Proceedings of the annual meeting of the Southern Anthropological Society

Volume 42
Number 1 *The Art of Anthropology / The Anthropology of Art*

Article 4

2013

# Art as Distraction: Rocking the Farm

Daniel W. Ingersoll
*St. Mary's College*, egrove_dwi@maildrop.cc

Kathleen Butler Ingersoll
egrove_kbi@maildrop.cc

# Art as Distraction: Rocking the Farm

*Daniel W. Ingersoll and Kathleen Butler Ingersoll*

## *Abstract*

Monumental architecture, massive statuary, and other art forms fascinate Westerners and tend to inspire positive judgments about past cultural virtuosity and sophistication. Like the pyramids of Egypt or the stone masonry of Machu Picchu, the *moai* (the statues) and *ahu* (stone platforms supporting moai) of Rapa Nui (a.k.a. Easter Island) have impressed, mystified, and preoccupied the Western cultural imagination since their encounter by Europeans.[1] Explorers, archaeologists, anthropologists, and tourists are drawn to the monumental like moths to light—which is understandable—but that light also blinds. Here a case is made that for Rapa Nui the obsession for the monumental has led to a certain inability to perceive past Rapanui culture in a holistic fashion. For example, we contend that the labor to sculpt and move the moai has tended to be massively overestimated, in comparison with the enormous energy invested in constructing the more homely horticultural infrastructure that involved billions of rocks. We argue that the loss of the palms did not cause the culture to crash because moai could no longer be transported or because the soils eroded away, as many claim, but rather that the palms became part of that more humble but enduring subsurface realm as amendment for planting pit soil. We also argue that the Western narrative of Rapanui cultural collapse, which hinges in large part on the

cessation of moai production, is not based so much on empirical data but on a ubiquitous Western mythic story form of apocalypse, here a secular, Malthusian version. The preoccupation with monumental art and the apocalyptic story model shape the perceived outcomes: cultural Armageddon, collapse, and ecocide. The collapse story tells more about us than about them.

## The Monumental

When anthropologist H. Russell Bernard polls Americans (United States), most recently in Florida, on what they rank as the great accomplishments of science and social science, he finds that they tend to conceptualize science as engineering and technology, identifying "life-saving drugs, computers, space exploration, and so on" (2012, 1). Almost no respondents mention constitutions, encyclopedias, relativity theory, actuarial tables, time-motion studies, probability theory—ideas that have transformed the world and that made the technology possible. American cultural "marking" of "success" clearly gravitates toward the material, the physical, and the palpable (Bernard 2010). Ideas find themselves relegated to the dubious realm of the Ivory Tower.

Ask any Westerner: What are the wonders of the world, ancient and modern? Pyramids, temples, tunnels, bridges, cathedrals, castles, frescoes, statues, skyscrapers, et cetera, the bigger, the more complex the technology, the better. Just watch the lead-in to the popular TV show *The Big Bang Theory* that interleaves on a timeline, moai among other glimpses of the world's extraordinary material accomplishments like the wheel, the Leaning Tower of Pisa, a locomotive, automobiles, warplanes, pyramids, and the Sphinx (evolutionary life forms, images of Jesus, Einstein, Martin Luther King Jr., and the Constitution appear also). If it's monumental, it's going to

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DOI: 10.56702/MPMC7908/saspro4201.3

grab Western attention, and if it's non-Western in origin, the mystery quest contest begins. Who built it? Surely, *these* people couldn't have engineered those massive earthen temple mounds (Southeast United States), the giant desert figures (Nasca Lines), the pyramids (Egypt, Mexico), et cetera, those marvelous statues and precise stonemasonry (Rapa Nui)! Rather, it looks like the work of the Seven Lost Tribes of Israel, Outer Space Aliens, itinerant Egyptians, or balsa-raft sailors from South America. The tightly fitted basalt blocks facing of Rapa Nui's Ahu Vinapu resembles that of Machu Picchu. If built by Peruvians, how did they get there? The moai, how did they move them? Myriad experiments follow to ascertain the technological processes: Were the moai walked (Heyerdahl 1989; Pavel 1995; Hunt and Lipo 2010), advanced with a bipod device (Mulloy 1970), or dragged on sledges, and if so, prone or supine (Van Tilburg 1994, 1995, 1996), or moved upright on rollers (Love 2000)?

Monumental architecture, massive statuary, and other art forms fascinate Westerners and tend to inspire positive judgments about past cultural virtuosity and sophistication. Like the pyramids of Egypt or the stonemasonry of Machu Picchu, the moai and ahu of Rapa Nui (you can readily find images of these on the web) have impressed, mystified, and preoccupied the Western cultural imagination since their first glimpse by Europeans. One attribute of the monumental, of course, is mass. The bigger the better; a smaller version, even if equivalent or greater skill is required to make it, rarely commands the same admiration—the craft skills required to form a contemporary five-centimeter-tall (little finger length) moai from hard obsidian, found in every tourist shop on Rapa Nui, may exceed those needed to fashion a five-meter-tall one weighing fifteen tons from tuff or basalt.

## The Arts

Combine the monumental with "art," and you have the real power to move the Western audience. And what could be more artful than the enigmatic smile of Mona Lisa, or more entrancing than the gaze of *Hoa Haka Nana I'a* (view this moai by visiting the website of the British Museum) (Horley and Lee 2008, 112)? We place *art* in quotation marks here, in part because art lives in the minds of the beholders. For Westerners, art constitutes one special and segmented category of experience and meaning among many other categories. Western culture generates myriad bounded, discrete categories: species names, personality types, occupational titles, as well as disciplines such as anthropology, sociology, history, and economics. Anthropology, for example, often deploys classificatory categories like kinship, religion, myth, ritual, subsistence, and technology. Although anthropologists of the functionalist theoretical persuasion attempt to interrelate them, the categories still remain segmented (Harris 1968, 516-17, 1999, 51-52), and they are still projected onto other cultures as if the categories were universal in their distribution, which they are not.

Art exists as a bounded Western cultural category. In Western culture, art pertains to the individual. Art offers a means to excel, to achieve wealth, to signal invidious distinction, to acquire fame, recognition, and remembrance. Art should be creative and original, thought provoking, radical, and new. Art stands apart from the functional; works of art are foregrounded, framed, set off from the mundane and placed in special locations. What Western culture defines as art entrances, captivates, inspires, and rewards with respect and admiration. The artistic, the monumental, and the technologically virtuosic rivet Western attention to the point of fixation, compulsion, and blindness—resulting in tunnel vision in respect to the cultural

complexity of others. An example from another culture: when Westerners view Navajo "sandpaintings," they call them paintings and label them "works of art." They watch in horror as the paintings are erased at the end of a curing ceremony. Even the anthropologist is barred from committing the sandpaintings to museums. Why is that? You need to put away the Western categories and take a holistic view of healing in Navajo culture to understand the drypaintings. Griffin-Pierce writes:

> The sandpainting is considered to be a sacred living entity. The Anglo perception of a sandpainting as an artistic achievement misses the true meaning of the sandpainting. The physical beauty of the depicted image is insignificant in comparison to the ceremonial accuracy and sacredness of the depicted forms. The emphasis of the sandpaintings is on process, the dynamic flow of action, and on its ability to summon power through the process of its creation and use. (1992, 55)

It's not about technology or art but about the power of knowledge, thought, words, mythic symbols, and the efficacy of the ritual itself to restore harmony and balance to a person or group. As the ritual unfolds, the sandpainting grows in depth and morphs, helping to tell stories and to merge past and present. You could not really exhibit a sandpainting in a museum; the upper surface of the sandpainting is just the final surface of a three-dimensional being. If you can grasp this, then not classifying sandpaintings as art makes perfect sense.

## Monumental Art

If we combine the monumental and art, the attraction is magnified indeed.[2] The moai are big *and* artistic, right (images of moai are easy to find on the web, for example, at TREKEARTH and the National

Geographic sites)? Of course! How big? So big that it took forests of trees to transport them. So big that an entire transportation system had to be created to carry them. So big that the manpower draw to create these social signaling devices overtaxed the economy, as the competition to outdo the Jones clan spiraled upwards until the last palm was cut down. So big that the overtaxed economy collapsed into civil disorder. So big that with the palms gone, canoes could no longer be fashioned, and the Rapanui became island-bound.

How artistic? So artistic that the moai have become widespread icons of artistic virtuosity for millions of Americans and other Westerners. What follows is a sampling of moai madness. There are restaurants that feature moai, such as Tiki Moai House in Fort Lauderdale, Florida, and Aku Aku in Las Vegas, Nevada. Want a moai garden statue? You can order a six-foot-high replica of one from *Ahu Akivi* through *SkyMall* (a catalog available to "approximately 88% of all domestic air passengers reaching more than 650 million air travelers annually" [www.skymall.com]) or directly from Design Toscano. Design Toscano also sells moai bookends. You can try to read your books in the glow from a Lumisource Electra Phosphor table lamp made in the shape of a moai. About to sneeze? Pull a tissue out of the nose of a moai tissue dispenser, available from the Acorn or the Bits and Pieces catalogs. You can get that marvelous hospitality drink popular in Chile and Peru, the pisco sour, in moai-shaped black plastic bottles—even in the United States (you can find it easily on the web, for example, at Tiki Central). Some companies, such as Moai Technologies or the Fellows Galleries, feature moai in their advertising. Buy a Wilco moai poster and support Los Padres Forest Watch. A recent (January 2013) Microsoft TV ad for its latest operating system depicts a seacoast scene (Pacific Northwest?) with a glimpse of a giant moai-shaped rock. Send a moai greeting card featuring three conversing moai that says, "Happy Birthday from one

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DOI: 10.56702/MPMC7908/saspro4201.3

the air moai with the caption "April 5th, 1722 Explorers discover 'Keester Island'" (American Greetings). Moai cartoons appear in magazines such as the *The New Yorker* (October 11, 2004), where a man with a moai-like head and a woman are at a bar. The woman says, "Wait. I never forget a face—Easter Island, 1722." Cartoons making the rounds on the Internet depict moai: one with two Rapanui men standing among a number of Ranao Raraku quarry-slope moai, one saying to the other, "This little vanity project of yours won't last, you know" (Creators Syndicate, Inc. 2010). In another cartoon depicting a group of moai on a grassy hill gazing at the sea, one moai says to the other moai, "Look at me while I'm talking to you" (www.CartoonStock.com). In the realm of the fine arts, one of Max Ernst's images in his graphic novel *Une Semaine de Bonté ou Les Sept Éléments Capitaux* (1934) depicts a man with a moai head looking in a hand mirror with a giant praying mantis perched on the dresser, and behind the man, a woman looking in the window from outside (shown in Kjellgren, Van Tilburg, and Kaeppler. 2001, 22, figure 7, *Jeudi le Noir Autre Example: L'Île de Pâques*). Ernst portrayed a series of humans with heads of *moai*.

We conclude our moai examples with some in-print representations. Since at least 1997, the *Rapa Nui Journal* has offered the regular feature Moai Sightings, but as early as 1992, the publication made occasional mentions of sightings. For example, in volume 25, issue 2, released in October 2011 (68), the following were featured: moai garden art from *SkyMall*, a moai atop a coffee stand in San Diego, a Starbucks cup from Chile with the Ahu Tongariki moai, battery-powered tiki pepper grinders, a moai head in the Gardens of Appletern in Holland, and a counter of a deli in Rocklin, California, with moai painted on the vertical surface. The *Rapa Nui Journal* recently decided to drop this section (last issue with the section, May 2012). In addition, many books about Easter Island feature moai on their

covers: Fischer (2005), Flenley and Bahn (2003), Heyerdahl (1959, 1989), Loret and Tanacredi (2003), McCall (1994), and McAnany and Yoffee (2010). The cover of the July 2012 issue of *National Geographic* recreates the scene of ancient Rapanui walking a moai with ropes attached to the head; the cover headline reads, "Easter Island The Riddle of the Moving Statues."

The impact of the moai on Western cultural sensitivity and consciousness has been massive, we argue, to the point of distraction. The moai as monumental art have dominated interpretation. We present a brief "revisionist" history that downplays moai and diverts the focus to the greater landscape.

## Our Brief Revisionist History

There are at least nine hundred moai (not including those possibly incorporated in semipyramidal and boat-shaped ahu), about 250 moai on ahu, and the remainder exist around the Raraku quarry (photograph 2.1) or beside roads (Mieth and Bork 2004a, 20; Sanger 2011). If the period of moai construction extended from around 1000 AD to ca. 1680, as some suggest, that's about 680 years, and positing regular production, about 1.3 moai per year (similar estimates can be found in Hunter-Anderson [1998, 88]). If the period of moai construction began after a later settlement date of ca. 1200 and lasted until ca. 1680, that would be about 480 years, a creation rate of about 1.9 moai per year, not sufficient to drain an island with an eventual population of five thousand to ten thousand (Flenley and Bahn 2003, 201). Employing the estimate of Jared Diamond (2005, 90 and 2007, 1693; see also Hunt and Lipo 2011, 11), who posited a population peak of around twenty or thirty thousand, surely many hands made short work. We suggest that although the moai are spectacular, they did not bankrupt the society any more than making skyscrapers has bankrupted Manhattan.

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Photograph 2.1. A view of Ahu Tongariki (background) from inland looking seaward, with one supine moai (foreground). The position of the camera is within the 1960 tsunami flood plain. (Photograph by authors)

What about the ahu, about 250 of them, with both rough-cut and fitted plates on the outer surfaces and tons of basalt rubble fill within? Some of the ahu are of massive scale, as at Ahu Tongariki, which is 220 meters long (photograph 2.2). But ahu without moai on them do not evoke nearly as much awe from the Western observer. Yet, the ahu, though usually reconfigured and without moai, continued in use into the 1860s and the time of Western disruption of traditional Rapanui society. And what about all those massive basalt curbstones (slightly curved foundation stones with small insertion holes for roofing support members) for *hare paenga* (elliptical or canoe-shaped houses) and their pavements of beach cobbles (*poro*)? No doubt, substantial labor was involved for all of these and more. Yet no commentators claim that making ahu platforms, fashioning

curbstones and hare paenga, transporting poro, or building roads or canoe ramps exhausted Rapa Nui resources.

Photograph 2.2. Moai on the Rano Raraku quarry slope. (Photograph by authors)

The moai did not all fall at the same time, nor did they necessarily all ever stand at one time. And the moai on the Rano Raraku quarry

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slope (not on ahu) remain standing to this day. European observers from Roggeveen in 1722 through the 1830s reported moai standing on ahu (Eyzaguirre 2004; Richards 2008, 69-70). Raging civil discord often gets invoked to explain the toppling, but few researchers have considered alternative causes and the chronological parsing of the falls, with Edwards et al. (1996) a notable exception. Following Edwards, we suggest that some of the moai fell due to simple structural instability of the ahu, or from tremors or earthquakes, and in some cases tsunami. While we are not aware of any documented topplings of moai by tsunami, in 1960 a massive tsunami spawned by an earthquake in Chile destroyed Ahu Tongariki; if any moai had been standing on Ahu Tongariki at the time, they would have been knocked down. Previously fallen moai were carried inland hundreds of feet. Ahu Tongariki was rebuilt and restored with moai erect by the Japanese firm Tadano in the 1990s (E. R. Mulloy 1991; Fischer 2005, 237-238) and is one of the major tourist stops today. Many moai seem to have been deliberately reincorporated into new forms of ahu as *fill*, perhaps by their own kin group members, as the prevailing cultural symbolism gradually evolved away from moai as cultural icons (see Fischer 2005; Flenley and Bahn 2003; or McCall 1994 for descriptions of the more recent Makemake and Birdman symbolism).

## Look Away: A Revisionist Landscape

Enough about moai. Step back from the ahu. Look where the coastal moai are looking: inland. What does the Western observer, the visitor, or the tourist see? According to a sampling of tourist impressions (Bove n.d.) and our own study-tour student reactions (at least initially): a barren, volcanic wasteland (photograph 2.3). In a recent book by two archaeologists, the word *barren* was used seven times, with most occurrences referring to Rapa Nui. Why? In part because the rocky appearance of the landscape suggests to the Westerner a

natural volcanic rubble field, in so many places difficult to traverse. There are thought to be no trees.[3] And there are few "working" people on the landscape. The crops once tended before European contact have been replaced with imported grasses for grazing, first for sheep, now for horses and cattle, not to mention the accidental invasive species (photograph 2.4). So, you need to use your imagination to reenvision the pre-European contact landscape: put the Rapanui people, the pre-European contact plants and grasses, and the gardens back into the panorama.

Photograph 2.3. West Coast ahu and rock-mulched gardens. (Photograph by authors)

The landscape beyond the social and ritual zones near the ahu and moai could hardly be further from a natural one. We pick up at the point where the *Jubea*-like palm no longer punctuates the landscape, perhaps due to human agency, but that's another story we will address in a separate paper. Pre-European contact cultural practices, rediscovered by archaeologists like Haoa Cardinali, Stevenson, and

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Photograph 2.4. Invasive plants: bull thistle and johnsongrass, west coast. (Photograph by authors)

Wozniak (Stevenson et al. 2005; Stevenson and Haoa Cardinali 2008a, 2008b, 2008c, 2008d; Wozniak 2005), indicate extensive quarrying and relocation of intentionally shaped and sized stone. Those scatters across the Rapa Nui landscape are human-created, as much as the burial markers in a New England cemetery surrounded by stonewalls. Think of almost every stone you see on the landscape as a manuport, placed deliberately in strategic areas by human action, for reasons Sonia Haoa Cardinali heard mentioned by the old people of the island (photograph 2.5). What many of the stone scatters mark is different kinds of gardens, such as lithic mulched, veneer, and boulder (photograph 2.6). Baer et al. (2008, 107) define six categories of rock gardens. These gardens clothe an amazing proportion of the landscape—excepting the Poike, the oldest of the island's volcanoes. Mieth and Bork (2004a, 42) estimate that "about 70% of the island

surface is strewn with stones of all sizes, in places forming a complete blanket." Distributions of the blanket type—that is, mulching stones (not all gardens are "mulched")—cover 76 km$^2$ of the island's 166 km$^2$ total (Bork, Mieth, and Tschochner 2004, 12; Wozniak n.d.). Mieth and Bork write:

> The labor intensity of the stone mulching phase is certainly still underestimated in its cultural importance. Taking into account the total weight of transported stones, it is clear that the physical effort invested in the stone mulching culture probably exceeded the labor efforts of the ahu/moai phase by far. (2004b, 62)

They graphically illustrate this concept of estimated stone-transporting labor with two vertical bars (2004b, 63, figure 13), one bar in front of a moai on an ahu, and the other superimposed on a stone-mulched garden surface. The bar height/volume ratio is about 1:11.7 (ahu and moai to stone mulch). We suggest that with quantification of ahu and moai volumes, and comparison to stone-mulched surfaces and underlying amended soil volumes within sample social territorial units, the ratio would actually be much more extreme than 1:11.7.

A study conducted by Ileana Bradford and reported by Hunt and Lipo (2011, 39-41) identified 2,553 *manavai* enclosures (photograph 2.7), covering 6.4 square miles, or 10 percent of the island surface area. We think the area figure is high, both impressionistically and mathematically. Our calculations with these figures, converting to meters, give their average radius of a manavai at 137 meters, on a scale with football fields. We think the average is more like 2.5 meters in diameter. Wozniak (2005, 140) furnishes a dimension range of 2-5 meters. In terms of numbers, according to Morrison (conversation, July 2012), the initial numbers were calculated from satellite images;

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Photograph 2.5. Sonia Haoa Cardinali in a rock-mulched, veneer garden with taro. (Photograph by authors)

Photograph 2.6. Extensive boulder gardens, north coast, Hanga Oteo. (Photograph by authors)

he thought around 80 percent of the number quoted above would actually ground proof to manavai. However, there are inarguably many manavai, and many more manavai than ahu and moai. The manavai and lithic-mulched gardens and boulder gardens still retain functionality and higher fertility levels after nearly 150 years of internment of the cultivators and by 100 years of sheep company grazing with little or no replacement of lost nutrients.

Photograph 2.7. Manavai with bananas surrounded by boulder gardens. (Photograph by authors)

Often, even when you think you are walking on natural bedrock, you are actually on a quarry's bottom, which may once have served a useful end-function of collecting and redirecting water flow. Each quarry—a volcanic flow or outcrop, mass of boulders, or extrusion—might have produced construction plates and curbs as well as thousands and thousands of stones for gardens. Mieth and Bork (2004a, 12) calculate 1.14 billion mulching stones, or 2.15 million

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tons for the island. Stevenson and Haoa Cardinali (2008c, 38) say billions (an estimate, not a count)—in just one area's survey—and we agree. Photograph 2.8 shows quarrying in interrupted progress. But when the rock finally is quarried down to ground level, it may serve an additional terminal function: water collection and diversion. Photograph 2.9 is a view of a large quarry in cross section. Photograph 2.10 shows a horse drinking water from a quarry taken to ground level; some terminal quarry surfaces of this type have channels cut in to direct water out. Thus, quarrying also contributed as one means of water resource management. Other means, quite dramatic in the transformation of the landscape, are being investigated now by Burkhard Vogt and his team (2012) on an intermittent watercourse on Terevaka, a location named Ava Ranga Uka A Toroke Hau.

Photograph 2.8. Volcanic outcrops with wedge rocks inserted to break up basalt. (Photograph by authors)

Photograph 2.9. Basalt quarry and flat surface left after quarrying. (Photograph by authors)

Photograph 2.10. Horse drinking from water collection basin. (Photograph by authors)

The billions of rocks serve multiple horticultural functions: protection from the wind; buffering of the soil and plant temperatures; conservation of soil moisture, moisture capture (dew condensation); control of weeds; a source of nutrients through leaching of minerals by rainfall; and prevention of soil loss by reduction of erosion (Bork, Mieth, and Tschochner 2004, 10). This sounds like the beginning of an eminently sustainable horticulture. So far, we have just scratched the surface—literally. Underlying those pesky (to Westerners) lithic- and veneer-covered surfaces, the boulder gardens, are enormous volumes of anthropogenic soils and thousands of planting pits. Under lithic mulch lies perhaps 62 cm of anthropogenic soil; under veneers, 88 cm; under boulders, 50 cm (estimated from excavation profiles in Stevenson and Haoa Cardinali [2008]). Take 70 percent of the island's area, 116 square km, at a modest 50 cm depth, or 0.5 m, and you have 58,000,000 $m^3$ of cultural/horticultural volume. This does not mean the rest of Rapa Nui's "un-rocked" landscape was not transformed. This is just the more visible part: the real rock art—rocking the farm—on a culturally varied landscape. The moai and ahu don't even register on this scale of demands on labor and resources.

What is in the anthropogenic soils underneath all those carefully shaped and placed rocks (photograph 2.11)? We think there is a good possibility that is where the palms and lots of other organic materials are, often as charcoal, otherwise known as biochar. The term *slash and burn* frequently occurs in the Rapa Nui literature, but we think there is widespread evidence in planting pits and anthropogenic soils underlying rock mulches for slash and char, a very different process, where biochar, *not ash*, is produced in a *reducing* atmosphere (highly limited oxygen). To differentiate, ash is mainly the remaining mineral fraction of plant materials left over after organic material has been burnt in an oxidizing atmosphere (lots of oxygen). Mineral ash is the primary product of slash and burn. Mineral ash will contain

nutrients such as phosphates, iron, boron, et cetera, but not much carbon. The ash provides a quick burst of fertility, but one that might last only a few seasons.

Photograph 2.11. Excavation of a rock-mulched garden showing dark amended soils. (Photograph by authors)

Charcoal, char, carbon black, or biochar results from combustion in an oxygen-low or reducing atmosphere. To produce biochar, oxygen access must be deliberately limited, here probably by burning carbon-containing materials in pits or leaf and dirt-covered piles. Then the biochar produced is added as an amendment to soils in planting pits or beneath rock veneer. The biochar amendment, while not really a fertilizer, helps hold moisture and acts like a chemical sponge to bind nutrients. Biochar resists decomposition, unlike raw compost, which readily gasses off carbon dioxide ($CO_2$) and methane ($CH_4$). Biochar can endure hundreds of years, maybe thousands (see Glaser and Woods [2004] and Woods et al. [2009] for a discussion

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DOI: 10.56702/MPMC7908/saspro4201.3

of the characteristics of Amazonian Dark Earths). Biochar—ranging from charcoal down to carbon black—is abundant in Rapa Nui anthropogenic soils and planting pit contents. The planting pit pictured in photograph 2.12, two meters or so in diameter and over a meter deep contained perhaps forty liters of charcoal. This could be where the palms and other trees went as they fell, by whatever cause: as biochar to thousands of planting pits and thousands of cubic meters of anthropogenic soils underlying lithic mulch.

Photograph 2.12. Salvage archaeology of a planting pit exposed by an eroding gulley in Sector 26, northwest coast, with Sonia Haoa Cardinali pointing out one end of a voluminous charcoal lens. Think of this lens as a three-dimensional dish-shaped deposit. (Photograph by authors)

Now, our hypothesis about palm and other organic material ending up as biochar resulting from slash and char rather than slash-and-burn technology is not the only possible hypothesis. In response to an earlier draft of this chapter, Andreas Mieth offered these comments:

> Regarding the intentional production of biocharcoal *especially for fertilizing* I am not so sure. I think that charcoal could also have been produced during slash and burn. Thick wood pieces like stumps are often undersupplied with oxygen during the burning process that causes development of ash *and* charcoal. This happened also when wood was burned in fire-pits and *umu*, where charcoal was perhaps also intentionally produced to keep the heat for longer time (as in barbecuing). We found also charred palm stumps covered by charred grass. The grass was obviously used to inflame the stump, but perhaps also for producing a slower burning process and production of glowing charcoal. We found evidence that charred palm stumps served as umu for cooking. But no doubt: the Rapanui knew about the fertilizing effect of charcoal and ash. It is no accident that this material is found in planting pits and garden soils. It is just the intentional production of [biochar] fertilizer that I do not find convincing—I argue rather for a secondary effect or use.
>
> And another important point: apart from the charred palm stumps only very little charcoal of palms is found in the fireplaces (see publications of the Orliacs). This speaks against a simple burn history of the palms. We argue more for a *slash and use* hypothesis, which means use of palms *without* burning them—perhaps the use of the palm stems as a liquid source followed later by their biological decomposition. The burning traces we find today are mainly from other tree and shrub species, and, in the later land use phase, more from grasses. The most evident charcoal remains of the palms are the charred stumps found in situ. (Mieth, personal communication, August 30, 2012)

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We still hold to the opinion that the production of biochar was deliberate, but we certainly recognize that charcoal and carbon black can also be produced by the slash and burn means described by Mieth above, and certainly, that decomposed palm could be part of the soil amendment process. The technologies are not mutually exclusive. Mieth mentions the biological decomposition of palm, something we have been documenting on Rapa Nui (yes, there are palms on Rapa Nui) and in the Hawaiian Islands. The several species of palms we are observing (coconut, royal, queen, and king palms, but unfortunately, no Jubaea palm available yet), once dead and down, decompose *very* quickly, much more quickly than trees like oaks and pines, leaving behind perhaps just their mineral content, some starch, and phytoliths. A series of experiments we have in progress on Molokai, one of the Hawaiian Islands, will test the residues left from both oxidation and reduction atmosphere palm combustion processes. We suspect that palm, a monocot, more like a weed than a tree, burns differently from dicot trees, more likely leaving fine carbon black rather than charcoal pieces as residue.

Biochar and carbon black, from whatever sources, survive in Rapa Nui anthropogenic soils to this day, helping to sustain soil fertility beyond what could ever be expected after a century and a half of horticultural hiatus and nutrient extraction by grazing. We think that the Rapanui discovery of the effectiveness of biochar could have originated in the umu and the general Polynesian practice of cooking in pits with leaf and earth coverings, automatically providing a reducing atmosphere (cf. Binford [1967] as an example for soil content analysis of features). First, it might have been observed that old cooking pits supported vigorous plant growth and then that the addition of charred materials from cooking pits to planting soils also aided plant growth. From there, the process could be generalized to a horticultural practice on a grander scale—in addition to umu, larger

pits or piles of carbon-containing stuffs to make biochar. Each time a planting pit is opened or the lithic mulch pulled back and a sweet potato or taro tuber is harvested, more soil amendment is added. From repeated additions, older charcoal ends up being ground to a powder, hence the dark brown or black color of many planting pits or lithic mulch garden soils. Once a planting pit or lithic-mulch garden is created, it becomes valuable infrastructure, to be used over and over again. Biochar is a great partner to "rocking the farm" for a sustainable horticulture. The palms might be extinct, but agricultural production continued to expand, supporting population growth rather than causing a crash. Much the same as in eighteenth-century Europe and North America, aggressive forest clearing was more than balanced by the application of manure, guano, and mined phosphates, resulting in sustainable and ever-increasing crop yields. Thus, we highlight two major ingenious Rapanui contributions to sustainable horticulture: rock gardening and biochar and other soil amendments, lessons that could and should be applied elsewhere in the world.

The relationships of rock placement to horticulture by archaeologists and anthropologists did not really begin to be understood until the 1990s (Wozniak 1999, n.d.; Stevenson et al. 2006), in large part because of the focus on the monumental, about which thousands of pages had been written by then. This is what we mean by "art as distraction." Similarly, soil amendment practices are just now beginning to be explored, and at this point, we are among the very few suggesting that deliberately produced biochar amendments made a big difference—we think further research on soil composition will support our argument. All of this—the billions of rocks, the hundreds of manavai, the ubiquitous rock gardens, the staggering volume of anthropogenic soils—dwarfs the human energy and resources needed to construct the maoi. The Rapanui created a

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sustainable world, not one convulsed by ecocide. To fully appreciate it, follow the gaze of the moai across the landscape of a most amazing food factory (photograph 2.13).

Photograph 2.13. Two stone worlds intersecting: sheep station stonewalls taken from laboriously fashioned and transported former Rapa Nui garden materials. (Photograph by authors)

## Apocalypse Now

We paint a very different picture from the latter-day Malthusians, the catastrophists who proclaim ecocide. The mantra, the microcosmic world metaphor goes this way: they cut down all the palms so they can move the bigger and bigger moai. All the while, the population rises out of control, headed for the inevitable Behavioral Sink. With no palms, no moai can be moved, no canoes can be built, and with the loss of palm cover, erosion consumes the soils. Civil disorder reigns. The moai are tumbled. *Mata'a* slice and dice, soaking

the island in blood. Cannibals stalk. The population crashes. A new poverty-stricken social order emerges. The culture has collapsed. Malthus was right.

This is a popular paradigmatic Western story of secular apocalypse projected onto another culture, a story that tells itself—just plug in the data that seem to fit the story format (Ingersoll 1979; Ingersoll, Attias, and Billheimer 1992; Ingersoll, Nickell, and Lewis 1980). The archetypal story, the source, is the biblical Book of Revelation, or Apocalypse. What happens is that the world as we know it ends; in the case of the Book of Revelation, people ignore or challenge the messages and warnings, which will result in the world being destroyed and reconfigured in a future that has not yet arrived, but with a present continuously vexed by dire predictions. The future-oriented biblical model adds an extension to time's arrow and history, a feature quite rare in the world's cultures and narratives. The humanities and sciences borrow and transform the model of apocalypse and future-orientation. In fiction and science fiction, worlds degrade, collapse, or crash, as for example in the popular films *Mad Max 2, Fahrenheit 451*, and *The Book of Eli* or the dystopian novels *Brave New World* (Huxley [1932] 1998), *Nineteen Eight-Four* (Orwell [1949] 2003), and *The Hunger Games* (Collins 2008).

Analogs or transforms inspired by biblical apocalypse emerge in Western science, as in the case of Malthusian theory: a population grows until it exhausts its resources and crashes. Heed the warnings: control nuclear weapon proliferation, stop pumping $CO_2$ into the atmosphere, cease cutting down the rain forest or there will be serious consequences. Endless variations draw on this apocalyptic theme. We received a recent mass e-mail (July 1, 2012): "The Great Methane Deposit beneath the Gulf of Mexico is melting; And its terrible gases are rolling forth! Repent, oh you people!" This apocalyptic warning combines theology and secular climatology.

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On Rapa Nui, in service of rank and privilege, all the trees came down; then the moai were felled. No one could escape the island. Weapons of mass destruction (WMD) proliferated; mata'a appeared suddenly as a tool type. Rampant warfare prevailed. The people starved, as evidenced by skeletal-looking figures. Ecocide! We could apply the same apocalyptic model elsewhere, say New England, if we could not translate their writings. Perhaps archaeologists would posit that something similar occurred in New England when the forests were removed (table 2.1). Weapons of mass destruction appeared;

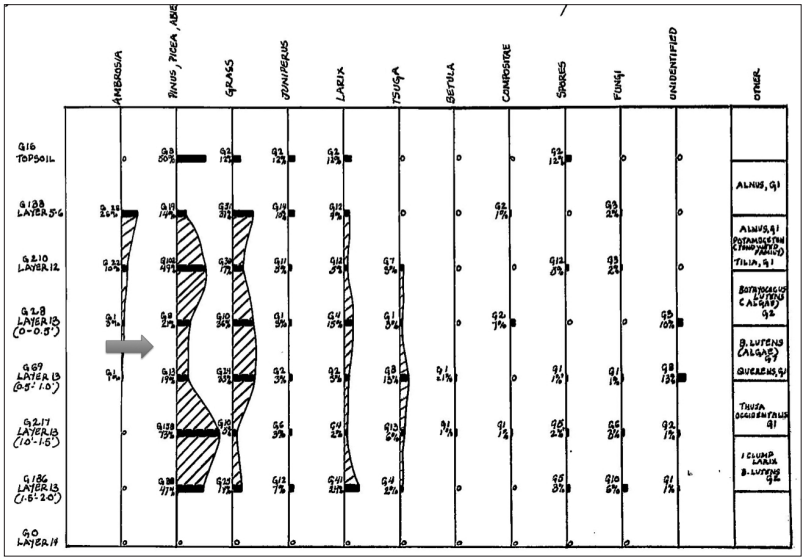


Table 2.1. Pollen diagram from Puddle Dock, Strawbery Banke, Portsmouth, New Hampshire, illustrating major loss of forest cover in this region of New England by the mid-nineteenth century (arrow) (Ingersoll 1971, plate 369). Pollen analysis by Richard Gramley. G = number of grains. Querens should be Quercus.

fearsome scythes replaced harmless sickles. The people starved as witnessed by landscapes punctuated by plots of death's head gravestones. Then New England's culture changed, leaving behind the rustic old agrarian world and evolving a new symbolism and an

industrial economy. The Longfaces were replaced by the Widefaces (a play on the oft-quoted Long Ears and Short Ears Rapanui narrative). The once overharvested and burned-over forests (for barns, houses, fences, ships, and sheep pasture) of New England returned and remain to this day.

Apocalypse makes for an exciting story (see the film *Rapa Nui* [1994]), but there are other ways to read the evidence. Here we will give a few examples with the "arts." Forests come and go, but cultures may grow in spite of their loss. Did the people starve? As reported in the ethnographic literature, *kavakava* (or *moai kavakava*: view examples of this art form at the website of the British Museum) generally represented how the spirits of the dead were understood by the traditional Rapanui (Englert 1970, 60-61; Métraux and Bullock 1957, 144-146; Métraux [1940] 1971, 250-252), not those dying from starvation, as imagined by Westerners. These *akuaku*, as several Rapanui legends record, sometimes appeared to the living. Similarly, the death's heads on New England gravestones (find photographs on the web by searching for "images for Death's Heads gravestone") represented not grizzly images of death but hopeful transformations to another world, involving the biblical metaphor of the grain needing to decompose first in order to give birth to the new seedling, as in John 12:24 (Cohen 1973). Those supposed WMD, the mata'a, while not normally thought of as art, sure get a bad rap (see images of mata'a on the web by searching "Images for mata'a Easter Island"). So far, every specific technical study of mata'a we have consulted finds that use-wear, typological reconstruction studies, and provenience data indicate that mata'a are primarily tools for working with vegetal material (Bollt et al. 2006; Church 1998; Church and Ellis 1996; Church and Rigney 1994; Stevenson and Haoa Cardinali 2008a, 107). We suspect that silica gloss and blood residue analysis (see Loy and Dixon [1998] for the detection of 10,000+ year old blood

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residues on fluted projectile points) will detect the gloss, but only rarely human blood residue. As the landscape shifted to dominant grass and brush cover, tools like the mata'a would be just the implement to cut and scrape tubers for food, vegetation for fibers, and fuel for the newer, smaller umu fires. New England scythes, like sickles, definitely become coated with silica gloss (or as it is sometimes called "sickle gloss") from cutting grass and grain—you can see it without a microscope and feel it. Scythes function best when frequently honed, and they look pretty formidable indeed, like Death itself that scythes often explicitly symbolize. But we Westerners know that the familiar Grim Reaper symbolism is metaphoric, not literal: the scythe is not a killing weapon; rather, the Reaper harvests souls as a farmer harvests grain.

Most variants of the apocalyptic narratives for Rapa Nui claim cultural collapse and a population crash before the encounters with the first of the Europeans (such as Roggeveen in 1722). The eighteenth-century explorers Roggeveen, Gonzáles, Cook, and La Pérouse made eyeball population estimates, but the explorers never stayed more than a few days and did not see much of the island. So how can we really tell if there was a population crash? We argue that the best archeological data show only slight population decline *before* the encounters with Europeans. While no systematic census was taken on Rapa Nui pre-European contact, it is possible to use proxies to follow population growth. In our opinion, the most accurate proxy data available is from archaeological surveys quantifying occupational sites and their locations. Population growth curves indexed by number of occupations (dated by obsidian hydration or radiocarbon methods) consistently show the decline occurring quite late—just before contact or at about the time of contact (Mulrooney et al. 2010; Stevenson and Cristino Ferrando 1986, 38; Stevenson and Haoa Cardinali 2008a; Stevenson and Haoa Cardinali 2008b, 8).

But there was without doubt a population crash. It occurred *after* European contact. The decline may have begun with the first contacts with explorers in the eighteenth century: Hunt and Lipo (2011, chapter 9) implicate epidemics brought on by each successive visit for the first signs of collapse. In the first half of the nineteenth century, numerous encounters with whalers and sealers could have reintroduced disease, and during this time the first episodes of blackbirding occurred, as when the sealing ship *Nancy* (ca. 1806) captured and took away twenty-two Rapanui (Richards 2008, 23-25). Things got much worse in the second half of the nineteenth century. In December of 1862, several ships, Spanish and Peruvian, captured as many as fifteen hundred Rapanui and sold them in Peru to be plantation workers and domestics (Maude 1981, 12-20). Whereas there might have been several thousand Rapanui in 1722, by 1877 there were only 110 (McCall 1994, 64; Rainbird 2002). Might we call this "Easter Island's forgotten genocide" (Peiser 2005, 532-534)? The impact of disease, blackbirding, and forced or benevolent deportations to Tahiti and Mangareva was devastating. From the 1870s until the 1950s, the entire landscape became a sheep station occupied by firms like Williamson, Balfour and Co., the organizers of the Compañia Explotadora Isla de Pascua (Arredondo 2003, 33). At times, as many as seventy thousand sheep grazed Rapa Nui (Mieth and Bork 2004a, 32) while the dispossessed Rapanui ended up interned, for all practical purposes, in one Rapa Nui town, Hangaroa, by 1898. You can figure out for yourself what impact nearly a century of sheep safely grazing had on the existing plant species and soils. If there ever was ecocide on Rapa Nui, this was it.

## Conclusion

Moai are indeed magical, but there's a very impressive world beyond and after, a world of rocks, quarries, engineered soils, water diversion

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DOI: 10.56702/MPMC7908/saspro4201.3

systems, and brilliant land-use strategies. The Rapanui found a small island with built-in challenges to human occupation yet nevertheless developed a sustainable horticulture and a spectacular culture. The Rapanui miraculously survived against all odds: European diseases, whalers and sealers (1800-1840), Peruvian slavers (1862), rendition of their people to Peru, expropriation of their land, annexation by Chile, repression of their language and culture, and internment in Hangaroa. Due not to homespun ecocide, but the Western presence, their numbers fell from several thousand at the time of first European contact (1722) to just above one hundred in the third quarter of the nineteenth century. Today, Rapanui culture remains extraordinary, vibrant, and creative. We could be easily convinced it is the most resilient culture the world has ever seen. Or, in our hubris, we could ignore its lessons (photographs 2.14, 2.15, and figure 2.1).

Photograph 2.14. A bulldozed pile of rocks resulting from the clearance of rocks from pre-European contact Rapa Nui veneer gardens, ironically, still growing taro. (Photograph by authors)

Photograph 2.15. Rapa Nui is not so barren after all: forest, pasture, and cows on Terevaka's slopes, 2011. (Photograph by authors)

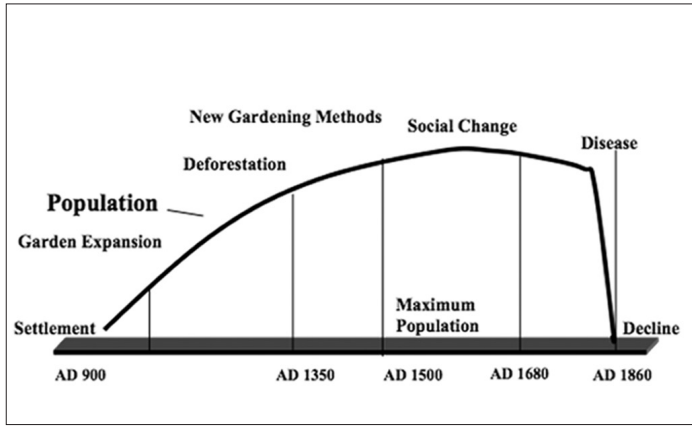


Figure 2.1. Christopher Stevenson's "alternative model" based on occupation site survey (2008). We think this is the last word: there was no "collapse" on Rapa Nui until the arrival of Europeans. (Permission by Christopher Stevenson)

## Acknowledgments

Thanks to Sonia, Pancho, Chris, Tahira, Pou, Ramon, Andreas, and Josie for helping us to see things in new ways.

## Notes

1. *Rapa Nui* is the residents' term for Easter Island. European languages employ some version referring to Easter, such as Isla de Pascua, Paasch Eiland, or Osterinsel. This paper employs the dominant convention in the literature of "Rapa Nui" for the island and "Rapanui" for the people, language, and culture.

2. Moai are by no means the only celebrated Rapanui "art" forms, but moai are the only one with worldwide iconic status. Other "art" forms include moai kavakava (carved wooden figures), clubs (*paoa*), chief's staffs (*ua*), paddles (*rapa* and *'ao*), feather headdresses, gorgets (*rei miro*), barkcloth images (*manu uru*), inscribed tablets (*rongorongo*), birdman carvings (*tangata manu*), and a wide range of petroglyphs. See Kjellgren et al. (2001) for illustrations published in conjunction with the exhibition "Splendid Isolation: Art of Easter Island," held at The Metropolitan Museum of Art, New York, December 2001 to August 2002. See also Heyerdahl 1959.

3. We estimate that trees or brush covers at least 10 percent of the Rapa Nui landscape, including the area of the town of Hangaroa that is rich with trees. An estimate published in the early 1980s (Rull et al. 2010, 53) was just under 10 percent trees and brush, and the area under cover has increased since then. Look at photographs 2.4, 2.8, 2.9, 2.10, 2.14, 2.15. Yes, there are trees on Rapa Nui.

## References

Arredondo, Ana Maria. 2003. "Life Stories of Women in Rapanui Society in the First Half of the Twentieth Century. Gender Studies, Part 3." *Rapa Nui Journal* 17(1): 15-33.

Baer, Alexander, Thegn N. Ladefoged, Christopher M. Stevenson, and Sonia Haoa. 2008. "The Surface Rock Gardens of Prehistoric Rapa Nui." *Rapa Nui Journal* 22(2): 102-9.

Bahn, Paul, and John Flenley. 1992. *Easter Island Earth Island*. London: Thames and Hudson.

Bernard, H. Russell. 2010. "The Secret Life of Social Science." Lecture delivered at St. Mary's College of Maryland, Department of Anthropology, Distinguished Scholar Program, February 15, 2010.

———. 2012. "The Science in Social Science." *PNAS Early Edition* (Proceedings of the National Academy of Sciences of the United States of America). http://www.pnas.org/content/early/2012/11/29/1218054109, 1-4.

*The Big Bang Theory* TV show lead-in can be seen on YouTube, http://www.youtube.com/watch?v=4S8GOQeSlTs.

Binford, L. R. 1967. "Smudge Pits and Hide Smoking: The Role of Analogy in Archaeological Reasoning." *American Antiquity* 32(1): 1-12.

Bollt, Robert, Jesse E. Clark, Philip R. Fisher, and Hirosato K. Yoshida. 2006. "An Experiment in the Replication and Classification of Easter Island Mata'a." *Rapa Nui Journal* 20(2): 125-33.

*The Book of Eli*. 2010. Film distributed by Warner Bros. Pictures. Directed by The Hughes Brothers. Written by Gary Whitta.

Bork, Hans-Rudolf, Andreas Mieth, and Bernd Tschochner. 2004. "Nothing but Stones? A Review of the Extent and Technical

Efforts of Prehistoric Stone Mulching on Rapa Nui." *Rapa Nui Journal* 18(1): 10-14.

Bove, Andrew. n.d. "Easter Island as a World Heritage Site." In preparation. To be included in an edited volume, *Beyond the Moai: New Archaeological, Cultural, and Historical Perspectives on Rapa Nui*, edited by Sonia Haoa Cardinali, Daniel W. Ingersoll, Kathleen B. Ingersoll, and Christopher M. Stevenson.

Church, F., and G. Ellis. 1996. "A Use-wear Analysis of Obsidian Tools from an *Ana Kionga*." *Rapa Nui Journal* 10(4): 81-88.

Church, Flora. 1998. "Upland, Lowland, Citizen, Chief: Patterns of Use-Wear from Five Easter Island Sites." In *Easter Island in Pacific Context South Seas Symposium: Proceedings of the Fourth International Conference on Easter Island and East Polynesia* (University of New Mexico, Albuquerque, August 5-10, 1997), edited by Christopher M. Stevenson, Georgia Lee, and F. J. Morin, 312-15. Los Osos: Easter Island Foundation.

Church, Flora, and Julia Rigney. 1994. "A Microwear Analysis of Tools from Site 10-241 Easter Island—An Inland Processing Site." *Rapa Nui Journal* 8(4): 101-5.

Cohen, Kathleen R. 1973. *Metamorphosis of a Death Symbol: The Transi Tomb in the Late Middle Ages and the Renaissance*. Berkeley: University of California Press.

Collins, Suzanne. 2008. *The Hunger Games*. New York: Scholastic Press.

Diamond, Jared. 2005. "Twilight at Easter." In *Collapse: How Societies Choose to Fail or Succeed*, 79-119. New York: Viking.

———. 2007. "Easter Island Revisited." *Science* 317:1692-94.

Edwards, Edmundo, Raul Marchetti, Leopoldo Dominichetti, and Oscar Gonzáles-Ferrán. 1996. "When the Earth Trembled, the Statues Fell." *Rapa Nui Journal* 10(1): 1-15.

Englert, Father Sebastian. 1970. *Island at the Center of the World: New Light on Easter Island*. New York: Charles Scribner's Sons.

Eyzaguirre, Eduardo Ruiz-Tagle, ed. 2004. *Easter Island: The First Three Expeditions*. Rapa Nui: Museum Store, Rapanui Press.

*Fahrenheit 451*. 1966. Film distributed by Universal Films. Directed by François Truffaut. Based on the novel *Fahrenheit 451* by Ray Bradbury (1953).

Fischer, Steven Roger. 2005. *Island at the End of the World: The Turbulent History of Easter Island*. London: Reaktion Books.

Flenley, John, and Paul Bahn. 2003. *The Enigmas of Easter Island: Island on the Edge*. Oxford: Oxford University Press.

Glaser, Bruno, and William I. Woods, eds. 2004. *Amazonian Dark Earths: Explorations in Time and Space*. Berlin: Springer-Verlag.

Griffin-Pierce, Trudy. 1992. *Earth is My Mother, Sky is My Father: Space, Time, and Astronomy in Navajo Sandpainting*. Albuquerque: University of New Mexico Press.

Harris, Marvin. 1968. *The Rise of Anthropological Theory: A History of Theories of Culture*. New York: Thomas Y. Crowell.

———. 1999. *Theories of Culture in Postmodern Times*. Walnut Creek: Altamira Press.

Heyerdahl, Thor. 1959. *Aku-Aku, the Secret of Easter Island*. New York: Pocket Books.

———.1975. *The Art of Easter Island*. Garden City, NY: Doubleday.

———.1989. *Easter Island: The Mystery Solved*. New York: Random House.

Horley, Paul and Georgia Lee. 2008. "Rock Art of the Sacred Precinct at Mata Ngaru, 'Orongo." *Rapa Nui Journal* 22(2): 110-16.

Hunt, Terry L., and Carl P. Lipo. 2010. "Ecological Catastrophe, Collapse, and the Myth of 'Ecocide' on Rapa Nui (Easter Island)." In *Questioning Collapse: Human Resilience, Ecological Vulnerability, and the Aftermath of Empire*, edited by Patricia A. McAnany and Norman Yoffee, 21-44. Cambridge: Cambridge University Press.

———. 2011. *The Statues that Walked: Unraveling the Mystery of Easter Island*. New York: Free Press.

Hunter-Anderson, Rosalind L. 1998. "Human vs Climatic Impacts at Rapa Nui: Did the People Really Cut Down All Those Trees?" In *Easter Island in Pacific Context South Seas Symposium: Proceedings of the Fourth International Conference on Easter Island and East Polynesia*, edited by Christopher M. Stevenson, Georgia Lee, and F. J. Morin, 85-99. Los Osos, CA: Easter Island Foundation.

Huxley, Aldous. (1932)1998. *Brave New World*. New York: Perennial Classics.

Ingersoll, Daniel W., Jr. 1971. "Settlement Archaeology at Puddle Dock." PhD. diss., 2 vols. Peabody Museum Library, Harvard University.

———. 1979. "Close Encounters of the Third Kind: A Hegelian Drama." Paper delivered at the Annual Meeting of the American Anthropological Association, Washington, DC.

Ingersoll, Daniel W., Jr., J. M. Nickell, and C. D. Lewis. 1980. "Star Wars, the Future, and Christian Eschatology." *Philosophy Today* 24(4/4): 360-74.

Ingersoll, Daniel W., Jr., with Elizabeth Attias, and Catherine Gravlin Billheimer. 1992. "Divining the Future: The Toys of Star Wars." In *The Art and Mystery of Historical Archaeology: Essays in Honor of James Deetz*, edited by Mary C. Beaudry and Anne Yentsch, 427-43. Boca Raton: CRC Press.

Kjellgren, Eric, JoAnne Van Tilburg, and Adrienne Kaeppler. 2001. *Splendid Isolation: Art of Easter Island*. New York: Metropolitan Museum of Art.

Loret, John, and John T. Tanacredi, eds. 2003. *Easter Island: Scientific Exploration into the World's Environmental Problems in Microcosm*. New York: Kluwer Academic/ Plenum Publishers.

Love, Charles M. 2000. "More on Moving Easter Island Statues, with Comments on the NOVA Program." *Rapa Nui Journal* 14(4): 115-18.

Loy, Thomas H., and E. James Dixon. 1998. "Blood Residues on Fluted Points from Eastern Beringia." *American Antiquity* 63(1): 21–46.

*Mad Max 2*. 1981. Distributed by Warner Bros. Directed by George Miller. Written by Terry Hayes, George Miller, and Brian Hannant.

Maude, H. E. 1981. *Slavers in Paradise. The Peruvian Slave Trade in Polynesia, 1862-1864*. Canberra: Australian National University Press.

McAnany, Patricia A., and Norman Yoffee, eds. 2010. *Questioning Collapse: Human Resilience, Ecological Vulnerability, and the Aftermath of Empire*. Cambridge: Cambridge University Press.

McCall, Grant. 1994. *Rapanui: Tradition and Survival on Easter Island*. 2nd ed. Honolulu: University of Hawaii Press.

Métraux, Alfred. (1940) 1971. *Ethnology of Easter Island*. Bernice P. Bishop Museum Bulletin 160. Honolulu: Bernice P. Bishop Museum.

Métraux, Alfred, and Michael Bullock. 1957. *Easter Island: A Stone-Age Civilization of the Pacific*. Oxford: Oxford University Press.

Mieth, Andreas, and Hans-Rudolf Bork. 2004a. *Easter Island—Rapa Nui: Scientific Pathways to Secrets of the Past*. Man and Environment 1. Kiel: Schmidt and Klaunig.

———. 2004b. "Traces in the Soils: Interaction between Environmental Change, Land Use and Culture in the (Pre) History of Rapa Nui (Easter Island)." In *The Reñaca Papers: 6th International Conference on Rapa Nui and the Pacific*, edited by Christopher M. Stevenson, J.M. Ramirez, F.J. Morin, and N. Barbacci, 55-65. Los Osos: Easter Island Foundation.

Moai Sightings. 1992. *Rapa Nui Journal* 6(1): 12.

Moai Sightings. 1997. *Rapa Nui Journal* 11(4): 159.

Moai Sightings. 2012. *Rapa Nui Journal* 26(1): 82.

Mulloy, Emily Ross. 1991. "The Destruction of Tongariki." *Rapa Nui Journal* 5(3): 33-34.

Mulloy, William. 1970. "A Speculative Reconstruction of Techniques of Carving, Transporting and Erecting Easter Island Statues." *Journal of Archaeology and Physical Anthropology of Oceania* 5(1): 1-23.

Mulrooney, Mara A., Thegn N. Ladefoged, Christopher Stevenson, and Sonia Haoa. 2010. "Empirical Assessment of a Pre-European Societal Collapse on Rapa Nui (Easter Island)." In *The Gotland Papers: Selected Papers from the 7th International Conference on Easter Island and the Pacific: Migration, Identity, and Cultural Heritage*, edited by Paul Wallin and Helen Martinsson-Wallin, 141-53. Visby: Gotland University Press.

Orwell, George. (1949) 2003. *Nineteen Eighty-Four*. New York: Plume.

Pavel, Pavel. 1995. "Reconstruction of the Transport of the Moai Statues and Pukao Hats." *Rapa Nui Journal* 9(3): 69-72.

Peiser, Benny. 2005. "From Genocide to Ecocide: The Rape of Rapa Nui." *Energy and Environment* 16(3/4): 513-39.

Rainbird, Paul. 2002. "A Message for the Future? The Rapa Nui (Easter Island) Ecodisaster and Pacific Island Environments." *World Archaeology* 33(3): 436-51.

*Rapa Nui*. 1994. Film distributed by Warner Bros. Film directed by Kevin Reynolds, produced by Kevin Costner and Jim Wilson. Written by Kevin Reynolds and Tim Rose Price.

Richards, Rhys. 2008. *Easter Island 1793 to 1861: Observations by Early Visitors before the Slave Raids*. Los Osos, California: Easter Island Foundation.

Rull, V., N. Cañellas-Boltà, A. Sáez, S. Giralt, S. Pla, and O. Margalef. 2010. "Paleoecology of Easter Island: Evidence and Uncertainties." *Earth-Science Reviews* 99:50-60.

Sanger, Kay Kenady. 2011. *Easter Island: The Essential Guide*. Los Osos, CA: Easter Island Foundation.

Stevenson, Christopher M. 2008. "Sustainability Lessons for Easter Island: Rethinking Rapa Nui's Ancient Agriculture." Lecture delivered at St. Mary's College of Maryland, November 5, 2009.

Stevenson, Christopher M., and Claudio Cristino Ferrando. 1986. "Residential Settlement History of the Rapa Nui South Coastal Plain." *Journal of New World Archaeology* 7(1): 29-38.

Stevenson, Christopher M., and Sonia Haoa Cardinali. 2008a. *Prehistoric Rapa Nui: Landscape and Settlement Archaeology at Hanga Ho'onu*. With contributions by Joan A. Wozniak, Helene Martinson-Wallin, Paul Wallin, Matthew Bampton, Linda Scott Cummings, and Pernilla Flyg. Los Osos, CA: Easter Island Foundation.

———. 2008b. "The Rapa Nui Context." In *Prehistoric Rapa Nui: Landscape and Settlement Archaeology at Hanga Ho'onu*, edited by Christopher M. Stevenson and Sonia Haoa Cardinali, 1-14. Los Osos: Easter Island Foundation.

———. 2008c. "The Hanga Ho'onu Archaeological Survey." In *Prehistoric Rapa Nui: Landscape and Settlement Archaeology at Hanga Ho'onu*, edited by Christopher M. Stevenson and Sonia Haoa Cardinali, 15-40. Los Osos: Easter Island Foundation.

———. 2008d. "Archaeological Evidence for Settlement and Landscape Use on Rapa Nui." In *Prehistoric Rapa Nui: Landscape and Settlement Archaeology at Hanga Ho'onu*, edited by Christopher M. Stevenson and Sonia Haoa Cardinali, 167-79. Los Osos: The Easter Island Foundation.

Stevenson, Christopher M., Thomas L. Jackson, Andreas Mieth, Hans-Rudolf Bork, and Thegn N. Ladefoged. 2006. "Prehistoric and Early Agriculture at Maunga Orito, Easter Island (Rapa Nui), Chile." *Antiquity* 80:919-36.

Stevenson, Christopher M., Thegn Ladefoged, Sonia Haoa, and Alejandra Guerra Terra. 2005. "Managed Agricultural Production in the Vaitea Region, Rapa Nui." In *The Reñaca Papers. 6th International Conference on Easter Island and the Pacific*, edited by Christopher M. Stevenson, José Miguel Ramírez Aliaga, Francis Mori, and Norma Barbacci, 125-36. Los Osos, CA: Easter Island Foundation.

Van Tilburg, Jo Anne. 1994. *Easter Island: Archaeology, Ecology, and Culture*. Washington, DC: Smithsonian Institution Press.

———. 1995. "Moving the Moai." *Archaeology* 48(1): 34-43.

———. 1996. "Mechanics, Logistics and Economics of Transporting Easter Island (Rapa Nui) Statues." *Rapa Nui Journal* 10(4): 110-15.

Vogt, Burkhard, Hans-Rudolph Bork, Andreas Mieth, and Annette Kühlem. 2012. "Monumental Architecture and Cultural Landscape Management at Ava Ranga Uka A Toroke Hau (Rapa Nui)." Paper delivered July 9, 2012, Session 1, The Archaeology of Rapa Nui, at the 8th International Conference on Easter Island and the Pacific, *Living in Changing Island Environments*, held at Santa Rosa, CA.

Woods, William I., Wenceslau G. Teixeira, Johannes Lehman, Christopher Steiner, Antoinette M. G. A. WinklerPrins, and Lilian Reballato, eds. 2009. *Amazonian Dark Earths: Wim Sombrek's Vision*. Berlin: Springer-Verlag.

Wozniak, Joan A. 1999. "Prehistoric Horticultural Practices on Easter Island: Lithic Mulched Gardens and Field Systems." *Rapa Nui Journal* 13:95-99.

———. 2005. "An Ethnoarchaeological Study of Horticulture on Rapa Nui." In *The Reñaca Papers. 6th International Conference on Easter Island and the Pacific*, edited by Christopher M. Stevenson, José Miguel Ramírez Aliaga, Francis Mori, and Norma Barbacci, 137-52. Los Osos, California: Easter Island Foundation.

———. n.d. "Subsistence Strategies on Rapa Nui (Easter Island): Prehistoric Gardening Practices on Rapa Nui and How They Relate to Current Farming Practices." To be included in an edited volume, *Beyond the Moai: New Archaeological, Cultural, and Historical Perspectives on Rapa Nui*, edited by Sonia Haoa Cardinali, Kathleen B. Ingersoll, Daniel W. Ingersoll, and Christopher M. Stevenson.