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RESEARCH ARTICLE

Coral Cultures in the Anthropocene

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Abstract

This essay discusses how coral is becoming a kind of charismatic megafauna and a cultural icon for extinction in the Anthropocene. Until recently, most of the cultural associations around coral emphasized the strangeness and exotic qualities of coral that combines animal, mineral, and vegetable bodies. Darwin studied coral as a robust maker of atolls, while Melville wrote about coral stringing the Pacific Islands as ‘marine gardens.’ More recent theorizing on coral from Eva Hayward and Stefan Helmreich has been keen to emphasize how coral is transbiological and queer in the multi-species kinships it enables. However, in recent decades, as evidence of bleaching and mass coral die-offs have been registered by marine scientists, coral is also fast becoming a barometer for the sixth mass extinction. I look at how contemporary cultural representations of coral are straining to reconfigure the life of coral as caught between associations of fragility and resilience, seeing coral as capable of supporting indigenous island civilizations while not being able to survive ocean warming of less than one degree Celsius. I examine the work of recent artists (Courtney Mattison and Alison McDonald) whose coral-themed work combines science and spectacle. These artists return to older visions of coral figured fantastically as both living and dead, yet updating this view for today, as we find coral to be a primary figure for life and death in the Anthropocene. I finish with a discussion of the recent documentary film *Chasing Coral* (2017) as negotiating multiple simultaneous visual tropes and coral conditions. This film aims to provide viewers with a sense of time constraints for scientists, filmmakers, and for coral reef colonies under extreme stress in areas including the Great Barrier Reef. The film tries to articulate a pathway between scientific documentation, environmental activism, and visual drama, ultimately composing these perspectives into a work

that suggests that the imbalance and overlap of these ways of engaging with coral will provide a model for how to form a global coral culture movement.

Keywords:

coral; environmental humanities; Anthropocene; chasing coral; extinction

Introduction

Corals, perhaps the species most evidently vulnerable to global warming since many corals cannot survive in just one degree Celsius average of ocean warming, are rapidly becoming a kind of charismatic megafauna that actually is made up of thousands of microfauna. The phrase ‘charismatic megafauna’ has been applied usually only to large animals deemed ‘flagship species,’ mostly mammals, which have been taken up by conservation groups as icons for the urgency of saving endangered species.¹ Animals like tigers and elephants garner enormous attention for species conservation efforts and for environmentalist institutional building since they are widely represented across media due to their photogenic brilliance, attraction for tourism, and longstanding iconic status in many cultures. The phrase ‘charismatic megafauna’ however has accrued a moderately negative connotation recently as many scholars are now using the term to recommend against the over-investment of conservation research and attention in just a few species.² These megafauna are seen as crowding out care and funding for the millions of other species on Earth. The focus on megafauna seems not to be ecologically rational since it does not account for species interdependence, complex food chains, and distributed ecosystem-building processes. But while these critiques are warranted, charisma can still remain ecologically and culturally relevant by layering emotional and subjective choice with objective environmental science as a way of declaring the utmost commitment to care for other species. If humans cannot do enough conservation to maintain charismatic animals, what chance does the rest of life have? If tigers cannot be saved, what animal would be deemed worthy of united efforts to prevent extinction? A critical reclaiming of the discourse of charismatic species can provide analysis of the problematic effects of narrow conservation favouritism while still considering how fantasies and emotional attachments can be effective in creating the conditions for plural forms of environmental care. One of the aims of environmental humanities writing then is to contribute to the crafting and reallocation of charisma among a wider range of species, while continuing to reflect on the roles enchantment can play in fostering ecological engagements.

Coral already has a long association across centuries as a source of charismatic enchantment and wonder (see for example Marion Endt-Jones’ edited collection *Coral: Something Rich and Strange*³). Until recently, most of the cultural associations around coral emphasized the exotic biological and sensual qualities of coral that combines animal, mineral, and vegetable (algae). Coral has fostered fantasies of floating wonders and dreams of alternative underwater lifeworlds, but also points to histories of shipwreck and the precariousness of humanity at sea. Darwin studied coral as a robust maker of atolls that bedevilled the burgeoning shipping industry, while Herman Melville, in *Omoo: Adventures in the South Seas* (1847), wrote about coral stringing the Pacific Islands as glittering ‘marine gardens’ of ‘coral plants of every hue and shape imaginable.’⁴ Oceanographer Roger Revelle, who supported and participated as a scientist in nuclear tests on coral atolls, stated in a 1954 paper that, ‘Of all earth’s phenomena, coral reefs seem best calculated to excite a sense of wonder. And of all the forms of coral reefs,

the atolls have appeared to men of science to be the richest in mystery and the most strange.⁵ Revelle thought coral maintained itself in patterns of disturbance and recovery, and that reefs were resilient and sturdy as a whole, since they are capable of building and sustaining atolls thousands of feet tall in the ocean. Though Revelle also studied the effects of climate change on oceans, this paradigm of resilient coral was replaced by research in the 1980s and 90s that documented increasing waves of mass coral death, called bleaching events. The culture of coral began to shift towards thinking of reefs as particularly precarious, sensitive, and acutely exposed to three of the most rapidly changing aspects of the Earth's climate, namely, temperature, sea level rise, and ocean acidification. As I discuss in this essay, coral's multiple vulnerabilities and perilous conditions have become now enmeshed with its previous characterizations of enchantment and strangeness.

In recent decades, as evidence of mass bleaching events increasingly has been registered by marine scientists, coral is fast becoming a barometer for biodiversity loss and rising rates of species extinction. 'Reefs are disappearing before our eyes', Marine biologist Rebecca Albright states. 'In the past 30 years we have lost approximately 50 percent of corals globally, and researchers estimate that only about 10 percent will survive past 2050'.⁶ Just as coral is often considered to be the 'rainforest' of the sea as it harbours a major portion of the ocean's biota, the death of coral reefs entails staggering losses of life across many food chains. To understand coral today then requires attention to situations of enchantment and extinction at the same time. Yet beyond the empirical science study of global coral populations, what are the ways of coming to terms with the multiple distresses facing coral colonies today? How do the changes in the life and death of coral change the figurations and charismatic associations of coral's existence? Coral has long figured as the site of intermixing of life and death in metaphorical associations of skeletal bone and luscious garden. In the Anthropocene, coral continues to be the bearer of such associations but now with planetary-scale implications. Stefan Helmreich points to the urgency to make coral legible in different ways: 'Coral is something to be read—for climate change, for potentially patentable genes, for representativeness'.⁷ The recent dire depictions of reefs across the planet indicate the need to make coral legible for coral's own sake as well as for the sake of human existence. Coral's charismatic life and charismatic death brings together nearly all the key material and conceptual issues of the Anthropocene: species extinction, multispecies interconnections, global warming, ocean acidification from carbon pollution, agricultural and industrial pollution, global fisheries and destructive industrial fishing practices, global tourism, indigenous island and coastal communities, and contemporary art's continued fascination with coral's precarious otherness. One way then to think the entanglements of the Anthropocene, extinction, and capital, involves thinking with and as coral.

Recent work in the environmental humanities has emphasized the difference between thinking *with* as compared to thinking *about* another nonhuman life. To 'think with' involves approaching nonhuman lives with a sense that curiosity and care are not just epistemologically wise ways of knowing these lives but also are the means by which to foster recuperative practices as collaborative among multispecies. Donna Haraway borrows the phrasing 'becoming-with' to propose how 'becoming-with is how partners are ... rendered capable'⁸ and to 'learn how to conjugate worlds with partial connections and not universals and particulars'. The preposition 'with' features in the work of several environmental humanities scholars (for example, Eduardo Kohn's *How Forests Think: Toward an Anthropology Beyond the Human* and the volume *Thinking with Water*⁹) who advocate that modes of thought need to expand beyond the empirical or data-driven sciences to include an openness to different cultural

modes of knowing that involve local knowledges, decolonial commitments, and new ways of aesthetically engaging with nonhuman lives.

This essay discusses the changing materialities and meanings of coral in the Anthropocene and provides a brief analysis of some artistic representations of coral that respond to these changes. Expressions of enchantment and charisma of coral continue to be embedded in cultural and scientific reflections on coral's precarious ecological situation today. By examining works of coral art alongside with a reflection on coral's charismatic status in the Anthropocene—a practice of 'thinking with'—I draw out some of the ecological and cultural concerns implicated in how coral is becoming 'the ocean's canary,' in the phrasing of acclaimed marine biologist J. E. N. Veron.¹⁰ If coral is treated under the metaphor of the barometer or as analogous to the miner's canary, what kind of ecological status or charisma is implied? Coral befits multiple metaphors and is at the nexus of multiple scenarios of life and death today. Justin Prystash comments that because coral 'straddles the organic and inorganic and constitutes a series of connections between individual polyps, limestone, barnacles, fish, and other marine life, coral lends itself to metaphorical proliferation'.¹¹ While there is no one right metaphor that befits coral today, studying the multiplicity of coral figurations is needed in order to be able to reflect on what kinds of attention is being brought to existing coral communities. Contemporary artistic representations of coral are straining to reconfigure the plenitude of metaphorical associations of coral as caught between fragility and resilience, construing coral as capable of supporting immense biodiversity and providing for island and coastal peoples while in many cases not being able to survive ocean warming of less than one degree Celsius.¹² Examining coral reefs and coral art together facilitates how reflecting on one can help understand the other. To think coral and coral art together requires connecting the multiplicity of coral metaphors with careful attention to multispecies study. Reflecting on metaphors that are attached to the life and death of coral also highlights how these metaphors are becoming central to thinking the Anthropocene and its extinction events. As I will detail, coral's metaphors are rapidly becoming extinction's metaphors.

Images of the life and death of coral, both *in situ* and in art works, provide a powerful visual means of orientation in a time of sea-change besetting the planet's oceans. Elizabeth Deloughrey, a leading theorist of a new wave of research in oceanic environmental humanities, remarks, 'The ocean drives our global climate, and due to sea-level rise our planetary future is becoming more oceanic. Scientific discourse has positioned the ocean as an evolutionary origin for life on earth and, given the imminent threat of rising sea levels, our anticipated destiny.'¹³ Stacy Alaimo points to the concern that current reflections on the Anthropocene too often have centered on debates over geological strata and human land management, thus disregarding 'the acidifying seas, the liquid index of the anthropocene.'¹⁴ Alaimo encourages 'tracing human immersion within global networks of harm' as a way to foster 'ethical and political commitments to sea life'. Analyzing human immersion in coral communities and coral art together reveals how the entangled affects of wonder and grief are crucial in furthering commitments to precarious liquid life. Here I examine the work of several contemporary artists and artworks that highlight the charismatic precarity of coral. Christine and Margaret Wertheim and Alison McDonald make artworks representative of coral out of discarded plastics. Their art shows how the life of coral today is intertwined with the sea of plastics, while urging viewers to consider plastic as having its own coral-like properties of fantasy and heartache. Courtney Mattison's renderings of reefs blend the features of coral and sculpture, narrowing the difference between art object and living entity. I finish with a discussion of the recent documentary film *Chasing Coral* (2017) as negotiating multiple

simultaneous visual tropes and coral conditions. This film aims to provide viewers with a sense of time constraints for scientists, filmmakers, and for coral reef colonies under extreme stress in areas including the Great Barrier Reef. The film tries to articulate a pathway between scientific documentation, environmental activism, and visual drama, composing these perspectives into a work that suggests that the imbalance and overlap of these ways of engaging with coral will provide a model for how to form a global coral culture consciousness.

Coral's Once and Future Arts

Existing at the juncture of rock and organism, geology and biology, coral reefs are constructed by individual saclike polyps that gather together into colonies (though some polyps can live individually). While not a plant, corals are often symbiotic with photosynthetic algae. Incorporating zooxanthellae or tiny coloured algae gives coral its bright colors. The algae provide the coral nutrition from photosynthesis that is put into the service of building a calcium carbonate structure. Not all coral polyps build reefs (of the approximately 2,500 known coral species, 1,000 are hard corals), but those that do pull the raw materials of calcium carbonate from the ocean and secrete them as an exoskeleton. Reef-building corals grow primarily in warm waters (though some reef-building species exist in cool deep ocean waters as well) within a narrowly defined range of acidity and at shallow depths, since the algae need access to sunlight for photosynthesis. Assemblers of aquatic complexity, corals are multispecies beings that are archipelagos for other multispecies populations. Corals often are called 'underwater rainforests' in that they provide harbour for a tremendous amount of biodiversity (the Great Barrier Reef, with 400 different types of coral, 1,500 species of fish, and 4,000 molluscs, has more aqueous biodiversity than all of Europe¹⁵). It is estimated that one quarter to one half of all aqueous life depend in some degree on coral reefs.

As polyps, symbionts, and colonies, corals are multiple beings with multiple interdependent temporalities. Corals build communities on the death of previous iterations of itself; a coral colony can survive for several hundred years on a reef that dates back up to 10,000 years ago, but that reef could be formed by offspring from a previous reef. Reef-making coral date back 500 million years ago, while other shell producing aquatic animals date to over 700 million years. As with ice cores, scientists have drilled through coral reefs to help in composing the climatological history of the planet. The advantage of using coral is that it provides a much longer history of sea level that can be correlated with temperature changes and greenhouse gas cycles. These core coral samples have provided important data for charting the planet's previous mass extinctions, which has the effect of further tying the history of coral together with the knowledge of extinction events on Earth. Veron calls corals 'messages from deep time'¹⁶ while at the same time he points to how rapidly coral is changing today, remarking that it may only be in the timespan of a century that much of coral life will be eradicated. The phenomenon of mass coral bleaching has been increasing in intensity and occurrence in recent decades. In a bleaching event, the algae leave the coral host, which turns bright white in colour. The coral is not dead yet, but in a highly stressed condition. While some corals are able to recover, many succumb to disease or lack of nutrients. While Darwin often argued that the extinction of one species came at the benefit of another—a position still commonly claimed as a uniform consequence today by biologists—the local extirpation and global possibility of extinction for corals would initiate a cascading biodiversity loss among other species. The mass bleaching events across the planet thus indicates a new condition for coral and its symbionts, transforming these 'gardens' from sites of fantasy and plenitude into sites of dystopia and dread.

The plural conditions of coral have evoked different kinds of human interactions and connections, but the primary longstanding attraction of coral remains its charismatic characterization as ‘something rich and strange.’ Coral’s biology has both been seen as radically alien to human sensibility and also remarkably similar to the human skeleton, and coral’s metaphors often are correlated to these two categories. Shakespeare’s *The Tempest* captures these polar associations in what is commonly known as ‘Ariel’s Song.’ The spirit Ariel misleads the shipwreck survivor Ferdinand into thinking that his father did not survive the boat’s sinking and that his body has transformed into coral at the bottom of the sea:

*Full fathom five thy father lies,
Of his bones are coral made.
Those are pearls that were his eyes,
Nothing of him that doth fade
But doth suffer a sea-change
Into something rich and strange.¹⁷*

The conversion of human bone into coral is a ‘sea-change’ that is possible because of the perceived similarities of the two substances. The lifeless human body transforms into living coral along conduits of the imagination’s anthropomorphic tendencies and tales of species metamorphosis. Yet at the same time everything remaining of the human body that lies on the sea floor undergoes a radical change into ‘something rich and strange.’ Shakespeare’s lines show how coral’s rich and strange ontology beckons anthropomorphism, yet also coral is a kind of life that commands wonder precisely because reefs appear to be an entirely independent underwater civilization rarely seen. The polar opposition of coral as akin to the human skeleton yet also radically strange recurs across centuries of scientific and cultural claims for coral’s anthropomorphism and for coral’s utterly alien and strange existence. Yet Shakespeare’s poem also hints at the interconnected ontologies of human life and ocean life, such that ‘sea-change’ signifies an inter-activity between the two domains. The acceptance of such a ‘sea-change’ is evident even in recent medical research developments that use coral as material for bone grafts in human patients.¹⁸

In Darwin’s early cogitations on coral in his *Notebook ‘B’* (1837–38), he ventures the notion that coral communities might provide the most apt model for thinking the interconnections of all life. ‘The tree of life should perhaps be called the coral of life, base of branches dead; so that passages cannot be seen—this again offers contradiction to constant succession of germs in progress.’¹⁹ Darwin rejected his own idea for this metaphor to visually model the origin of species but as Justin Prystash notes, these early writings prompted reflections on how coral played a prominent role in Darwin’s thinking that led to his questioning of ‘dominant conceptions of subjectivity, gender, and time.’²⁰ In his first monograph, *The Structure and Distribution of Coral Reefs* (1842), Darwin proposed a theory of the origin of coral atolls as the result of reefs that had first developed around volcanic isles that had slowly subsided back into the ocean. As Darwin hypothesized, while the island sunk, the coral reefs continued to build on top of themselves to maintain proximity to the ocean’s surface. This theory has since proven correct with later evidence provided by core drillings into the Bikini Atoll that revealed several thousand feet of coral all the way down to bedrock in the ocean floor. Darwin viewed corals as powerful builders and ‘myriads of architects’²¹ that could construct works of art more vast and sublime than humans:

We feel surprise when travelers tell us of the vast dimensions of the Pyramids and other great ruins, but how utterly insignificant are the greatest of these, when compared to these mountains of stone accumulated by the agency of various minute and tender animals! (465)

It is not clear if Darwin is winking here, since the Egyptian pyramids, as well as the Mayan pyramids, are made out of limestone sediments compacted in large part from ancient coral reefs. Darwin's admiration at the 'accumulated...agency' of reef-building corals contributed to a trend in the nineteenth century in viewing the collective activity of coral as a kind of communal political labor. In Jules Verne's *Twenty Thousand Leagues under the Sea* (1873), the narrator remarks on how corals possess 'their own existence while at the same time participating in communal life. They thus live a sort of natural socialism'.²² Counter to doctrines of individualism and notions of endless strife among living beings, coral came to be seen as embracing of communal entanglements. Yet this sense of coral as having its own independent political life is now being superseded by the global biopolitical entanglements that coral finds itself caught up in.

These references to coral as a special kind of oceanic community now need to be contrasted with discussions of coral signalling the broader collapse of oceanic communities. In more recent attention to coral, the collective life and collective death of coral has featured as a measure of the precarity of oceanic conditions in the Anthropocene. The metaphor of coral as 'ocean's canaries' applies to both the endangerment of coral communities and the human communities that depend on the biodiversity supported by coral reefs. In addition to the 'ecosystem services' of reefs as nurturing fish and crustaceans that provide primary food sources for hundreds of millions of humans, corals serve as both material and symbolic resource for many coastal and indigenous island communities. Indigenous peoples in the Pacific, the Indian Ocean, and the Caribbean, have formed extensive and intimate connections to coral. Native Hawai'ian communities hold the belief that the birth of an island, including its coral, is the manifestation of 'the most ancestral being'²³ where the sea, sky, and land come together to supply the necessary ingredients of life. The Kumulipo, a native Hawai'ian chanted poem composed in the early eighteenth century, opens with the creation of life from coral-covered islands. A coauthored study by scientists and native Hawai'ian ethnographers details the Hawai'ian belief that 'the skeletal composition (calcium carbonate) of corals and humans is the same material, further supporting the belief that we are direct descendants of corals'.²⁴ The researchers add, 'Corals are a foundation of life in Hawai'i. Throughout the Native Hawaiian understandings of natural processes, intimate, reciprocal relationships between man and coral have been nurtured in both spiritual and practical realms'.²⁵ The Tonga scholar and writer Epele Hau'ofa has called for a solidarity among Oceania peoples rooted in the stewardship of the Pacific Ocean in concert with other coastal indigenous communities. He states, 'No people on earth are more suited to be guardians of the world's largest ocean than those for whom it has been home for generations'.²⁶ The life and death of coral overlaps with indigenous struggles for decolonization and oceanic solidarity in the face of rising seas. While the collapse of coral is frequently characterized as a loss that resonates as a marker for the Anthropocene and humanity as a whole, the death of coral most directly affects the coastal communities that daily interact and depend on coral communities. To think with coral then is to intertwine its conditions with coastal and island indigenous life, the *longue durée* of native ways, and contemporary movements for indigenous protections of land, food sovereignty, and political self-sovereignty.

The multi-species and multi-cultural communities associated with coral now face accelerated precariousness as evidence of mass bleaching events becomes more common.

Today it is estimated that 75% of all coral reefs are threatened in their near-term survival. The combination of enchantment and extinction that describes the status of coral communities also applies to recent works of art that aim to provide visual and material exemplification of coral's changing fate. It is no surprise then that the life and death of coral has recently become increasingly present as a theme and medium in contemporary art. There is an emerging trend in coral art to incorporate into the artwork the very materials that are part of the long chain of the production of carbon pollution that is causing direct harm to reefs. Materials such as petroleum-based plastics, which contribute to the destruction of coral, are repurposed as a kind of 'vibrant matter'²⁷ for coral artworks. Margaret and Christine Wertheim's *Crochet Coral Reef Project*, begun in 2005, has grown into multiple installations spread across different locations of knitted materials into the shape of coral reefs (crochetcoralreef.org). Some of the reefs are crocheted from plastic garbage and involve synthetic yarns produced in part from petroleum. Marion Endt-Jones describes how the crocheted reefs, some of which are constructed to show bleaching, 'draw attention to the effects of pollution and global warming brought about by Western consumer culture. Corals crafted from yarn and plastic become hybrid, post-evolutionary species pointing to the so-called Great Pacific Garbage Patch, a vast agglomeration of plastic waste in the Northeast Pacific Ocean caused by a confluence of currents'.²⁸

Since the Wertheim's project has garnered a lot of attention already,²⁹ I'd like to examine a few other coral art works. Australian artist Alison McDonald's 'Coral Bommie' (2009)—a coral bommie is a stand-alone coral formation, often a column shape, which projects higher from the sea floor or platform of a reef—is also a work made of plastics and composed primarily out of recycled water bottles (figure 1). The collection of clear water bottles and colourful lids reveal geometrical and algorithmic forms of elegance that mimic coral when collected. The use of dry, empty water bottles stands as a material contrast to the coral's liquid habitat. Made from a petrochemical industrial substance, used to monetize fresh water, and likely to end up thrown away and contributing to the overwhelming amount of plastic refuse circulating in the sea, the coral sculpture seems to stand in condemnation of its own material composition. McDonald's work ties the life and death of coral directly to petroleum products, plastic waste, the commodification of water, and global energy use. The sculpture makes visually evident how coral is directly and immediately affected by carbon capitalism and the massive amount of waste built into this system. The desire to recycle the plastic bottle is put into the service of the artwork, but viewers can still easily recognize the bottles, which are in a liminal state between garbage and art form. McDonald's work can be understood in a longer tradition of aesthetic theory as exemplifying the technique of 'defamiliarization' (a term developed by Viktor Shklovsky) and 'laying bare the device',³⁰ methods first used by Russian formalist theorists in the early twentieth century to describe how modernist artworks reflected on and exposed the devices and materials that composed the work. Defamiliarization disrupts the ordinary, routinized view of an artwork (or an object depicted in a work of art), to be replaced by a new way of looking that is aware of the formal and material elements of composition as artificial devices. Laying bare the device is a tactic whereby the artist uses defamiliarization—such as the contrast between form and content—in order to reveal that the process of production of the work can also be a source of aesthetic value. McDonald's 'Coral Bommie' defamiliarizes both the plastic bottle and coral art as viewers toggle between these two substances, making refuse and reef, normally alien to each other, here combine into one work. McDonald's art lays bare its plastic materiality to reveal the compositionality, labor, and materiality of the work as a combined artistic and political act. The enchanting forms and

design of coral is composed from the disenchanting refuse of water bottles that are reminders and reminders of a global hydrocapitalism that converges with petroculturalism. In 'Coral Bommie,' coral is made out of the very thing that is distressing it, while insisting the viewer behold at the same time aesthetic enchantment and disenchantment in the life and death of corals.

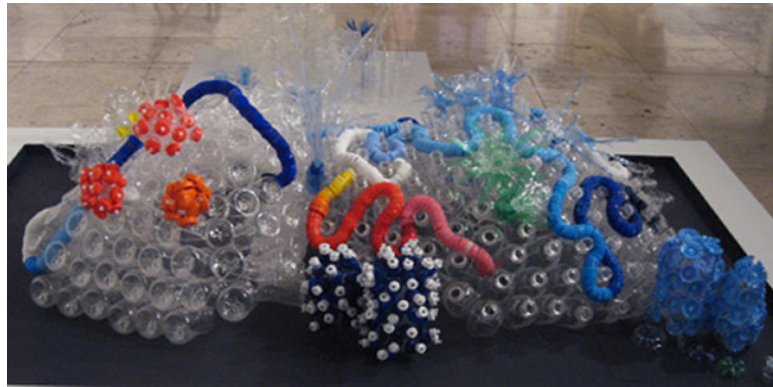


Figure 1 Alison McDonald, *Coral Bommie*. Copyright Alison McDonald and Jane Gillings

Looking at recent works of coral art, one cannot help but revisit Shakespeare's phrase 'something rich and strange' as a marker for the intersection of coral aesthetics and coral's precarious biological state. Such coral art repurposes the phrase into a descriptor for how prominent phenomena in the Anthropocene, including global markets, carbon-based economies, and contemporary art spaces, are 'rich and strange' materials for understanding the life and death of coral today. U.S. artist Courtney Mattison's series 'Our Changing Seas' is composed of three large sculptures crafted from 2011-2014 intertwining the flourishing of corals with the bleaching of corals. These large tableaux of life size coral art are made mostly from clay ceramics and colourful glazes that are rich with calcium carbonate. Each work shows a kind of 'ages of coral,' the lifecycle from thriving to bleaching to being overcome by algae. In 'Our Changing Seas II',³¹ the viewer is able to walk around the sculpture to witness the life and death of coral over and over again (figure 2). At the beginning of the sculpture, healthy and vibrantly painted coral of several unique species are packed together suggestive of a rich symbiosis; at the end the flat, pale white coral all look alike in their bleakness. The pun on changing seas/sees follows the viewer's eye as it pans the artwork. Allowing the viewer to linger on the threshold between life and death, Mattison's detailed corals also calls for viewers to linger over the experience of what it would mean to mourn coral's demise. In their Introduction to *Mourning Nature*, the editors Ashlee Cunsolo and Karen Landman propose that 'asking what counts as a mournable body' can be a way to recognize the wider implications of 'environmental grief'.³² For Cunsolo and Landman, expanding the range of mourning to a wider variety of nonhuman animals—and embracing personal reactions to such loss—can have a powerful effect in coming to terms with environmental distress as a collective experience. Mourning nonhuman animals such as corals can also provide a sense of common connection across human and nonhuman communities that appreciate grief as a fundamental contribution to ecological engagement. Mattison's works show a shift from coral as associated with wonder to being identified with elegy and catastrophe, a 'pessimist in paradise' as one book calls coral's condition.³³ Her work draws from longstanding tropes of the fantasy of coral but reveal coral's condition today as a disturbed fantasy or poisoned garden. Endt-Jones discusses how coral has

long been cherished by artists influenced by Christian notions of transubstantiation,³⁴ finding in coral a metamorphic being that bridges animal and mineral, water and life. Mattison depicts a different metamorphosis in her sculpture, as coral becomes stone, ghostly, and disenchanting. The viewer can return to the vibrant section of the coral but now is vividly aware that both living and dying coral involve wonder and melancholy, an admiration for the ‘rich and strange’ as well as grief for what ‘sea-change’ has become.



Figure 2 Courtney Mattison, *Our Changing Seas II*. Photographed by Courtney Mattison.

Coral Collapse in Camera

The long history of coral used in artworks are reflective of the widespread sense that coral *in situ* is already a kind of natural artwork. Encountering coral underwater stimulates a synesthetic delight of colour, texture, shape, outline, and form. Living coral is extremely photogenic, but recent mass bleaching events also have shown how the death of coral is strikingly photogenic. How then should one look at coral death? How does one understand the visual evidence of such death and what kinds of reactions and responses can be drawn from such exposure? The documentary *Chasing Coral*, directed by Jeff Orlowski, grapples with the problem of how to visualize and react to coral’s spectacular, even charismatic, death. The film follows a small team of coral activists in their attempts to provide photographic evidence of the rapid onset of bleaching at several reefs around the world. The documentary provides viewers with a brisk education in the biology of corals, the crisis of bleaching reefs in warming and acidifying seas, and the difficulties of constructing reliable underwater cameras. Situated between aesthetics and education, the film poses questions directly to the audience concerning how to garner immediate attention to coral’s plight. Most of the first half of the film centers on the work of diver Richard Vevers in his visits to several dive sites along with coral scientists

and his determination to provide time lapse photography of coral bleaching on a large scale. The second half of the film shifts focus to one of the underwater camera crew operators, Zack Rago, who reveals his childhood devotion to coral and becomes the film's emotional focal point as he struggles to witness and photograph a massive bleaching event in the Great Barrier Reef during the 2015–2016 Australian summer. The devastation that year to the Great Barrier Reef received considerable press, including one online journal that took the form on an obituary and eulogized: 'The Great Barrier Reef of Australia passed away in 2016 after a long illness. It was 25 million years old'.³⁵ Though the whole reef has not succumbed, making this elegiac announcement awkward and controversial, these kind of pronouncements, along with documentaries like *Chasing Coral* that show what the death of a reef is like, highlight the need to find a provocative form and mode of address to reckon with the wider impact of coral's precarious condition.

Australian poet Judith Wright writes that, 'If the Barrier Reef could think it would fear us' and adds 'we have its fate in our hands'.³⁶ Much of the documentary's narrative is preoccupied with how to make the documentary and present coral's current story, hence the 'chasing' title. The various successes and failures of equipment and storytelling provide a kind of 'laying bare' of the device to let viewers know that we are not witnessing via the unmediated eye of nature but with the highly mediated and limited camera technology available. The vast majority of contemporary nature documentaries seek to naturalize the artifice of the camera lens so that the viewer feels as if the animal is intimately right there before the gaze. In the *Planet Earth* series (2006, produced by Alastair Fothergill), for example, the camera and filmmakers are never to be seen, and while no humans enter the visual space, the voice-over from David Attenborough is performed as if he was present in the moment watching the animals directly.³⁷ By contrast, *Chasing Coral* treats the physical and emotional struggle with the cameras as integral to the authenticity and reality of the story of trying to provide a reliable and intimate witness of the life and death of coral. The strategy of discussing the film as one is making it also is intended to direct the viewer to see *Chasing Coral* as aware of its straining to articulate a pathway that includes scientific documentation, environmental activism, and entertaining visual drama. The film ultimately composes these perspectives into a work that suggests that the emotional seesaws and self-aware mediations of these ways of engaging with coral will provide a model for how to form a global coral culture movement.

The film crew eventually manages to provide single stills and time-lapse photography of the brilliant colors and liveliness of coral as well as the dismalness of what mass coral death looks like. In reckoning with the visual sea-change of 'something rich and strange' into dead coral, Vevers provides a voice over narration that serves as another moment of 'laying bare' when he states, 'you see a picture of a beautiful white reef—is that a good thing or a bad thing?' With the explanation that we are watching luminous white coral in its dying throes, the film then assumes typical expectations of nature documentaries as it teaches the audience how to correlate seeing and feeling. In trying to guide viewers into how to react to this 'incredibly beautiful phase of death,' Vevers slips directly into the voice of coral as he tells viewers that 'it feels as if coral is saying "look at me, please notice"'. In this moment, coral's death, an event of the loss of animacy, is felt to be personified. As this comment arrives near the end of the film, both filmmakers and audience are thrust into a bitterly dissonant experience of simultaneous thrill and devastation at being able to successfully see the Great Barrier Reef's mass destruction. The accomplishment of obtaining images of coral bleaching becomes both the emotional high and low of the film. At this moment,

the emotional broadcasting of the film stumbles into a powerful yet awkward situation of simultaneous success and failure.



Figure 3 Richard Vevers, *Staghorn Coral in American Samoa*, XL Catlin Seaview Survey, *The Ocean Survey*

The film's technological achievement of underwater still shots taken day after day over several months provides a before-and-after-shot experience that solicits further reflection. In the final minutes of the film, viewers see several before/after images of corals in different locations, with the ability to slide between the time of life and death. In one glance, one sees some of coral's multiple temporalities and possible futures. The slimy waters left after coral's demise add yet another visualization of gothic decay to the larger catalogue of destruction in the Anthropocene. The cultural meaning of this kind of double vision is generally legible as a dichotomy of good/bad, life/death, utopia/dystopia. But this film's ability to provide visual evidence of the collapse of biodiversity prompts viewers to expand the meaning of before/after photography by contextualizing these images as part of the larger visual repertoire of climate change linked to extinction events in the present. Thus the before/after photographs, such as the view of a staghorn coral colony (*Acropora muricata*) in American Samoa succumbing and becoming covered in algae (figure 3), is also meant to provide evidence of the before and after of warming and acidifying seas. Here we see biological time come into direct conflict with Anthropocene time, with the speed of climate change overwhelming the slow capacity of coral to adapt. The before/after also provides a visual analogue to the viewer's changed relationship to knowledge/responsibility—now that the audience knows the precarious state of coral, one cannot insist that the globe will only see the dire effects of climate change much later in the future. Observing coral gardens turn into algal slime calls for a reimagining of the oceans as rapidly trending towards 'gelatinous futures' in the phrasing of Alaimo.³⁸ 'The Anthropocene seas will be paradoxical, anachronistic zones of terribly compressed temporality

where, it is feared, the future will move backwards, into a time when the oceans were devoid of whales, dolphins, fish, coral reefs, and a multitude of other species, but jellyfish (and algae) proliferated... [T]here is little enthusiasm for a future in which the oceans become like the ancient acidic seas, characterized as “slime–rock systems”.³⁹ Understanding coral in the Anthropocene necessitates collapsing present and ancient temporalities, revealing a time in which complex life forms retreat as proto-life seems to advance.

The before/after shots of coral collapse, however, are also meant to mobilize a new kind of global communal coral activism. In the final minutes of the film, coral biologists and indigenous island coral watchers from around the world offer brief testimony of the dire conditions of coral in geographically specific locations across the planet. Yet up to this point the film did not provide any interviews or commentary from global coral communities including Caribbean, Pacific Islander, and equatorial coastal peoples for whom coral is intimately intertwined with ancestral and contemporary life ways. The film only provides a brief nod to how the loss of coral also entails the loss of coral cultures and traditional lives bonded to coral’s condition. Even as the film employs the device of double vision in order to make legible coral’s transition from life to death, the challenge remains for viewers to disrupt the linear, oppositional structure of before/after by striving to imagine and realize alternative paths and futures for coral. Bärbel Bischof has highlighted how coral scientists face multiple difficulties in assessing and preserving Marine Protected Areas, including the high cost of research, disagreements in academic methodology, and the recurring problem of sidelining longstanding local and indigenous stewards of coastal biomes.⁴⁰ Irus Braverman, in her book *Coral Whisperers* (2018), details the flourishing research into assisted migration of resilient corals and artificially constructed reefs. Braverman pursues the enmeshed emotions of hope and despair of coral scientists as they measure disappearing coral life and attempt to regrow reefs using techniques including breeding hardier corals and artificial coral reef transplantation. As Braverman suggests, ‘immersing ourselves in the multiplicity of coral life allows us to step back and recognize the many assumptions... that underlie our understandings and our regulation of life and death—both in our environment and, eventually, in ourselves’.⁴¹ In a time of mass coral bleaching but also massive efforts to save reefs, can one envision still another shift from death to life of corals? Perhaps one can turn again to the legacy of diverse coral cultures to provide insight for future figuration. In Derek Walcott’s epic poem *Omeros*, which cultivates an aesthetic and historical consciousness of events of life and death across many epochs of oceanic encounters, he writes of coral’s capacity to colonize upon its own death:

where coral died
it feeds on its death, the bones branch into more coral,
and contradiction begins. It lies in the schism
of the starfish reversing heaven; the mirror of History
has melted and, beneath it, a patient, hybrid organism
*grows in his cruciform shadow.*⁴²

Walcott’s poem points to how coral—as a biological entity and cultural figure—incorporates in itself a multitude of phenomena of death that intertwine with its multitudinous aqueous life. Such death includes the history of the transatlantic slave trade, and the lives and deaths experienced by longstanding inhabitants of coastal lands. The massive bleaching of

coral reefs today is a new 'schism'. Once again it is a question whether coral can 'feed on its death.' Walcott's poem points to the possibility of 'a patient, hybrid organism', perhaps another iteration of 'something rich and strange', which could emerge in the maelstrom of the Anthropocene, if coral can continue to maintain itself in its own contradictions and reconstitute itself upon its death. The artworks discussed in this paper offer initial ways towards understanding and envisioning what, if anything, can 'grow in [coral's] cruciform shadow'.

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Endnotes

1. See George Feldhamer, Joseph Whittaker, Anne-Marie Monty, Claire Weickert, 'Charismatic Mammalian Megafauna: Public Empathy and Marketing Strategy', *The Journal of Popular Culture* vol. 36, no. 1, 2002, pp. 160–167; Fiona Sunquist, 'Who's cute, cuddly and charismatic?', *International Wildlife*, vol. 22, 1992, pp. 4–12.

2. See Jamie Lorimer, 'Nonhuman Charisma', *Environment and Planning D*, vol. 25, no. 5, 2007, pp. 911–932; Monika Krause and Katherine Robinson, 'Charismatic species and Beyond: How Cultural Schemas and Organisational Routines Shape Conservation', *Conservation and Society*, vol. 15, no. 3, 2017, pp. 313–321.

3. Endt-Jones's Introductory essay to the volume points out that coral has long been held to have aesthetic and talismanic value, and was incorporated in early examples of jewelry in many cultures across the globe for its beauty and purported powers. The shapes of coral also were seen as bizarre and attractive to collectors of cabinets of curiosity in the 16th and 17th centuries. Marion Endt-Jones, 'A Monstrous Transformation: Coral Art in Culture' *Coral: Something Rich and Strange*, ed. Marion Endt-Jones, Liverpool, Liverpool UP, 12.

4. Herman Melville, *Typee, Omoo, Mardi*, New York, Library of America, 1982, 488.

5. Quoted in Alastair Sponsel, 'From Cook to Cousteau: The Many Lives of Coral Reefs', in *Fluid Frontiers: Exploring Oceans, Islands, and Coastal Environments*, John Gillis and Franziska Torma, eds., Cambridge, UK, White Horse Press, 2015, pp. 153.

6. Rebecca Albright, 'Can We Save Corals?', *Scientific American* vol. 318, 2018, n.p. online.

7. Stefan Helmreich, *Sounding the Limits of Life: Essays in the Anthropology of Biology and Beyond*. Princeton, Princeton UP, 2015, 60.

8. Donna Haraway, *Staying With the Trouble: Making Kin in the Chthulucene*, Durham, Duke UP, 2016, 12.

9. Eduardo Kohn, *How Forests Think: Toward an Anthropology Beyond the Human*, Berkeley, U of California P, 2013. Cecilia Chen, Janine MacLoed, Astrida Neimanis, 'Introduction: Toward a Hydrological Turn?', *Thinking with Water*, Cecilia Chen, Janine MacLoed, Astrida Neimanis, eds. Montreal, McGill-Queen's UP, 2013. In their Introduction, the editors of *Thinking with Water* articulate how 'thinking with' is engaged with waters as places of material and cultural histories up to the present. By contrast, 'Thinking of or about water in these ways may nonetheless repeat the assumption that water is a resource needing to be managed and organized' (3).

10. J. E. N. Veron, *A Reef in Time: The Great Barrier Reef from Beginning to End*, Cambridge, MA, Harvard UP, 2009, 221. Iain McCalman reiterates the metaphor: 'Corals are indeed the canaries of climate change, and they face death from many more threats than noxious gases in coalmines.' Iain McCalman, *The Reef: A Passionate History: The Great Barrier Reef from Captain Cook to Climate Change*, New York, Farrar, Strauss and Giroux, 2013, 275. Consider for a moment the metaphor of the 'canary in the coalmine.' Where did that canary come from and how did the animal arrive at the mine? There is a biopolitics and a story of global capture and trade of canaries that is implicit in the metaphor and material practice of carrying canaries into coalmines to detect noxious gases.

11. Justin Prystash, 'Zoomorphizing the Human: How to Use Darwin's Coral and Barnacles', *Rhizomes*, vol. 24, 2002, n.p.

12. Coral scientist Charles Birkeland emphasizes the polar opposite qualities of coral that make it all the more difficult to find a way to respond to the dualities of coral's condition. 'Although coral reefs are the most productive ecosystems in the sea, the fisheries of coral reefs are among the most vulnerable to overexploitation. Despite having the power to create the most massive structures in the world made by living creatures (including man), the thin film of living tissue of coral reef is particularly vulnerable to natural disturbances and effects of human activities.... This combination of attributes—creative power and fragility, resilience and susceptibility, productivity and vulnerability to overexploitation—makes management of coral-reef systems a particular challenge to science.' Charles Birkeland, 'Coral Reefs in the Anthropocene', in *Coral Reefs in the Anthropocene*, Charles Birkeland, ed., New York, Springer, 2015, pp. 7.

13. Elizabeth DeLoughrey, 'Submarine Futures of the Anthropocene', *Comparative Literature*, vol. 69, no. 1, 2017, pp. 33–34.
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15. UNESCO, World Heritage List, 'The Great Barrier Reef', 2018. <<https://whc.unesco.org/en/list/154>>
16. Veron, 89.
17. William Shakespeare, *The Tempest*, New Haven: Yale UP, 2006, 35–36.
18. See Marissa Fessenden, 'Sea Coral Makes Excellent Human Bone Grafts', *Smithsonian Magazine*, October 23 2014. <<http://www.smithsonianmag.com/smart-news/sea-coral-makes-excellent-human-bone-grafts-180953121/>>. The consumption of many corals taken orally or injected into the blood stream for medicinal purposes has long been practiced in some Western and non-Western medical traditions.
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20. Prystash, n.p.
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29. See Eva Hayward, 'Fingeryeyes: Impressions of Cup Corals', *Cultural Anthropology*, vol. 25, no. 4, 2010, pp. 577–99; Stefan Helmreich, 60–61.
30. Viktor Shklovsky, 'Art as Device,' *Viktor Shklovsky: A Reader*, ed. Alexandra Berlina, London, Bloomsbury, 2017, 88. In an interesting intersection with animal studies in literature, one of Shklovsky's examples of defamiliarization is a story by Tolstoy told from the point of view of a horse.
31. <http://courtneymattison.com/ourchangingseas-nsu/>
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33. Steve Jones, *Coral: A Pessimist in Paradise*, London, Little Brown, 2007.
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35. Rowan Jacobsen, 'Obituary: Great Barrier Reef [25 million BC-...]', *Outside*, October 11 2016. <<https://www.outsideonline.com/2112086/obituary-great-barrier-reef-25-million-bc-201>>.
36. Cited in McCalman, 244.
37. On the DVD edition after each episode of *Planet Earth*, however, the producers added a further featurette that revealed how some scenes were filmed For a longer history of wildlife documentary film that focuses on the popularization of this genre in the United States, see Gregg Mittman, *Reel Nature: America's Romance with Wildlife on Film*, Cambridge, Harvard UP, 1999.
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 42. Derek Walcott, *Omeros*, New York, Farrar, Strauss, Giroux, 1990, 297.