

Not Continents in Miniature: Islands as Ecotones

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Islands are different from all other lands in so far as they are defined by water.

It has been noted that “the concept ‘island’ implies a particular and intense relationship between land and water.”ⁱ No wonder, for the word itself comes from the Old English *igland*, *ig* meaning water. As waterlands, islands have not one, but several ecosystems. They are *ecotonal*, namely places where ecosystems intersect, overlap, and, as the word implies, exist in creative tension with one another. Islands are never the clearly bounded entities we imagine them to be. It was Rachel Carson who rightly insisted that “always the edge of the sea remains an elusive and indefinable boundary.”ⁱⁱ We will never understand island environments until we stop treating them as exclusively territorial, as continents in miniature.ⁱⁱⁱ My interest in the ecotonal nature of islands arises from my work on shores, the archetypal ecotone, where marine and terrestrial ecosystems intersect. Interest in ecotones is relatively recent and still underdeveloped, but intersects with a growing awareness of all things once regarded as marginal, both in the sciences and the humanities.

Islands vs Continents

Our misunderstandings of about the relationship of land and water are the product of western science and culture.^{iv} In the ancient world, land and water were never so differentiated as they are today. To the ancient and medieval Greeks, archipelago

meant the Aegean Sea itself, only later referring to the islands contained within. Now it refers to any group of isles.^v Ancient and medieval Europeans viewed the world as archipelagic, if not aquapelagic, one large *Orbis Terrarum* surrounded by many smaller isles.^{vi} Columbus voyaged in anticipation of island hopping to Asia. His chance discovery of a landmass that could not be sailed around or through called the archipelagic vision into question, and, by the eighteenth century, the modern distinction between islands and continents had come to be considered a fact of nature.

Still, the ancient view of the world as terraqueous persisted in many parts of the world. Until the eighteenth century, shores were considered waterlands, an indefinite zone of ever-changing dimension. It was not until then that term “coast” ceased to be a verb, referring to alongshore sailing, and became a noun, applied initially to certain edges of continents, though rarely to the shores of islands. The coast line was a cartographer’s fiction, superimposed on the fractal shore by the authorities of the newly emerging nation state, who seized upon the idea of the coast as confirmation of continents’ claim to be a natural unit of advanced civilization.

“People who live on continents get in the habit of regarding the ocean as journey’s end, the full stop at the end of the trek,” writes Jonathan Raban. But islands afford another perspective, one that takes water into account. Again Raban: “People who live on islands, especially on small islands, the sea is always the beginning....Islanders also know the sea goes on and on, in a continuous loop of shoreline and life, without a terminus.”^{vii} But it is the continent- alist view of history and

geography that has come to dominate in modern times, first in the west and then around the world. When European and American imperialists entered the Pacific in the eighteenth century, they set boundaries around islands that made no sense to indigenous peoples used to seeing the water as connecting rather than dividing.

In the modern era, islands have been treated as miniature continents, emphasizing “the bounded landscape at the expense of the broader seascape.”^{viii} Environmentalists have followed in this tradition, focusing either on land or on sea, ignoring that which connects them. For the most part, the environmental sciences have been landlocked disciplines. Oceanography is the last born of the modern sciences, always playing catchup. There exists what might be called a blue hole in environmental history, which has consistently ignored the 7/10s of our globe’s surface covered by water, a biosystem estimated to constitute 98 percent of our biosphere. Western civilization has largely ignored the sea except as something to pass over. The cartographic tradition of drawing lines where none exist and coloring blue all that lies offshore reinforced the notion of an elemental difference between land and water.

Lands were deemed to have histories, but the sea was assumed to exist outside of time. Modern historical writing has been largely continent alist in orientation. For most historians, history begins and ends at the coast. And even maritime history has been largely concerned with what happens *on* rather than *in* the sea. Islands, which can be shown to have

played an enormous role in historical development, have suffered from a similar continent alist
condescension. Only recently have they reclaimed their proper place in time, largely through the
efforts of global historians.^{ix} Now it falls to environmental historians to reveal their relationship to the larger environment.

Challenge of Environmental History

Reformulating and revitalizing environmental history requires that we not only go offshore, but that we follow water wherever it takes us. More attention must be given to watersheds and estuaries, to brown as well as blue water. We must follow migratory species, including humans, back and forth across the tide line, for island environmental history must be a history without borders, a history in depth as well as breadth, where earth, wind, and water are in constant motion and interaction, and humankind plays a significant role. Of necessity, such a history will be more liquid, but still grounded in the actual experiences of islands and islanders. We need to muddy the waters by bringing earth, water, and humanity together.

The challenge to environmental historians is to find the appropriate temporal
and spatial frames, to reset the boundaries of their subject so as not to mistake

momentary and local phenomenon for the large processes that have had such a profound

impact on island life. Rachel Carson rejected Alexander Pope's notion of man's earthly existence: "His time a Moment, and a Point his space." Instead, she urged us to consider deep time and broad horizons when it comes to studying environments, even those as supposedly bounded and static as islands.^x

It is particularly important to understand that island history is a co-construction of humans and nature. Nature has shaped islands, but islands also bear the imprint of humankind. It has been said that "it is just as interesting to ask how people make islands as how islands make people."^{xi} Islands appeal to us because they appear to be bounded objects which can easily be grasped by the mind's eye. Of all topographies, they are perhaps the most metaphorically powerful. We use the concept of island to describe all kinds of places – mountains, parts of the brain, traffic dividers – when we want to suggest separateness and isolation.^{xii} But equating islands with insularity blinds us to their realities, which are by no means disconnected from the world at large.

How islands are perceived varies from culture to culture, and over time within cultures. Islands in the minds of islanders are very different from those perceived by people who dwell in the interiors of mainlands, but not necessarily so different from those in the minds of coastal people, who have a similar relationship to the sea as islanders do. In the past, both islanders and coastal people qualified, along with the flora and fauna they depended on, as *edge species*, people capable of exploiting the possibilities of the ecotones they occupied. Inlanders

can also master margins, taking advantage of multiple environments, but, as industrial agriculture has become increasingly monocultural, interior ecotones have become increasingly rare.^{xiii} But it is also important to differentiate people who live *on* coasts from those who live *with* them, making their livings by crossing the tideline as fishers, gatherers, or mariners. Today, increasing number of people live *on* the shore, but fewer and fewer know how to live *with* the sea in an ecologically sustainable manner.

Environments are not something apart from us, but something that we have had a hand in constructing. The scale of an island environment is partly determined by nature, the patterns of winds and waves that impinge on it, but is also defined by how far its inhabitants range off and onshore in search of resources. Newfound landers were traditionally expert at hunting and gathering on both sides of the tideline. In summer, they turn their backs on the interior, but in winter they can be found inland, shooting moose, harvesting berries, and felling timber. Where fisheries are involved, the relevant environment is established not just by the migrations of the species being pursued but by the range of the fishers. The operative environment of an oyster man or clammer may be relatively narrow in scope, but a deep-sea mariner will engage with several different ecosystems in a single voyage. The whalers of Nantucket, for example, ranged from the Atlantic and the Pacific, encountering a remarkable variety of conditions. Living an ecotonal existence, islanders are extraordinary sensitive and adaptable to the conditions of both land and water. Their relationship to nature is by

no means passive. On the contrary, they have been shaping their own environments for millennia.

Living Ecotonally

While ecotones exist in many places, anywhere two or more ecosystems intersect, they are perhaps most common where land and water meet. They are found along streams and rivers, in wetlands, on the shores of lakes and oceans. Early human settlements were found in such settings, and it has been recently determined that the first developed *Homo Sapiens* made their home in the coastal caves at Pinnacle Point at the southern tip of Africa roughly 165,000 years ago, taking advantage of the nutritional wealth available at the tide line. From there they migrated alongshore, eventually populating the entire globe. It was along the so-called "kelp highway" that the world was first inhabited by humankind. Ever since, ecotones have been our favored habitat, just as they are for all other species, birds, fish, as well as

other animal species. Where ecotones were not provided by nature, we have created them. As we shall see, an ecotone is not a thing, a fact of nature, but a process involving many agents, including humans.

First used in its current sense of transitional space in 1926, *ecotone* combines the Latin term *eco* (derived from the Greek word *oikos* meaning house) with *tone*, which means tension in Greek.^{xiv} It is not a passive or static place, but one that is dynamic, belonging as much to history as to nature. Ecotones not only produce the greatest biodiversity, but the greatest rates of change. As Florence Krall has put it, "Change is a fundamental part of all natural communities, even those that seem stable, as the cycles of life and death act set into play a succession of regenerating events. But at the ecotone change is most evident and inevitable."^{xv} It is perhaps not surprising that ecotones have gotten little attention until recently, for so much attention in environmental studies has been focused on equilibria within systems, so little on change as such. Now, in a period of ecological crisis, change demands our attention. In response, the new environmental history has put into motion so many natural features that were once seen as beyond the reach of time. When she wrote her classic, The Sea Around Us in 1951, Rachel Carson could still talk of an "incorruptible sea." Today, the language of eternal sea is

being

displaced by that of the "mortal sea," an acknowledgment of the massive changes that so evident now, but which were always a part of our marine world.^{xvi}

While the historicization of nature is now proceeding rapidly, it is surprising that ecotones, where change is so evident, have gone largely unnoticed by historians. In part this is because the change that occurs in an ecotone like an oceanic tidal shore appears to be more cyclical than linear. But this, like so much else, is more illusion than reality. Cyclical and linear change are inseparable, and the shore, however much we may wish turn it into an icon of stability, is one of the most fundamentally altered places on earth. It is high time not just to bring ecotones into history, but to place them at the center of attention. Like so much that we have consistently defined as "marginal," of little interest in and of themselves, ecotones turn out to be central, not just on the micro but the global scale. They deserve our whole hearted attention, especially when it comes to islands, where ecotones have had so much greater importance than in the case of other land forms, particularly the interiors of continents.

I want to argue, as I have done in my history of shores, that islands that many of the characteristic features of islands and islanders are the product of island's ecotonal nature. Things than are often ascribed to islands as territories is in fact the product of their interaction with that which surrounds them. It is their unique character as waterlands that is what we should be paying attention to. This approach forces us to look well beyond the island itself, expanding the scope of island studies. At a recent conference on the future of islands held at the University of Michigan, Godfrey Baldachinno emphasized the resilience of small islands, demonstrating the many ways they have responded to the often hostile natural, political, and economic environments they find themselves. In a related, paper, Elizabeth DeLoughrey effectively undermined the myth of island isolation, showing the ways in which islanders have been consistently more connected to the larger world than are most continentals.^{xvii}

There are many ways to explain this, but one that is particularly fruitful is to see island shores as interfaces making connections between things that might otherwise remain separate. Just as membranes do on a molecular or cellular level, they facilitate

exchanges that are

beneficial to all the parties concerned. The place where land meets water has always been

a place of trade, not just of commodities but of ideas and languages. Until the modern era, water was the fastest, most efficient mode of communication. Before there were ports designed to

facilitate commerce, trade took place periodically on beaches, a safe, neutral zone.

In what is sometimes called "silent trade," ships would deliver goods to the shore and then stand off waiting for place their counteroffer there. If agreed upon, the exchange would be completed

without a word spoken. Until well into the seventeenth century, the European herring trade

was conducted a temporary sites that attracted hundreds of fishermen, leaving no trace once they finished their business.

Shores were considered extraterritorial, places where strangers could come and go as freely as the fish, birds, and other animals that also made their way stations on their

annual migrations. This accounts for the greater diversity of species that are found in marine ecotones. Shore peoples have been historically more heterogeneous than

inlanders, more likely to intermarry with strangers, more open to cultures brought from afar. Part of this is due to the wider range of their own travel, their dependency on the kindness of strangers in far flung ports of call. European cod fishermen of diverse national background arriving at Newfoundland to begin the fishing season in modern period

maintained peaceful coexistence by electing an "admiral" to adjudicate disputes until they all returned to Europe at the end of the season. Seafaring is, by nature, cooperative to some degree. Crews have always been mixed. The shore remained a commons, open by law and custom to fishers, hunters, fowlers, and navigators until our own time, when the extension of territorial limits and the privatizing of shores have ended ancient practices in the developed world.

Rachel Carson described the shore as a "marginal world," for her a term of admiration rather than, as it has become today, one of demigration. "Today a little more land may belong to the sea, tomorrow a little less. Always the edge of the sea remains an elusive and indefinite boundary." For Carson, it was this marginality that gave shores their superior generativity. "Only the most hardy and adaptable can survive in a region so mutable...In the difficult world of the shore, life displays its enormous toughness and

vitality...^{xviii}

This explains in part why islanders have been so resilient, so flexible and adaptable. The sea is both friend and enemy. Islanders have shown little tendency to romanticize it, leaving that to mainland landlubbers. Seafarers are sea fearing, fatalistic but not passive. The shore is for them that margin of error that makes all the difference between success and failure. Creating and maintaining margins is a hedge against becoming too reliant on one ecosystem or another. Until recently most fishers were also farmers, going to sea seasonally to supplement their earnings from small holdings. They did not live directly on the coast, but came down to the sea when their prey migrated close to shore. For most of history mariners have been part-timers, poor people who had no other choice if they were to support themselves and their families. Only very recently has seafaring become a profession, and a not very desirable one at that.^{xix}

Shore people, and islanders in particular, have always been jacks-of-all trades, one of the reasons they have survived in often hostile environments. Despite the stereotypes

of backwardness attached to them, they have always been in touch with advanced worlds, often ahead of their hinterland counterparts in adopting the latest ideas and fashions. Today, islanders have little choice but to adopt the most modern practices in order to survive a world that ruthlessly impinges on them. One of their tried and true means of survival has always been migration. When the environments of their native islands betrayed them, Pacific islanders picked up their crops and animals to move on, ultimately inhabiting worlds far larger than ever conquered by landlocked peoples. Today they are on the move again, this time sending back remittances that sustain the islands of their birth. There are often more islanders on mainlands than on the islands of origin themselves.

Shore people, and islanders in particular, learn to be adaptable. Living in a transition zone, which is itself always changing and often very challenging, they are fully exposed to what are sometimes called "edge effects."^{xx} Whatever advantages an ecotone may offer, edges are "fraught with tension."^{xxi} This is true not only of biological edges, but also culture ones. As Florence Krall has put it: "Cultural ecotones are the pluralistic contexts out of which conflict and change emerge; they are the places where society smooths wrinkles in her skirts."^{xxii}

It is important to note that ecotones are made, not given. Two or more ecosystems may intersect, but an ecotone does not exist unless someone takes advantage of this condition. The shape and size of a given ecotone is also a product of initiative. Human evolution has been ecotonal, beginning first at the point that forest met savannah, developing at the edges of streams and lakes, and then, in humankind's most spectacular leap forward, at the southern tip of Africa some 164,000 years ago. Carl Sauer was the first to perceive the shore as the original home of humankind, and recent research in the caves at Pinnacle Point, South Africa, has confirmed that *Homo Sapiens* originated in the ecotonal conditions of the tidal zone. For millennia, however, humans have been creating their own edges. "Thus, people do not just seek out and live along 'naturally' occurring ecological edges, but intentionally change the temporal and spatial dynamics of ecological systems in order to increase ecological diversity and resource abundance."^{xxiii}

Fire has long been used by hunter/gatherer peoples to clear heavy forests, opening up clearings for the growth of plants, both to be harvested by themselves and which attract large animals for kill or capture. When Europeans arrived in the Americas they found a mosaic of intersecting ecosystems created by Native American burning practices. They expanded upon these, creating still more ecotones conducive to their own forms of agriculture and animal husbandry.^{xxiv} The same was true of the shores, where local peoples had already learned to shape the tidal ecotone so as to enhance the clam and oyster harvest. On the northwest coasts of America, shore societies, as rich culturally as they were materially, had already reshaped the intertidal zone. As Rowan Jacobsen has reminded us in his fine study of Native American oyster cultures, "we are made for – and made by – that thin world where land meets sea."^{xxv} The Haida people occupied a waterland that they called *xhaaydla*, which was neither land nor sea, but both, living in a different kind of space but also on a different kind of time, much more attuned to daily, monthly, and seasonal rhythms of the sea.^{xxvi} They not only lived *at* the edge of the sea, but knew how to live *with* the sea in manner that has been largely lost today, even among islanders

Islands are notorious shape changers. Because shores are fractal rather than

linear, the

their exact dimensions are hard to pin down. They change with every tide, with major storms

and earthquakes. Our ancestors were right in thinking of them as moving or floating, as alive,

for, like shores, they are elusive and indefinable. In places of great seismic activity, they are

known to rise suddenly and disappear just as quickly. Both the Atlantic and the Pacific are

full of vanished islands, some quite real, others fanciful.^{xxvii}

But islanders' relationship to their habitat is also extraordinarily variable, as Canada's Prince Edward Island demonstrates. Until quite recently, its people were deeply engaged with the sea, approaching it as a resource, but seeing it as a place of toil and danger, to be avoided during leisure hours. They built well back from the shore and faced their houses away from the sea. Those who frequented the island's magnificent beaches were described as "chasin' the shore," seen as eccentric, even a little mad. It was tourists who first colonized the shore, building to the edge of the sea. It was only when native islanders began to disengage with the sea they too began to chase the shore, though many are now priced out of the choicest seaside locations.^{xxviii}

Mainlands have colonized islands, but the reverse is also true. Islands have provided platforms from which previously underpopulated mainlands were colonized. Island environments were also transplanted to continents. In the case of early agriculture, it moved from the Levant to Aegean isles, and from there to the Greek mainland, where it spread to northern Europe. In the case of northwestern Europe, coasts and islands played a key role in the Stone Age, as hunter gatherers moved along its Atlantic edge. They settled in rich estuaries and moved inland along rivers. But it was on islands that western Europeans first took up permanent residence, combining agriculture with fishing and shellfish gathering. As Barry Cunliffe has put it, "it was the sea that set the pace."^{xxix}

Hardening of Edges

Of course, the relationship between water and land differs from island to island. Large islands are more like continents, with their own interior ecosystems, less influenced by oceans, very different from smaller islands whose climates, flora, fauna, and human populations, are inseparable from the sea around them. Inhabitants of small islands have always been what ecologists call an *edge species*, moving back and forth across the tide line, simultaneously exploiting land and sea. They have been part of the loop of shoreline and life Raban talks about, their movements more cyclical than linear as they take advantage of daily, monthly, and seasonal changes to harvest the riches of both land and sea. Hunter-gatherers had long ranged deep inland

as well as far offshore on a seasonal basis. Europeans would extend their hunting and
fishing

practices both temporally and spatially, ultimately making the whole world an ecotone of
resources. In the case of whaling, what had been a local edge became a global one.

Around the globe, the loop has now been shattered, and coastal dwellers, insular as well
as continental, are no longer true edge species, except for their geography. With rare exceptions,
islands have become less ecotonal. Coasts are increasingly armored and wetlands
have disappeared, thereby severing a particularly rich connection between land and sea.
And islanders now no longer experience the connections between the two as they once
did.

Except in the underdeveloped world, it is rare for farmers to fish, or fishers to farm. With
the
industrialization of the world's fisheries, connections between land and sea have been
severed.

Fishing fleets have become footloose and crews internationalized. Many ships are now
registered

in foreign lands, some of them landlocked. They no longer have home ports. In the age
of

container ships crews often do not even set foot on the lands they visit.^{xxx}

It is not just that the natural environment of islands has changed, but both island and continental populations have altered their attitudes toward both land and sea.

Islanders.

particularly in the Atlantic and the Mediterranean, have become more continental in their

habits

and perspectives. For them the sea has become an alien world. It is only when hurricanes, tsunamis, and oil spills strike that they are reminded that they live in an ecotone, a

waterland.

For thousands of years in Japan an awareness of living not just *on* but *with*

the sea has been a part of coastal consciousness. To remind themselves of its

cruelty, Japanese villagers erected so-called "tsunami stones" to mark the farthest extent

of

inundation and to encourage people to build on higher ground. But recently the stones

have been

ignored and building on the shore has increased, encouraged by government-financed

construction of massive seawalls that, as the 2011 tsunami disaster showed, produced a

false

sense of security and contributed to scale of the devastation, which must be considered

not so

much a natural as a human disaster.

Though a growing part of humanity now crowds close to the shore, only a tiny minority have any idea of how to live with the sea. In the past, shores were colonized from the sea. Today, the newcomers are mainly inlanders, who have no notion of how earlier generations coped. Shores are the least understood part of our geography and history. In the absence of any sense of their past, the tendency has been to reach for technological fixes, such as seawalling, which have only increased the rate of coastal erosion. In the long run, the only sensible solution to accept the sea

and its

dangers, to build well back from the shore, to beat a strategic retreat, but there is

something

that property owners and the governments dependent on shore property for taxes have

been

reluctant to do. But there is really no option if we are to adapt successfully to the climate

changes

that are already upon us.^{xxx}

The terms shore and coast are often used interchangeably, when, in fact, they have different and conflicted histories. Before there were coasts, there were shores. The *coast line* was the invention of the eighteenth century, a fiction inscribed on a fractal

environment that bore no resemblance to its smooth, continuous contours. The modern notion of coasts was called into being by the rise of the continental nation state, which needed something that appeared to be a fact of nature to reinforce its fragile boundaries. As Martin Lewis and Karen Wigen have suggested, we are now entering into a post-continental era, when shores are again the focus of attention.^{xxxii} For two hundred years, national histories began and ended at coastlines. Now, what were once seen as natural borders are in question. There are 160 uncontested marine borders, but 270 that are challenged.^{xxxiii} And islands are again the focus of international tensions, not so much because of the lands themselves but the fishing in surrounding waters and the mineral riches that expanded territorial zones give them access to. With so much attention focused on what lies offshore and under the sea, the world looks a great deal more aquapelagic, a sea of islands, with emphasis on the sea as a material and strategic resource..^{xxxiv}

Global history has caused us to be wary of reifying political borders, but we must be prepared to treat so-called natural boundaries as equally liquid. As we have seen, land and water constitute an ecological continuum. We need to be wary of distinguishing too sharply the marine and the terrestrial. So-called “blue water history” has vastly exaggerated the importance of the deep seas at the expense of near shore waters, where most of the world’s fishing and shipping has always taken place. Perhaps it is time to focus on what might be called “brown water history” in order to better understand those ecotonal places which have been so central to human evolution..

The Necessity of Margins

Until quite recently shores have been regarded as marginal. Shore peoples

and particularly island peoples have of secondary interest to historians and geographers. But now we are beginning to appreciate the centrality of the marginal. Take the lowly hedgerow, for example. For most of the twentieth century, thousands of miles of hedgerow have been destroyed in the name of agricultural modernization. But now this ecotonal feature is again recognized as vital to the health of the fields it borders, and to the maintenance of biodiversity generally. After decades of ploughing right up to the edges of their fields, farmers began to become aware of the vulnerability of monocultures, the disappearance not only of plant, but animal and bird species. Lately, farmers are again hedging their fields, creating ecotones between forest and field, streams and pastures to prevent erosion and pollution, thereby hedging their bets against blight.

. An appreciation of margins is occurring everywhere. We now know the losses that occur when rivers are straightened and channeled, eliminating their meandering margins, cutting them off from their ancient flood plains. And now we are suddenly aware of the effect that the hardening of coasts has had on the ability of shores to maintain their own health and that of shore populations. When beaches are seawalled, dunes leveled, and shores built on, some of the most fertile margins of the world == wetlands, deltas, estuaries – have disappeared in an astonishing short time. The result is not a shore more stable and protected coast but one that is significantly more vulnerable than ever before.

It is in this moment of environmental crisis that we are rediscovering the necessity of margins. As Wendell Berry puts it “margins work to allow and encourage care and

contain disaster.”^{xxxv} He argues that “if change is to come, then, it will have to come from the outside. It will have to come from the margins.”^{xxxvi} Timothy Mason argues that we need to “support margins. As a matter of urgency we just *cannot* go on thinking of them as ‘in-between.’ We must choose to include them on this side of human social practices, to factor them into our political decision”^{xxxviixxxviii}

I have been arguing that we are an edge species, but we must be careful not to allow our edges to harden in barriers rather than perform as seams that afford connections that are vital to our social and environmental health. It might be better to think of ourselves as a margins species, for, as Edward Casey puts it, the margin is “embracing and open, in contrast with an edge, which emphasizes alterity and difference...”^{xxxix} Edges divide places, margins bring them together. Margins are a space of flows; edges belong to fixed places of stasis. It is the same true of the temporal dimensions of margins. At an edge, time’s arrow is unidirectional; in margins, time is cyclical. Edges belong to a world of linearity, margins to the realm of circularity. An edge is by definition something “in-between,” substance of its own. It always belongs to something else. It has no history or geography of its own. As a momentary transit point on the way to elsewhere, an edge is not a place in its own right or a time apart with its own duration and rhythms. Margins are humanly habitable, edges are not. Margins encourage humans to connect and communicate. They are the seams that facilitate exchange and communication. Unlike edges, which call a halt, margins invite entry and allow escape.

Shores are classical margins, always, as Rachel Carson insisted “elusive and

indefinable boundaries.” By turning them into coasts, fixed and lifeless extensions of land we thought we were protecting them and ourselves. However, the hard edges we have designed to fend off disaster betray us time and again. Seawalls only increase the force of wave action and lead to greater coastal erosion. All the barriers and hardened harbors the Japanese erected to defend themselves against tsunami only increased the destruction in 2011. The straightening of the Mississippi did not diminish massive flooding, but instead deprived its neighboring farmlands of vital nutrients. Damming and straightening of rivers has been disastrous to fish life, animals, and the peoples that rely on them. Failing to provide broad enough temporal and spatial margin of error has proven to be a miscalculation that we are now only beginning to recognize and correct.

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Endnotes:

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- x. Carol B. Gasstner, Rachel Carson (New York: Frederick Unger, 1983), 64
- xi. Cyprian Broodbeck, "Insularity of Island Archaeologists: Comments on Rainbird's 'Islands Out of Time,'" Journal of Mediterranean Archeology 12:2 (1999), 234.
- xii. T.H. Eriksen, "In which sense do cultural islands exist?" Social Anthropology I (1993), 133-47.
- xiii. Berry, chapter ix.
- xiv. "Ecotone" was first used in 1904 to mean to indicate a space that separated. By 1926 it had come to be associated with connection. It was first applied to water in the 1960s. "Ecotone," Oxford English Dictionary.
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