

## **Island Trajectories**

Before the dawn of human culture, oceanic islands were worlds unto themselves. Each one was unique, with animal and plant species that had come there on the currents of air or sea. On each island, as Darwin eventually recognized, they evolved with one another into assemblages of odd, striking, and naïve creatures unparalleled anywhere else. This evolution took place without any reference to humans, because there were as yet no humans in those environments. Even islands near one another were singular; Bali and Lombok, twenty miles apart on the opposite sides of “Wallace’s Line,” have contrasting biota. The singularity of ecosystems on isolated islands was even more marked. On the Hawai’ian Islands, splendidly remote in the central Pacific, gems of animals and plants evolved, the nene goose and silversword plant among countless others, peerlessly adapted to local conditions. Changes continued, but the changes were guided by local conditions. On Tahiti, say, they were “Tahitian” changes, unmatched elsewhere. Species arrived from abroad, but seldom, accidentally, and only rarely successfully. Then humans landed.

Richard Grove, in *Green Imperialism*,<sup>1</sup> suggests that islands offer a series of microcosms where ecological processes can be observed more clearly than in continents due to their circumscribed areas and relative isolation. Small islands like Nauru or Madeira, and even relatively large ones such as New Zealand, present those who come to inhabit them with special limitations not only of space but also of subsistence and time. From the viewpoint of humans, they are severely finite and their resources are consequently limited. The humans who arrived in these places, therefore, had to deal with the problem of shrinking resources much sooner than those who lived on the greater landmasses of the

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<sup>1</sup>Richard Grove, *Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism, 1600-1860* (Cambridge: Cambridge University Press, 1995).

Earth. My recent visits to Madeira, Bali, Hawai'i, Tahiti and the Society Islands, New Zealand, and the Marquesas have provided me with material for reflection on that subject. The pattern of human occupation of such places follows a similar, but not identical trajectory. What is that trajectory?

Tim Flannery, in *The Future Eaters*,<sup>2</sup> maintains that human groups arriving in new environments use the resources they find available, granted their level of technology, without thought of sustainability, until they approach the limits of those resources. Thus they have a tendency to consume what they, or their descendants, would need for the future. This is notably true of the peoples who arrived on islands, such as the Polynesians. Archaeological investigations in the past few decades have made it clear that they exploited whatever edible plants and unsuspecting animals they found, making many of them extinct.<sup>3</sup> In Hawai'i, for example, the Polynesians eliminated about 40 of the 110 native species of land birds before the first European showed up. In New Zealand, the Maoris quickly wiped out a dozen species of giant wingless birds called moas.

Initial survival and population growth depended on native resources, usually birds, fish, and sea mammals. As a rule there were enough of these to feed the new arrivals with abundant protein, and to support rapid population growth. There were limitations, however. Almost no land mammal species except for bats had managed to establish themselves on the more distant islands. Few native plants provided a plentiful food source for humans.

The settlers, however, were usually not castaways or victims of storms. They had set out deliberately to find new islands, and they carried useful species with them, introduced animals and plants that flourished after an initial period of difficulty and provided resources for rapid population growth. In the Pacific, they brought dogs, pigs, and chickens, while rats and geckos stowed on board, or perhaps were thought useful, too. Elsewhere, colonists introduced goats and larger domestic animals. The voyagers packed dozens of plant species to bring with them; they spread the coconut palm widely, and in the tropical Pacific, they carried useful seeds and shoots for horticulture such as taro, yams, breadfruit, and bananas. Once these productive

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<sup>2</sup>Tim Flannery, *The Future Eaters: An Ecological History of the Australasian Lands and People* (New York: Braziller, 1995).

<sup>3</sup>Patrick V. Kirch and Terry L. Hunt, eds., *Historical Ecology in the Pacific Islands: Prehistoric Environmental and Landscape Change* (New Haven, Yale University Press, 1997).

introductions had propagated enough to provide dependable sources of food, the numbers of humans and their settlements could increase further. Forests fell in the path of expanding agriculture, with erosion as a result.<sup>4</sup> During this time of rapid expansion, the most productive land was fully occupied, and even marginal lands had to be used. At that point, further expansion was unsustainable. Competition for food and other resources became keen, and after having lived out the time of abundance, island societies generated ways of dealing with a new situation of shortages.

Jared Diamond, in *Guns, Germs, and Steel*,<sup>5</sup> proposed that technological modifications in relation to the environments occupied by societies enable some of them to move to a new level of more effective interaction with those environments; various adaptations appeared. These allowed the period of rapid population growth to continue, but only to the point that the circumscribed environments of the islands could endure.

New technologies of horticulture increased food production. For instance, the sweet potato (*kumara*) was brought from its original center of domestication in South America by far-ranging Polynesian vessels, and became a staple even in colder islands like New Zealand, where most tropical food plants would not grow. But there these horticultural adaptations faced barriers of soil, climate, and available space.

Emigration to other islands was possible, even to hitherto undiscovered ones, but this rarely relieved the pressure for long. The size of vessels was not large enough, and the social and resource cost of building and provisioning the craft so high that not many vessels could leave, so the resident population could not be stabilized in that way alone.

Aggressive sub-groups with strong leaders arose and contested one another for the land and resources. This was a dominant pattern on many islands, including the Marquesas, Hawai'i and New Zealand. In much of Polynesia, it was accompanied by a social stratification in which the chiefs and nobles (*ariki, ali'i*) laid prior claim on the preferred resources, which they forced the commoners (*menehune*) to provide. Much energy was used in erecting monuments that emphasized the political and religious power, and by extension the

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<sup>4</sup>Barry Vladimir Rolett, "Hanamiai: Prehistoric Colonization and Cultural Change in the Marquesas Islands (East Polynesia)," *New Haven, Yale University Publications in Anthropology*, 81, 1998, p. 10.

<sup>5</sup>Jared Diamond, *Guns, Germs, and Steel* (New York: W.W. Norton, 1999).

economic affluence, of the ruling class. Measures to prevent population growth are noted, and these are often connected with social privilege; for example, on some islands infants born of relations between nobles and commoners were killed. Methods of contraception and abortion were practiced. Deaths in battle, and cannibalism to ingest the vigor of brave opponents, were also an influence on population. Patrick V. Kirch, in a paper on subsistence and ecology, summed it up well: “The prehistoric cultural sequences of Polynesia present the same scenario over and over: initial settlement by a numerically restricted group, rapid population growth, expansion into all habitable biotypes, and — frequently — intergroup conflict and degradation of the natural environment.”<sup>6</sup> In very small atolls, competition between chiefdoms was absent, and extremely scarce resources delimited subsistence.

Societies often made cultural adjustments that encouraged more careful use of resources. Taboos amounting to a tradition of conservation can be identified. These prohibitions, carrying religious and legal sanctions, protected certain species and resources. Tribes were often forbidden to hunt their totem animals. In Hawai’i, certain fish species were regarded as sacred to individual gods, and catching them was forbidden during the time of year when those gods were honored. In consequence, those species could recover their numbers during critical times.<sup>7</sup> Certain forests in the mountains were regarded as holy precincts, where spirits resided, and their use was strictly limited. The Hawai’ians treated the highlands with the traditional ethic of *aloha aina*, based on love and reverence for nature, and especially the awe felt for *mana*, the living spiritual energy shared by living beings. These are instances of attitudes and practices found on many islands.

Factors of adjustment to resource scarcity were different on different islands, and the long-term results also varied. Some island societies suffered disaster. On Easter Island, there was constant warfare between rival groups, and human energy was spent in erecting huge statues to honor ancestors of the nobles in tribal groups. Virtually all resources were overused: all the trees were cut, nesting populations of sea birds were destroyed, and chickens, the only domestic animals that had survived on the island, had to be hidden in fortress-like coops to protect them from enemy raids. Environmental impoverishment and a

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<sup>6</sup>Patrick V. Kirch, “Subsistence and Ecology,” Jesse D. Jennings, ed., *The Prehistory of Polynesia* (Cambridge, MA: Harvard University Press, 1979), p. 304.

<sup>7</sup>Examples from New Zealand are listed in J. Donald Hughes, “New Zealand: The Maori and Island Resources,” *CNS*, 12, 1, March 2001, pp. 119-20.

rapid population decline resulted. Pitcairn Island was abandoned after its original Polynesian settlement. In these cases, the trajectory of human population and resource use ended in a crash not unlike that of other animal species when their numbers exceed the capacity of food resources.

On other islands, population remained at a fairly high but stable level, and resource use was sustainable after the initial period of depletion. This seems to have been true of such islands as Samoa, New Zealand, and Hawai'i before the arrival of Europeans. The pattern in those places was vigorous competition between strong chiefdoms combined with a deep sense of reverence for the gods of nature and the creatures and elements that shared the islands with them and on whom they depended. The motto of Hawai'i, "Ua mau ke ea o ka 'aina i ka pono," means "The life of the land is sustained by a proper relationship."

Even the Pacific islands that maintained a large population to the time of European incursion suffered great changes, including damage to landscapes and biodiversity. But one may well ask what determined the difference between the trajectories of human occupation in "successful" groups like the Marquesans as compared with "failed" groups like the Easter Islanders. The question cannot yet be answered definitively, but I will offer a few observations. The cause cannot be ethnic; all the inhabitants were Polynesian. Easter Island was probably settled from the Marquesas. Nor can it be intertribal warfare, since that was rampant on all islands and archipelagos except the smallest ones. There were no important differences in technology between "successful" and "failed" island inhabitants. The type of island was not the deciding factor—there were successes and failures on both high islands and atolls—although extremely small islands did not offer much space for success. The presence or absence of specific resources, and differences in the list of animals and plants introduced by settlers, or brought later, to specific islands is a matter that needs further careful study. The degree of contact between island groups may have played a role; when the first Europeans arrived, the Easter Islanders believed they were the only people in the world. Population pressure was the only powerful driving force behind environmental degradation before European impact, so that people on islands where controls on population growth were effective had a better chance of conserving their renewable resources. I would like to think that wise traditional leaders who knew when to place taboos on critical resources made a difference in "successful" communities, but historical records are inadequate to establish that point.

The changes that take place on small islands are local in scale, although they reflect events worldwide in scope. A longer, more complex pattern of change occurred on the larger landmasses such as Pre-Columbian North America, as Flannery describes in his recent book, *The Eternal Frontier*.<sup>8</sup> Beyond that, with the worldwide expansion of industrial technology and the market economy, the Earth has become an island, and a pattern like the trajectories of population growth, resource exploitation, depletion of biota and inter-group conflict observed on islands is now occurring on a global scale. The question is just which island history the global trajectory will turn out to resemble most.



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<sup>8</sup>Tim Flannery, *The Eternal Frontier: An Ecological History of North America and Its Peoples* (New York: Atlantic Monthly Press, 2001).