figure known as *Kaltharr* ('Yellow Trevally'), and Hale (1982: 31) stated that "the whole system gives the impression of being an invention".^{ix}

The anthropological perspective

A large body of anthropological research about the Wellesley Islands (albeit much of it unpublished) has accumulated since the time of Tindale's study and indicates a more complex picture than he proposed.^x

In the first instance we must stress that the cultures of the four language groups display many commonalities reflecting their adaptation to coastal lifestyles. Coastal places have always been used for hunting and collecting sea foods (which in the 21st century continue to contribute substantially to the local diet); resources obtained include turtle, dugong, fish, oysters, shellfish and crabs (Memmott & Trigger 1998: 112-117). Throughout the region, traditional resource gathering activities in coastal domains are generally entwined closely with the spiritual features of 'saltwater country'. The socioeconomic importance of the sea and coastal land systems, especially on the islands, complements the intensive bodies of religious knowledge about 'saltwater country'. This aspect of the indigenous cultures in this area can be referred to locally as 'Sea Law' or 'Saltwater Law'. It is said to come from an ancestral time of creation known as 'the Dreaming' and incorporates beliefs concerning the formation of the coastal environment by ancestral beings who left sacred energies in particular sites. These energies can be used for catalyzing the fertility of particular animal species or meteorological phenomena. Individuals take on a particular totemic identity after the phenomenon associated with the particular site with which they are associated. A potent and pervasive entity in the sea is *Thuwathu* the Rainbow Serpent, who punishes humans for breaking the Sea Law. The Wellesley Islanders hold a large body of customary knowledge concerning the marine environment, its plants and animals, the weather, tides and the behaviour of the seas. There is a detailed classification of the seasonal cycle, and extensive knowledge of the nature of offshore winds, the movements of fish schools, the times of the fattening of fish and the reproduction of sea animals. As well as various techniques used to catch sea resources, there are traditional practices associated with the consumption of certain species. For example, butchering of dugong was a rule-governed exercise throughout the region, with different parts of the animal ideally being distributed to people of different status (Memmott & Trigger 1998).

If we start to look for cultural differences between the North Wellesley and South Wellesley Islanders, however, many can be elicited. For example, despite sharing a common set of land holding mechanisms (patrilineal ideology, patrilineal affiliations, conception and birth place attachments), the Wellesley groups exhibit interesting divergences from one another in the articulation and emphasis of these mechanisms to establish distinctive land tenure systems. At the western, mainland periphery, formalization of patrilineal relationships by the Ganggalida within an acculturated overarching system of subsections and semi-moieties diffused in from the west. This then gives way amongst the Lardil to the patrilineal system but without the subsection classification. In the smaller-scale Kaiadilt society of the South Wellesleys, what is likely to have been an inherited patrilineal system has transformed into a more flexible birthplace-based system of land

tenure with patrilineal rights as a secondary mechanism. In broad terms this involves a west-to-east simplification of kinship systems, with the smaller-scale Kaiadilt society having the most flexible arrangements.

Figure 4. Two lengths of wall connected to a stand of mangrove trees, Bayley Island. Is this one continuous wall and if so, is it one or two traps? (Photo by Connah and Jones of University of New England, 12/5/82.)

A similar west-to-east simplification generally applies to material culture. The Lardil had a repertoire of some 65 or more artefacts, while the Kaiadilt repertoire entailed about 28 items (Memmott 1982). Artefacts in common included the raft, paddle, bark torch, shell knife, stone oyster hammer, spearthrower, bark dish, fighting stick, fire-sticks and small hand-nets. Both groups also used stone-walled fish traps. Lardil artefacts with no Kaiadilt equivalent included the dugong net, large fishing nets, message stick, handball, septum ornaments and dancing artefacts. Conversely, several items in the Kaiadilt repertoire were not found among the Lardil. One was a weapon, a round-shafted throwing stick (*jardiyali*) with each end sharpened into a narrow prong. The Kaiadilt hunting (*mawurraji*) and fishing (*kurumbu*) spears had much larger heads and prongs respectively and had more timber barbs than did their Lardil counterparts. The Kaiadilt had a specialised form of hunting spear (*kujiji*) up to 3.3 m long, which had a two-piece shaft, as well as a separate head. (Memmott 1986.)

To further exemplify these differing modes of cultural derivation, mention can be made of the many structural similarities between Lardil/Yangkaal and adjacent mainland (Ganggalida, Waanyi, Garrwa, Yanyuwa) male initiation ceremonies that involved ritual circumcision and subincision. The Lardil attributed the origin of their ceremony to the mainland interior. Nevertheless, there were a number of elements in this ceremony that emphasized a marine context, such as the symbolic use of the fishing net and spear, the teaching of the secretive *Demiin* language introduced by the Yellow

Trevally ancestor, and the sacred song cycles concerning the travels of ancestral Fish Beings along the south-east coast of Mornington Island. There was thus a fusion of mainland and island influences in Lardil and Yangkaal cultural expression. The Kaiadilt initiation was distinctly different with little of the elaborate ceremonial overlays or secretive aspects of the mainland or Lardil/Yangkaal ceremonies. Kaiadilt rituals always occurred publicly without the mainland taboos restricting gender access.

The extent to which aspects of their material culture were the result of a lengthy process of local innovation, adaptation and integration in an insular environment, or, alternatively, of acculturation from the Australian continent via the trade routes of the southern Gulf of Carpentaria, are questions that still remain to be answered. To better understand the reasons for the cultural differences, our study proposes to carry out a more in-depth comparative analysis of selected cultural aspects of these islands and the adjacent mainland group, the Ganggalida. To this end, the mainland influences that have filtered through to the north and south islands respectively will be identified. Items that may have been rejected by Islanders may also be identified. It is argued that despite similar environments and an awareness of mainland culture, the Lardil and Kaiadilt developed different technological methods to deal with everyday problems. This resulted in differences in the complexity, diversity and repertoire sizes of their artefacts, as well as associated aspects of territorial, economic, social and ritual organization.

The archaeological evidence

The archaeology of this part of the Gulf of Carpentaria has not been comprehensively researched and is not well understood. Although there has been some speculation on the prehistory of the Wellesley Islanders, and particularly the Kaiadilt, only one comprehensive archaeological survey has been published (Robins *et al.* 1998), and absolute ages obtained for only six sites.^{xi} The results indicate that archaeological evidence in the Southern Gulf is limited in terms of site types, and particularly in terms of deep stratified sites with time depth. There are no large rock shelters on the mainland or in the islands, nor any large shell mounds. Shell is quickly eroded in the hostile monsoon environment. Sites with long stratigraphic sequences are scarce. Three test excavations on the mainland have provided dates ranging from 1277 calBP to 247 calBP. Samples of oyster shell from a small shell midden at *Wurdukanhan* on the northwest side of Mornington Island have provided a basal date of 5284 to 5660 calBP. This is the oldest date yet obtained for any archaeological site on the coast of the southern Gulf of Carpentaria. (Although oyster is not a preferred shell to use for dating owing to secondary re-crystallisation, tests on these specimens found no re-crystallization to be evident.^{xii}) This age attests to the potential of the archaeology to address questions regarding the length of human occupation of these islands. Another potential source of archaeological information is human skeletal remains, though their study is constrained by contemporary cultural sensitivities.

Of particular interest in the archaeological record are the numerous rock-wall fish traps^{xiii} scattered throughout the Wellesley Islands and along the nearby mainland coast. Local people believe that all of these traps were built by mythic ancestors, although different accounts of whom these ancestors were are provided by the Lardil/Yangkaal, Ganggalida and Kaiadilt respectively. Numerous species of fish, sharks and stingray were easily captured when caught behind the walls of these traps by the receding tide. (Memmott & Trigger 1998: 112-114.)

According to the available literature on Indigenous rock-wall coastal fish traps, the Wellesley Islands contain the largest known complex of traps in Aboriginal Australia (Bowen & Rowland 1999; Campbell 1982). In total, 108 fish trap sites have been located and 334 fish traps or pens identified by the current authors and their colleagues. However their distribution is not uniform between the four constituent language groups of the region. The highest density of traps is on Bentinck and Sweers Islands in Kaiadilt territory (one site per 0.4 km of coastline). The lowest

density (one site per 8 km of coastline) is in Lardil territory, which includes Mornington Island, by far the largest island in the Wellesleys (Robins 1983.)

Figure 5. An inter-tidal rock platform on (large) Bountiful Island asserted by the Lardil to be a fish trap created by the Ancestor Marnbil. Signs of constructed rock walls are not obvious from aerial reconnaissance. There are however many rock pools which would yield a rich catch of food resources.

Although the fish traps are a shared aspect of material culture throughout the study area, they contain design elaborations in the South Wellesley Islands which may indicate that the Kaiadilt employed more complex harvesting practices. On this basis, we hypothesize that the Kaiadilt developed a greater dependence in fish traps and may have specialized this technology in particular ways. Our study will attempt to make comparisons between the four groups on the extent of trap use (versus other fishing and hunting technologies), trap numbers, sizes, layouts and shapes, usage under different seasonal tidal conditions, fish herding techniques inside traps, usage of trap gates and ponds, and other such properties. A specialized Kaiadilt trap technology might partly explain why they had a less complex material culture repertoire than those of their neighbours. Adjustments in the locations of fish traps in response to the changing sea levels and coastline definition during the period of occupation of the region is another subject of our ongoing research (Memmott *et al.* 2004).

To help address these issues it is necessary to get some temporal perspective. By dating archaeological sites we can determine how long people have been on the islands, and we might be able to detect cultural change or stasis through time. Some evidence for cultural change has been obtained from the mainland at Bayley Point. Evidence from sites on Mornington Island indicates a relatively lengthy occupation since at least the mid-Holocene, and thus provides a sound temporal base for further investigation.

Figure 6. Ronnie Jupiter spearing a crab, Bayley Point, on a falling tide, September 1983. Note that the fishing spear was a male-specific implement. The wall is cemented together with oysters. (Photo from Trigger 1985, p.127.)

Figure 7. Trap wall at low tide, showing a drainage channel and indicating a likely point to design in a gate. (Ref. RB 5668/7, AERC L8/2-158.)

The specific problem of dating particular Wellesley fish traps has been discussed in another recent paper (Memmott *et al.* 2004). Dating middens and/or campsites in proximity to traps can only provide an inferred approximation of the age of an adjacent fish trap. An alternative approach to dating trap sites is to look for the possibility of excavating the buried ‘arm’ walls of traps where they are found to have become covered by sediments as the sea level fell, and now extend under the beach. Excavations in accumulated sediment and beside the trap walls may then provide materials suitable for dating. These could include carbon-bearing materials deposited in the sediment. Calcareous faunal remains (sub-fossil relics) attached in growth positions on the rock wall could be candidates but suitable species in this region have yet to be determined. Luminescent dating of sediments would probably not be attempted unless they could be shown to be aeolian deposits. There is also the more remote possibility of finding an artifact within an existing fish trap wall that may have some datable property suitable for modern techniques (eg residue analysis). Tindale

(1963:241) had noted the use of trap walls to store stone artifacts on Bentinck Island. (We have found no evidence so far in our field research of brain corals inside traps that could assist in dating.)

Summary of findings

It is now useful to bring together the various strands we have briefly discussed. We do this in two ways. The first is to integrate the information as a grid, with the discipline-specific source of information on the one axis, and the different social groups on the other. This is shown in Table 1.

Table 1. Summary of comparative findings on three of the key study groups from the South Wellesley, North Wellesleys and mainland respectively (adapted from Evans 2004).

Discipline	Kaiadilt	Lardil	Ganggalida
Linguistics	Clear phylogeny as an offshoot of insular southern Tangkic, reflecting classic phylogenetic split with migration to South Wellesleys Small amounts of lexical borrowing (and one bound morpheme) from unrelated Garrwa to west.	Borrowings of subsection terms (without differentiation for gender); terms for moiety-specific modes of land custody Borrowing and elaboration of Demiin from Forsyth Islanders, to the point where it is now seen as a Lardil rather than a North Wellesley trait.	Borrowings of subsection terms, with gender differentiation. Operation of areal contact with other mainland languages maintains conservative typological traits of language.
Genetics	Hyper-differentiation of small migrant population, reflecting drift, bottleneck, and amplified effect of subsequent rogue genes. Likely small rhizotic effect, through intermarriage with Garrwa population before migration, amplified by drift and founder effects.	Hyperdifferentiation of population, though to a lesser extent than with the Kaiadilt.	No studies to date.
Archaeology	No dates yet: dates needed for initial settlement, subsistence shifts through time, trade/exchange and for construction of fish-traps.	Two dates on Mornington: 5660 to 5120 calBP; 1628 to 1000 calBP; from two sites.	Shell middens/shell scatters at Bayley Point, Old Doomadgee and Gunamula range from 1400 calBP to 0 calBP.
Social Anthropology	Kinship system retained. Decline of clan-based estate system as adaptation to smaller population.	Patrilineal clan structure with local estates, but not aligned with patricouples. Recent adoption of subsections, patrimoiety distinction, ceremonial song cycles linking to mainland.	Alignment of land-holding clans with patricouples as subsection system becomes entrenched, strengthening patrilineal basis of clan affiliation.
Material Culture	Limited artifact repertoire. Lack of diverse fishing net types but an intensive use of rock-wall fish traps.	A relatively large repertoire of artefacts indicating receptivity to mainland ritual diffusion. Greater dependency on a range of fishing net types and less dependence on rock-wall traps.	Preliminary analysis indicates Ganggalida repertoire most closely resembled Lardil, but no in-depth analysis of all items yet. ¹

¹ See Trigger (1987) for an introductory comparative analysis.

The second is to take a single chronological sweep through the study region, integrating information from the various groups and disciplines. This is given in Table 2.

Table 2. Integrated environmental and human chronology of the Wellesley Region.

Period & environmental events	Significant human events	Supportive evidence of human events
18 to 6 ka –influx of sea with migrating coastline at 50-100m a year	Possible earlier Pleistocene colonisation.	No known evidence as yet.
8 to 5.5 ka – ongoing influx of sea	Colonisation of the Mornington Peninsula from mainland; splitting off of Lardil from Proto-Tangkic language.	<i>Wurdukanhan</i> midden site gives benchmark occupation date for Lardil (5284-5660 calBP)
5.5 to 5 ka: separation of large islands from mainland. Sea levels peak at approx 5.3 ka	Oral accounts of channels being cut between islands elaborated into sacred histories of ancestral beings.	Inferred from changes in sea-level and sacred histories on channel cuttings.
5 to 3.4 ka: sea levels now drop approx 1.7m.	New campsites and resource places established on newly formed cheniers (Robins <i>et al.</i> 1998)	
1 to 0.5 ka: smaller islands now stabilized with freshwater sources.	Re-colonisation of Forsyth Islands from mainland by Yangkaal, and of Bentinck Islands from mainland (Point Parker) by Kaiadilt.	Similarly estimates of time of recolonization by these two groups based on linguistic divergence of Yangkaal and Kayardild languages from the Ganggalida language.
0.5 ka or more recently?	Limited contact of Kaiadilt with Garrwa and Yanyuwa. Socio-cultural differentiation between groups.	Loan words in <i>-nganji</i> 'own', <i>murdinyi</i> 'no-name'; presence of unusual genetic markers shared by Kaiadilt with Karrwa.
Last 150 years up until 1914 when mission colonisation occurred.	Recent adoption of subsection terms from mainland into Lardil, via Yangkaal, and adoption of patri-moiety concept.	Oral history; failure of subsection terms to undergo final truncation. Lack of adaption of subsection classification to clan estates.

Summary of problem

The ongoing presence of the four cultural groups of the Wellesley Islands and adjacent mainland provides a unique opportunity to examine issues relating to cultural change and isolation on offshore islands. The present researchers have access to a contemporary Aboriginal knowledge base of traditional marine resource exploitation technologies, and an existing body of ethnographic and linguistic research that indicates complex variability in language, social systems, material culture and marine technology. Archaeological evidence for a relatively lengthy occupation of at least one island, and an extensive system of fishtraps, provide the necessary temporal and spatial reference points to test hypotheses about isolation. There were clear cultural commonalities between the study groups as well as obvious differences. These differences reflect a number of factors, including the likely sequence of settlement of the islands, differences between the North and South Wellesley Islanders in the degree of cultural permeability and acceptance of social transmission to and from the mainland, and socio-economic adaptations reflecting the different demographics of the North and South Wellesley populations.

Clearly there are many missing strands to our story, from all sides: we know less about the detailed ethnography of the mainland, archaeological information is minimal in all parts of the Wellesley study region, we have no genetic information for Ganggalida and for the other groups we lack studies from the era of molecular genetics. Linguistic evidence is reasonable for two groups (Lardil and Kaiadilt) and only fair for Ganggalida. Yet despite all these gaps, some of which can be filled by fresh research, and some of which will remain forever open, it is clear that a systematic comparison of all the evidence can begin to throw up a richly layered human history for the region. Although the picture of isolation presented by Tindale was exaggerated, the importance of the Kaiadilt in wider debate about physical and cultural isolation remains. Indeed, in light of the new data and arguments that indicate a more complex set of relationships than Tindale envisaged, the case of the Kaiadilt has become even more important.

To date we have identified and described differences and speculated on causes, but have not come up with a robust theoretical model supported by adequate, integrated data. Future research will focus on this goal.

The authors and their colleagues intend to generate arguments from anthropological evidence and combine the findings with archaeological and environmental results in an attempt to explain the cultural differences and similarities between the groups. Although it may be difficult to prove empirically, it is hypothesised that the Lardil comprised a society whose physical and social geography facilitated cultural independence but which at the same time was open to regular trade and exchange of technologies and beliefs. These traits permitted the maintenance of large socio-ceremonial gatherings at which exchanges of cultural traditions could occur. The Kaiadilt, on the other hand, owing to their relatively greater isolation and insular outlook, had less frequent interaction with the mainland, maintained their sense of cultural difference more vigorously, and initiated a process of local intensification through the specialised development of fish trap technology. In recent decades, research in Aboriginal Australia has revealed examples of intensification whereby levels of production were increased and the resulting surpluses stored, allowing more sedentary lifestyles and larger communal gatherings (eg Lourandos 1997). We propose that our study will develop socioeconomic models at a regional level that will inform the intensification debate. If these models withstand scholarly scrutiny, they will add an important dimension to ongoing debates about the nature of intensification in Aboriginal Australia. They may, for example, indicate that intensification in the development of a particular technology and means of production may not be associated with sociocultural change.

Debates about the nature, extent, timing and duration of isolation are central to an understanding of the account of the colonisation and occupation of Aboriginal Australia. While debates about the nature of isolation in arid areas of Australia, particularly as a consequence of late Pleistocene climatic change, are becoming increasingly important (eg Smith & Hesse 2005; Veth *et al.* 2005), a good deal of scholarly discussion about isolation has centred on islands. At least since the time Darwin's work on Galapagos finch evolution, islands have been considered scientific laboratories where patterns and processes of physical and behavioural change unfold in isolation and so can be studied with much greater control over inputs and outputs than is otherwise possible. It is now known that while insularity does provide researchers with some 'experimental control', cultural change in particular does not occur in isolation except in extreme cases such as on Tasmania and Easter Island: island people manipulate their physical insularity to increase or decrease their sociocultural isolation from outside (eg Gosden & Pavlides 1994). Understanding how, when and why island people do this will allow us to understand better how people in general manipulate their social environments to control, influence and even reverse larger-scale and often seemingly irresistible flows of people, ideas and things. In comparison to other Australian islands, we believe that the Wellesleys provide a unique opportunity to carry out significant island research of this type.

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- ii The journey between the North and South Wellesleys was more challenging still, owing to the open-sea distance of around 50 km plus challenging reefs and winds, and there appears to have been no deliberate, direct contact between the North and South Wellesleys, though there are accounts of (accidental) one-way voyages on traditional watercraft from the South to the North Wellesleys (Roughsey 1971).
- iii The authors are indebted to our colleague Dr Errol Stock of The Australian School of Environmental Studies, Griffith University for his guidance in writing this section of the paper
- iv Tindale (1977:251) mentions 'the finding of a crude bifacial stone tool of *mariwa* type ... known to the islands as [tjilaNand], which was in situ in deposits which had been planed during the mid-Recent high sea levels between about 6000 and 3800 BP and subsequently exposed by lateral gully erosion.' It is unclear from this description whether the tool to which he refers could have been deposited in pre- or early-Holocene times, during (our) 'Stage (a)', or whether it must have been deposited during the period of mid-Holocene high sea levels.
- v This population estimate is speculative and based on Tindale's estimates (1962b).
- vi There are some other mainland languages also involved in this classification, viz Minkin and Nguburinji but they are not related to the analysis in this paper ... see Evans (2002).
- vii Though there were social restrictions on who could use it – namely second-degree initiates – it was generally acceptable to use *Demiin* outside ceremonial contexts, except in the presence of certain relatives (see McKnight 1999).
- viii See Hale (1973, 1982), McKnight (1999), and Hale & Nash (1997) for further information.
- ix The sociolinguistic innovation of having a special initiation register, *Demiin*, appears to be a recent innovation within Yangkaal, borrowed into Lardil (Evans 2005). This hypothesis is supported by a sacred history which is the subject of a cycle of Lardil/Yangkaal initiation songs, whereby the ancestral sea and bird animal beings hold the first male initiation on Denham Island in Yangkaal territory and then travel along the south-east coast of Mornington Island performing parts of the ceremony at various places and in the accompaniment of the Yellow Trevally. This suggests a Yangkaal to Lardil direction of acculturation.
- x A more detailed analysis of some of this material is to be found in Evans (2002, 2005).
- xi Although Tindale (Tindale 1962a, 1962b, 1977, 1981) undertook research in the Wellesleys, particularly on Bentinck Island, and speculated on the prehistory of the Kaiadilt, little of it was based on archaeological evidence. Archaeological research really only began in the 1980s, when a series of small archaeological, ethnographic and environmental projects were promoted by Robins and his colleagues. In the 1980s and 90s, Robins undertook archaeological reconnaissance surveys and test excavation in conjunction with Memmott on Mornington and Sweers Islands (Robins 1982, Memmott 1982, 1985, Memmott & Robins 1984). Robins *et al.* (1985, 1998) also undertook work on the adjacent mainland coastline in 1983 and 1988. In addition to this work, all of us jointly undertook a survey of stone wall fish traps and their geomorphic context, on the mainland coastline and throughout the islands in 1983 and 2004 (Robins 1983, Memmott *et al.* 1984, 2004).
- xii M. Barbetti, Macintosh Dating Centre, University of Sydney, p.c. to R. Robins, August 2005.
- xiii In 1983, several of our research team (Robins, Trigger, Memmott) made an aerial survey of most of the Wellesley Islands and the mainland between Moonlight Creek and Bayley Point, specifically to locate fish traps. In addition to aerial surveys, some ground surveys coupled with ethnographic recording were undertaken on the traps at Bayley Point and Point Parker (Memmott *et al.* (1984), Robins (1983), Robins *et al.* (1998), Trigger (1985, 1987)), and on selected traps on Mornington and Sweers Island.