

REVIEW ESSAY:

## **Archaeology's Contribution to Island Studies**

*Scott M. Fitzpatrick*

*Department of Sociology and Anthropology  
North Carolina State University  
Raleigh NC, 27695  
USA  
[scott\\_fitzpatrick@ncsu.edu](mailto:scott_fitzpatrick@ncsu.edu)*

### **Abstract**

Archaeology has, and will continue to make, some important contributions to the broad field of 'island studies'. In this essay, I discuss four major topics in island archaeology that are helping to shape the way we think about islands. These include: (1) seafaring and the human maritime diaspora; (2) the effects of aquatic boundaries and isolation; (3) historical ecology and the impacts of humans on island ecosystems; and (4) climate change, sea level rise, and coastal degradation. As archaeologists continue to explore these and other issues with colleagues from both the social and natural sciences, we will come to better understand how islands have shaped humans, and humans have shaped islands.

*Keywords:* archaeology, islands, seafaring, isolation, historical ecology, coastal degradation

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### **Introduction**

The study of islands as discrete units of analysis has been embraced by a wide range of disciplines, from biologists and biogeographers to environmental scientists, geographers, political scientists, anthropologists, and many others (Baldacchino, 2006). Indeed, the special interest given to islands has spawned a number of associations, research programmes, interest groups, conferences, an upcoming *Encyclopedia of Islands* (University of California Press), and dozens of academic journals over the past few decades. Most of these are broad in scope geographically and more multidisciplinary in nature, such as the Island Cultures Research Centre at Macquarie University in Australia and their newly established journal, *Shima*, as well as this current venue. Others are dedicated specifically to a discipline (primarily geography) or region (such as the Caribbean, Pacific, or Mediterranean). Regardless of the particular foci of each group, it is clear that there is something about islands that has captured the attention of scholars worldwide that has now led to a diverse array of 'island studies' which has "developed in an attempt to understand and account for the nature, dynamics and diversities of islands and islanders (and their relation to non-island entities)" (*Shima* Editorial Board, 2007)

When Godfrey Baldacchino asked me to contribute a paper to *ISJ* on island archaeology, it just so happened that I was at the time developing an introductory piece with Jon Erlandson for the *Journal of Island and Coastal Archaeology* which we co-edit, on the importance that islands and coastlines have for a number of anthropological and historical issues (Erlandson & Fitzpatrick, 2006). In the process we had given considerable thought to how the wide range of topics in archaeology could be narrowed down satisfactorily to illustrate why islands and coastal environments are truly critical pieces of the puzzle for helping us understand ancient human behaviour. In the paper, we suggested that there were eight major topics in island and coastal archaeology that were currently the focus of most related research programmes. These were: (1) the antiquity of coastal adaptations and maritime migrations; (2) variations in marine or coastal productivity; (3) the development of specialized maritime technologies and capabilities; (4) underwater archaeology and drowned terrestrial landscapes; (5) cultural responses to insularity, isolation, and circumscription; (6) cultural contacts and historical processes; (7) human impacts and historical ecology in island and coastal ecosystems; and (8) the conservation and management of island and coastal sites. As I began to think more about the importance that islands and coastlines have for archaeology as a discipline, it seemed to me that it would be a useful exercise to provide a review of how archaeology has contributed to other fields of study and why it will continue to be an integral and growing part of more holistic analyses of island life.

There are several important issues and realms of inquiry that archaeologists working on islands have helped bring to the forefront of scientific discourse. This, of course, is not a one-sided affair, but a mutually beneficial relationship that has the potential to bring together a host of scholars in the social and natural sciences. The issues I believe are particularly relevant include: (1) seafaring and the human maritime diaspora; (2) the effects of aquatic boundaries and isolation; (3) historical ecology and the impacts that humans have had on island ecosystems; and (4) climate change, sea level rise, and coastal degradation. It should be noted that I chose these particular topics because they have seemingly greater potential for extensive multi-scalar and plura-disciplinary analyses. I do not wish to imply, however, that other topics should be ignored or lack the potential for future cross-disciplinary action. I first briefly discuss why the foundation for an archaeological study of islands has developed and then proceed with the four major topics listed above to help define the role of archaeology in the broader realm of island studies.

### **An Archaeology of Islands**

In a previous paper published in *ISJ*, Pete Hay (2006:19) asks whether a “coherent theory of islandness – nissology...” is possible (*see also* discussion in McCall, 1994). It is certainly a worthy question to ask why islands are such attractive places to study for many scientists. Baldacchino (2005a:35) suggests that the “geographical precision” of islands is part of what makes them unique and amenable for study, and that the notion of a boundary is “key to an island’s existence and identity” (Baldacchino, 2007b:1). Hay (2006:31) remarked that, because islands “...attract affection, loyalty, identification...” and are “places - special places, paradigmatic places...” that forge (or even force?) deep

relationships with “place”, the formula is set for a nissological perspective to emerge. Might we say also, as Baldacchino (2005b:247) did, that “island(er)s have a sufficient commonality to warrant looking at them comparatively, justifying a systematic ‘island studies’ perspective”?

From an archaeological perspective, Patrick Kirch (1986a:2) two decades ago noted that the “essence of islands is discreteness, that is, their bounded and circumscribed nature.” These observations mirror what Colin Renfrew (2004:276-278) noted was part of the attraction of islands to anthropologists, archaeologists, and people in general – that they tend to “feel” remote, often requiring a journey that involves separation from somewhere else. Regardless, it is clear that there are many different beliefs as to what makes ‘islandness’ a phenomenon worth investigating, and at the risk of too much repetition, I refer readers to Baldacchino’s (2005b; 2006; 2007a) recent reviews and discussion on the subject.

Archaeologists have worked on islands for decades, but why is an *archaeology* of islands different enough to capture the attention of researchers as some would suggest and warrant a separate sub-discipline or field of study (for discussion of this issue, see Broodbank, 2002; Anderson 2004, 2007; Fitzpatrick, 2004a; 2004b; Renfrew, 2004; Rainbird, 2007)? Can they really be approached differently from non-insular or even coastal landforms? This may depend on where you are and who you ask. Rainbird (1999) noted that Western ideologies have been influential in structuring some of the underlying theories behind island life, suggesting that islands have been falsely perceived as both dangerous, strange, and exotic places, as well as virtual Gardens of Eden. Andrew Sharp’s (1963) contention that Pacific Islanders could have only reached remote islands accidentally is an excellent example of how ethnocentricities derived from these attitudes have structured theoretical modeling of seafaring and migration in Oceania (however short-lived). As many researchers have already recognized, however, there is evidence that suggests islands really are worthy of study as distinct units for archaeologists and other scientists (e.g. see Kirch, 1986b; Keegan, 1999; Anderson, 2004; Renfrew, 2004), even if writers of fiction (e.g. Daniel Defoe’s *Robinson Crusoe*), Hollywood directors (e.g. “Fantasy Island”, the miniseries “Lost”, “King Kong”), and some scholars have overemphasized their exoticness and remoteness.

One of the major goals of archaeology is to examine how human societies evolved culturally over time. Archaeology as a discipline, in fact, is the only one specialized in providing a deep temporal snapshot of what was happening to humans in the ancient past on a millennial scale. As part of our work on islands, we are interested in how humans developed certain seafaring skills, became susceptible to the effects of (or possibly even encouraged) isolation, interacted with each other across the seascape, and adapted to and transformed newly encountered environments, among many other things. Although some of these issues may not be necessarily exclusive to islands, the effects of remoteness and isolation, whether discouraging or encouraging interaction, are amplified in importance when one considers that humans had to cross larger seas and oceans using some type of watercraft to reach them and would have been out of contact for long periods of time – weeks, months, or even years. We must also consider that return trips were not always

possible or desirable, as would have been the case if people were forcibly removed or exiled (e.g. Anderson, 2006), did not possess the skills to retrace their aquatic steps, or lacked sufficient resources or people such as navigators and boat builders to continue sailing on. But it is generally agreed upon that as maritime technologies improved over time, remoteness often became less of an issue, allowing islanders to partially dissolve the aquatic boundary and link their societies together.

Although the underlying reasons behind establishing different venues, centers, or “fields” of island studies may vary, the notion that an island can be defined because it is circumscribed (that is, surrounded by water) has helped, in part, to fuel the interest in these landforms by archaeologists, just as it has with other scholarly pursuits. Analyzing the effects that islandness has had on plants and animals can trace its roots to the biological sciences, dating back to Darwin’s observation that island species appeared to be related to mainland varieties, but had radiated as a result of their separation from the mainland. MacArthur & Wilson’s (1963; 1967) equilibrium theory of island biogeography was extremely influential in this regard, as it postulated reasons behind why insular biota maintained a relative equilibrium and the effects that island size and distance had on the immigration and extinction rates of island biota.

But we should not forget that the anthropological study of islands and ways in which culture was shaped by ‘islandness’ began decades earlier. Malinowski’s research on the Kula Ring in the Trobriand Islands from 1915-18 (after which he published the highly acclaimed *Argonauts of the Western Pacific* in 1922), Radcliffe-Brown’s (1922) work in the Andaman Islands, Margaret Mead’s landmark studies in Samoa (1928), and Raymond Firth’s (1936) ethnographic pursuits in Tikopia, for example, drew attention to islands as possible (and perhaps overly convenient) anthropological units or laboratories for study (*see also* Mead, 1957).

In the 1960s and 1970s, Fosberg’s (1963) session “Man’s Place in the Island Ecosystem”, (organized in 1961 at the Tenth Pacific Science Congress in Honolulu) that included Vayda & Rappaport’s (1963) piece on “Island Cultures”, along with later studies by Evans (1973) and Held (1993), approached islands as suitable “laboratories” for studying culture because of their insularity. In the latter two cases, facets of biogeographical theory were implemented to examine how cultural behaviour and complexity evolved in island societies in the Pacific and Mediterranean. Keegan & Diamond (1987) also looked at the theory of island biogeography and how it may have affected the timing and success of human colonization in various island regions. Prevalent themes in these studies were concepts of distance, size, and isolation and how islands, as bounded and circumscribed environments, limited the potential for interaction. It is clear that some of these studies, although perhaps overstating the degree of influence these effects had on island societies, were influential nonetheless in laying the groundwork for analyzing a host of issues such as culture contact, human impacts on insular biota, and sociopolitical changes that occurred through time as a result of isolation or interaction.

Although archaeologists working on islands today have, for the most part, dismissed the island laboratory concept and do not see single islands as ideal units of study, issues of

remoteness still remain important avenues for future discussion – in fact, the understanding of islands as “bounded places” has probably only been refined by an appreciation of the permeability of all boundaries. In response, some archaeologists have instead begun emphasizing the ways in which island societies have interacted with each other through time and see isolation as primarily a sociocultural construct (see Rainbird, 1999; 2005; 2007; Boomert & Bright, 2007). It is not my intention here to review all of the reasons why islands may or may not be “unique” or appropriate units of study for scholars or the degrees to which isolation and remoteness may be social or environmental – these debates will likely continue in perpetuity. However, it is my belief, along with many other scholars, that an “archaeology of islands” does exist and that this realm of inquiry has, and will continue to have, some important things to contribute to the general study of islands and the human condition worldwide, as I discuss below.

### **Seafaring and the Human Maritime Diaspora**

As Irwin (1999:252) succinctly stated:

“ ... landlubber archaeology has remained largely ignorant about prehistoric seafaring and paid little attention to the ocean as a contextual variable. While field archaeology necessarily takes place on land, except in the case of shipwrecks, some important developments in prehistory took place at sea.”

To reach islands in the distant past, humans had to develop some type of watercraft that was capable of holding at least a small group of people. Boat technologies need not have been sophisticated to accomplish this task when islands were intervisible or the channels between them narrow. Possibly the earliest evidence for humans reaching islands purposefully was when *Homo erectus* crossed a 20 km stretch to the island of Flores in the Indonesian archipelago sometime between 800-900 thousand years ago (Bednarik, 2003; Morwood *et al.*, 1998). This event may have been repeated even though seafaring technologies were likely very rudimentary (such as a raft of some sort).

It was not until much later during the Late Pleistocene when humans began crossing greater distances, venturing 90 km across open ocean to reach Australia and New Guinea between 35-50 kya (Bowdler, 1993; Davidson & Noble, 1992) and 140 km to reach the Bismarck Archipelago some 35 kya (Allen *et al.*, 1989a; 1989b; Wickler & Spriggs, 1988). It is here that we begin to see seafaring become more sophisticated with peoples colonizing islands further away and in some instances, probably returning to their homeland. Not long after, particularly during the Middle and early Late Holocene (ca. 6000-1000 BP), humans around the world began to master the art of voyaging across larger seas and oceans such as the Mediterranean, Atlantic, Pacific, and Caribbean to explore new lands, obtain desired resources, and settle increasingly remote islands.

What is important to remember is that humans, like most terrestrial mammals, are simply not good swimmers. For millions of years, humans were tied to land because water is a medium that requires some type of watercraft to effectively cross even short distances. Longer voyages necessitate something more complex – dugout canoes or outriggers and

paddles, with or without sails – along with adequate provisions (often including plants and animals), supplies, people (of both sexes if colonization is the objective), and typically, but not always, astral navigational techniques. Without these technologies and considerations, humans would have been unable to travel such long-distances and establish successful colonies on islands (Anderson, 2001; 2005a).

So, from a purely maritime perspective, the archaeology of islands has played a critical role in documenting and helping to understand how seafaring skills evolved over time (even if direct evidence is not always available) and how peoples may have responded to climatic fluctuations such as El Niño/Southern Oscillation (ENSO) events (Anderson *et al.*, 2006). One could argue that coastal or riverine areas in general, not necessarily islands, spurred seafaring as a result of peoples congregating in increasing numbers within littoral zones worldwide and taking advantage of terrestrial, riverine, estuarine, and marine resources (*see* Erlandson, 2001). This is partly true – the earliest direct evidence for boat building dating to around 8000 years ago comes from two major river systems – near the Tigris and Euphrates in modern-day Kuwait (Carter, 2006) and the Lower Yangzi River in China (Jiang & Liu, 2005). But both site locations were in close proximity to the sea. Ceramic-making horticulturalists who settled the West Indies ca. 400 BC are thought to have originated in the Orinoco River Basin of Venezuela (Keegan, 2000), another case of maritime adaptations along a major river system presumably spurring long-distance voyaging. There is certainly something to be said about needing and using boats in coastal areas. But the fact remains that islands as geographical entities led to the development of more sophisticated maritime technologies and perhaps encouraged exploration based on the notion of *autocatalysis* (i.e. the fact that there are islands out there suggests others will be found; Keegan & Diamond, 1987).

### **The Effects of Aquatic Boundaries and Isolation**

Archaeological evidence indicates that through the Holocene, humans began to settle islands that were increasingly remote. In the case of the Pacific, scholars have argued that the Bismarck and Solomon Seas along the northern reaches of New Guinea (Near Oceania) were the practice ground for Austronesian speakers to perfect their seafaring skills before venturing out to the far reaches of western Polynesia by around 1300 BC. Here they covered distances of hundreds of kilometers to settle Vanuatu, New Caledonia, Fiji, Tonga, and Samoa (Kirch, 2002; Spriggs, 1997). The settlement of Hawaii, New Zealand, and Rapa Nui (Easter Island) a little over two thousand years later, across even greater expanses of sea, and in New Zealand's case, a very different climate, suggests increasing levels of nautical expertise. However, this did not necessarily ensure that peoples could or would return to their homeland and there are numerous instances which indicate that human populations became isolated from other people and places (Anderson 2005b).

This is especially evident with Rapa Nui, arguably the most remote patch of land ever successfully colonized by humans. The island, located 1900 km east of Pitcairn (the nearest island) and 3500 km west of South America, was settled sometime around AD 1200 (Hunt & Lipo, 2006). Archaeological and genetic evidence from rats (Barnes *et al.*, 2006; Hunt 2007) suggest that the initial colonizing group never received new immigrants

or had any sort of external contact. What is interesting about this case is the degree to which Easter Islanders competed with each other to build the famous *moai* statues in increasing numbers and size. The carving and transport of *moai* across the rugged landscape is truly a testament to human craftsmanship, ingenuity, and engineering. Prior to European contact, however, they had toppled nearly every statue as conflict between clan groups escalated. To Sahlins (1955), the manufacturing of progressively larger *moai* was a case of esoteric efflorescence, whereby limited resources in an insular environment led islanders to channel their efforts to produce exorbitant monuments. Renfrew (1984) also suggested that temples on Malta may have experienced a similar phenomenon.

Admittedly, the construction of larger megaliths is not relegated to islanders, as we well know. However, because of their isolation, Easter Islanders were more susceptible to dramatic changes in their resource supply as a result of carving and moving the statues. Whether this was solely related to deforestation from trees being cut down for transporting statues, or possibly other phenomena such as rats eating the palm tree seeds (Hunt, 2006; 2007), is unclear. But it does appear that the subsequent degradation of the landscape prevented them from continuing to carve *moai*. The ceasing of statue construction was related to a continually diminishing resource base (e.g. trees) and the inability of Easter Islanders to import them from elsewhere because of their isolation. This supports Rollet & Diamond's (2004) statistical analyses of 81 archaeological sites from 69 islands in the Pacific which demonstrated that isolation is one of the main environmental factors that predisposes towards deforestation.

What this case demonstrates, as do many others (Cherry, 1985; Anderson, 2004; 2005b; 2007; Fitzpatrick, 2007), is that isolation is a real, albeit mutable concept that seems to have influenced human behaviour in the past. Although we must be cautious in correlating isolation with closure (Kirch, 1986a:2), it is true that islands themselves are generally lacking in resources and more ecologically (and at times socially) fragile. Fosberg (1963:5) recognized this when he noted that islands can be distinguished from other landforms by their "extreme vulnerability toward great instability when isolation is broken down." The aquatic barrier can isolate an island, creating a "screening effect" (Tsai, 2003) to humans and other organisms - not only because of the remoteness factor (however perceived), but by oceanographic conditions that may render discovery difficult.

A good case in point is when the Spanish attempted, on numerous occasions, to locate the "Enchanted Islands" of the Palauan archipelago in Micronesia in the early 1700s after Father Paul Klein met Carolinians in the Philippines who had blown off-course while sailing from Lamotrek to Fais, located over 600 km away (Hezel, 1979; 1983). In 1664 alone, Spanish missionaries recorded no fewer than nine different landings of people who had drifted from the Carolines and spoke of islands to the east. In December 1696, Klein described their experiences in a letter to the Jesuit General in Rome (Hezel, 1972:27) that triggered an interest in finding these islands to claim for the Spanish Crown. Ironically, the only successful attempt to find Palau from bases in both Guam and Manila was in 1710 by the Spanish vessel *Santissima Trinidad* captained by Francisco Padilla, who then had to spend four days fighting the winds and currents and was never able to secure anchorage (Hezel, 1972:33). What this historical case illustrates is that: (1) oceanic conditions can

both attenuate and propagate isolation; and (2) even some the most skilled traditional sailors in the Pacific were not always successful in finding land or reaching their destination. In the Palau case, historical records and computer simulations of drift and intentional voyaging shows that strong seasonal winds and currents prevented outsiders from finding Palau purposefully or accidentally during most times of the year (Callaghan & Fitzpatrick, 2007). The same might also be said for many other livable islands in Remote Oceania (Anderson, 2005b) and the Cayman Islands in the Caribbean which have no traces of prehistoric settlement (Stokes & Keegan 1996; Keegan, 1999:255).

“Still, isolation is a real variable. The water gaps between different islands have certainly limited the intensity of interactions, and in at least one case [in the Caribbean], the Cayman Islands, human settlement did not occur prior to the arrival of Europeans. It is likely that these small and isolated islands were beyond the reach of traditional ocean-going canoes” (Keegan 1999:255-256).

There are, of course, concerns that the physical properties of an island or group of islands (i.e. circumscription) are no longer useful in archaeological analyses of cultural development or adaptation, primarily because they infer isolation. As Anderson (2007:243) points out, these concerns:

“ ... are part of a post-processual move away from historical ecology and biogeography as the effective underpinnings of change and towards a view of insularity as a contingent, malleable and even elusive concept which can be regarded productively in terms of the construction of social identity and status.”

It is true that island archaeologists have, until fairly recently, often emphasized the uniqueness, isolation, boundedness, and circumscription of islands compared to continental areas that are influenced from principles outlined in biogeography. Broodbank (1999:237) makes an important point here:

“Although island biogeography must not (and has no pretensions to) set the main agenda for island archaeology, we merely impoverish ourselves by entirely denying its relevance out of a faddish distaste for Darwinism in the social sciences.”

Despite some shortcomings that biogeography may have in analyses of island cultures, we should not completely disregard the influence that separation and the crossing of an aquatic boundary may have had to island peoples socially, culturally, physiologically, or psychologically. As Tsai (2003:216) notes, “isolation is one of the key factors influencing evolutionary change, for it creates conditions whereby the gene pool of a population becomes distinct from that of other populations.’ An interesting corollary may be psychiatric and psychological studies on the effects of isolation on astronauts and scientists in Antarctica (Santy, 1983; Barabasz & Barabasz, 1986; Palinkis, 1990; Wood *et al.*, 1999). The results of a study conducted by Palinkis & Browner (1995) of 121 members of the United States Antarctic Program in 1988–1989 for a 1-year period indicated that individuals in these situations tended to show symptoms of boredom, depression, avoidance, restlessness, anxiety, temporal and spatial disorientation, emotional discharge,

and deficits in task performance. In reviewing these studies, Santy (1983:520) remarks that “even when such symptoms (especially depression and irritability) occur among only a few members of a small, isolated group, they could pose serious survival problems for the rest of the group under certain circumstances.” One wonders how similar symptoms might have affected ancient seafaring groups, particularly if separation from family and friends was extended for long periods of time.

It will also be interesting to see whether the discovery of a possible new human species found on the island of Flores, *Homo floresiensis* (Morwood *et al.*, 1998; 1999), stands up to scientific scrutiny. Some argue that the remains are not a new species at all but instead microcephalic or pygmy (Weber *et al.*, 2005; Martin *et al.*, 2006), while others support the original claim (Arque *et al.*, 2006; *see also* Falk *et al.*, 2005). If scholars agree that this is indeed a new species, this would certainly seem to suggest that humans in the relatively recent past were susceptible to the effects of smaller island environments (insular dwarfism), much like other endemic dwarf species, confirming what we knew already – that culture is just one part of the equation that makes us human. As Terrell (1997; 2006) notes, biogeography can be useful for understanding the history of human settlement and introduce new ideas of how to approach prehistoric colonization and settlement in different environments, whether they are islands or not. Simply put, we should see humans as ‘in nature’, not ‘above nature’ (cf. Terrell, 2006:2088) without this perspective being labeled solely as environmentally deterministic.

### **Historical Ecology and Human Impacts**

One of the most important contributions that archaeology has made to the broader spectrum of island studies is within the interdisciplinary research approach known as historical ecology which attempts to understand long-term human-environmental interactions. Brooks (1985:660) has described historical ecology as a “complementary approach to evolutionary ecology”; from an applied perspective, it could be defined as the “use of historical knowledge in the management of ecosystems” (Swetnam *et al.*, 1999:1189). Within an anthropological framework, Balée (1998a:3) has noted that historical ecology involves the “empirical investigation of relationships between humans and the biosphere in specific temporal, regional, cultural, and biotic contexts...” (*see also* Balée, 1999; chapters in Balée, 1998b). Balée (2006:75) also remarked in a more recent review that historical ecology is “a new interdisciplinary research program concerned with comprehending temporal and spatial dimensions in the relationships of human societies to local environments and the cumulative global effects of these relationships. Crumley (1994:6), one of those responsible for integrating archaeology within this new conceptual framework, suggested that “*historical ecology or landscape history* is the study of past ecosystems by charting the change in landscapes over time” (italics in original). What is paramount within historical ecology is the need to integrate the social and natural sciences, creating an interdisciplinary approach using data from environmental history, paleoecology, ethnography, and archaeology, for example, to tease out changes that have occurred to the environment through time by humans.

However, there is one fundamental omission in these definitions of historical ecology and that is the exclusion of marine (and in general, aquatic) ecosystems. Instead, the idea of *landscape* tends to be of paramount importance. “A central term used in historical ecology to situate human behaviour and agency in the environment is the landscape, as derived from historical ecology, instead of the ecosystem, which is from systems ecology” (Balée, 2006:75). Although humans, for the most part, live on land and interact with their terrestrial environment (leaving those vital clues archaeologists hold so dear), we should not forget that one of the major goals of historical ecology is to examine human interactions in *all* environments. An abundance of evidence shows that marine-based fauna, including sea mammals, fish, mollusks, and many others, were targeted by humans in the past, relied upon for subsistence and tool-making, and in many cases, over-harvested.

It is curious to note that, in Balée’s recent synthesis of historical ecology, he fails to cite Kirch & Hunt’s (1997) volume, since this collection of papers was instrumental in paving the way for incorporating archaeological data into island environments as part of this perspective. This effort was partly in response to the growing recognition that humans who had settled the Pacific Islands prehistorically had impacted their environments by transporting non-native plants and animals, practicing agriculture, and overexploiting limited resources. The end result was the extirpation or extinction of numerous island biota, notably birds, but also many other species of animals and plants (e.g., see papers in Kirch & Hunt, 1997; Steadman, 2006; Anderson, 2007). What papers in Kirch & Hunt (1997) proffered, and what has been emphasized on a greater scale recently throughout the Pacific (e.g. Nunn, 2001) and places such as the Caribbean (see Fitzpatrick & Keegan, 2007) or marine environments in general (Rick & Erlandson, 2007), is that archaeologists should, by virtue of their expertise in recording past human events, play a prominent role in examining the effects that humans have had on island ecosystems because “archaeology offers the temporal and spatial breadth required for long-term ecological analysis” (Crumley, 1994:6). This is particularly important when it comes to analyzing islands, where pristine ecological conditions were dramatically affected by the arrival of humans. Archaeologists, using a variety of techniques at their disposal, including radiocarbon dating, can help to pinpoint the time at which humans arrived and provide a baseline for events that occurred thereafter. This is critical, for one of the primary questions that must be resolved is whether changes to islands were natural or anthropogenic and the degree to which humans may have altered or impacted these “insulaspheres.” We should not lose sight, however, as to the role that environment and climate change may have also played in altering cultural behaviour, as Nunn (2003) has argued.

Although not developed specifically by or for archaeologists, historical ecology has emerged as a field of study that greatly benefits from archaeology and is extremely amenable for research on islands. Kirch (1997) lists several current themes in Pacific Island historical ecology that carry over to other island regions. These include: (1) tracking natural versus anthropogenic change; (2) anthropogenic impacts on island ecosystems; (3) environmental evidence for human colonization; (4) environmental change and human society; and (5) whether island ecosystems are fragile or resilient. Although I will not repeat previous discussions of these topics, it is suffice to say that they are all worthy of

further research on islands and that island archaeologists will form a critical nexus for research in these environments that bridges a multitude of disciplines.

### **Climate Change, Sea Level Rise, and Coastal Degradation**

This brings me to the final major contribution that I believe archaeology can and will continue to make to the broader field of island studies: the tracking of changes to littoral zones, of which islands are surrounded. Farran (2006: 55) rightly noted that “islands are defined by their coasts” (at least geographically) and it is this dynamic marker where land meets the sea that many human groups for millennia have focused their attention for subsistence, access to other places via watercraft, and as locations for building their homes and villages.

It is easy to see why coastlines have been so important to so many people. In archaeology, the literature is now rife with descriptions of how human populations have lived in and exploited resources along coastal environments and the importance they played in the development of social complexity (*see* Erlandson, 2001 for an excellent review, who also notes how slow these realizations were in coming). Archaeologists have also been interested in examining how peoples responded to hazards along coastal areas, of which tsunamis and earthquakes are the most dramatic and destructive (Losey, 2005). Other disciplines such as marine biology and ecology examine reef, mangrove, and estuarine dynamics (Mann & Lazier, 2006); political scientists and policy makers often analyze issues regarding development (Beller & d’Ayala, 1990) and coastal hazard issues (Economics and the Environment, The H. John Heinz III Center for Science, 1999); environmentalists track the effects of runoff from logging, agriculture, and other human related activities (Vernberg & Vernberg, 2001); tourism and recreation planners discuss how to implement strategies for attracting tourists to islands (often focusing on beaches and other coastal areas) and how this might be done economically while diminishing the impact of development (Orams, 1998; Hall, 2001; Priskin, 2003) – the list goes on almost indefinitely. What cannot be disputed is that oceanic islands are surrounded by water and as such, have dynamic coastlines. Because coastlines are extremely susceptible to natural processes, including wave, tidal, storm, and eolian (wind) action, they present opportunities for archaeologists to investigate how peoples in the past were affected by these events and subsequent impacts to the archaeological record.

Archaeologists working on islands have helped to examine how natural processes can impact coastlines and destroy the archaeological record. Spenneman (1987; 1998 [2004]), for example, looked at how cyclones and wind action destroyed coastal shell middens and various archaeological features in Oceania (*see also* Nunn, 2000). Rick (2002) used historical wind records and geomorphological evidence on San Miguel Island in the Channel Islands of California to demonstrate that eolian processes were responsible for displacing lighter cultural remains, creating concentrations of heavier materials, abrading artifacts, and significantly altering the composition of *in situ* archaeological deposits. My own research with colleagues on the island of Carriacou in the southern West Indies indicates that sites along the east coast are eroding at a rate of approximately 1 metre (3 feet) annually, primarily a result of sand mining by locals for construction (Fitzpatrick *et*

*al.*, 2006). Detailed measurements and photographs taken over the past six years at Grand Bay where we have conducted large scale excavations indicate that this site is losing hundreds of cubic metres of anthropogenic soils and thousands of artifacts and food remains each year. As Erlandson & Fitzpatrick (2006:20) pointed out:

“Coastal erosion is often considered to be natural and inevitable, an impact that requires no serious assessment or mitigation. There is a natural component to coastal erosion, which would occur whether humans existed or not. However, coastal erosion is often intimately linked to human actions: rising sea levels due to global warming; rapid development in coastal areas; damming of rivers and construction of harbors, jetties, and sea walls; dredging and boat traffic; mining of beach sand or coral; clearing of mangrove and other forests; overgrazing and dune destabilization; and looting or vandalism.”

As Baldacchino (2007a:1) reminds us, approximately 10% (600 million) of the world’s population lives on islands, and even more reside in low-lying coastal areas. This places tremendous pressure on locals, especially those on islands along the smaller end of the spectrum who must often resort to tourism to sustain the economies due to a dearth of natural resources. And because coastal tourism is a primary focus for development, this can lead to the destruction of archaeological sites within these littoral zones, especially in places where laws and regulations protecting cultural and archaeological resources are insufficient or lacking altogether. Archaeologists have both the ability and responsibility to track these changes and help influence decisions and public policy on how coastal zones should be managed and protected.

## **Conclusion**

In this essay, I have attempted to draw attention to some of the major contributions that island archaeologists can and will continue to make to the broader realm of island studies. As mentioned previously, although there are aspects of research that may not necessarily be solely privileged to island environments (such as seafaring and coastal degradation), they nonetheless offer insights that help us understand why various cultural behaviours developed and changed over time and the necessity of working with other scholars to investigate and protect the ancient past.

Seafaring is certainly of importance in this regard as “access to islands, in the most direct functional sense, depended on seafaring, but that in turn on a variety of factors which shaped its history” (Anderson, 2004:263). The degree of maritime technologies available to any given group, in part, dictated the extent to which people could travel, dependent of course too on oceanographic conditions that may have made voyaging extremely difficult on the one hand, or fairly manageable on the other. Sea travel is (and remains even today), a relatively fast and efficient form of transportation, and once the technology was mastered, locations separated by water may have become closer than others separated by relatively inaccessible land (*see* Denning, 2004; Lape, 2004; Terrell, 2004; 2006).

But even highly sophisticated boats such as outriggers sailed by those with advanced navigational expertise was usually not enough to link islanders together consistently during all parts of their settlement histories. As a result, there were periods of relative or complete isolation. Anderson (2004:263) notes that “in the past, relative isolation of islands depended on the fundamental relationship between the sea and boats; easy passages encouraged substantial interaction, difficult passages produced isolation. As such, “it can be argued that the directions, timing, and tempo of island colonization were basically shaped by technological innovation in boats” (Anderson, 2004:264; *also* Anderson, 2005b). This is largely true, although various cases also remind us that currents and winds can drastically reduce opportunities for landfall, even when the destination is known, as was the case with Palau, at least historically (Hezel, 1983; Callaghan & Fitzpatrick, 2007). Oceanographic and anemological (wind) patterns may also influence the direction that migratory groups take. Callaghan’s (2001) computer simulations which suggested that those Caribbean islands closest to the South American mainland may not have been necessarily settled first (also supported by a compendium of radiocarbon dates [Fitzpatrick, 2006]), and Anderson *et al.*’s (2006) postulation that El Niño-Southern Oscillation events created a reversal of winds to westerlies that may have driven the eastward migration of peoples into eastern and southern Polynesia, are two cases in point.

Apart from issues of colonization as might be influenced by seafaring capabilities, oceanographic conditions, and geographical proximity to other land masses, archaeologists are interested in what actually happened after humans arrived to islands. Circumscribed environments like islands, especially on a smaller scale, are extremely prone to external interventions. Research worldwide is now demonstrating that peoples who first colonized islands were bringing with them a number of non-native plants and animals that began to drastically transform these once pristine ecosystems. The introduction of the dog, pig, chicken, and rat to various islands in the Pacific, in conjunction with human exploitation of native flora and fauna, clearing of forests, and intensive agriculture, led to the extirpation and extinction of many species (e.g. Kirch & Hunt, 1997), especially birds (Steadman 2006). This also had the effect of causing erosion that infilled bays, choked coral reefs, and created new habitats for mangrove and many species of marine life. Evidence from the Caribbean shows a similar trend, primarily during the Ceramic Age (ca. BC 400-AD 1400), with peoples transporting the dog, guinea pig, agouti, hutia, and opossum from South America to the West Indies, intensively cultivating crops such as manioc, and over-harvesting resources such as marine fish and mollusks (Newsom & Wing, 2004; Fitzpatrick & Keegan, 2007). A general pattern of overexploitation of marine foods prehistorically can be seen on a global scale (see papers in Rick & Erlandson, 2007).

These impacts are even more visible historically and in modern times, with invasive species causing long-lasting or even irreparable damage. The brown tree snake (*Boiga irregularis*), a native of Australia, Papua New Guinea, and island Melanesia that was inadvertently transported to Guam on US cargo ships in the mid-20<sup>th</sup> century, has wiped out nearly all of the island’s native bird species. The “Columbian Exchange”, involving the transference of people, animals, plants, and communicable diseases between the Old and New Worlds, has had a profound and often devastating effect on peoples and landscapes, first on islands in the Caribbean and the eastern coasts of the Americas, and then later

expanding elsewhere (Crosby, 1972). There is no question that new foods such as potatoes, tomatoes, maize, and tobacco brought to Europe and Africa from the New World, and livestock, breadfruit, and sugarcane transported to the Caribbean, helped to fuel trade and interaction between Europe, the Americas, Africa, and eventually Asia. This “homogenization” of the neo-tropics (Crosby, 1972) has had many social and economic benefits, but at great cost to human lives and biodiversity. Baldacchino (2000) has defined these smaller island units as “hypothermic” because they respond more excessively and dramatically to exogenous events than any coastal or mainland community (which have a physical, but also psychological, hinterland to retreat to); this is clearly the case for the Caribbean.

When examining the long-term histories of islands, an historical ecology approach that incorporates data from multiple disciplines, including archaeology, marine biology, paleoecology, and environmental history, will ultimately lead to more robust analyses of how humans transformed and impacted island environments. Island biota evolved for thousands or even millions of years without human intervention. Because of their ecological fragility, the colonization of oceanic islands by humans had some disastrous environmental consequences and as a result, many islands today are but a shell of their original state in terms of native biodiversity. Archaeological investigations that seek to explain the changes that occurred to islands or archipelagoes over the long-term by developing good chronologies to use as baselines for human settlement will greatly enhance our understanding of how different groups confronted newly discovered islands and what happened afterward.

Lastly, island archaeologists are important contributors to the worldwide discussion of how coastal regions are degrading in the face of increased development, climate change, and resource extraction. Because littoral zones were as important to prehistoric settlers on islands as they are today for a variety of reasons – subsistence, resources for making tools, and as mechanisms for travel, to name a few (along with tourists who are attracted to beaches and coastal-related activities) – they often have concentrated population centres that are more susceptible to natural catastrophes such as hurricanes and tsunamis, and erosion from both the wind, sea, and human activities. Archaeologists are able to track how natural and cultural events affected peoples prehistorically, are impacting the archaeological record, and compare the frequency of events in the past as compared to the present (e.g. Nunn, 2005).

### **Future Directions**

It is my hope that in this essay I have satisfactorily presented some of the major roles that archaeology can play in the broader scheme of island studies and that those whose expertise lie outside of archaeology can greater appreciate what the discipline has to offer in analyses of islands naturally and culturally. The question remains, however, as to what direction island archaeology is going: with debates surrounding whether isolation, either as a result of an aquatic boundary or remoteness, is social or environmental (or the degrees to which each may contribute to culture behaviour) and if it is more appropriate to approach the evolution of human societies theoretically from a reticulate (interconnected) or

phylogenetic (linear trajectories from parent groups to daughters) perspective, it is clear that we are confronted with a number of important issues that deserve greater attention. The investigation of these will require pluri-disciplinary initiatives, lest we become 'insular' in our thinking. Broodbank (1999:238) said it well:

“The overall moral must be that if island archaeologists around the world are to link up to greater effect than in the past, there is an urgent need for pooling of new ideas and coherent debate on core concepts, as well as much greater awareness of regional developments and conditions, both in terms of analytical paradigms and the inflow (or currently the flood) of fresh data.”

In terms of theoretical exploration, we must generally pursue islands on a contextual basis that is historically contingent, recognizing that humans are distinctly different than other species while at the same time admitting to ourselves that we are not exceptionally unique just because we *are* human (Terrell, 2006:2089). The implication for island studies, archaeological or otherwise, is that 'islandness' is a phenomenon that should be examined, whether it is recognized by islanders themselves or by outsiders. Archaeological approaches to islands that solely favour cultural models for societal change (Rainbird, 1999; 2004; 2007) and that diminish the role that biogeography can play in analyzing island societies prehistorically (*see also* Boomert & Bright, 2007), will hopefully be tempered and allow the hallmarks of archaeology – a combination of the social and natural sciences – to more effectively integrate scholars from other disciplines in the pursuit of understanding how islands have shaped humans, and how humans have shaped islands.

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