Title
Confronting the Artinatural: Science, Wilderness and 21st Century Nature

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Publication Date
2016

Peer reviewed|Thesis/dissertation

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Science, Wilderness and 21st Century Nature

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A dissertation submitted in partial satisfaction of the

requirements for the degree of

Doctor of Philosophy

in

Environmental Science, Policy and Management

in the

Graduate Division

of the

University of California, Berkeley

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Summer 2016

Abstract

Confronting the Artinatural: Science, Wilderness and 21st Century Nature

by

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Three hundred years after the Scientific Revolution and the exploration of the vast "wilderness" of the "New World," concepts of "nature" have found themselves in some peculiar orientations. On the one hand, the hyper-advancements in science and technologies have continued to induce a sense of human mastery of nature, a story of the human hand skillfully manipulating earth as it deems fit. On the other hand, a strong idea of wilderness, or untouched and wild land, has remained in the lexicon and imagination of many American minds. These concepts – science and wilderness – rely on notions of the natural and the human as separate realms, and yet so much of science and wilderness indicates a special bond and symbiosis between humanity and nature.

In this work I explore the realms of the natural and artificial by comparing and contrasting two seemingly dissimilar institutions: The California Academy of Sciences in San Francisco and Muir Woods just to the north in Marin County. Both pillars of the Bay Area's window into nature, these sites offer diverse and contradictory narratives about the human place in the environment and the kinds of behaviors and attitudes that are appropriate in each. What I uncover are the strange overlappings and coincidences of the apparently divergent institutional perspectives.

The idea that I bring to bear to confront these strange parallels is a concept I call the "artinatural." Like other words that intend to integrate two opposing realms – hybrid or cyborg – the concept of artinatural combines the ideas of natural and artificial to suggest that things, institutions, and even ideas can be simultaneously artificial and natural. A wooden chair, for example, is both from nature (wood from trees) and artificial (made with human hands and/or technologies). The concept is also meant to ask whether the artificial is really outside the realm of the natural at all.

What becomes clear through the exploration of the questions and topics above is that American perspectives on nature that have assumed a great distance between humanity and nature have been a driving force behind both environmental destruction and social injustices. It is through a new understanding of nature, one that accepts humanity and its artifice as significant parts of the natural, that these destructive practices can begin to be counteracted.

Acknowledgements

This work would not have been possible without the exceptional support of my adviser Professor Carolyn Merchant. Professors Kimberly TallBear, Carolyn Finney, and Isha Ray were crucial in their guidance for the early development of this project. Professors George Lakoff and Justin Brashares served as two inspirational voices that helped guide my way down the often-windy path of inquiry. Thank you to Professor David Winickoff for encouraging me to critically analyze the California Academy of Sciences. Also, many thanks to Professor Gregory Levine for his gracious support as I delved into my analysis of the artificial and the Anthropocene. The late and great Professor Charles Muscatine was always an intellectual motivator, encouraging me to pursue these inquiries even when I had my doubts – his voice is sorely missed. Finally, a special thanks to colleagues, family and friends (and my dog Sonny) for their ongoing moral and intellectual support. The seeds for this project were planted some years ago, and one discussion in the wee hours of the morning on a New York City subway with my friend Henry Bradford Morris III was a key factor in the development of the idea of the artinatural.

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Chapter 1

Introducing the Artinatural

In 2015, the state of California reached a point of crisis. There was one year of water left in the state's reservoirs and thousands of sea lions washed up dead on state shores. What led to this crisis? Was the science not good enough? Oddly, scientists seem to have a pretty solid understanding of how these critical problems arose: a mixture of natural and anthropogenic factors that led to warming oceans and lands, intensified by greenhouse gas emissions that accelerate climate change. Taking a step back, it is not difficult to see how fossil fuel-energized industrial economies have strangled Earth's ecosystems. Worldviews in which nature is simply a resource for human use, rather than completely intertwined with our ability to live, are at the heart of these economies and systems. The sad irony is that humanity will materialize the very thing some cultures have already done ideologically - that is, *erase itself from nature* - if ideologies of artifice and its relationship with nature cannot be positively transformed. These ideologies guide and endorse behaviors and practices that now govern industrialized economies.

A few thinkers quite aptly named this time period the "Anthropocene" because of the huge and undeniable impact of human societies on the planet. The global ecological future is now, more than ever before, tied to the effects of human societies at large. On the other hand, the future of humanity is even more tied into the careful balance of global ecosystems. In other words, the problems that humanity confronts are *artinatural* - the intermixing of what some perceive as a separate nature with human society and artifacts. If the concept of the Anthropocene helps illuminate the fact that earth's nature is greatly affected by human societies, the concept of the artinatural shows that humanity is completely inundated by the natural as well, and is, in fact a force of that very "nature." The purely artificial is a myth – there is only the artinatural. In this artinatural world, the complex intermixing of humanity and nature will determine our species' future within earth's complex, intertwined, and fragile life-supporting ecosystems.[1]

…

Language, although powerful in its effects on human understanding of the world, is also an imperfect tool for representing reality. To describe something realistically, or as it truly is, is a lofty, perhaps impossible goal. But some words and ideas can do a better job than others of teasing out the complexity of reality. Words and ideas activate neural networks in our brains with which we attempt to understand the world around us. In terms of current life on earth, what could be more crucial than the ways in which "nature" is conceptualized and understood? Indeed, it is now painfully evident that the conceptualization of nature is something to which greater attention must be given.[2]

Unfortunately, nature's complexity, and the careful matrix that sustains healthy ecosystems, is something that is rarely conveyed or understood in a way that promotes sustainability. Instead of language that allows one to see that humanity, and the larger

ecosystems within which humanity exists, are absolutely connected, the English language splits up the two. There are "wilderness areas" that we can visit for a day, or even an hour, and then leave. We can join an "environmental group" that focuses on "environmental" issues, somehow made to be seen as exterior to basic human sustenance and society. The language used allows "the environment" to become a fringe interest, an externality. This failure of language is dangerous and may signify the difference between flourishing as a species and extinction. This work attempts to fight against these weaknesses in the language used to describe ecosystems and humanity. It is an attempt at getting to *a more realistic* language that describes the world closer to the way it is, rather than by means of the often-erroneous cultural stories about nature that have prevailed since the dawn of civilization.

…

Three hundred years after the Scientific Revolution and the exploration of the vast "wilderness" of the "New World," concepts of "nature" have found themselves in some peculiar orientations. On the one hand, hyper-advancements in science and technologies have continued to induce a sense of human "mastery" of nature, a story of the human hand skillfully manipulating earth as it deems fit. On the other hand, a strong idea of wilderness, or untouched and wild land, has remained in the lexicon and imagination of many American minds. These concepts – science and wilderness – rely on notions of the natural and the human as separate realms, and yet their reliance on this dichotomy indicates a special relationship between the presumably opposed realms.

In this work I explore the realms of the natural and artificial by comparing and contrasting two seemingly opposed institutions: The California Academy of Sciences in San Francisco and Muir Woods National Monument, just to the north in Marin County. Both pillars of the Bay Area's window into "nature," these sites offer diverse and contradictory narratives both about the human place in the environment and the appropriate kinds of behaviors and attitudes that humans should have therein. I engaged in participant observation (as an observer of, and visitor to, these sites), performed surveys with visitors at the sites, and explored the histories and philosophies that helped to formulate these particular institutions. What I uncovered are the unexpected overlappings and coincidences of the seemingly opposed institutional perspectives.

Perhaps there is no better symbol of the technological and scientific cutting edge than the Bay Area and its Silicon Valley. The California Academy of Sciences may intend to capture this symbol in a way that can be disseminated to its clientele in their natural history museum. By the same token, what better symbol than that of John Muir to represent the bold and tenacious notion of wilderness? Muir Woods is perhaps the most accessible window into this idea for nearby urban dwellers. But how do these two realms overlap? What could they share in common when they at least attempt to represent such vastly different realms of human experience and culture? Or are these realms really so different? Is there a wilderness in science and a science in wilderness?

After exploring these two symbols of nature, I will visit an array of subjects from Fukushima's radioactive landscapes to creative ways to reimagine race with the artinatural perspective. These investigations provide examples of how new approaches to understanding nature can transform other aspects of human society and identity. What will be revealed as we examine displays of nature through science and wilderness, as well

as with race and radioactivity, is that both ideological sides to the binaries of nature maintain and perpetuate a justification for damaging environmental and social practices.

From the perspectives both of science and of wilderness, nature has been colonized. In science, the conquest revolves around trying to understand and control aspects of nature. For wilderness, on the other hand, the conquest involves delineating parts of nature to be preserved as museum pieces or idealized versions of an ostensibly pure "nature." Through careful examination of these kinds of sites one may begin to tease out the bifurcated, colonialist cosmology that seeks to narrowly define and control, and replace it with a more integrated and humble perspective. Seeing the true relationships between people and nature may actually allow societies to better formulate positively transformative and sustainable approaches to the problems that have arisen from the damaging perceptions and conceptions that have dominated European-American cultures for the last centuries.

Some Persistent Dichotomies regarding Nature

Here are some of these persistent dichotomies, or binaries:

Human || Nature
Culture || Nature
Artificial || Natural
Civilization || Wilderness
Human || Animal
Mind || Body
Subject || Object
Reason || Emotion
Man || Woman
Familiar || Stranger
Internal || External

These binaries form powerful metaphorical, hierarchical, and moral structures. There are several hierarchies implicit, for example, in the wilderness-civilization binary. One of the hierarchies imagines wilderness as a pure place that represents everything beautiful and clean; another hierarchy elevates civilization as a force that conquers a dark and brooding nature. Both of these stories played a part in forming a moral hierarchy that placed the European man over animals, nature, women and people of color. That kind of hierarchical narrative forms the foundation for justifying history's most brutal events: slavery, European colonialism, the Holocaust, and other atrocious acts committed against human populations imagined to be lower in the hierarchy. Poor conduct toward women, nonhuman animals and broader ecosystems can be ascribed to these binary, metaphorical hierarchies – in each case the colonialist worldview sought to "civilize" these entities that were seen as more "natural" or wild.

The "mind vs. body" binary, made famous by Descartes and many subsequent interpretations of his work, functions along comparable hierarchical perspectives. The Cartesian "mind" is seen as more esteemed than the lowly body: all wild things and

animals have bodies, but only the civilized human being has a mind. Reason is valued more than emotion. Emotions were associated with the more animalistic or automatic responses of the body's clockwork. In this cosmology, reason and the mind are the most prized human features. David Hume, however, fought back on some of these assumptions – he argued that "reason is, and ought only to be the slave of the passions." One thing this proclamation implies is the severe difficulty of getting past binary-thinking even when attempting to challenge its assumptions: in suggesting that emotions hold precedence over the mind, Hume re-affirmed the specious rupture between reason and the emotions. Since Hume, there has been a growing undertaking toward the idea of an "embodied mind" in which the mind and body are not separated, either functionally or categorically. Beyond Hume's work, there have been numerous projects to tackle some of the other erroneous binaries. The binary I tackle in this work is that of the artificial and the natural.[3]

Powerful implications hide behind categories like natural and artificial. Some synonyms for "artificial" include false, fake, synthetic, manufactured, sham, manipulated and unnatural. There is a strong sense of contamination in these terms. On the other had, the antonym of "artificial," natural, has synonyms such as these: pure, essential and legitimate. Whole moral systems could be construed from the contrast between artificial and natural. But some artists and writers were at least implicitly aware of the untruthfulness of these kinds of binaries and hierarchies and, since then, there have been academic attempts to deal with them more directly, some of which I will investigate in the next segment.

Nature and Integrative Terminology

Growing knowledge of global ecological crises has encouraged a number of academic initiatives that seek to challenge alienating binary paradigms, and to work toward ideas of nature that are more inclusive and integrative. Donna Haraway's idea of the "cyborg," for example, blurs the lines between machine and organism, nature and culture. Because humans have become so interwoven and reliant on technology, from cars to contact lenses, they are "cyborgs." Because there is never culture without nature, or vice-versa, then these things could be called "naturecultures." Bruno Latour also offered the term "hybrid" to signify the intermixing of nature and culture. I utilize the term "artinatural" – a word that was first developed in the 18th century landscape architecture – to describe things that are simultaneously artificial and natural, such as dog breeds and radioactive forests.[4]

The term "artinatural" was first coined in Batty Langley's 1726 and 1728 publications, *Practical Geometry* and *New Principles of Gardening*. In Langley's case, the word was used to describe "regular irregularity." More specifically, the term described a method in landscape architecture in which "a symmetrical geometry overlaid by asymmetrical elements such as serpentine paths."[5]

Comparable to other words that intend to amalgamate two seemingly opposed spheres, the term "artinatural" combines the ideas of natural and artificial to suggest that things, buildings, institutions, and even thoughts can be simultaneously artificial and natural. A wooden chair, for example, is both natural (its wood is from trees) and artificial (it is made with human hands and/or technologies). The concept is also meant to

ask whether artificial things are truly beyond of the realm of the natural whatsoever. Unlike the term "cyborg," the term artinatural does not primarily refer to individual subjects; rather, it refers to landscapes, buildings, ideas and other artifacts. Unlike the term "hybrid", the term artinatural is not as broad or vague: it specifically describes things that are simultaneously natural and artificial, rather the broader category of instances when culture mixes with nature. Donna Haraway's usage of "natureculture" pushes readers to not see "nature" or "culture" as either "polar opposites or universal categories" – something both Raymond Williams and William Cronon contend concerning nature and wilderness, respectively. The term artinatural exists as a more specific adjective referring to things constructed by humans – what are usually referred to as "artifice" – rather than to culture as a whole. Culture and nature, it could be suggested, are both artinatural in some meaningful ways. To be certain, the term "artinatural" arrives out of these other inspired, integrative analyses and terminologies.[6]

Donna Haraway defines a "cyborg" as a "cybernetic organism, a hybrid of machine and organism, a creature of social reality as well as a creature of fiction." She follows this with a much more intricate, detailed, and creative account of its manifestations, among which she includes human beings. She argues that with the idea of cyborg, "nature and culture are reworked; one can no longer be the resource for appropriation or incorporation by the other." She also suggests that the concept of cyborg may offer "a way out of the maze of dualisms in which we have explained our bodies and our tools to ourselves." [7]

Bruno Latour, in *We Have Never Been Modern*, on the other hand, mirrors Haraway's notion of "cyborg" with an emphasis on the idea of hybrids. He argues that if it was a goal of the Modern to purify the natural from the cultural, what ensued was the vigorous mixing of the two entities, forming what he calls "hybrids." The attempted "purification" of nature and culture thus led to "proliferation" of hybrids.[8]

Haraway's notion of the "cyborg" is a creative way to conceptualize the multiple and complex, artificial and natural, constitutions of organisms. The notion of the hybrid, moreover, is a useful tool for understanding how concepts and objects become simultaneously cultural and natural. The two nouns, hybrid and cyborg, leave space for an *adjective* specifically for built and/or altered objects and environments that involve dual, multiple, and/or complex constitutions.[9]

If buildings are a kind of cyborg or a kind of hybrid, what adjective could better describe this built object? I think the term cyborg is particularly effective for describing the complexities of organisms. The term hybrid, on the other hand, can easily refer to just about anything – it is not specific enough. The term "artinatural," however, manages to describe more plainly the dual, simultaneously natural and artificial quality of built objects.

There are two major functions for the term "artinatural" that overlap considerably with the other terms mentioned above. The first function is to recognize the human hand in both nature and the idea of "nature" – this is a project that has been already thoroughly explored. As William Cronon has argued, even the idea of wilderness is a construction rather than a positive reality somewhere outside of culture. The second function is to recognize the ever-presence of the natural in the artificial; this is a more difficult project and involves the recognition that human beings, our cultures and artifacts are in some sense irrevocably, and always, natural.[10]

The concept of artinatural helps in the conceptualization of the interrelationships between ecosystems and technological systems. As with hybrids and cyborgs, the concept of the artinatural helps to show that eco- and technological systems are intertwined and inseparable. The failure to recognize the intertwined and complex relationships between these systems is what allows for the exploitation of these landscapes and their inhabitants. A concept like "artinature" is needed precisely because it is so difficult to tackle a complex world for which language has so thoroughly dichotomized.

Bruno Latour's "actor-network theory," Karen Barad's "agential realist" approach, Jane Bennett's "vibrant matter," and Mel Chen's "animacies" help elucidate another significant aspect of what integrative terms such as artinatural hope to encourage. Animacies and vibrant matter draw attention to the animacy and vibrancies that even inanimate objects possess. Actor-network theory illuminates the multifarious and counter-intuitive agencies of "actants" that include inanimate objects. These re-articulations and alternative understandings of materiality – some call them "new materialisms" - contest the more customary, normative hierarchies present both in racial and sexual identities as well as in binaries like animal-human, nature-human, subject-object, and wild-civilized. Combined with the self-reflexive viewpoints of Donna Haraway's "situated knowledges" and Sandra Harding's "strong objectivity," the new materialisms above, as well as integrative terms like artinatural, hope to offer more complete, and less biased, understanding of the world, as well as increased humility.[11]

The desk on which my computer is resting is visibly made out of wood. It was either constructed by human hands or by machines that may have been constructed by human hands. More or less the same is true of my computer, except it is made with metals and plastics themselves naturally sourced originally. Even synthetic materials have original sources in nature – all this is not to mention that the human species itself, as well as its civilization and artifacts, can be understood as natural or even wild. But what is *not* artinatural?

The sun and moon can offer a good way to signify just what can and cannot be described as artinatural. The moon and the sun, before they were named or even seen, both started as entirely natural things. The ideas and names humans have used to refer to the moon and sun are artinatural – they are both constructed and based in the nature of biological animals and brains. The moon has now been physically altered and touched by human artifacts and has thus become artinatural to some degree. The sun, however, ostensibly remains unaltered by humanity and is almost entirely natural. Galaxies that are both unknown and unnamed are still entirely natural. Artinatural things are things that have been altered by human actions. All artificial things fall into the category of artinatural, but not all natural things. Ideas are artinatural, but unaltered objects themselves are still natural. And beyond this, all (artificial and) artinatural things are still part of nature. These more subtle distinctions and complexities are challenging to traverse, but in this struggle is potential for growth.

One of my favorite examples of artinature is a living wooden bridge I saw in a documentary about rural India. The bridge was made by redirecting tree branches and roots across a chasm, forming it into a living bridge that continues to grow and strengthen. It is natural in every way, and also undeniably artificial – it is not one or the other, but rather, it is artinatural. The same is true of bridges made from felled logs; but the naturalness of that bridge is less evident, more hidden. Again the same is true of a

shiny new phone or car; these items tend to hide their own artinaturalness. The vast majority of the universe is not artinatural, but a good deal of things here on earth are artinatural, either intentionally (i.e. built objects) or unintentionally (e.g. radioactive pollution and other pollutants with uncontrolled dispersal).

The idea of artinatural may lend itself to reflection on moral and ethical problems that established, normative categories have tended to encourage. If constructed objects are artinatural, rather than simply "natural" or "artificial," then perhaps there is something other than these two crude categories that should go into assessing moral concerns. Genuineness, authenticity, sustainability, and even functionality could be good places to start. A well-constructed wooden table may not be seen as entirely "natural," but it can certainly perform a useful function for many years, if not for decades or even centuries. Furthermore, if the production and source materials of this table have been chosen carefully, the table could have benefits absent in, for example, a similar plastic or metal table. In a similar vein, if you critique the possibilities of human genetic engineering, the debate would speedily move past the natural/artificial binary, toward more critical issues like the lack of genuineness or authenticity of what might be a rather de-stabilizing and jarring development in society (as we will see with characters like Gregor Samsa and Edward Scissorhands in Chapter 2). Fallacious and simplistic distinctions hide the complexities of serious moral concerns, while integrative terms (and the concepts they induce) may intensify and expand moral queries that rest at the core of these topics.

To appreciate this interconnectedness of events and issues means that one can no longer conceive of an entirely contained "artificial" object or place. For example, some have learned the tough way, through recent incidents like Fukushima's nuclear disaster and the BP oil spill in the Gulf of Mexico, that although radioactive materials and crude oil may momentarily be contained in artinatural structures, they are still structures that exist in the natural world, and moreover, they are *by no means* eternally or wholly sealed from that broader natural world. These toxic discharges clearly traversed the conceptual boundary between "artificial" and "natural" and prove that they had always been, in fact, artinatural. An artinatural perspective would encourage similar projects that entail risky and dangerous practices to be approached as only *temporarily* safe and contained. Even if the oil spill had never happened, the oil products would still eventually have been distributed through routine processes into the world's landscapes and skies, adding (if more gradually than an explosion or spill) to increases in greenhouse gas emissions and other pollutants. Global climate destabilization, for example, is an illustration of the artinatural: it is not just human societies emitting countless tons of chemicals into the atmosphere, but also the interconnected atmospheric functions that prompt the warming, the storms, and rising ocean levels. Not to see these artinatural intricacies, and not to respond to them, would be catastrophic.

Equivalently important, acknowledging the artinatural can help societies move toward constructive, transformative outcomes. Because one no longer imagines the city as only artificial, one can start to envisage more edible gardens, urban farms, rooftop gardens, decentralized renewable energy production, and green/ecological corridors throughout and within cities and suburban neighborhoods. There may be countless cars, trucks, and machinery strewn about places deemed wilderness, but now there can also be a new kind of artinatural wilderness within cities – integrating more species of plants and

animals in what was once strictly imagined as artificial. If destructive artinatural developments have already occurred, at least many constructive artinatural transformations can be offered to restore them.

Chapter Layout

In chapter 2, I delve into what I call ontologies of nature, or cosmologies and perspectives of nature. I explore the changing ideas of nature through some European and American literature and film, as well as a small foray into the modern environmental movement. I then delve into the idea that the purely artificial is a myth; this involves a look at the idea of the Anthropocene more in depth as an example of the artificial taken to its extreme.

In chapter 3, I explore not only the museum at California Academy of Sciences, but also some critical perspectives on the history of science and objectivity. Here science is, in part, a relationship with nature that is wrapped up with specific human cultures – it is an artinatural cultural practice that involves a special intermingling of the artificial and the natural. The museum at California Academy of Sciences displays nature in such a way that illuminates aspects of science's special relationship with society as well as science's own, sometimes profound, shortcomings.

Chapter 4 is about the idea of wilderness as conveyed by Muir Woods National Monument and the writings and legacy of John Muir himself. This chapter also explores how foundational writings and ideas about the environment looked at nature. Wilderness, too, will be revealed as an artinatural category, heavily shaped and managed within specific cultural contexts. But rather than suggesting that wilderness is "merely" a social construct, I will go one step further to say that humanity vis-à-vis wilderness is just as much of a construct, that humanity too is as natural and wild as the wilderness itself, but that the culture of wilderness acts as a civilizing force that defines what is and is not appropriate behavior and identity for humanity. To reveal and confront the artinatural can expose these kinds of social norms in such a way as to question or reconstruct them in refreshing ways.

Chapter 5 looks at Fukushima's radioactive crisis, as well as other nuclear disasters, as a prime example of the age of the artinatural, replete with its threats to ecosystems globally. Then I will briefly explore the BP oil spill in the Gulf of Mexico as a reinforcement of artinatural reality.

In Chapter 6, I turn to an analysis of ways in which the recognition of the artinatural could lead to positive and transformative new understandings of identity and the self. I explore this subject through the more specific lens of race. The artinatural perspective helps to understand the social construction of race in the context of a much broader view of the human species and culture.

Finally, Chapter 7 provides a conclusion and summary of these explorations on the artinatural, artinature, and artinaturality.

Chapter 2

Ontologies of Nature and the Myth of the Artificial

"We are made of starstuff." –Carl Sagan

"The greatest good for the human and nonhuman communities is in their mutual living interdependence" –Carolyn Merchant[12]

To some, science is understood as the mastery of nature and wilderness is understood as the absence of this mastery, an uncontrolled nature that can roam free. But as one looks more closely at the practices of western science, it becomes clear that it is only a nominal mastery that leads to the chaos of unbridled technological expansion resulting in ecological crisis. On the other hand, American wilderness can be seen as controlled by park management bureaus and legal regulations. Indeed it may be that wilderness is a more mastered version of nature than what is accomplished by science.

The perspectives of science and wilderness revolve around ideas of "nature" through history and culture. In this chapter I explore the concept of nature in these traditions, especially by engaging a variety of pertinent literary sources in which the understandings of nature shine through most brilliantly and vividly. I also investigate the tradition of environmentalism and its relationship to nature. All together, this history of "nature" will help to situate the meaning of the concept of "artinature." Not only is the idea of "nature" artinatural itself, but much of nature as seen and modified through perspectives like wilderness and science is also artinatural. Furthermore, the "natural" is a fundamental aspect of the "artinatural" because, as the term implies, the artificial can be seen as a part of the natural. This makes a concept like artinatural curiously circular – and that is an intended consequence of the concept. That said, to understand the artinatural, one must first fully explore the idea of the *natural*.

…

A sharp reconsideration of the meaning of "nature" – and by nature I mean the universe in its entirety, including humanity and its artifacts – could be productive in diverse and significant ways. In the past, ideas about nature have helped to shape the ways in which individuals – and societies at large – treat their environments and bodies. On the other hand, concern for social and ecological issues is limited by one's awareness

of complex systems like ecosystems and societies. In order to address social and ecological crises democratically, individuals' understandings of ecosystems must broaden. The most difficult challenges in fostering greater attention to the idea of nature include developing ways in which one can go beyond dualistic thinking about nature and, instead, uncover significant moral arguments that encourage the study and learning of more complex and integrative views of nature. These more complex views of nature include more integrated understandings of the self, as Sagan's quote above implies: if we truly are "made of starstuff," then some of the socially-constructed categorizations of peoples are not merely skin deep, but also exceedingly over-simplified. To move toward the more complex artinatural perspectives, we must first better understand "nature."

Modern Alienation, Nature & the Environment

The problematic dualism inherent in the term "environment" – that separates the self from its surrounding environs – is an age-old one. Throughout European thought and literature we can trace the troubling, alienating human/nature binary. Aristotle provided an early distinction between what is natural, innate, or essential, and what is artificial, created, or malleable. *Physis* and *nomos* were terms used to make this demarcation between nature and human. *Techne*, or artifice, was part of *nomos*, or the laws, languages, and customs of human societies. The history of the idea of nature involves these kinds of distinctions. Aristotle, anticipating the overlap between nature and art, wrote: "generally art partly completes what nature cannot bring to a finish, and partly imitates her" (*Physics*, II, Bk. 8, 16-17). Similarly, he holds that imitation "is one instinct of our nature" (*Poetics*, Sec. 1, Part 4). Human beings are then "imitative animals" by nature. So, not only is the artistic drive a kind of force of nature, but nature is also, by implication, a kind of artistic force. Thus even in one of the foundational formulations of the human-nature dichotomy, there was some intriguing room for an integration or overlap of the two opposing entities that would become the artinatural (to which I will return later).

Since Aristotle, concepts of nature have included both of the above interpretations to varying degrees. On the one hand, there has been a sharp contrast between human society (its artifacts included) and nature (and non-human animals). On the other hand, there have been some interpretations of nature that have seen human beings as part of the greater whole. Because of this, one can clearly see that "nature" is a much broader concept than "environment." In fact, the term environment is just one of the many definitions of nature. Francis Bacon (1561-1626), for example, was a key proponent of the view of nature as a separate entity, a tool and resource for human societies to "command" (and also to obey). With Robert Boyle's (1627-1691) experimental method, moreover, the sciences took an increasingly instrumentalist approach to nature and its bounties. Through Boyle's experimental method, nature could be the source of great wealth and power. Perhaps there was more wealth to be gained from seeing nature as a separate object rather than seeing it as an integral part of who we are and how we survive. "Environmental" problems, so to speak, had not yet become so disturbingly destructive on a global level.[13]

Environmentalism unquestionably chose a restrictive concept to rally around: "environs" – or surroundings – are surely something to care about, but they conceptualized (by its very definition) as the other. Because of the delineation between the external world and one's self, environmentalism has been affiliated, at least metaphorically, with the idea that ecosystems, oceans, forests, rivers and lakes are external resources for human consumption or admiration, rather than with the belief that these are, in fact, integral, even internal, aspects of humanity's life support system. In other words, the term "environment" leads to an instrumentalist conceptualization of nature, rather than one that recognizes the complexities and "mutual living interdependencies," to use Carolyn Merchant's words, of life on earth. The term "environment" implies a fundamentally bifurcated cosmos in which problems like global warming and pollution are not personal or central concerns. For both the nurturing and dominating conceptualizations of "the environment," humanity is to be understood as separate from the rest of nature.[14]

But how did this idea of the separation between nature and humanity develop? One approach to this question is to investigate conceptualizations of nature by exploring culture, including literature, philosophy, and cinema, that underscore the fluctuating concepts of nature (and the natural) in contrast to concepts of the human and artificial. These sources can help to unearth some of the vast oscillations in the understandings of nature and thereby elucidate the outcomes they have shaped. With Aristotle, as I have just shown, and even as early as the pre-Socratic philosophers, there is already a notion of nature and the natural as separate from the artificial and the human. Skip ahead a couple thousand years and George Perkins Marsh is inquiring "whether man is of nature or above her?" According to Marsh, humanity had already started to alter earth's surface as strongly as if through geological process. More daringly perhaps, wilderness advocates such as Henry David Thoreau and John Muir had accepted the idea that humanity was, in some way, part of nature. The instant of separation for Thoreau and Muir, however, was the binary of wilderness and civilization. Human artifice, in other words, human alternations to nature, were not thought to be part of the natural world. This dichotomous characterization carried on through the writings of later environmental writers such as Aldo Leopold, Rachel Carson, and Bill McKibben. What made these thinkers draw so clear a line between civilization and wilderness? What broader practices or social norms are hidden away within this myth of the artificial as separate from the natural?[15]

The conceptual split between nature and humanity, developed and advanced in largely by thinkers like Francis Bacon, could have been one source for the anomie and alienation that Shakespeare epitomized in Hamlet's (1603) words: "I have of late… lost my mirth." "The earth," seems to Hamlet, "a sterile promontory," and its sky, nothing but a "a foul and pestilent congregation of vapours." Not only has Hamlet lost his pleasure in his everyday life, but his feelings about the natural world around him have shifted from once "majestical," to simply "sterile" and inert. The once gorgeous night sky appears now as a mundane scientific happening: the simple transmission of light, as information perceived by the biology of the eyes. Being a contemporary of Bacon, Shakespeare was aware that conceptualizations of the world were becoming more scientific – that even the idea of the human was being thoroughly reimagined. Hamlet, as a character, is an exemplar of the emergent scientific worldview of Shakespeare's era. Hamlet's solipsism, his constant, almost empirical self-scrutiny, is in largely his own greatest adversary; not

only does it restrict his ability to feel pleasure, but it splinters his sense of self, and results in a distressed fragmentation – even bifurcation – of his identity. The discomfort that Hamlet feels regarding his body and his status as a human being became a durable theme in the arts, and remains so today.[16]

Mary Shelley's 1818 work *Frankenstein* builds on this unique human anxiety of the human hands of science interfering with, and even resurrecting, human biology itself. In this seemingly unnatural development that seems a type of human godliness, there was also a sort of alienation from biology. In 1851, Herman Melville's *Moby Dick* presents a powerful allegory about how a man's fight against nature – the white whale Ishmael – really is a fight against himself. And, writing from the viewpoint of a society then recently industrialized, Fyodor Dostoevsky builds on themes present in *Hamlet, Frankenstein*, and *Moby Dick*. Early in his *Notes from Underground* (1864), his narrator announces: "I think that my liver hurts." A declaration like this implies an odd kind of relationship between his internal organs and his mind. There is an uneasiness revolving around the biological processes taking place inside his own body, of which he is only partially aware: strange things are happening that he can loosely imagine, but cannot know or control. But perhaps more critically, the processes that are going on inside him may be perceived as alien or non-human. Maybe this is one reason why the character that Dostoevsky depicts is so thoroughly alienated – just as Ahab is inadvertently on a quest to destroy part of his own nature, the Dostoevsky's underground man finds himself utterly detached from his own. Joseph Conrad's 1899 *Heart of Darkness* seems to come full circle in this exploration of the neglected truths of humanity that are so soaked in self-denial.[17]

One of the most remarkable of all portrayals of this kind of self-alienation is Franz Kafka's Gregor Samsa in *Metamorphosis* (1915). "As Gregor Samsa awoke one morning from uneasy dreams he found himself transformed in his bed into a gigantic insect." Gregor brilliantly represents the kind of thorough mutation that modern scientific thought had performed on human identity. Charles Darwin and Ernst Haeckel's development of, and elaboration on, evolutionary theories had exhibited to intellectuals like Kafka the alienating reality of humanity's arbitrary position in an uncaring, mechanistic, and objectified biological world. Additionally, the insensitive norms of society relegated Gregor to social outcast, a freak of nature. The distorted and disparaged identity assigned to Gregor by both his family and himself following his metamorphosis into an insect led, ultimately, to his death. Gregor's story is an apt allegory for the way the new scientific society treats its outsiders, those who are not elevated by its binaries, distinctions and hierarchies. [18]

Nearly eight decades after *Metamorphosis*, Tim Burton's film *Edward Scissorhands* surveys related terrain (a sort of updated *Frankenstein*) with its artificially assembled main character, Edward, himself a strange cyborg project never finished. His hands, which remain in the developmental form of scissors, were supposed to be exchanged for more lifelike prosthetics by his inventor, played by Vincent Price. One of the film's most moving scenes is when the old inventor reaches out with the prosthetic hands he intends to install on Edward. He collapses in front of Edward's innocently hopeful visage, and as the old man falls, Edward reaches into the prosthetic hands with his scissorhands, ripping into, and demolishing, what were to be his new human-like hands. With the inadvertent ruin of those prosthetic hands was also the end of his dream

to become more human. Without human hands, Edward must now exist in a strange reality where he is unfinished. But, as the narrative suggests, Edward is, in fact, even more human precisely due to his deficiency. His discomfort with his own nature exposes a psychological experience that becomes increasingly common as technologies – and scientific approaches to understanding life – become more interwoven with the fabric of everyday life. Ironically, Edward's incompleteness, and his attempt at becoming human, is precisely what makes for his powerful humanity. Edward, similar to Kafka's Gregor, must creatively investigate the boundaries between human, artifice and animal. Are human beings animals, biological organisms like insects or are we – through artifice, culture, and mind – something entirely different? Maybe all the heroes above share this in common: each is wrestling with the social and personal ramifications of conceptual categories that have insistently alienated and bifurcated not only their "human" identities but also the ontological status of the greater nature wherein they exist. Related themes have proliferated in films such as Blade Runner, Gattaca, Artificial Intelligence, Elysium, The Matrix, and Mad Max. A technologically advanced society finds itself in the midst of ecological destruction and crisis, often involving protagonists that struggle with unclear and unsettled identities.[19]

If characters like the Gregor Samsa and Dostoevsky's Underground Man emphasize the strange acknowledgment of humanity as existing within the animal kingdom and the biological cosmos, then the character of Edward Scissorhands conveys the severe, sometimes disturbing addition of technology and machine into that biome, the human body. In each case the characters are reacting to, and fighting with, the fictions and restrictions of once-accepted dualistic cosmologies. In Kafka's work, characters started to see the insect in the human, or the odd similarities between the two beings: both bodies contained the same kind of slimy, mucous-ridden biological processes. And with Tim Burton's scissorhands, there is the idea that technology gets literally implanted into the body, transforming us into partially mechanized, robotic beings: cyborgs. Both of these provisional paradigms are difficult to digest; these characters do not seem to enjoy thinking of themselves as either machines or insects – but both archetypes have also surfaced as (uneasy) characteristics of post-Darwin and post-DNA identities.

The conflicted, awkward identities that Kafka unveiled in his 1915 work still loom large today. The now clichéd Cartesian paradigm that elevated the mind over the body – and humans over other animals – was implicitly challenged by Darwin's theory of evolution (1859). But through the measure of complexity (and the notion that humans are the most complex animal, a controversial proposition), people fought with the conception of the human as the pinnacle of beings. In the next sections of this chapter I will explore the how the ideation of nature relates to both modern environmentalism and broader socio-historical trends.

Nature & Modern Environmentalism

Environmentalism itself came out of particular approaches to, and understandings of, nature. Environmentalism's nature, more often than not, features a strong dichotomization of dualism of wilderness and civilization that I explore to a greater extent in Chapter 4. These binary understandings of nature often include very specific formulations of cultural identities, either implicitly or explicitly embedded in them.

Dorceta Taylor's abstract to her article, “American environmentalism: the role of race, class and gender in shaping activism 1820-1995” (1997), for example, explores the idea that “the history of American environmentalism presented by most authors, is really a history of middle class white male environmental activism.” Taylor outlines the ways in which “class, race and gender” have influenced the environmental movement. She breaks down her analysis into four eras of environmentalism: the “pre-movement era,” “the post Hetch-Hetchy era,” “the post-Carson era,” and the “post-Love Canal/Three Mile Island era.” Taylor defines the “pre-movement era” by describing its REP, or "Romantic environmental paradigm,” “which called attention to the destruction and domination of nature, and advocated compassion for other species, the harmonious coexistence of humans and nature, government protection of wild lands, and a return to a simpler lifestyle.” But this movement, Taylor argues, was largely a middle class phenomenon that obscured the working class issues that also related to environmental problems. During this era, moreover, minority and female populations were dealing with labor and social challenges that not only rendered middle class environmental interests irrelevant, but also involved their own particular, often quite different, environment-related struggles. Even during the post Hetch-Hetchy era, “people of color saw their biggest problem in the community and in the workplace as racial oppression.” [20]

With the post-Carson era, a new environmental paradigm (NEP) came into being. This new paradigm “critiqued the development of high technology like the nuclear industry, encouraged population control, pollution prevention, risk reduction, energy, recycling, environmental clean-ups and espoused post-materialist values.” In other words, this kind of environmentalism was an attack on certain forms of artifice, aspects of humanity seen as opposed to, or separate from, nature. It became clear also that not everyone in society suffered from pollution equally. Ultimately, the Environmental Justice movement, which sought to connect the missing links between social justice and mainstream environmentalism, developed out of long-standing movements in fights for urban justice, worker's minority and gender rights with a focus on urban communities rather than romanticized wildernesses.[21]

A political-economic critique of contemporary globalist environmental narratives put forward by Giovanna Di Chiro (2003) argues that the “expression of global commons signifies a neoliberal environmentalism reasserting cultural difference in the terms of making the world environmentally secure for unrestrained capitalist accumulation on a planet of finite resources and limited ecosystemic resilience (in the name of “sustainable development”).” This “ecoliberalism” white-washes difference in favor of a shared environmental threat. The Environmental Justice (EJ) movement has, however, been able to construct a “politics of difference grounded in an ecological discourse of interconnectedness and common ground.” Toxic tourism exemplifies how an EJ approach can be used to counter ecoliberalism and its sibling, ecotourism. The oddest aspect about global environmental narratives is their conceptual exclusion of peoples/cultures/difference - it is about the “environment” and, at least ostensibly not about people at all. Of course these things are always about people, and in the case of ecoliberalism, people who are supportive of, knowingly or unknowingly, corporate interests. It ties into both the REP and the NEP that Taylor discusses. To add “justice”

into this mix complicates, exposes and expands the issues and their complexities through bringing in the complex social issues inherent in difference (and how they relate to the environment). Geographer David Demeritt, on the other hand, argues that the global scale is simply too large and impersonal to become emotionally effective for individuals to take problems seriously or to think they have an empowerment in confronting them. Either way, global environmental narratives are problematic. [22]

A certain weakness in the broader environmentalist movement is found in Indian historian Ramachandra Guha's critique (1989) of one of its manifestations, Deep Ecology (DE). Deep ecology sought to go deeper than the "shallow ecology" of mainstream environmentalism by attempting to enforce a biocentrism instead of anthropocentrism. But, in so attempting, Guha argues, they missed some of the most crucial issues faced in places like India, where the direst environmental problems are faced by the poorest people often in urban settings; for this population, the environment is a "question of sheer survival, not of enhancing quality of life." In this light, deep ecology displays an environmentalism that is anti-human in that it advocates for things such as creating humanless wilderness areas when there are places in the world where this would mean starvation and death for thousands of people. The idea of intentionally and dramatically lowering the human population is perhaps even more disturbing. Guha does well to enumerate these problems inherent in one wing of the environmental movement. An artinatural conception of ecological problems recognizes Guha's critique in that it doesn't abstract human beings from nature; they themselves are an integral and utmost concern of an ecosystem.[23]

Others have argued that mainstream environmentalism has failed to deliver results adequate to address the ecological and climatological crises. Ted Nordhaus and Michael Shellenberger (2004) characterize today's environmentalism as merely "just another special interest" and the environment is merely a "thing." They suggest that this old environmentalism be discarded and, in its stead, new ways of thinking about the environment be developed. Furthermore, they see the problem as an issue of "framing" in which current categorizations of things like global warming are expressed in a way that does not emphasize the extreme human rights/survival side of the story, but rather simply as a problem of "environment." The environment, they add, is seen as a separate from oneself and thus not as highly prioritized. Their point is that something like global warming should not be only for "environmentalists" to worry about: it is an issue that will touch each of us and each of our families and should be understood and prioritized as such, rather than being merely some sort of special interest. Moreover, the focus on root causes such as "carbon dioxide in the atmosphere," they argue, is a very weak angle. In the end, the authors offer a somewhat convoluted solution that includes new kinds of investment, tapping into "the creative worlds of myth-making, even religion" to find solutions to these dilemmas. [24]

In *The Soul of Environmentalism*, Michel Gelobter et al (2005) take a few stabs at the *Death of Environmentalism* piece above, noting that the two authors missed a lot of the diversity of approaches to environmental change that various movements have already started. These authors, however remind us that "the politics and innovations" of

early modern environmentalism "in almost every way... derived directly from the same era's fight for black power and racial justice" and other related social movements. They put forward that solutions to environmentalism's failures "have to reach people in their souls" - this actually sounds a lot like the argument made in *Death*.[25]

Finally, and in a response to a report made by EcoAmerica, George Lakoff (2009) suggests that environmentalism needs new framing in order to be effective. Lakoff believes that we need to understand the neurology behind conceptualizations in order to adequately push for those that would be more effective:

> First, the public's very understanding of nature has to change. We are part of nature; nature is not separate from us. Nature nurtures us. The destructive exploitation of nature is evil. What is good is the use of nature that doesn't use up nature.[26]

Lakoff believes that approaches to thinking and talking about "environmental" concerns have been inadequate and that better framing is necessary to buttress the fundamental issues facing the society. An idea like the artinatural that resists the conceptual separation between the human and the natural is one more tool to more accurately frame and understand a complex nature. From an artinatural perspective, environmentalism (already a flawed concept as it represents only one side of an oversimplified dualism) would have to include humanity in its sphere. Ecology includes all human beings and our artifacts.

The Myth of the Artificial

As an adolescent I worried that what I once found strange and awe-inspiring would simply become plain, normal and boring. I saw that everyday life is both absurd and miraculous, and yet, over time – perhaps due to something we could call shifting baselines of perception, it all would become something that seemed merely mundane. I wanted to keep a hold of that special vision of life around me that saw its special sort of magic, its absurdity and its odd, ineffable miraculousness. But what was it that drew my imagination so strongly toward an imagining of life around me as boring and plain?

Around that time I developed a theory that the science fiction and fantasy I loved so much was part of the problem; that to explore the "extranatural" or supernatural was to also paint everyday life as less than extraordinary, boring, and mundane. How could it be, however, that science fiction and fantasy, works of such imagination and creativity, could so dull my everyday experience? And what, really, was the basis of this powerful demystifying process? Could it be that I was somehow tricked into numbness and boredom by the very ideas and cultural norms I lived by? But which beliefs and ideas were to blame? How could such beauty and awe be replaced with such normalcy? And could it be that an idea as plain as "the artificial" plays a substantial role in such an undesirable metamorphosis of mind and life experience?

The idea of something being singularly "artificial" is, I would suggest, merely a myth, and perhaps one of the most powerful myths within many cultures and languages. That nothing can be truly and completely artificial would seem to go against the grain of common sense and basic life experience. Isn't the computer I now type on inherently "artificial," or at least the smartphone in my pocket? Or perhaps the car that I drive

around? Or, if none of these truly leave the realm of the "natural," then could at least my own thoughts – concepts, numbers, or even "artificial intelligence" itself – be considered completely "artificial"? I don't think so – all of these things arise from what we call "nature" – our bodies and brains. Indeed, perhaps there is no such thing as the pure artifice of which many conceive. The rest of this section will attempt to explain why this is, and what consequences (even the demystification of the world) such a powerful myth can have.

To believe that something can be purely artificial and exist separate from nature is to believe in singularly human place where nature's laws no longer completely apply. In this make-believe space and time, ecological consequences can more easily be ignored. Human bodies and minds can exist unhindered by the greater spaces beyond. The myth of the artificial can be a beautiful creation of space-time away from responsibility and into remarkably creative spheres. But as far from nature as these spheres of artifice may have appeared, these spheres are—and were always—part of nature.

To believe that Fukushima's nuclear reactors could simply exist within their own artificial, constructed space – and never seep out into the greater spheres of which they always were a part – is a fairytale that many people badly wished to believe. Similarly, to believe that what happens in cities stays in cities is a naïve and comforting dream that many human beings enjoy. But just as cities reach out into, and indeed exist within, the biospheres beyond, an individual's private life often spills out into one's public life (and the separation is merely a comforting, and sometimes benign, dream).

It should be clear, then, that I doubt that the myth of the artificial is benign. I believe it is an illusion that will soon see its demise, literally and figuratively. As human societies continue to affect Earth's biosphere, it will become more and more clear that we are intimately connected to the greater ecosystems and climates at large. Our bodies are microcosms of these greater ecosystems, and they too, will see destabilizations and stark reminders that the nature in the human, and its make believe world of artifice, were always fundamentally natural. The myth of the artificial was a luxurious belief that certain human societies could once afford to have.

Why have some resisted seeing the human as natural? Because some fear that that means either that all human behavior is then forgiven and equalized, or that somehow humanity is unchanging and/or biologically determined. But nature has always changed and the wild branch of nature that is humanity has shown itself to be incredibly dynamic. The plasticity of human culture is not only a great boon for humanity's potential to survive on earth, but it also reveals artifice as some of the most awe-inspiring aspects of nature. And perhaps that is another reason that the myth of the artificial is so difficult to shed.

Imagine for a moment that the sleek sharp-cornered black monolith of Stanley Kubrick's "2001: A Space Odyssey" represents both artifice and the power to control nature with which human beings seem to be graced. Even though this particular "artifice" was of "nonhuman origin" in the story, it also triggered the use of tools and weapons in proto-human hominids, led to the long journey to one of Jupiter's moons, and also seemed to encourage the increasing advancement of science and technology. What was the moral of this story? That despite the mastery achieved in science and technology, the nature of the universe still strongly held the upper hand over humanity. Even HAL, the

computer designed to be superhuman, fell to the trappings of all-too-human weaknesses, themselves bred in, through and by nature.

Artificial Intelligence (AI) itself is still a part of nature and natural ecosystems. It comes through, and by, natural biological forces, i.e. human educational and technological systems that were always organic and natural in origin. AI is perhaps the most difficult sphere of nature to see as natural. It is the most purified human construction and yet it, like human thought itself, cannot escape the realm of nature either. Natural and artificial intelligence are both *embodied*, either through organic matter or metal, electrons and silicon – all materials from natural sources.

The dream of the artificial is like a cubbyhole or a warm cave. It is a place one can feel safe, unhindered by the outside world – it is the dream of complete protection from the storms outside. But this dream has become pathological. Painful as it may be, the false line between the artificial and the natural must be exposed as the fairytale it has always been.

But if the myth of the artificial is a place of false safety, then the end of that myth is perhaps a place of awe and inspirational reimagining of the universe. It is a realization that could infuse wonder into the mundane. Human beings, our products, and our conscious imaginations, have all miraculously emerged from a complex universe. It is a sort of *real, natural magic*—a sort of fairytale itself, but one that entails new responsibilities because it recognizes new limits and fragilities. Human life is far more fragile than the cozy myth of the artificial would have us believe.

The difficulty of giving up the dream of the artificial is that it requires a re-imagination of the self, a reconsideration of the realities of being human: the facets of our DNA, cells, sinew, bone, fat and muscle, and the limited agency of being a highly complex natural organism that is constantly exposed to changing environs, climate and ecosystems. But these truths of the body, like the truths of the greater natural world, seem to only gain recognition when all options for delusion and deception have finally run dry.

I am reminded, again and again, that the human brain is no truth machine – rather, it is a survival machine. It becomes more like a truth machine, we should hope, when survival finally, in certain conditions, requires truth.

If the myth of the artificial is a fantastical safe-haven with colonialist implications, then it is also a form of conceptual territorialization: to denote one conceptual sphere from another is akin to marking off territory. In this case, it is an aggressive and ingrained kind of conceptual territorialization. If the "artificial" denotes a mythical time and space, what work does the concept of the "Anthropocene" do along those lines?

The Anthropocene, or the "Petrolocene"?

Atmospheric chemist Paul J. Crutzen's term "Anthropocene" may commit the ethical-intellectual sleight-of-hand of clumping all humans together. In a similar vein, the term may be guilty of a special form of human exceptionalism. Crutzen does, however, centralize carbon dioxide emissions and global warming in his explication of the term, suggesting that it's more about the substances humans are using than it is about human beings themselves.[27]

There may be more helpful ways of defining this era than that of "Anthropocene," and I offer "Petrolocene" as one. Jason W. Moore argues that "Capitalocene" is the better term, but I don't think the widespread use of fossil fuel energy is tied to one specific economic system (Stalin and Mao used plenty). The "Petrolocene" insists that it is the use of particular substances that defines the course and movements of this era. Any other species (with any other economic system) using this substance in the same ways (or to the same extents) would lead to similar outcomes.[28]

The idea of the Anthropocene, according to Ian Angus, falls prey to a simplistic sweeping together of humanity as a single unit. The idea of the Petrolocene may face similar challenges – certainly those members of society that further the use of fossil fuel energies are more at fault than others. This would single out major corporations (and their shareholders) as well as cultural-political-economic systems that are more petroleum-heavy.[29]

It is difficult to see just how pervasive fossil fuel energy has become in human life. Almost every major global change perpetrated by human beings is powered by fossil fuels. Deforestation, industrial agriculture, telecommunications, transportation, and even the development of nuclear technology are all fossil fuel-powered. I imagine that most human bodies are fed, warmed, clothed and housed by fossil fuels in one way or another. But more importantly, the human bodies that are creating the most geological changes are certainly powered by petroleum. Again, not all human beings are equally destructive, contrary to mainstream global environmental narratives – but the common thread amidst the damage is the use of petro-fuels.

The idea of the Anthropocene has another edge to it, however, beyond the human-exceptionalist one that is blind to human difference. It can help folks step back and look at Planet Earth as a whole in which human influence, one way or another, has threatened its own potential to exist into the future. Human beings, as they always (even if unacknowledged) have been, are completely at the mercy of an infinitely larger "nature" or "universe" that embodies and encompasses us. Contemporary, destructive human cultures, societies and practices could gain new humility with this kind of recognition but it would need to be coupled with broader awareness about just how human life is threatened. Pointing out the incredibly damaging use of petroleum is perhaps the most crucial point here – and will be the most difficult substance-addiction for the species to overcome (if, indeed, it ever does). Of course some people and cultures don't suffer with this specific affliction, but they too would likewise go down with the ship of humanity and thus the global view again shows its (albeit very problematic) value.

The Slow Violence of a Myth

Visual culture theorist, Professor Nicholas Mirzoeff critiques the concept of the Anthropocene in its insistence that "whether we like it or not," the world is "a human created machine that is now unconsciously bent on its own destruction." He then calls for a "decolonization of the biosphere" to create a "new sustainable and democratic way of life." This separation (after classification) is key to the concept: that artifice has transformed the world from what it was, Nature, to what it now "inevitably" is: an Artifice separate from nature. It is my contention that, just as English Professor Rob

Nixon shows in the rhetoric of national warfare, the idea of the biosphere as *artificial* is a central tenet of the ideology that both led to ecological destruction and continues to disempower individuals from imagining an escape from its disastrous plight.[30]

The logic of warfare turns landscape into battleground. The necessity of the fight or flight mentality makes invisible the delicate other-than-human life forms that call the landscape their home. The idea of the Anthropocene in a sense militarizes the planet – it is nothing but environmental battleground in a war that is currently and rapidly being lost. While it is a battle cry for change, it is a hopeless and totalized one, without the requisite individual empowerment required for political progress. It is also a vision that obscures a significant ecological fact: rather than being the captain of the ship of Planet Earth, the human animal is simply one of countless life-forms that live at the will, and in the context, of greater, complex ecosystems. To imagine that the world is somehow artificialized is to live in the dangerous myth of human specialness and exceptionalism. That very powerful and tantalizing myth could very well kill us off.

Nixon points out the "slow violence" that chemicals from warfare enact on communities. There is perhaps an equally insidious—or even more fundamental—slow violence from an ideology and worldview that ignores complexity in exchange for a reduced, human-tinged fairytale world in which landscapes are transformed into simplified, artificial battlegrounds. Intricately intertwined ecosystems resist reduction through a kind of slow rebellion that carries a much greater weight than these visions of artifice could begin to induce. Of course, on the geological scale, there is nothing "slow" about any of these events.[31]

Finally, there is something paradoxical about the idea of post-nature or the end of nature. The end of humanity would at once signify both the end of the (human) idea of nature and no end at all. Perhaps the "post-human" concept is a more valuable idea about which to promote reflection. For humanity to disappear, to me, is akin to one of the artist's deepest fears and beautiful tragedies: to die without successfully communicating/sharing one's deepest thoughts and feelings. For no human to exist would complete this tragedy for everyone – and yet it seems an inevitable tragedy one way or another (either through speciation, extinction, or both). I'm not sure how helpful this kind of thought is – perhaps it lends itself toward defeatism. But certainly a humbler approach than that of the artificialized, imaginary world of the Anthropocene should be welcomed.

A New Modernity?

> What is important is to exploit and develop the superiority of doubt against industrial dogmatism. The goal is not a turning back but rather a *new modernity*, which would demand and achieve self-determination, and prevent its truncation in industrial society. -Ulrich Beck [32]

"Industrial dogmatism" is propelled by the myth of an artifice separate from, and perceived to effectively control or dominate, "nature". This myth, which has started to unravel in light of global, local, and even personal ecological crises that pose mortal threats, must be overcome in order to reach what Beck refers to as a "new modernity".

The first step must be to disengage the "common sense" aspect of the artifice-nature distinction. The enormity of the power behind such an assumption is not to be

underestimated; the conceptual separation is burnt into thousands of years of language. "Art" and "Nature" exist on ends of a spectrum and thus for one to see them as overlapping, inclusive spheres is probably more than paradoxical, even blasphemy, for many people. Among environmentalists, for example, the distinction is almost a religious one. When William Cronon deconstructed the idea of wilderness, Gary Snyder was fast to give a public and scathing attack. This is because one of the outcomes of removing the distinction is an invitation to post-apocalyptic, technocratic, dystopian imaginings of the future like those in Blade Runner and the Matrix. But that is not the point of removing such a distinction; rather, the blurring of the lines can promote a realization that as much as the built world seems to represent a split from the rest of the ecosphere, it is still very much a part of it, and is as fragile as the ecosystems themselves. It is a "new humility" that is so integral to this "new modernity" – a humility that recognizes humanity's subordinate place in the matrix of life on earth.[33]

There is this powerful dream that goes along with the conceptual split between the artificial and the natural: it is a dream of absolute power and technocratic possibility. But the truth may be more like the scene in Mad Max: Fury Road where the heroine returns to what used to be "the green place," full of lushness and trees, only to find a swamp wasteland followed by endless hills of desert. The control is an illusion, a mirage on an otherwise endless desert. It's the moment when this heroine has finally escaped all traces of wishful innocence. The irony is that this terribly damaging myth of separation is the very notion that many environmentalists have so painstakingly coalesced around. It is a dangerous step forward to attempt, wrought with pitfalls of various unintended interpretations. And it may be a conceptual jump too perilous to achieve successfully – but it's fun to consider despite its challenge. How would societies be managed and organized if artifice's true place in the ecosystem were recognized and taken seriously?

Reimagining the Home

The root of "ecology", the Greek "oikos" means household or family – and this is ironic. Ecology and conservation biology were fields meant to explore, understand, and at best preserve an increasingly endangered "nature." In these environmental imaginings, however, it was customary to see nature and human as separate categories – human society, is indeed the true home or household for human beings. The built environment – and all that one deems "artificial" – is indeed the space that is most familiar to most people in "developed" societies. It is this kind of perceived familiarity, moreover, that perpetuates dissociation between human beings and their greater ecosystems (of which human beings and their built environments are a part).[34]

Because the artificial or built environment is so familiar it feels safe. An Eden where actions have seemingly self-contained repercussions – much like a properly functioning nuclear reactor. Byproducts are contained in the short run. But the system is not closed where it seems to be; rather, it is meaningfully interconnected throughout the biosphere. The true "closed system" includes both the built environments (interior space included) and everything within the atmosphere. The familiarity of the built world is a dangerous illusion, like a desert mirage. With an enticement similar to the singing of the Sirens, the familiarity of the built environment beckons emotions of safety, comfort, and even ecstasy while covering up its true dangers. These dangers can only be evaded

through an interrogation of the familiar that challenges the false sense of security that many persistent worldviews of humanity and nature have bequeathed.

To me, recognition of the autonomy of nature should also bring with it a feeling of the strange rather than the familiar. For nature to be autonomous is something beyond strange; every human body consists of myriad natural-biological processes that can neither be controlled nor even fully monitored. These processes themselves made possible what people see as their familiar built environments and objects – this is precisely where the autonomy of nature was mistaken for the control of "man." If human cultures can re-invision their fragile place in a larger, unspeakably more powerful force of ecosystems, perhaps ecologically sound policies would be easier to obtain. It involves a re-mystification, a stranging of the world, humanity, and nature itself (once wrongly thought to be cleanly separate).[35]

What would a healthy human relationship with ecosystems look like? It would simply be one that is more aware, and more sensitive to, ecological realities and limits. I, for one, would speculate that people would vote for better ecological policies as well as change their habits in ways that would be ecologically beneficial. One way to promote this kind of awareness and sensitivity is to promote an understanding of the built environment as an artinatural entity – a place that is at once built and part of nature. To see the world as artinatural is to remove the opaque glaze of the familiar and to introduce a somewhat less comfortable lens with which to see the world closer to what it is: a fragile interwoven, deeply connected ecosystem of processes and organisms. Ecology, paradoxically, is in this case just what is not familiar or taken for granted; rather it invisibly encompasses all that once seemed simply cordoned off and controlled – even within private houses and apartments we exist in strange, artinatural ecosystems rather than the mundane "artificial" world that so many have effortlessly envisioned.

Perhaps ideas like the "Anthropocene" do damage because they strip power from individuals. What would a healthier human perspective look like? Which theory could promote healthier, more action-inducing experiences? Certainly not the anaesthetization that the mythos of the artificial does, and probably not the totalized "Capitalocene" either. Current economic and environmental realities are leading to a situation of powerlessness for which the only way of getting back to power is to resist such totalizing terms.

The overarching, blanketing, totalizing terms present a red warning light for the patient going under anesthesia. If that light fails to awaken people from their chemical slumber, the terms will become self-fulfilling and the result will be an end to the era they describe. But, if people wake up to these dangerous trends to take transformative action, then the eras themselves may prove to be false, and will thus end to form a much better kind of era; an era of more vivacious aliveness – escaping the chemical sleep (and ensuing death).

Thus the mythos of the artificial is akin to a chemical sleep, a dangerous anesthesia that could end in death rather than reawakening. It is how one chooses to respond to the chemical slumber that will determine whether the future contains an elongated life or a hastened death. Death needs to be on one's mind as its possibility is not only eventually inevitable, but even dangerously accelerated in this trance-like state.

Conclusion

In this chapter, I have provided an overview of perspectives on nature in European and American cultures and in environmentalism. These ideas of nature, as well as the exploration of the myth of the artificial, are necessary for comprehending the concept of artinatural. I touched briefly on philosophy, literature, film, and scholarly work done on race in relation to nature, biology and the environment. I showed that nature was systematically seen as something outside of the human realm, and this notion was imbued in the development of the conservation and environmental movements. As I explore more deeply into the understanding of "nature" through the American traditions of "science" and "wilderness," it will become clearer just how artinatural these things tend to be. Culture is deeply embedded into these varieties of "nature," while nature had already seeped into the makings of culture.

Is the solution, ironically, for people to live more urban lives (which tend to be less energy intensive)? And in this urban space, a re-imagining of the nature/artifice relationship that perhaps brings aspects of country living back into urban spaces through a recognition of artinatural realities. The truth probably rests in things that cannot be controlled - people will live where they will, and where they can. The continuance of human life itself will involve various compromises and imperatives - many of which cannot be engineered in advance. But the soft power of changing perspectives through education, writing and other arts is something that could work in complex, ecological sorts of ways – and there really is no predicting what these kinds of changes in perspectives could do for societies in the long run.

By looking at prime examples of the display of American wilderness and science one can find particularly important coincidences. But exactly how do wilderness and science overlap in America? In the following chapters one can see that both spheres draw lines around a nature that to be understood as separate from everyday human reality. Whether nature is bottled or fenced, the displays of American wilderness and science conceal the awareness of the special interconnectedness that exists between the human animal and the rest of nature. As the culturally produced lines are made more visible, the natural truths help us see that the lines were never really there at all, a reality that could take more than a little while to normalize.

Chapter 3

Nature in a Bottle: Science on Display

"What is a scientist after all?
'It is a curious person looking through a keyhole, the keyhole of nature, trying to know what's going on.' –Jacques Cousteau, French Explorer"
(Display at California Academy of Sciences)

"The only shibboleth the West has is science. It is the premise of modernity and it defines itself as a rationality capable of, indeed requiring separation from politics, religion and really, society…. but when one looks at the practice of science in a laboratory, as I did, this division is revealed as false…. Scientists are very much entangled in their culture and this culture is not pristine." -Bruno Latour

To make the trek to the California Academy of Sciences (CAS) requires that you first make your way to San Francisco's beautiful gem of a public space, Golden Gate Park. Depending on where you're coming from, you might take mass transit, Highway 101, 280 or 1; or one could simply bus, bike or walk from another part of the city. If you do drive, you can find free parking on one of the park's many streets or, more likely, you might pay to park in the Academy's subterranean lot. If you are visiting the city from out of town, you likely made your way over to the museum on a tour or tourist bus, many of which stop right in front of the place.

Founded in 1853, only three years after California had reached statehood, "The California Academy of Natural Sciences," as it was then called, was to be a place where nature could be put on display to animate the public's awe and admiration. A stuffed giant Wooly Mammoth would stare down on visitors as a relic from the wild. A few years later, from 1872 to 1890, the renamed California Academy of Sciences was located at Grant and California Streets in San Francisco. From 1891-1906, it found new grounds on Market Street, enabled by a grant from James Lick. In 1910, San Francisco citizens authorized the Academy to be moved to Golden Gate Park, a move that finally took place in 1916. Many years later, in 2003, after numerous additions, the academy was rebuilt again. In 2008, architect Renzo Piano made the Academy's museum the "greenest" in the world. Nowadays the thoroughly modernized California Academy of Sciences houses an albino alligator named Claude that can be seen listlessly lazing in a constructed swamp area. Here "nature," in all its glory, can be bottled and consumed in the safety of a human structure.[36]

As I venture through this museum, I wish to explore the strange lines that are placed between what is natural and what is artificial, and what is actually artinatural. How does the lens of science perceive nature? Can nature truly be "bottled" or is the "bottle" itself a specific and odd sort of artifact of nature? Does the California Academy of Sciences present its visitors with a "Disney version" of the natural world that neglects nature's complexity?

The facade of the museum is extremely modern looking, reminiscent of Norman Foster's architectural creations that focus on using industrial parts to make unique looking structures like the enormous glass-covered, cigar-shaped Gherkin in London or that angular, zigzagging building near Columbus Circle in New York, Hearst Tower, that houses a host of publication and communication companies including those of the Hearst Corporation. Renzo Piano's museum looks sharp, and boasts plenty of geometric lines and lofty ceilings. It's a clean place, so clean that it was proclaimed the greenest museum ever built at the time of its construction. Moreover, it is a particularly "artificial" looking structure that screams human control over space; it is architecture that is not trying to convey the natural, or even the artinatural. And yet, even in their geometric edges lies materials that are, even if covertly, undoubtedly from nature itself.

In this chapter I relate the experience of visiting San Francisco's California Academy of Sciences' museum. I first provide a brief look at the development of the modern scientific method in Europe as well as the notion of objectivity itself. I look at Donna Haraway's analysis of the American Museum of Natural History in New York and then present the findings of my research at the CAS. How has the museum attempted to "capture nature" in its dioramas and other showcases? How has the Academy's museum

captured the spirit of the Scientific Revolution and in what ways has it diverged? Who has access to the perspectives on science offered by the Academy's museum and who is being left out?

I argue that the California Academy of Sciences' museum is not only an artificial, or constructed, place, but it is a natural place as well. In fact, it is artinatural – simultaneously artificial and natural. But it is a specific sort of artinatural, one that serves those who are wealthy enough to enjoy its rather pricey parking and premises. It is a place, however, that promotes ideas that are in contrast to the notion of an integrated or artinatural understanding – it attempts to show that the human and the natural are separate realms.

A good place to start, therefore, is with the origins and meaning of modern science, where modern science begins, and the way science emerged during what we call "the scientific revolution."

The Making of Modern Science & "Objectivity"

Modern research science did not simply rise out of thin air; rather, it has its own particular cultural and intellectual history and context, one that helped enshroud certain practices and perspectives in the light of societal approbation. But to point out these contingencies is also to point out that the development of science as we experience it today could have been very different. How and why did science develop in the ways it did and what was special about the scientific method and its notion of "objectivity"?

An exploration into certain historical moments in the last several hundred years may help us address these questions. In *Leviathan and the Air-Pump,* Steven Shapin and Simon Shaffer describe an epistemological battle between 17th Century scientist Robert Boyle (1627-91) and philosopher Thomas Hobbes (1588-1679) over one of the first great feats of the modern experimental method – the air-pump – that helps delineate some of the logic behind the development of a particular kind of science. Although Hobbes created arguments that would influence his readers, Boyle created machines that could manipulate physical systems external to the human mind. Central to this distinction is the binary between material production versus immaterial or intellectual production. [37]

Historically, what gets emphasized in the distinction between material and intellectual production is the predominance of practices that can produce results and revenue. Thus James C. Scott's notion of "productivism," for example, is one that treats "human labor as a mechanical system which could be decomposed into energy transfers, motion, and the physics of work." While philosophical ideas such as those of Hobbes' could have the power to influence the material world, they could not themselves produce material processes in the same way that a device in a laboratory could. The success of Boyle's experimental program signified the mechanization of human labor and a turn to an emphasis on material production. [38]

This development in modern science significantly implicates the display of science and nature at the California Academy of Sciences. The ways in which Boyle's "experimental practices became institutionalized," are examined by Shapin and Shaffer, who contend that "experimentally produced matters of fact were made into the foundations of what counted as proper scientific knowledge." They believe that, by and large, historians have failed to provide an adequate account of these processes because

historians "start with the assumption that they (and modern scientists) share a culture with Robert Boyle, and they treat their subject accordingly." Shapin and Shaffer note that Boyle's program "triumphed over alternatives and objections, and in [Boyle's] own country it did so very rapidly." But while Shapin and Shaffer argue that "the success of the experimental programme is commonly treated as its own explanation," they fail to ask why it had so much success, so rapidly and with so little effective criticism. Although they desire to put themselves "in a position where objections to the experimental programme seem plausible, sensible, and rational," they do not scrutinize one of the experimental program's most salient strongholds: its ability to produce materially. This outcome, moreover, may be yet another reason why historians were so quick to take Boyle's side; there is an unspoken assumption that material production is not only useful, but good – that epistemologies and methodologies that can materially produce are *naturally* superior to those that cannot.[39]

Shapin and Shaffer hold that Boyle's "mechanical philosophy used the machine not merely as an ontological metaphor but also, crucially, as a means of intellectual production." The physical and material aspects and products of this machine, however, should not be ignored. Boyle, along with Robert Hooke, achieved his first experimental "success" with a machine that "consisted of two main parts: a glass globe (or "receiver") and the pumping apparatus itself." The peculiar appearance of this seemingly sophisticated jumble of pieces of which this machine was composed is the first part of its own material productivity: the apparatus itself. The second form of material production achieved by this experiment is the function of the apparatus: the evacuation of the air, etc. Thus there are two major aspects of an experiment's material productivity: the physical apparatus itself and the physical work it can do. This combination is nearly a direct parallel to Scott's notion of productivism, as it involves the transfer of human work on the machine into energy transfers and motions; Boyle's machine has thus has achieved a mechanization of human labor.[40]

Their overriding concern with the contingencies and inaccuracies inherent in the development of "matters of fact," may account for Shapin and Shaffer's neglect of the more pragmatic and utilitarian influences of the time. Surely, while industrial capitalism arguably had not yet been fully developed, mercantilism (or pre-industrial capitalism) was in full swing. In addition, all of the makings of a utilitarian, protestant ethic of production and a Machiavellian notion of ends justifying means were present in Boyle and Hobbes' social world. Scientific practices had been transformed in such a way as to emphasize knowledge that could be productive materially and economically rather than something like knowledge for wisdom's sake. In this way the budding scientific practices were not as much about truth-production as they were about material production. The binary view of nature as separate from the human, rather than a more artinatural perspective, may at this point have been more materially productive.

A window into the ways in which scientific knowledge factors into these new webs of pro-capitalist, productivist powers is provided by Donna Haraway's "Situated Knowledges," in which she examines the fallacious claims to objectivity of scientific knowledge, or, what she calls "the god trick." The god trick involves an attempt at total vision and total objectivity, which, in the process, becomes anything but a complete vision. Her recommendation for "situated" forms of knowledge is a call for more self-aware, self-critical ways of seeing that do not cloud vision through a false appeal to

omniscience. Scientific vision, she argues, is tied into a project of "militarism, capitalism, colonialism, and male-supremacy." Haraway wishes to dismantle the destructive and oppressive power-webs through a re-imagination of scientific knowledge. [41]

Haraway reminds her readers that "objectivity" is always situated in a subjectivity or standpoint that evades total vision. One cannot, therefore, be "objective" without recognizing the situated, relative, or contingent aspects of a problem, idea, or thing. Relativism itself, however, is not to be understood as objectivism's opposite because it, too, involves a "god trick" which claims neutrality that evades the reality of positionality (it, in fact, tries to avoid positions altogether). Sandra Harding's notion of "strong objectivity" fortifies Haraway's perspective. Basically, for objectivity to become stronger, it must also see the non-neutralities that are involved in science. "Maximizing objectivity is not identical to maximizing neutrality, as conventional understandings have assumed." To be more objective, then, one would have to become more aware of the assumptions, positions, and standpoints that are always part and parcel of the practice of science. The world *out there*, however, does not need to be brought into question – skepticism about the existence of reality would be an inappropriate way to approach situated or "strong objective" knowledge because these two notions require some "faith" in the ability to (at least) partially know or at least *be in contact with* the "outside world". This, however, has always been the worry of scientists who oppose relativism – they think that relativists are trying to undermine the possibility of, or belief in, reality.[42]

Haraway and Harding's responses to science are, in part, trying to retrieve that which has been lost in the reduction of "knowledge of phenomena to a sterile, abstract concept," as Vine Deloria states, in which "much is lost that cannot be retrieved." But Vine Deloria also makes the claim that "as Western science edges ever closer to acknowledging the intangible, spiritual quality of matter and the intelligence of animals, the Indian view appears increasingly sophisticated." There are other ways of practicing "science" that do not have to include mastery, control, and attempted dispassion; or, if they still do, they can do so via different means, without laboratories and machines, but through story, tradition or personal experience. Science does not have to mean a more robotic examination of a mechanical, clockwork universe; it can instead involve a process of feeling and seeing a lively, interactive and meaningful cosmos that refuses to be entirely controlled or understood. If more healthy approaches to ecological crises are to be found, it may require changing the ways in which science is limited and delimited, which really means changing the ways people are supposed to interact with, feel, and think about nature. [43]

But how does one go about trying to change the ways people interact with, feel and think about nature? Well, perhaps it starts in the most vital places – at home with the kids, how kids are taught about what "nature" means at school, etc. But central also are the key institutions that translate nature to the public. These include parks and museums. More specifically, wilderness parks and natural history museums are perhaps the most integral vectors in creating these specific changes. The interpretation and understanding of nature, as we saw in the previous chapter, has crucial influences on many other aspects of society. Race and identity, for example, are intimately tied into cosmologies of nature. Approaches to "environmental" or ecological concerns, moreover, are fundamentally wrapped up in how nature is understood.

The processes of cultural production via the objectification of nature that happens in natural history museums have various real and sinister effects in, and on, the broader society. Donna Haraway, in her chapter "Teddy Bear Patriarchy," points out that "the relations of knowledge and power at the American Museum of Natural History should not be narrated as a tale of evil capitalists in the sky conspiring to obscure the truth. Quite the opposite, the tale must be of committed Progressives struggling to dispel darkness through research, education, and reform." It was decadence, Haraway asserts, for which "exhibition, conservation, and eugenics were all directed as prophylaxis." She calls the dioramas of the museum "meaning-machines" that constructed things like "race, gender and class." The Museum itself is a kind of "visual technology" that helps to promote the myth that "man is not *in* nature" and that nature, as "she," is "imagined to be without technology." Natural history museums, in particular, can be described as places of incarceration: they can allow for an all-too-narrow vision of identities often replete with the attitude of providing/owning an all-knowing, ahistorical and complete vision. [44]

The whole issue of what happens when museums "display" nature is described by Karen Wonder who comments that "the 'cathedrals of science,' or 'temples of nature'—as the natural history museums were variously described"—went in one of two directions: either to "serve the interests of a small, scientific elite, or edification of the public at large." The habitat diorama, designed for the edification of the public, "originated at about the same time that frontier expansion and human exploitation of the wilderness were in an accelerating phase." Habitat dioramas, then, can be seen as a response to the loss of wilderness, a rallying cry to preserve an idea of something that is in the process of vanishing. But how did these kinds of displays convey nature and wilderness to their viewers? And what cultural norms were weaved into the diorama's portrayals of nature? [45]

"The societies that have most abused nature," Kate Soper notes, "have also perennially applauded its ways over those of 'artifice.'" In a similar vein, Karen Wonder points out that it is precisely when ecosystems are threatened that societies become more interested in preserving their representation in habitat dioramas. And perhaps the truth is a mixture of these two parallel insights: that it is indeed an artificial move both to applaud nature over artifice and to put nature on elevated display. The artificial maneuver of nature loving seems to first require the artificial distillation of a "nature" and a "human world" that are two separate entities – the illusion of their separateness then allows for the continued control and abuse of nature. Nature, the glorified other, can be quietly dominated, hidden by the veil of praise and worship. In this light the conservation movement can be understood, in part, as a sort of cover-up for mainstream maltreatment of ecosystems. [46]

Here a consideration of the power of the idea of nature leads to an alarming question: what if conservationism was a kind of corporate greenwashing? It is true that the conservation of forests, lakes and rivers have had a real impact on the land and the people on that land – but was it also a kind of carte blanche for all of the more destructive activities just beyond the fences of the reserves? It is a shocking possibility, and one that is worth considering. It would be revolutionary, for example, if true sustainability found its way into the nuclei of homes and corporations rather than in the few places it has historically been found, out beyond the fray, in America's great backyard of national parks and "wilderness areas." I think the reason that there has been this separation is

directly related to the way people think of nature as external, in the forests and mountains, rather than internal, in our very bodies, homes and artifacts.

So how do visitors to the California Academy of Sciences understand nature? How does the place frame nature and what influences might these approaches to nature bequeath to its visitors? Certainly the physical layout of the museum sets boundaries, lines, and demarcations between the nature to be viewed and the subject walking around the objects. The glass boxes within which the "wildlife" is held create a separation between guest and inhabitant. A visitor can have one's nose only inches from the fangs of a rattlesnake, through the glass. The animals become unreal in a way, as they are so far from grasp. But there are no live human beings within this kind of glass cage, with the notable exception of the "scientists at work," carefully shielded from those members of the "public" who paid to walk through the open sections of the Academy's museum. But if the living specimens are somehow beneath the guests in terms of social status (they are, indeed, incarcerated and under the control of the Academy staff), the Academy's scientists would seem to have a special, higher status than do the visitors. They are allowed behind the scenes and in the "non-public area." Thus the California Academy of Sciences museum not only conveys nature as something separate that humans can effectively capture and quantify, but it also sends certain messages about who controls this knowledge and power over this specific kind of nature. Could the scientists be the high priests of the Academy and rule over its more advanced knowledge, including its application and presentation? If we dig even deeper, it might become clear that it is not even truly the scientists who wield these powers, but the funders and funding sources that influence the research potentials. Perhaps the scientists share something meaningful in common with the caged living specimens as they are prey to the fits and starts of funding sources out of their control. First, however, we must take a tour of the museum to explore how the visitors themselves experience the natural history museum at the California Academy of Sciences.

A Tour Through California Academy of Sciences' Museum

I am driving over the newly constructed Bay Bridge where the white beams lift into the sky like a pelican's wings during a full turn. I slow down as I head through the bridges' central tunnel, which is carved out like a perfect half circle. Following highway 80 West towards the 101 North Exit, I then cruise up Fell Street toward San Francisco's Golden Gate Park. The tall Eucalyptus trees that line the park's panhandle waiver in the light breeze, as clouds seem to be scattering over the city. I soon descend into a modern concrete parking lot. This highly constructed place is where I have come to experience nature in its "essential" form; nature distilled through the lens of technology and science at the California Academy of Sciences. In the following pages I will wander through messages strewn through the museum, often simply from texts that are displayed on its walls, but first I will re-visit the scientific fortress's first line of defense, its cost of admission.

As I pay for my ticket in front of the museum, the first anomaly that comes to mind is this: how is it that in a public park, namely SF's beautiful Golden Gate Park, visitors to a building in this public park have to pay $34.95 to go inside? I, being a student, could pay the student rate of $24.95, still, in my book, a gouging rate. It only

took me until reading the text posted on one of the display windows that I realized this was no public area; science is (more than) partially off limits, it is prohibitively expensive and "non-public." The California Academy of Sciences is like a privately funded fortress of cutting edge science, only offering a peep to those who can pull enough green out of their wallets to pass through their pearly gates. But to those who can afford the time and money to pass through those gates, the rewards are handsome. It is not only a beautiful, clean space, but it is also a place of human-aggrandizement – a place where you can walk and fulfill a grand sense both of cultural dominance and human exceptionalism. The idea of human mastery of nature is alive and well here. The Academy offers a clear sense of nature contained in a bottle by a humanity ready to squeeze out every possible drop of utility and knowledge from that completely contained object. But what is missing or misleading here? As it turns out, if Cal Academy offers nature on display, it also displays a very specific human reality and culture of science: the museum itself, with all its micro-displays, is its own kind of macro-display of a very specific human culture in a historical context. Moreover, the lines between human and nature blur very quickly when one takes a few steps back.

"Student Admission $24.95"

As I noted above, the first thing I noticed during my excursion to the museum was the entrance fee. The cost of admission for the average person is actually $34.95. The only trouble is that the average person probably cannot afford it. The prohibitively expensive entrance fee raises the question, "Which populations is the California Academy of Sciences trying to serve?" The answer to this question can only be, those who can afford the price of entrance, i.e. well off local residents and tourists. Many of the walls of the Academy are adorned with placards and tributes to (ostensibly) wealthy donors (as we shall see shortly). The Academy itself is of such quality construction that it

is not difficult to see how this money was spent. Operating costs for a museum of this nature also sometimes dictate high entrance fees so as to avoid bankruptcy. Also, entrance fees help to insure that there is a limit to the number of visitors. Four times per year the Academy offers free entrance to its visitors and this generates extraordinary lines of people. There are, understandably, all kinds of reasons for a substantial entrance fee. But still, an institution of this nature with these policies will only allow itself to serve certain portions of the population – and these can be severely restricted when there is such a monetary barrier to experiencing it. It is already a particularly artinatural experience, as a human-designed experience of nature is protected by the societal contrivance of the entrance fee. As I searched further into the depths of the museum, I found other clues to its culture.

"The California Academy of Sciences gratefully acknowledges the following donors for their generous contributions and support of fundraising events (January 1st, 2011- June 30th, 2012)"

Under this heading is a list of some 500 donors. The first 10-20 donors are called the "Platinum Circle" to denote a donation of $100,000 or above. It may take some reflection to realize just how astonishing this list really is – it is featured rather predominantly on a major wall, eye-level, in the back of the museum, not far from the albino alligator's false swamp. These donors are, apparently, only contributing toward a 1.5 year time period and this only for fundraising events during that period that makes the length of the list seem staggering.

This kind of support displays an inkling of the gargantuan running costs of such a place, but it also begs the question, "why must entrance fees nonetheless be so high?" It

does not seem as though the Academy has trouble finding large-sum donors. Where does this money go? (Certainly not towards free tickets for the public of a public park.) There are undoubtedly many difficulties and complexities involved in the finances of such a place, but donors are there, expensive and flashy architecture and interior design is there as well: the displays are flashy and so are the placards for donors.

There are many more tributes to donors scattered around the museum. You get the sense that a) they'll run out of space to display the names of donors and b) these tributes take away space that might otherwise be used to display educational, science-related information. Strange that donors are such a centerpiece of the museum. What message does this send to visitors of the new place? Is science truly public? Can a poor person have comparable influence on, or access to, an institution that is funded by such wealthy and powerful people whose names are painted all over the walls? Perhaps the next exhibit might help to shed light on these questions. But one thing is for certain: the artificiality of the nature here is only trumped by the naturalness of its artifice (namely, that the donor support wields undeniable power especially voiced in these displays); and it is thoroughly artinatural.

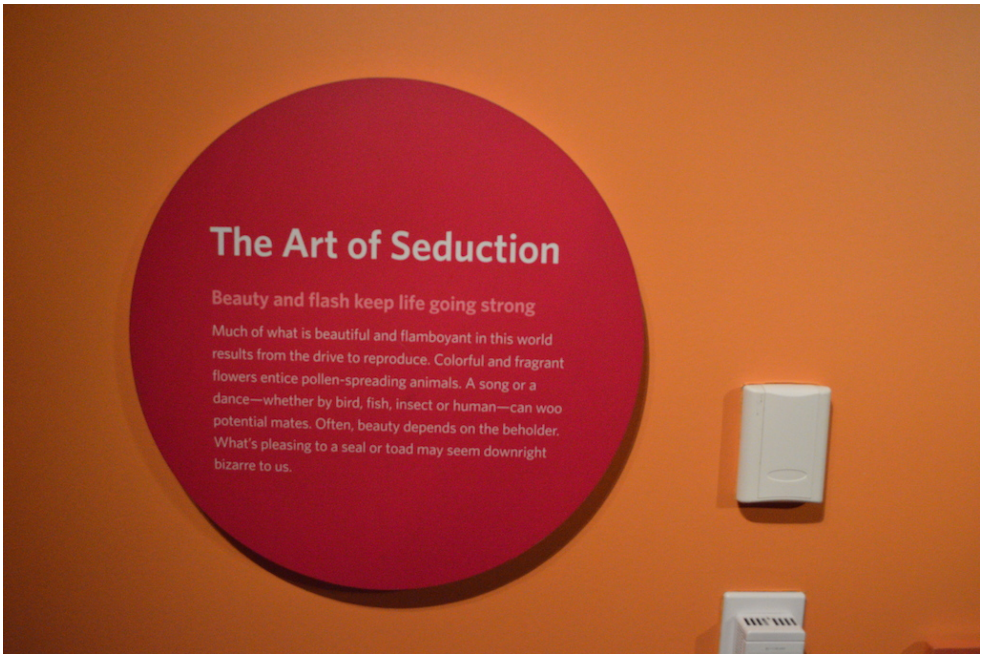
"NON-PUBLIC AREA / SCIENTISTS AT WORK"

There is a special section of the museum on the first floor, in the back, called the "Project Lab," where people appear to be practicing work in their own sort of display case. It is clear that this is not a normal part of the museum as it clearly states on the glass: "NON-PUBLIC AREA / SCIENTISTS AT WORK." The remarkable thing about this statement is that its wording reveals, or implies, more than it was probably supposed to. Its words imply that the practice of science is a "non-public" function accessible and

available only to highly-qualified experts. It seems to be the knowledge version of the financial barriers (entrance fee) mentioned above. So, even those wealthy enough to visit the museum mustn't confuse themselves with scientists, or so the sign implies. This was certainly an inadvertent message and most probably not the view held by Academy officials. However, sometimes the display of scientific knowledge in a museum such as this one can send a powerful message to visitors about who wields the power to hold, create, or access scientific knowledge. Pedestrian visitors are not meant to be the purveyors of the knowledge themselves, but rather, the scientists in charge of the exhibits hold the keys to the gate of scientific wisdom and only they can define just how the visitors are supposed to see and understand nature. But even here, this may be only an apparent truth: is it the scientists or the sources of key funding that have more influence on the directions research is allowed to go? Still, all these messages (the intended and the unintended) suggest that science is out of reach, a place for experts, and certainly not an accessible realm of practice and experience appropriate for visitors.

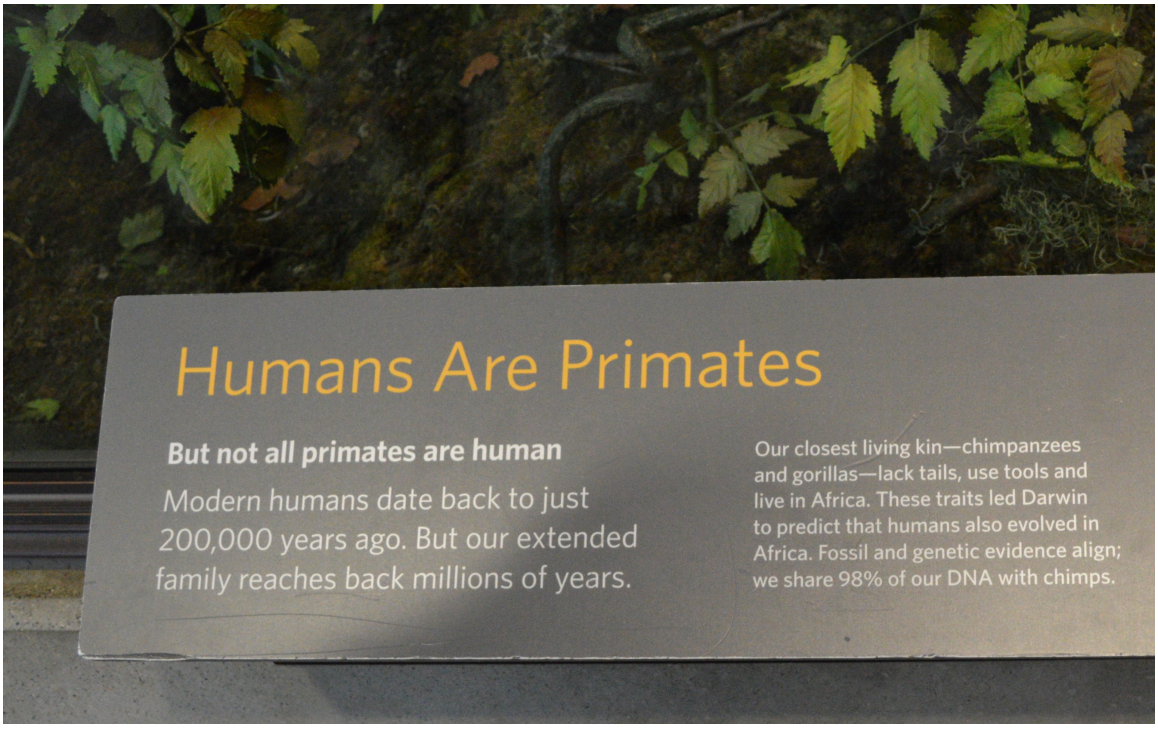
Seen in the light of the steep price of admission, the "non-public area" gains even more meaning. Even when one has the means to enter the Academy's pearly gates, the scientific knowledge is held at arm's length. True scientific wisdom is hidden from guests in much the same way that the engine of a modern car is sound-proofed from its driver and passengers. The message sent cannot be underestimated: the Academy's visitors are passive audiences, voyeurs to acts of knowledge-making and truth. Rather than being themselves agents of knowledge, the well-to-do public that visits the Academy can rest assured that the experts have it all under control. Action is discouraged; and a culture of passivity is firmly placed in its stead. This aspect, of course, is countered by countless programs that the Academy has in place for K-12 classrooms that visit its grounds annually and take part in educational programs. Such programs, however, do not change the message that is delivered to the museum's average visitor. The museum's nature is artinatural in the sense that certain individuals get access to, and control over, the knowledge and experience therein.

“Much of what is beautiful and flamboyant in this world results from the drive to reproduce.”



Found on an informational placard about mating and evolution in the basement of the Academy, the above statement seems to suggest or announce how beauty exists in the world. The first response I have to this statement is to ask if the beauty of the cosmos – the stars, supernovas and galaxies that can be admired in the Academy’s own planetarium – are the result of “the drive to reproduce”? Of course the statement says “much” rather than “all,” which makes me wonder whether the human ability to appreciate visual beauty stems at all from the drive to reproduce, either directly or indirectly. And even though the statement uses the word “much” rather than “most” or “all,” there are a lot of assumptions wrapped up in its fibers. Many beautiful biological forms, for example, may have arisen evolutionarily to evade predators or to serve a more specific function like speed or flight. These are certainly not directly about reproduction, but they may indeed strengthen the ability of an animal to stay alive. The statement, however, fails to convey the complexities of reality, and thus offers its viewers a simplistic version of biology, and certainly not what one might expect from the experts behind the exhibits.

“Humans Are Primates / But not all primates are human”

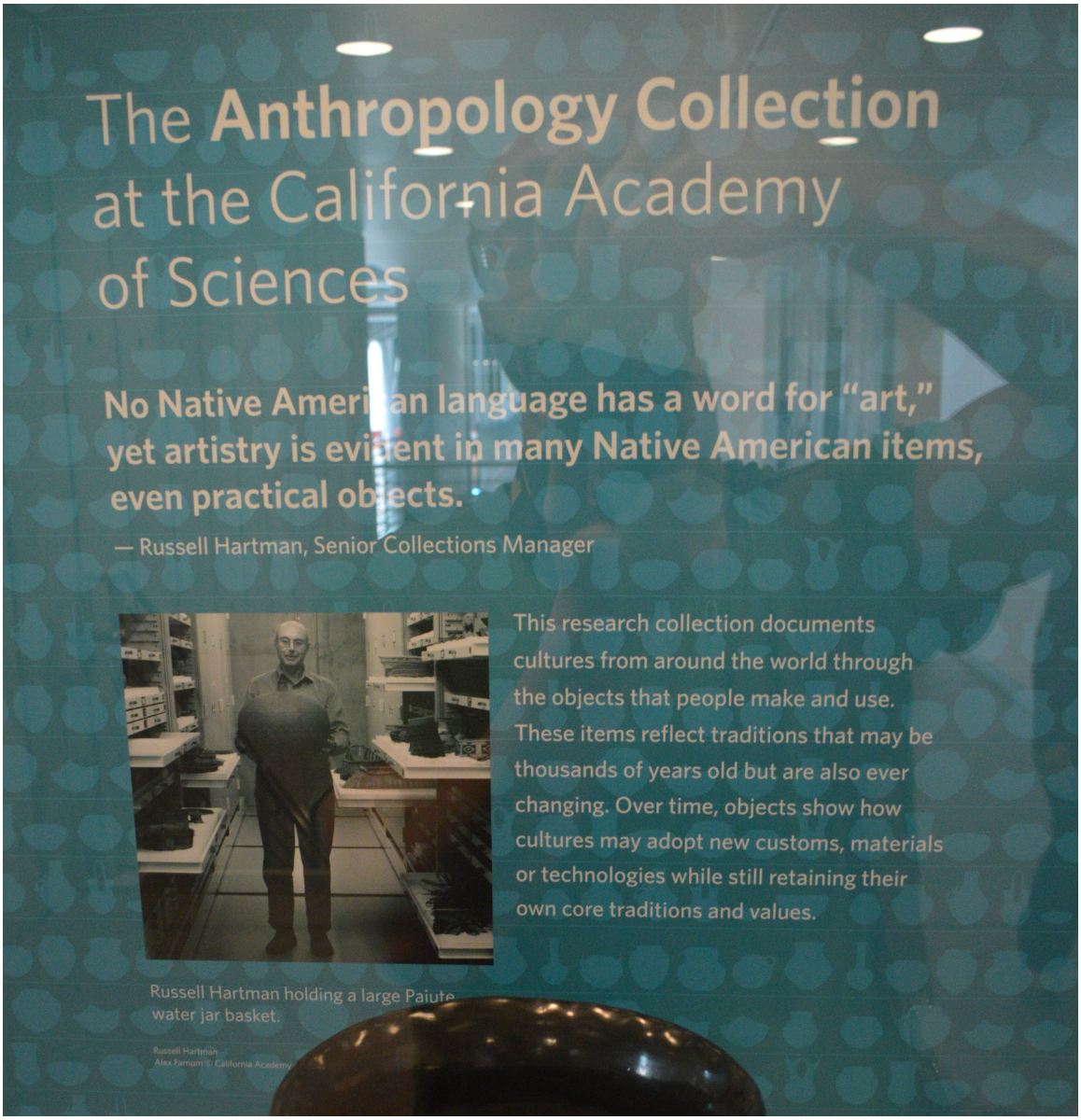


At the human evolution exhibit I found the statement: “Humans are primates / But not all primates are human.” What could be wrapped up in this idea? The assumption seems to be that humans are special primates; this is certainly not something with which most people would argue. But what other assumptions might exist or correspond with such a statement? Let’s visit some dichotomies of nature that shed light on this notion. The human-animal binary is often used to help understand and define the specialness of humanity, in other words human exceptionalism. Animals, from this perspective, are seen as lowly and all part of one group; humans, on the other hand, are understood as forming their own exceptional place in the world. It is easily forgotten, moreover, that humans are also animals, and very much a part of that whole group. The trouble is that it is an all too common assumption in powerful historical-cultural veins of thought that human beings are basically outside of, or above, the rest of nature’s animals, plants and places. This conceptual separation, of course, is part of what prompted me to research these places, institutions and topics. The fascinating thing about the statement above is that it wields a double-edged sword of meaning. On the one hand it reminds people that humans are animals and part of nature (primates even!); on the other hand, it asserts that we are a special sort of primate that renders all nonhuman primates as part of the “other” group. In other words, there are humans and then there are all other primates: two distinct categories. This thinking replicates itself in racialized understandings as well. The “us versus them” is a sort of analogue to the “humans versus animal” binary. Xenophobic and discriminatory perspectives grew into and out of this sort of biological thought.

The phrase, “Humans are primates / But not all primates are human,” may indeed be the most revealing of all the statements posted in the museum. Its double-edged function echoes a sleight of hand also present in Darwin’s famous evolutionary theory.

Despite the fact that humanity is generally placed in the biological nature where evolution takes place, the notion that the human species was the most complex of all species managed to persist. It perhaps morphed into a neuro-centric notion that humanity has the most complex brain, but still there is an element of human exceptionalism that finds a way to discriminate in favor of certain inhabitants of the planet and human societies. It is a special version of biological thought that allows one to have one's cake and eat it too: we may be a part of nature but we are the extraordinary pinnacle of that nature. This same logic that puts humans over other animals gets transferred and applied to race, class and gender hierarchies in society. These simpler hierarchical and dichotomized visions of biology and nature obscure the more complex, artinatural truths.

“No Native American language has a word for “Art””



In an exhibit showcasing Native American pottery, the statement “No Native American language has a word for ‘Art’” was written on top of one informational board. The scientific perspective on American Indian cultures has been a crucial subject for indigenous and science studies scholars. This exhibit seems to portray indigenous peoples as only *objects* for study rather than human *subjects* that can produce their own scientific knowledge. To proclaim that Native American languages have no word for “art” would seem to be an extreme form of ethnocentrism. It may be that we had no word for the true sense of what “art” is rather than the other way around. Perhaps these languages, indeed, were more in touch with the “artinatural reality.” But even so, I would be surprised if no indigenous languages of North America have some sort of concept or word for art. And this idea also hides the fact that many American Indians speak English as a first

language…. Here again, Native Americans are seen as objects of study rather than creators of knowledge themselves. Their work is put in a glass display, as if they were *natural* objects just like all the other displays in the Academy. Strangely, that this is the only explicitly *cultural* exhibit in the museum. It would all become a lot clearer if an artinatural perspective were deployed in such cases; one that realizes not only the assumptions made by anthropologists looking through specific and powerful cultural lenses, but also that the binary classifications of peoples and cultures do not do justice to experienced realities.

Plastic and Glass Globes

Near the "non-public area" where there are "scientists at work," there are two different kinds of globes. The first is a much smaller, but still rather large (about 10 feet high) model of Planet Earth with its countries and tectonic details. Next to it (and behind it, if one is looking from the right place) is a giant glass globe full of vegetation and butterflies. This globe is meant to mimic the temperature and conditions of a tropical region. Butterflies fly right next to your face or may even land on you, as you walk up the swirling pathway through the inside of the glass dome.

Both of these domes are vast simplifications of what they are trying to represent – and they are reminiscent of Boyle's experimental method explored earlier in this chapter in that they take something vastly complex and distill it down to simple, mechanical parts. They are productive in what they set out to do—visitors enjoy them and get to feel in touch with tropical nature—but they are highly imperfect and even amount to a blatant misrepresentation of what they ostensibly represent. They serve as microcosms of the macrocosm of the museum itself – they whittle down the great complexity of the subject matter they symbolize in order for it to be legible to the audiences that frequent the museum. This is an intractable problem, as there is no way of relaying the actual complexity of the earth or a tropical ecosystem in a place like this, however well endowed. Nonetheless this kind of museum strives to do an adequate job. A friend of mine who talked with the scientists there notified me that almost all of the plants in the giant glass dome are incredibly common house and garden species – but still, they provide a realistic-looking backdrop for a butterfly-filled model of a tropical ecosystem. It is certainly an artinatural concoction of species, space and culture-specific lenses.

California Academy of Sciences Survey Results and Analysis

Wandering around the entrance of the Academy's natural history museum, I handed out brief surveys to visitors (you can see the format of the survey just below). These visitors were often either from Europe or nearby – many of them tourists trying to squeeze into their day the most S.F. attractions that they could (and many of them arrived on buses).

<u>Questions</u> (circle your response please)

California Academy of Sciences is "natural": a) agree b) disagree c) don't know/unsure

California Academy of Sciences is "wilderness": a) agree b) disagree c) don't know/unsure

California Academy of Sciences is "artificial": a) agree b) disagree c) don't know/unsure

California Academy of Sciences represents "science": a) agree b) disagree c) don't know/unsure

California Academy of Sciences is "accessible": a) agree b) disagree c) don't know/unsure

California Academy of Sciences is "part of nature": a) agree b) disagree c) don't know/unsure

Humanity is "part of nature": a) agree b) disagree c) don't know/unsure

Artificial/"manmade" objects are "part of nature": a) agree b) disagree c) don't know/unsure

(For the tabulation of the survey see Appendix A)

The results of the survey were mixed and highly interesting. About two thirds of the respondents deemed the California Academy of Sciences "natural," almost one third even saw it as "wilderness," and just about half saw the place as "artificial." Almost 90% of 100 respondents believed that the Academy represents "science." Only half of the respondents considered the Academy "part of nature," but over 90% believed humanity to be part of nature. When asked whether things made by humans are part of nature, the responses were rather evenly split between "agree," "disagree," and "don't know/unsure."

The fact that a substantial portion of respondents believed the Academy to be "wilderness" could mean one of two things: one, that the respondents were unclear about what they themselves meant by "wilderness" (as already mentioned, some of the respondents were from Europe and spoke English as a second language) or they defined wilderness in a creative way – that the human and natural elements in the museum somehow could evoke a sense of wilderness. That only half of the respondents looked at the museum as artificial similarly might mean that people were torn about the meanings of the word – perhaps they saw the term as meaning "fake" instead of "human-made." The respondents who disagreed may have also considered the place part of nature, rather than merely human. But half of the respondents also deemed the place part of nature, and yet two thirds deemed the place "natural." It can be difficult to evaluate just how visitors understand the place and its status in the world. This might be because the terms themselves are too limited and simplistic, or it might signal that respondents answered the queries carelessly. But mostly I believe the problem has to do with language and its interpretation – especially when English was not the respondent's first language.

It seems clear that the California Academy of Sciences has overwhelming elements of *both* the natural *and* the artificial. But these two spheres are never actually separate in the first place: the natural human biology, and some of its specific cultures, led to building the tool of the natural history museum, to the California Academy of Sciences, and to a reverence for other parts of nature. It is truly an artinatural institution in every facet of its existence. Science itself, it can be said, is a special kind of artinatural practice – it involves distilling aspects of nature in such a way as to understand, view, and analyze its contexts. It is nature in human perspective. It is nature in a box, nature packaged, nature caged, or nature framed in scientific terminology and understanding. It is not an idealized "nature" all by itself – that, theoretically, would require no human presence or influence. Science's nature is artinatural by default and by definition. But there is a dark side to this version of nature.

One European couple I surveyed was appalled and disgusted just after their visit to the Academy. They could not stand how small the cages for the live animals were; they felt that no live animals should be kept in such a way. They saw the albino alligator as being the involuntary subject of a freak show, all listless and caged in small quarters.

The alligator largely sits there unmoving, and may even serve as a powerful metaphor for science's treatment of, and perspective on, nature. The alligator's bloated, pale skin suggests a lazy, European history of conquest and leisure in the face of violence and oppression. But the alligator himself is caged, just as is the civilized European subject, perhaps unbeknownst to him or herself. Civilization conquers and oppresses, caging its subjects and drawing boundaries around them. The museum of natural history becomes a metaphor for this – its visitors walk around the caged and stuffed animals only to reinforce the parallel notion that he or she too is incarcerated in that space, shielded from the more advanced knowledge of the scientists behind the scenes and the once true realities of the animals now caged in simplified habitats.

But the fact that the overwhelming majority of visitors feel the California Academy of Sciences represents "science" is illuminating. In spite of the fact that the

museum only shows or conveys a small portion of scientific knowledge, often in a packaged or simplified form, means that visitors may very well be missing what's beyond both the displays and their implications. The power of the place is that it gets this chance to convey "science" to a captive audience that experiences the place earnestly (as they might after having spent the cost of admission). The details of the displays may seem trivial at first sight, but they have great, albeit subtle, effects on museum guests.

How might the details I outlined above quietly shape a visitor's mind? In the first place you must be wealthy enough for the $34.95 admission if you're a non-student adult. Then, you might get the idea that humans are apes, but that they are the most special of them, at the top of the group, and by implication, the apotheosis of the animal kingdom. But the signage also suggests that normal humans aren't scientists and that they cannot access the more advanced scientific knowledge (so perhaps the scientists are indeed the apotheosis of the animal kingdom?). Furthermore, you might start to think that native peoples are closer to nature than non-native peoples. They are to be studied and displayed just as other animals are, even if the study is focused on their arts rather than their morphology. These arts, however, are largely driven by the desire to reproduce (or so the display by the fish tanks would seem to suggest). Finally, the world and its biosphere are simple enough to be adequately represented in medium and large domes filled with houseplants. Or perhaps you might for a moment forget how complicated planet earth really is. These are all things that might be inferred just by a look at some of the details that I noticed in one 2-3 hour visit to the museum! These signs and symbols carry much weight in terms of their implied meanings and implications – they create the world from a very certain and specific perspective, one that might lend itself to a worldview that promotes practices damaging to people and ecosystems alike. Here the devil truly is in the bottle.

Beyond the more public space of the California Academy of Sciences is the extensive "marketing wing" of the institution. This is where the Academy is spun to donors and potential future donors who keep its cumbersome overhead precariously afloat. Here, again, the Academy is presented in palatable displays to individuals of disposable wealth. The Academy is really much more than these displays, but how else could it connect in such an efficient way to visitors and donors alike? The truths of biology and science are not always pretty, but almost always much too complex for simple display. The same is true, of course, of the human social world, which is also regularly boxed, bottled and displayed in more digestible formats. But when does simplification become oversimplification? In other words, when does simplification do more damage than benefit?

For centuries, if not millennia, European and American "nature" has been distilled down to that green and blue space out beyond the human sphere. It was an all too successful rendering of the cosmos that led to great scientific and material productivity, and to an unparalleled control of advanced industrial societies over their surroundings and possibilities. But possibility turned into an impending impossibility – the threat of global climate destabilization and species' extinction rates that threaten entire ecosystems. Raw power morphed into great peril in a matter of a dozen action-packed decades. That is the central paradox of the science and technology that made so much possible – it has now made many things impossible as well, and it threatens to do much worse. The trickiest twist to the story is that the science and technology were never *not*

part of nature. It was a part of the bigger whole, as wild and destructive as it has been. But confronting this artinatural reality that reveals the nature that is, and has been there all along allows for new relationships and practices to be imagined.

Although cultures of human exceptionalism have developed in nature, the artinatural perspective shows that they are not accurate or realistic cultures. Similarly the culture of scientific exceptionalism that envisions indigenous cultures as objects of study, rather than themselves producers of knowledge, is revealed as both contentious and culturally biased. Western science has envisioned nature (and people "close to nature") in a box that creates a false distinction between the human and the natural. This distinction denotes a kind of "Disney version" of the world, one envisioned as much more simple and innocent than, in fact, it is. In truth, human beings are limited by the same weaknesses and processes that many other animals are; moreover, there are many skills that other species possess that humanity does not. Other primates, for example, have managed to *not* develop cultures and technologies with the capability of wiping out much of the life on planet earth. Some apparent human strengths could very well turn out to be weaknesses, true wolves in sheep's clothing. Western science sits in the same place: "objectivity" appeared to be the way to know the most and the best; but would the best knowledge really lead to widespread destruction of the bases of life on earth as we see today? Perhaps it is a question of wisdom versus information – the latter being dangerous without plenty of the former. Wisdom may be something those hoping to practice "objective" science need to turn to more and more. If science hopes to look through the "keyhole of nature," as Jacques Cousteau suggested in the quote at the top of this chapter, then they must remember that the keyhole itself is not only a limited view, but a view shaped by human cultures. And yet those human cultures are also somehow part of that nature that we thought we were peering at from elsewhere – what a paradox that is! And if Latour's quote beneath that "scientists are very much entangled in their culture," holds true, they are just as much entangled in the nature, or, in fact, the artinature.

The culture of science too is not nearly as simple or innocent a place as the California Academy of Sciences would have its visitors believe. The actual practice of the sciences in the academic world (and also in the research done behind closed doors at the Academy itself) involves highly complex and advanced awareness, analysis, and implications. These, however, are by and large hidden from the public's awareness and knowledge. This problem is more structural than intentional, however. American educational institutions can only provide a certain level of scientific knowledge to their students; few make it into the truly advanced echelons of scientific practice. This separation demands that a place like the Academy's museum, in order to be viable to the public, must cater to an average common denominator that is far from the most advanced sciences.

Conclusion

Hard and fast conceptual boundaries have made a huge impact on human societies, the way their civilizations are structured, and the way life is lived. The resulting practices, often based on false dualisms, can be extremely oppressive and destructive. And, in some cases, even institutions meant to do good for society may impact negatively the very causes they wish to foster. In the next chapter, I turn to the topic of wilderness to

explore one of the many instances of such a negative impact. As William Cronon has argued, the prevailing idea that to be natural or wild something must also *not* be human has done some significant damage to the hopes and goals of the environmental movement. How can these goals better be met? What changes in thinking, perspectives, and, in turn, practices, could be achieved revolving around the presentation of science and wilderness in society?

Claude, the Academy's listless albino alligator, is a good reminder that not all is well in the culture of nature that we have so far explored. Bloated, separated, and without direction, he floats atop the false swamp with little hope of redemption or health: is this the kind of nature we wish to believe in and uphold? Perhaps a greater recognition of the artinatural aspects of such displays could strengthen such public projects, as well as a sliding scale for the entrance fee. Greater access itself would heal the divide between those who are allowed to explore and question nature, and those who are not. And it should not be forgotten, in the management of these displays of nature, just how culturally specific it is to put nature into an artinatural bottle and then charge people to view it.

Chapter 4

Nature in the Fence: Wilderness on Display

Another glorious Sierra day in which one seems to be dissolved and absorbed and sent pulsing onward we know not where. Life seems neither long nor short, and we take no more heed to save time or make haste than do the trees and stars. This is true freedom, a good practical sort of immortality.
–John Muir, *My First Summer in the Sierra*[47]

This, then, is the central paradox: wilderness embodies a dualistic vision in which the human is entirely outside the natural. If we allow ourselves to believe that nature, to be true, must also be wild, then our very presence in nature represents its fall. The place where we are is the place where nature is not. If this is so—if by definition wilderness leaves no place for human beings, save perhaps as contemplative sojourners enjoying their leisurely reverie in God's natural cathedral—then also by definition it can offer no solution to the environmental and other problems that confront us. To the extent that we celebrate wilderness as the measure with which we judge civilization, we reproduce the dualism that sets humanity and nature at opposite poles. We thereby leave ourselves little hope of discovering what an ethical, sustainable, honorable human place in nature might actually look like. –William Cronon, *Uncommon Ground*[48]

After visiting Cal Academy, one can head north on Highway 101, across the majestic Golden Gate Bridge, and up to California's most scenic highway, the aptly named Highway 1. As I lead my vegetable oil-fueled 1978 Mercedes up the windy roads, I notice how smoothly paved the roads are, and that the trees and houses seem to meld together along them. Many buses take visitors up to Muir Woods while spewing out diesel particulates, their turbos screaming. All of this for people to explore the notion of "wild nature" beyond human civilization – and it continuously occurs to me that there is really no clear separation between people and nature. But how is it that one is supposed to walk the beaten, fenced paths looking beyond at the "untouched nature" without asking if these designations and boundaries truly define nature, or are simply a cultural vision of nature with baggage going back beyond John Muir's actions and words? Has nature become incarcerated, as T.H. Birch might suggest, within the fences of National Park Service guidelines?[49]

Muir Woods National Monument was founded in 1908 by President Theodore Roosevelt, thanks to a donation of land by William Kent. Kent turned down Roosevelt's offer to name the woods after himself (Kent), and the honor was instead bestowed on Muir. Muir, on the other hand, was ecstatic about the woods and that his name was given them:

> Saving these woods from the axe & saw, from money-changers and water-changers & giving them to our country & the world in many ways the most notable service to God & man I've heard of since my forest wanderings began. A much needed lesson & blessing to saint & sinner alike & encouragement to God. That so fine divine a thing should have come out of money mad Chicago! Wha was'a' thocht it [sic]! Immortal Sequoia life to you.[50]

Although Muir himself was not directly responsible for the formation of Muir Woods, his legacy and image were instrumental in its conceptual foundation. But what does Muir Woods really signify?

It may be impossible, however, to truly define a place like Muir Woods National Monument. Why? Because it consists of countless things people still have trouble describing: complex ecological relationships, genetic operations happening every moment in each living thing, the constant and chaotic patters of water flowing down the creek, the strange human cultural elements that seek to define the place through subtle and indirect means, and the stream of sun- and moon-light throughout the day and night. But if the place is to be described, and people most certainly do this all the time, there are some simpler aspects and approaches on which to focus.

To define a concept one must also indicate what it is not. In other words, what is *not* nature? Are human beings not natural? And are their products and creations not also a part of nature? Or one might start with an even simpler question: what is not wilderness? To define wilderness there must be non-wilderness. So where is the line between them? At Muir Woods there are paths through a forest of redwoods, as well as a small, beautiful creek. Is beyond the path wild? Or does the path through the woods negate the wildness of the forest? As J. Baird Callicott and Michael P. Nelson argue in *The Great New Wilderness Debate*, although wilderness was originally set aside for "virile recreation" of sorts, it has now found a new "non-anthropocentric" meaning in its status as special

"habitat for intrinsically valuable rare and endangered species." It should come as no surprise that visitors to Muir Woods were split in defining the place as "wilderness." Perhaps this has something to do with the history of wilderness in the United States, and even the history of the woods' namesake, John Muir.[51]

In this chapter I explore the strange parallels found between the culture of science and the culture of wilderness – particularly the ways in which people are able to demarcate nature, bottle it, or put it on display. But the lines will be blurred yet again, especially as they concern the artinatural, the strange reality of overlapping spheres that have all along only *appeared* to be separate. I will also explore the idea of nature as wildness, John Muir's idea of freedom, and William Cronon and Thomas Birch's analyses of "wilderness." Finally, I will provide a short history and overview of Muir Woods and outline the findings of my research there. I will discuss the idea of wildness as the antithesis of mastery, and the ways in which this idea fails in practice; that wilderness, as Cronon argues, is patently human. But humanity is also patently wild. And, like the California Academy of Sciences, Muir Woods promotes a bifurcated cosmos that refuses to conjoin the realms of the natural and artificial. It does this by trying to demarcate the natural and the wild. The irony, or surprise, is that in so doing, Muir Woods reveals the much deeper and more integrated truth of its artinaturality; it is a place where the human and natural spheres show themselves to be largely overlapping and intimately engaged.

Touring the Grounds of Muir Woods

Before even entering the Monument there are signs with clear instructions in the parking lot itself. These are instructions about (some of the) inappropriate or prohibited behaviors in the park. It is clear from the get-go that this is not a "wild" place in the sense that it is free. Rather, it is a very controlled space, manicured and curated with precision and care. Here there are "No Pets" "No Picnics" "No Bikes" and "No Smoking." Some of these are odd to find (such as, No Picnics) as there is a café inside the gates of the place itself where you may buy picnic items to consume (more on this later). No bikes and no smoking are understandable enough because they pollute the air and damage trails and bridges. But still, these kinds of regulations suggest a very specific message to Muir Woods' guests about how they should think about and treat this "natural" space. The rule about No Pets also sends a message about the human relationship to other-than-human species: they are not equal and they are not part of the human community. Moreover, domesticated animals are no longer considered appropriate visitors to "wild" space, even if civilized humans are permitted. But again, if the rule is simply to avoid legal problems involving dogfights or attacks on guests, then it is understandable enough. But that does not mean it does not send certain signals to the Monument's guests –indicators about animals are still present in the case of these rules.

As you enter the park after paying a modest fee ($7.00), the first thing you might notice after the archaic welcome gate is the tastefully constructed wooden walkway under your feet. It seems to turn the monument into a giant porch or forest deck on which one can explore the woods from a heightened, controlled atmosphere. It creates a kind of scientific platform on which to view the nature around you from an approved distance. The signs that line the walkway remind visitors to keep that assigned distance, pleading guests to "– PLEASE – stay on boardwalk" and "PLEASE STAY OUT OF CREEK" and "Help Plants Grow Please Stay on Trail" and "Please Do Not Disturb Bark" – these are to designate acceptable versus unacceptable behavior on the grounds of the monument. They are entirely reasonable requests, for if people did not follow them the woods might quickly become a damaged ecosystem, replete with human trash left and right. But these signs also seem to suggest an appropriate human relationship to nature: humans, being the "visitor to nature," must not walk on nature or touch nature. Nature is to be respected at a safe distance; we are only *visitors* here. While this admonition might be a reasonable approach or attitude, it is certainly not scientific fact. Humanity is part of nature, so why are we being treated otherwise?

A visitor center and café located just to the right of the entrance sells baked goods, coffee and organic fruits; no one need go hungry on this "expedition through nature." Rather than being a true expedition through wilderness, Muir Woods is a nature or wilderness theme park of some sort. It is an emblem of wilderness, a symbol of the nature we're not supposed to touch, except it is circumscribed, managed and populated by people more or less non-stop during the daytime. In other words, Muir Woods is the most touched of untouchable places, and defines the proper, accepted behavior of humans to American wilderness. If the larger national parks had a staging ground to prepare their guests, Muir Woods could be this place. "Please leave all natural and cultural objects behind for others. Thank you!" So reads a temporary sign placed in such a way so that you can read it just before leaving the woods. At Muir Woods, nature is the object of worship and study that one must appreciate from a careful distance with the utmost respect.

"THIS TREE IS DEDICATED TO GIFFORD PINCHOT FRIEND OF THE FOREST CONSERVER OF THE COMMON WEALTH"

Not too deep into the woods there is a tribute to Gifford Pinchot. There is some irony here, as Muir and Pinchot once butted heads over Hetch-Hetchy. Theodore Roosevelt, also memorialized in the woods, sided with Pinchot in the idea that a dam should be placed at Hetch-Hetchy to provide a water source for the people of San Francisco; nature and wilderness were to be seen as resources to serve the people rather than the cathedrals of worship that Muir so promoted. Fittingly, Muir Woods seems to encompass both perspectives as a place that conveniently allows the public to worship a beautiful and exalted nature – in this way it is at once used for the public and admired at a distance. It thus completes a sort of Muiran-Pinchotian promise, a strange marriage of ideals indeed.

Cathedral Grove: *enter quietly*

Deeper into the Woods there is a section where visitors are meant to remain silent so as to allow for quiet appreciation of the vastness and profundity of the forest ecosystem. Mildly coincidentally the name of this site is "Cathedral Grove". There is a connection to Catholicism and Christianity more broadly in this name, with a suggestion of a sort of nature spirituality of that Muir himself practiced. But in this superimposing of nature and Christianity also suggests a strange distance between the subject (the visitor to Muir Woods) and the pseudo-religious object (the sanctity of the Woods and the religious experience therein). But perhaps in the distance created between humble visitor and sacred wilderness there is also the intention, on the part of the Woods' designers, that visitors foster a special connection – rather than religious distance – to the forest itself. It is debatable, however, whether this experience of quiet creates more distance or more emotional proximity.

During my visit to Muir Woods I came across a crumpled-up, bloodstained tissue on the path. What one item could better symbolize the monument itself than this tissue? Its fibers are from processed trees, much like the culturally processed trees that surround the path. The blood that stains the tissue is a metaphor for the humanity that "stains" nature. But indeed it is no stain, for humanity belongs in the woods just as the blood belonged on the tissue. The tissue and the blood are both organic, as in coming from nature. But there is also a great pain or injury represented in this blood stained tissue and Muir Woods is much the same way: the park itself was conserved largely because of the destruction of many other forests and ecosystems. There would be no need for such a monument to protect these trees and animals if they were ubiquitous in the United States. The trees and animals were disappearing. There is, indeed, blood on the paths of Muir Woods, and this blood still carries with it great pain and danger. The existence of a monument like Muir Woods is a warning that humanity is already in danger, that too much damage to ecosystems has taken place and that it must be stopped and reversed. Forests like those found in Muir Woods used to be the rule and not the exception.

A Wilderness Separate from Humanity?

John Muir is the patron saint of the wilderness movement. Environmentalists regularly bow to the altar of Muir and yet his approach to nature has much in common with that of the industrialist. To Muir, human artifice is still seen as separate from nature, and human beings (besides ones just like him, apparently) have no place in the pristine mountains and streams of his wilderness. How ironic, however, that this adoration and admiration still allows for a certain presence in those wild places (hiking, backpacking

and camping) and, arguably, quite different practices beyond the fences of the park are also ordained through the practice of wilderness adoration: if the "wilderness" is the only sacred home of the wild, then land beyond or outside the parks can be considered to be completely at the mercy of the human hand and machine. Wilderness, and the dualistic view of nature it suggests, is then a two-way street. On the one hand, wilderness is "untouchable" and, on the other, other land can be altered with abandon. Might there be a better way to understand the wild?

The idea of wilderness has been much analyzed and exposed. As William Cronon writes, "Far from being the one place on earth that stands apart from humanity, it is quite profoundly a human creation—indeed, the creation of very particular human cultures at very particular moments in history." Then wilderness was a very specific ideal in colonial and post-colonial American history, one that supported the policy of kicking indigenous people off what was to be "pristine" *uninhabited* land. Along these lines, some scholars have seen the culture of "whiteness" imprinted on this space, suggesting that wilderness represents racial and cultural purity, the analog to "dirty" urban spaces.[52]

Another tangential argument comes from T.H. Birch, who claims that "designated wilderness areas become prisons, in which the imperium incarcerates inassimilable wildness in order to complete itself, to finalize its reign." To have wilderness and wildness "locked up" creates the space in the rest of human society for wildness to be banned and exiled. But even within the wilderness areas themselves, the laws of a society are upheld. Moreover, wilderness may symbolize "otherness," and in this process of enclosing and incarcerating that space, the defining and enclosing of otherness is also achieved. But can the antithesis of mastery develop through mastery itself? Is wilderness the absence of mastery or simply a form of it? If wilderness is the mastery of the masterless, then it defines and circumscribes a space that is meant to be perceived as undefined and unrestricted. Paradoxically, however, wilderness is heavily defined and restricted. The spotted owl of the Pacific Northwest, for example, may have led its own solitary life in the vast forests, but it also leads a very important existence in U.S. courts that, in turn, has affected many lives of many species, including our own. The wild then plays an intimate role in human societies, and humanity plays an important role in defining and representing the wild.[53]

The demarcation between wild and civilized is merely that - a socially constructed line that obscures deeper realities. A sense of control over these multiple identities of self and other, wilderness and city, is illusory and temporary at best. As Birch and Cronon both suggest, wildness is actually everywhere, both in the wilderness and in the city. Identities can travel just as far as wildness. But in these possibilities is the fear of the loss of control – be it by the imperium or individual. It is the illusion of control allows for a sense of safety from chaos and disorder, hence the great pressure for some to hang onto dualistic ideals.

Dualistic Conceptions of Nature in the History of Environmental Thought

The history of environmental thought also sheds light on these topics and how they continue on in present-day Muir Woods. The development of preservation, conservation and environmentalism in Euro-American society is a story of many complexities, patterns and reinforced dualisms. John Muir and Henry David Thoreau,

who at times envision human beings as part of nature, get lost in more spiritual or more idealistic, notions about nature and its sublime beauty. Muir and Thoreau are writing in a time when American wilderness is still so vast that it is something they are learning to embrace rather than fear. George Perkins Marsh's opus, on the other hand, seems to be about a time in Europe when there really was very little "wilderness" left to fear. Marsh depicts the vast influences our species has had on the planet as a sort of warning about what can go wrong in the "advancement" of human civilizations. More recently, biologists like Rachel Carson, Paul Ehrlich, and Edward O. Wilson wrote popular works about the human species, or at least the actions thereof, as having become pestilent or even cancerous. These modern biologists have begun to fear the utter loss of what was once seen as pristine and ideal. But in the process these biologists, as well as other influential environmental thinkers such as Aldo Leopold and Bill McKibben, reinforced the notion of a nature separate from humanity. The following, a mostly chronological foray into the history and development of this thought, eventually helps to show how an artinatural perspective might rework and repair approaches to ecological crises.

Henry David Thoreau offers an early and unique kind of conservationism, as he writes in 1854's *Walden*, "I go and come with a strange liberty in Nature, a part of herself." Thoreau suggests that we are made of the same stuff as plants and that Nature is the "mother of humanity." But, in Thoreau we can also find a latent disgust for human society, thus creating an ideological separation between "wild" and "civilized" (rather than human and nature, but still tangential). In this portion of a paragraph, Thoreau exposes this binary viewpoint: [54]

> In society you will not find health, but in nature. Unless our feet at least stood in the midst of nature, all our faces would be pale and livid. Society is always diseased, and the best is the most so. There is no scent in it so wholesome as that of the pines, nor any fragrance so penetrating and restorative as the life-everlasting in high pastures. I would keep some book of natural history always by me as a sort of elixir, the reading of which should restore the tone of the system. To the sick, indeed, nature is sick, but to the well, a fountain of health. To him who contemplates a trait of natural beauty no harm nor disappointment can come. The doctrines of despair, of spiritual or political tyranny or servitude, were never taught by such as shared the serenity of nature.[55]

Indeed, Thoreau might have a hard time seeing society as a part of nature – or, even so, as an equal or worthy part. Thoreau reiterates this idea in the first words of his *Walking*:

> I wish to speak a word for nature, for absolute Freedom and Wildness, as contrasted with a freedom and Culture merely civil, — to regard man as an inhabitant, or a part and parcel of Nature, rather than a member of society. I wish to make an extreme statement, if so I may make an emphatic one, for there are enough champions of civilization.[56]

So even though Thoreau wants to emphasize that we are part of nature, he wants to emphasize that "nature" and "civilization" are two different things. It seems the

integration of humanity into nature wasn't complete for him, or at least had exceptions. Still, Thoreau was a rare kind of thinker in his time, one who utilized ideas from Indian philosophy in his writings.

The observations and conclusions of George Perkins Marsh, writing in 1864, can be represented rather well in one substantial paragraph. Despite appearing to be "a matter so strictly belonging to mightier than human powers":

> It is certain that man has done much to mould the form of the earth's surface, though we cannot always distinguish between the results of his action and the effects of purely geological causes; that the destruction of the forests, the drainage of lakes and marshes, and the operations of rural husbandry and industrial art have tended to produce great changes in the hygrometric, thermometric, electric, and chemical condition of the atmosphere, though we are not yet able to measure the force of the different elements of disturbance, or to say how far they have been compensated by each other, or by still obscurer influences; and, finally, that the myriad forms of animal and vegetable life, which covered the earth when man first entered upon the theatre of a nature whose harmonies he was destined to derange, have been, through his action, greatly changed in numerical proportion, sometimes much modified in form and product, and sometimes entirely extirpated.[57]

Marsh is concerned about the "geographical influence" of human societies, particularly their destructive impact: "Man has too long forgotten that the earth was given to him for usufruct alone, not for consumption, still less for profligate waste."[58]

But in this text there is also the notion that humanity is separate from nature, as Marsh writes "though living in physical nature, he [the human] is not of her [nature], that he is of more exalted parentage, and belongs to a higher order of existences than those born of her womb and submissive to her dictates." He later refers to "man" as earth's "noblest inhabitant" and yet warns that the actions of this inhabitant may lead to its own extinction. Yet, Marsh chooses to end his opus with a sort of rhetorical question, that seems to offer humanity a challenge, "whether man is of nature or above her." It remains a mystery what facts would allow the reader to decide the answer to this riddle – perhaps if man is above nature, he would continue to destroy it? But more likely, Marsh is probably inferring that if humanity wants to deem itself "above nature" they must first show that they can learn to survive on earth. Still, either way, it seems that Marsh wants the reader to believe that we really are separate from that realm; we are more godly, and less natural. He does argue that "the earth was given to [man] for usufruct alone, not for profligate waste" – and this idea holds that humanity must formulate better respect for nature almost as a partner, as Carolyn Merchant suggests, as she quotes Marsh: "Man should become a co-worker with nature in the reconstruction of damaged fabric."[59]

John Muir also separates wilderness from civilization, but this time by envisioning it as a sacred and spiritual thing: "the hills and groves were God's first temples." Muir, too, lionizes nature and wilderness as compared to human society and civilization. His brand of conservation we can call preservationism seeks to promote a

wilderness free of the dirtiness of human society. In response to the idea of damming Hetch-Hetchy to supply California residents with water, he writes: [60]

> The temple destroyers, devotees of ravaging commercialism, seem to have a perfect contempt for Nature, and, instead of lifting their eyes to the God of the mountains, lift them to the Almighty Dollar. Dam Hetch Hetchy! As well dam for water-tanks the people's cathedrals and churches, for no holier temple has ever been consecrated by the heart of man."[61]

So for Muir, wilderness is clearly a sacred thing, a thing not to be touched by the careless hand of human society.

Yet Muir also spoke of humanity being a part of nature. Once, in describing the beauty of the sky and geology around him, Muir wrote that "More and more, in places like this, we feel ourselves part of wild Nature, kin to everything." Muir often speaks of his hikes in the mountains as if he were an invisible, objective observer quietly experiencing the world around him. There seems to be a great tension about humanity's place in the natural world. Perhaps to Muir, only *his* was the right way to experience Nature, that other cultures and urban dwellers had gotten it wrong.[62]

When John Muir first set foot on California land in 1868, the state was in many ways a vastly different place from what it is today. It was a land recently inhabited by indigenous peoples and still inhabited by a large range of biota. Muir's leather boots took hold on rocks and dirt that were, undeniably, *not* untouched. It had not been a land without people and yet his dream of preserving it would epitomize the idea of a pristine "wilderness" *free of people* (perhaps with the exception of himself). In this way "wilderness" was a sort of eco-colonialism: it was taking back the land from all people, including the indigenous people who had found their livelihood there over the millennia. Where there had been a peopled land, Muir construed an uninhabited wilderness that offered, as he saw it (in the epigraph above), a special kind of freedom: "Life seems neither long nor short, and we take no more heed to save time or make haste than do the trees and stars." The "immortality" Muir found in the wilderness appealed to many who would cherish his writings and mimic his travels into the wild, but it was an immortality founded on the mortality of other cultures and ways of being; it was no innocent ideal. Recognizing this will necessitate a sometimes profound adjustment in the interpretations of some of his cherished writings:

> Walk away quietly in any direction and taste the freedom of the mountaineer. Camp out among the grasses and gentians of glacial meadows, in craggy garden nooks full of nature's darlings. Climb the mountains and get their good tidings, Nature's peace will flow into you as sunshine flows into trees. The winds will blow their own freshness into you and the storms their energy, while cares will drop off like autumn leaves. As age comes on, one source of enjoyment after another is closed, but nature's sources never fail.[63]

Nature is here seen by Muir as endless and unalterable, a treasure of freedom for the mountaineer. It is out there, an experience you can travel to if you have the means and

status to enjoy it in such a luxurious way. But "Nature's peace" was a luxury that had been hard fought for by pioneers and colonialists alike, and at the expense of those who had dwelled there before.

Muir had Scottish roots. He and his family emigrated from Scotland to Wisconsin, where he would attend college. He was raised in the Christian faith and he would bring this faith to bear in his own version of a kind of religious reverence for wilderness. The California landscapes would become his cathedrals. And just as Christianity was used as a broad justification for colonialist practices, it can be argued that wilderness admiration played very much the same role in America.

There is one moment in John Muir's writings that sheds light on this question, while also hearkening back to discussions about science. It is a moment that Carolyn Merchant highlighted when Muir encounters something unusual to him in the High Sierra. On a particularly sunny day he saw something strange in the distance approaching him - a band of "Mono Indians" traversing a mountain pass. To Muir, nothing could be a more unnatural sight. These Indians did not belong on the mountain where he was; he saw them as "ugly" and out of place. He accuses them of having no proper place, either in the wilderness or in civilization; to him the Indians are but a dirty contaminant plaguing an otherwise pristine mountain pass. "Somehow they seemed to have no right place in the landscape." To him, "the strange creatures… were mostly ugly." But Muir did not look at himself in the mirror to ask, for example, whether he himself (a native of Scotland) belonged in the High Sierras of California. Muir had already assumed a kind of universalist, objectivist perspective; he was the "view from nowhere," the ordained scientist searching through the wild lands only as a white scientist could. Somehow his ethnic makeup was invisible, and the Native Americans' the opposite: a blotch on an otherwise pristine wilderness, outsiders in a land they, in fact, were truly from. How could this be? How could Muir have re-written history? And what historical-intellectual tools was he applying to do so? It seems it never occurs to Muir that he, as a light-skinned emigrant from Scotland, might be the true outsider or contaminant. In fact, it is as if his own culture and race, his whiteness, gets a pass, or some sort of invisibleness – and this is the myth of mainstream science: a clear vision of nature without contamination; but the nature does not stop at the glass or with the contours of the bottle – it continues in the space between "subject" and "object", and within the subject him- or herself.[64]

There is a very strange perspective on the human and the natural that Muir's legacy and namesake project onto the land. As others have argued before me, Muir's wilderness was a certain social construction of nature, one that perceived it as quite separate from the human, and yet, the conception itself is entirely human. Ironically, this very human conception of wilderness sees it as a place where humans should only be able to visit briefly, rather than a place that we are from, within which we could sustainably live. Wilderness, then, is also about the process and culture of civilization. At the end of this chapter I will endeavor to show that both wilderness and civilization are each artinatural places in their own particular ways.

Thoreau and Muir, one could argue, both suffer from a problem laid out by Kenneth Wolf's *The Poverty of Riches*, a book about Saint Francis of Assisi. Both Muir and Thoreau were college educated (at University of Wisconsin and Harvard,

respectively), and mobile enough to allow them to choose to practice a life of simplicity and wilderness adoration. In this way their love for the outdoors, and the wild dangers that these places may hold, can be seen as an optional luxury rather than a universally available lifestyle. They do not necessarily account for those who cannot afford to live, and to take on the substantial risks, that they do.[65]

Gifford Pinchot offered a different approach to Muir's. What we can call "conservationism" focused less on a pristine wilderness as a sacred thing to protect, and more on allowing natural resources to benefit the most people for the "longest time." In political terms, this meant damming Hetch Hetchy to serve the people of the San Francisco Bay Area.

With Aldo Leopold there is an attempt to operationalize a new brand of conservationism through his "land ethic": "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise." There is a question, however, here of what is included in the term "biotic community" – do we, for example, include human communities and cultures as a part of this term or do we not? The answer would tell us whether Leopold is making a biocentric or anthropocentric claim. For me, more signs point to Leopold being the latter rather than the former. He writes that "a land ethic changes the role of Homo sapiens from conqueror of the land-community to plain member and citizen of it. It implies respect for his fellow-members, and also respect for the community as such." Leopold is also interested in conserving and protecting the land for recreational activities like hunting. It would appear that Leopold is a conservationist rather than a preservationist. However, some of his central ideas can be interpreted as leaning toward the biocentric, preservationist camp; this however would ignore the more present truth that Leopold tends to discuss caring for the land for the primary purpose of keeping ecosystems healthy for human use.[66]

When Rachel Carson breaks into the scene, the needs for conservation had reached new heights. Widespread use of DDT, from her perspective, had the potential to threaten both broader ecosystemic functions and human health itself. Carson's critique had roots as far back as Marsh regarding humanity's ability to reshape, sometimes detrimentally, earth's geography – but with a significant change in kind: Carson speaks of pesticides that are "more dangerous than any known before," but more singularly, "they have amazingly become something to be showered down indiscriminately from the skies." The shift in perspective on human effects on the environment may at first seem like a subtle one, however, it is in this subtlety that the important difference is found. Important anthropogenic effects are now not only invisible to the human eye, but they are also more complex because they interact with systems of much higher complexity. But to Carson, this is not the primary concern – indeed, ecologists could test for, and find, the potential effects of chemicals on ecosystems if they were given the time and resources to do so.[67]

There is a potential for irony in Carson's descriptions about these chemical problems. In the first pages of *Silent Spring*, Carson makes a clear delineation between what is human and what is natural. I believe this same thinking might be behind some of the carelessness that leads to the use of such synthetic chemicals: a belief that the artificial somehow remains inconspicuously *within* the very boundary between itself and the natural. Carson writes that "the history of life on earth has been a history of interaction between living things and their surroundings," already creating a clear

delineation between concepts of "self" and "environment". Carson writes of the chemicals as "synthetic creations of man's inventive mind, brewed in his laboratories, and having no counterparts in nature." In fact, Carson calls these developments a part of "man's war against nature." In these paragraphs it seems that humanity has no place in nature: "Nature has introduced great variety into the landscape, but man has displayed a passion for simplifying it."[68]

Paul Ehrlich moves a step farther into some of Carson's fears in arguing that the human species itself has grown to epidemic proportion as a part of the overall biome. Ehrlich seems to see humanity as a part of the biological ecosystem, but also a dangerous part to itself and to other species as well. His recommendations at times seem culturally insensitive, as well as at odds with views such as Barry Commoner's about demographic transitions.

E.O. Wilson's *Diversity of Life* takes on conservation through the concept of biodiversity, warning that widespread species loss could trigger unpredictable and potentially disastrous effects. Wilson argues that "humanity has initiated the sixth great extinction spasm, rushing to eternity a large fraction of our fellow species in a single generation." Like Ehrlich, he recommends "abatement of population growth." He also uses a broad brush stroke in declaring the possibility that "in the instant of achieving self-understanding through the mind of man, life has doomed its most beautiful creatures." It seems that this "moment" of self-understanding could be understood as not only much more than a moment, but with very particular triggers of cause for such extinction events (industrialization, petroleum industry, unbridled economic development, etc.). Furthermore, Wilson follows Carson in furthering the human/nature binary: "evolution cannot perform as in previous ages if natural environments have been crowded out by artificial ones." [69]

Bill McKibben shares the same conviction expressed by Wilson and Carson: that "wild nature" "will not survive the new global pollution":

> By changing the weather, we make every spot on earth manmade and artificial. We have deprived nature of its independence, and that is fatal to its meaning. Nature's independence *is* its meaning; without it there is nothing but us. [70]

This reliance on an untouched nature and a vision of humanity as separate from, and even tainting, nature arrives again and again in these literatures. It provides the field with significant philosophical and moral quandaries and it begs the question: since when, or at what point, did the human species and its creations leave the realm of nature?

The irony of scientific arguments such as Ehrlich's and Wilson's is that they rely on some of the same logic that, debatably, led to some of the ecological problems themselves. Enlightenment or instrumental reason, as Horkheimer and Adorno argued in their *Dialectic of Enlightenment*, understands nature only in so far as it can control it – all knowledge of nature that does not provide the thinker power are rendered valueless. But instrumental reason, to a large extent, could be argued to be one of the main causes of advanced industrialized economies, the very entities that have created such a "population bomb". Can the problems be fixed with the same tools that created them? This is a

looming question, and one that technocrats would surely answer "yes" to if they were willing to agree with its premises. But thinkers like Wendell Berry would beg to differ….

Wendell Berry critiques what he calls Wilson's "reductionism" in his *Life is a Miracle*. Berry argues not only that Wilson's *Consilience* reduces the humanities via the sciences, but also that science and technology cannot fix the problems that arose within them. He seeks a change in language used to describe things, but more fundamentally, he seems to request a new worldview entirely. He writes:

> It seems clear that humans cannot significantly reduce or mitigate the dangers inherent in their use of life by accumulating more information or better theories or by achieving great predictability or more caution in their scientific and industrial work. To treat life less than a miracle is to give up on it.[71]

While Berry stops short of explicitly demanding that people change their worldviews and understandings of the world, this request is nonetheless implicit in his words. Unless people start seeing "miracles" and mystery in the world, replete with humility and respect for these elements, Berry sees no possibility for a humanity that can survive on planet earth. One way that Berry brings out is the juxtaposition of science and religion in some unorthodox ways. It seems that what Berry is arguing is that for ecosystems to be saved, science needs certain tools that the sphere of religion typically possesses. And, implicitly, that religion too needs some of the knowledge of science.

What these preservationists, conservationists, and environmentalists show us is that these movements were not as radically different from mainstream attitudes about nature as they could have been. Even though they often recognized the human species as part of nature, they often considered humanity's products and constructs as patently *unnatural*. What I think this movement needs is a new perspective that refuses to draw such a sharp line between the natural and the human – indeed, the truth is closer to the artinatural. "Wilderness" is both a human idea and a space once managed by human cultures. But cities too are natural in their own way. Human beings come from the same evolutionary and biological processes as other animals and our creations can be understood in that context, with their own special differences of language and culture. When these lines are blurred perspectives on issues can no longer be compartmentalized and marginalized. The survey results point to a need for a term that goes beyond simplistic categories and, rather, blends the concepts into something closer to the truth.

Muir Woods National Monument Survey Results

As I entered the parking lot to Muir Woods National Monument, large trees waived their abundant leaves in the gentle wind, the sun beaming down through the canyon, bathing everything in happy light. Tour buses parked at their special parking spots, the drivers waiting nearby as their passengers explore the park. It was in this setting that I asked visitors to fill out a brief survey about Muir Woods.

Questions (circle your response please)

Muir Woods is "natural": a) agree b) disagree c) don't know/unsure

Muir Woods is "wilderness" : a) agree b) disagree c) don't know/unsure

Muir Woods is "artificial" : a) agree b) disagree c) don't know/unsure

Muir Woods represents "science": a) agree b) disagree c) don't know/unsure

Muir Woods is "accessible": a) agree b) disagree c) don't know/unsure

Muir Woods is "part of nature": a) agree b) disagree c) don't know/unsure

Humanity is "part of nature": a) agree b) disagree c) don't know/unsure

Artificial/"manmade" objects are "part of nature": a) agree b) disagree c) don't know/unsure

(For the tabulation of the survey see Appendix A)

The survey results were in many ways clearer than those at California Academy of Sciences. Nearly 90 out of 100 respondents deemed Muir Woods as both "natural" and "accessible." Only a handful of respondents deemed it "artificial." Respondents were almost evenly split in their assessment of whether Muir Woods is "wilderness." Finally, around half of respondents thought Muir Woods National Monument "represents science."

On one question, there was nearly a consensus: only one respondent at Muir Woods disagreed with the statement "Muir Woods is part of nature." On the other hand, around 40% of respondents disagreed that "things made by humans are part of nature" (and almost 30% were unsure). This question was the most contentious for respondents at both sites; one respondent took approximately 5 minutes trying to figure out how to answer this particular question after having breezed through every single other question. Finally, 96% of Muir Woods respondents agreed that "Humanity is part of nature."

Muir Woods National Monument does a very effective job of representing itself as a place of nature and the natural. Around 80% of respondents disagreed with the statement "Muir Woods is "artificial."" This, however, does not change the fact that Muir Woods is on many levels designed by people and full of human rules and artifacts. But, this does show that the dichotomy between natural and artificial is alive and well in respondents' minds.

The survey also shows that in general people break things down into simplified categories that correspond with cultural tradition: of course Muir Woods is natural, it is a grove of trees with some wooden walkways going through it! Of course it's not "artificial" – this is precisely the kind of place associated with the word "nature" – streams, insects, wild animals, and big trees. But this is not to say that people approach these questions simplistically. Many commented that they would have liked more options between "agree" and "disagree," that there were shades of grey, or that most of it was natural and not artificial. Still, for the most part, those terms fulfilled expectations. Yet there were cases where the artificial and the natural overlapped – although there was no word to adequately describe this overlapping. The wooden benches lined outside the entrance to the park seemed natural, and yet also pretty constructed or artificial; so which one were they? The categories did not suffice. I think that if pressed, respondents would admit that many things in the park were artificial, and that also somehow many artificial things were also natural. One comment implied that human-made objects are artificial as long as they are in active human possession, but become natural once they have left that possession and are "taken back" by nature. This comment is an interesting insight into how what is deemed artificial may signify a kind of property or ownership over things.

To recognize the artinatural in the context of Muir Woods is to allow for the idea that even when human beings preside over an object that they have created, nature has ownership as well. Likewise, when a park such as Muir Woods is established, one could recognize the artinatural aspect that nature in this context has a real human handprint on it, even a specific cultural handprint. But the lines between artificial and natural simply were not clear to respondents.

Some respondents desired that there was a spectrum between artificial and natural that they could pencil in, which suggests that a category that melds the two, like that of the artinatural, is needed. The line between the two categories is anything but hard and fast. Something can be artificial, part of nature, and natural at the same time. Everyday language confuses the meaning of these words as well. The discourse of food manifested at places such as the Muir Woods Café offers slightly different angles on the same words: "all-natural" foods with no "artificial" additives versus "artificially flavored" items that one may see, understandably, as overly manufactured or fake. The word artificial has largely become synonymous with "fake" – and this fact may skew responses related to the word "artificial." Still, the word suggests a manufactured quality, something most people did not see in Muir Woods. And yet, Muir Woods is quite manufactured, both ideologically and literally. The paths through the woods are constructed, as are the rules visitors must respect while there. The café could just as easily be part of a city and even the informational boards direct visitors to approach and think about the park in particular ways.

One of the consequences of the idea of nature that is conveyed in a place such as Muir Woods is that one might assume that nature is everything beyond the walkway. It stops at the fence so to speak. That means that you, the visitor to the woods, are not natural. It is one thing to admit that humanity itself is biological; it is quite a different thing to imagine one's entire self, our technology included, as a part of that nature. The truth is that there is no line between nature over there and the nature inside – the line that appears to be there is one drawn by human culture. When the lines are seen for what they are, pieces of culture projected onto our worlds, jarring questions and realities can be

uncovered. For nature to be a part of our every action, even our consciousness and identity, brings questions to the idea of free will and self-determination.

The artinatural perspective demands that the human self can no longer be understood as *strictly* human. Rather, the human is now understood as natural, part of nature, biological, ecological, geological, physical, chemical, astronomical, etc. But there is great resistance to seeing the natural in the artificial or the artificial in the natural from a large array of intellectual camps.

Why is there so much resistance to seeing the natural in the artificial? For humanities and social sciences scholars there is the specter of "explaining away" or justifying cultural practices that in many cases have been unjust, oppressive or downright dangerous. But to be natural does not mean to be right, fair, or correct; it simply means to be part of nature. When a cheetah in the wild eats her newly born cubs to stay alive, this is not an optimal option, but it is indeed part of nature, a nature that could've been better for the mother cheetah, that could've offered her more sources for nourishment and survival than the terrible last-ditch effort. Owls can do the same to a fallen chick. But we humans also have the amazing tool of cultural knowledge, teaching and learning. We may be able to imagine better or novel options to avoid terrible actions and situations.

On the other hand, why might biologists cringe at the notion that the cultural is not part of nature? Because as varied and open to change as the human realm can be, it still finds its possibility in the genes we have. We may even be able to manipulate these genes, but they remain the basis for other actions. As otherworldly as experience may seem, there remains a biochemical foundation for our bodies and lives. But we are not natural or cultural; rather, we are both, always, simultaneously. They are not at odds or opposed: we are artinatural creatures. There are artintural, complex and mysterious systems that make up everything in human society. Other-than-human animal societies too can exhibit some of these strange artinatural complexities, but the human world with its space-crafts, race cars, bureaucracies and institutions is the one that perplexes and confounds the human mind the most – it made us believe that we were an altogether separate beast from the rest of nature, and this was a crucial cognitive failure that could have, and has already had, dangerous repercussions.

The story of nature told by a place like Muir Woods is more about human culture than the reality of the trees and streams of California's forests. The wild places *over there* are places civilized human beings are supposed to leave untouched, to save for a place of research, worship, or even hunting. But what does that leave for the civilized person to see nature *in him or herself*? Lines are drawn somewhere, and hierarchies of order are set for those lines, and in the process, societal norms are imagined, reproduced and reinforced. This certainly does not just happen in places like Muir Woods – it is something that happens everywhere people go. But what does happen at places like Muir Woods and the California Academy of Sciences is the formation of perspectives and norms surrounding nature and the human relationship to nature. Attitudes about humanity, the self, biology, ecosystems, wilderness, animals and specific human cultures are forged walking down the paths and through the exhibits. Nature is tied into all of these things.

Technology Excess Disorder

What are the implications of the California Academy of Sciences and Muir Woods as artinatural? And what concerns result? To be human, for something to be artinatural, is not necessarily something bad or contaminated. But there are times when the human side, despite itself being part of nature, can be overbearing, excessive and damaging. I'd like to propose that this be thought of as technological excess, or Technology Excess Disorder (T.E.D. for short). The problems caused by technological excesses range from the highly global – climate destabilization – to the highly personal – internet addiction, and everything in between: pollution, ecosystem collapse, skyrocketing species extinction rates. As Sheila Jasanoff writes, there are technologies that are "humble" and good, and then there are technologies that are "hubristic" and bad – these "technologies of hubris" are some of the ones that create the problem of technological excess. But too much of a good thing can also be a bad thing. Perhaps the internal combustion engine, and the petroleum-based fuels that run some of them, were humble and good on a small scale, but over time they became excessive. T.E.D. is a serious problem, one that threatens the ability of human beings to survive on a large scale, but also one that, on a much smaller scale, threatens the fabric of everyday life. The scientific perspective toward nature is a form of technology and, at times, technological excess. The important thing is to promote the kinds of scientific perspectives that are nurturing to ecosystems rather than excessive and damaging. For ecology to increasingly recognize and confront artintural aspects of ecosystems is one step in that direction.

Biophobia

But what ignites obsession with technology, with new, shiny and bright objects that continuously offer clean simplifications of reality? Against what do these factors contrast? The simplest answer is life itself and the not-so-clean realities of biology. Living organisms are full of bacteria, mucous, chaos and complexity. Biology is dirty, not clean, and evades the simplifications of human technologies. The world is not a pixelated screen and never will be, but screens exist in the world as a way to filter reality into something more palatable. A viewer can focus on the screen and its finite pixels instead of the world beyond the screen and its infinite, mysterious, and even frightening materiality. Reality itself is profound, final, and frighteningly complex; we have put technologies between ourselves and the more difficult realities that exist beyond them.

There is a word for all of this that contrasts sharply with E.O. Wilson's notion of biophilia, or love of life by living things. In fact, *biophobia* signifies fear of life by human beings. Humans are highly complex biological mechanisms full of processes of which most people would rather not be aware. Using the bathroom and closing the door and flushing the products of this process down the drain are more harmless examples of biological denial. Not only could there be dangerous bacteria in the defecated products, but there is also something unpleasant, to be avoided in standard conversation. We always have some fecal matter inside of us, as well as urine, and many other "gross" things that we do not like to acknowledge or think about. Even the blood and veins that help sustain us are enough to disgust some people. There are many aspects of our

biological being that produce fear for people, perhaps the most formidable of these are aging and mortality itself. [72]

Technology offers the hope of fighting against the chaos and complexities of biology to elongate one's lifespan, or perhaps do away with death. But within this hope is a repulsion for biological reality – something that even the possibility of immortality cannot negate. I do not fault one for fear of living things – they are truly something worthy of both awe and fear, and they are things that have inspired many religious myths.

Denialism is at the heart of biophobia. No matter what technologies are introduced, the fact that bacterial colonies sustain our bodies, that food is processed in our guts, and that nutrients flow through our veins will not change. These strange and awesome processes of genetic expression and mutation are largely inevitable. We are all part of something much larger than a single individual identity, as much as many might wish to forget it. Millions of ancestors (both human and pre-human) provided their way for us to exist, and trillions of bacteria were always part of these bodies (and still are now in each living individual).

Battling with the technological excess of scientific approaches to nature is to combat biophobia. Biophobia pushes people to ignore important truths about humanity and its intimate place within nature. Biophilia, on the other hand, is a more idealized perspective and feeling toward nature that may help remind people of our interconnectedness with other animals and natural processes that sustain us. But perhaps both views can be a little too polemical. Biorealism might be the better middle path – a place where humanity and the rest of nature can be viewed from more realistic perspectives. Instead of biophobia, I put forward artinature as a concept that strives for a biorealistic vision of the human place on the planet. Everything human beings do is through and by nature, even the aspects that might make our species unique, such as abstract thought and complex written languages. If these thoughts and languages do not engage ecosystemic realities more effectively, humanity existence itself is at stake.

Conclusion

When words such as "nature" and "wilderness" are as troubled as I have shown, they can acquire deeper meanings and understandings. In many cases specific terms such as forest, lake, ocean, desert, and mountain can be used instead. Nothing can be done to belittle the greatness of these magical places and things. Recognizing the natural in the artificial, and the natural in the human expands one's understanding of the ultra-complex and majestic realities of both nature's possibilities and what it means to be human. If humanity and its cultures are to survive within a complex nature, then human cultures must learn to find more accurate understandings of the artinatural realities that surround us. Muir Woods is indeed artinatural – it is a place where the human and the natural are intermixed in myriad, fascinating ways. Muir Woods involves very specific scientific perspectives informed by very particular historical circumstances and traditions.

Another conclusion is that science and wilderness have much more in common than is readily apparent. Science, "the mastery of nature" is really less of a mastery than previously thought, and wilderness "the antithesis of mastery" is really about a certain kind of mastery of "the wild." Both put nature inside a conceptual fence. Wilderness serves as an exemplar of the myth of a bifurcated world: wilderness is what we tried to

point to in order to say, “That is what we are not.” As we have now seen, this is a myth of a particular culture trying to distinguish a certain echelon of humanity as a pinnacle or apotheosis of the “civilized.” But just as fancy clothes cover up a much more honest self underneath, the myth clothed the truth about the naturalness of humanity. Wilderness’s nature is artinatural because it was a human or artificial attempt at defining nature *but it never transcended the nature of which the artifice was always comprised*. “Artinatural,” I argue, is a better way of revealing something about another imperfect concept: “natural.” The truth does not perhaps exist within a particular language, but language can at least, bit by bit, aspire to truth.

Chapter 5

The Artinatural in Practice

"Radiation is no longer merely the background radiation of rocks, the bombardment of cosmic rays, the ultraviolet of the sun that have existed before there was any life on earth; radiation is now the unnatural creation of man's tampering with the atom."
-Rachel Carson, *Silent Spring* (1962)[73]

How can we think about Rachel Carson's quote above? For me, the term "unnatural" is the place to start, for what, if anything, can we truly call *unnatural*? The artificial, as I have argued, is something that comes from natural processes, as do our thoughts and creations. Even the materials used to produce radioactivity are from "nature" – it is, indeed, an artinatural sphere, and instead of being "unnatural," radiation from nuclear energy and bombs is patently *artinatural*. How can this idea change the perspective on these issues? Because to confront the lack of separation between what is artificial and what is natural means that it can no longer be safe to assume that the "artificial" realm within a reactor, for example, can be kept from entering the "natural" realm that is outside of it: they were both always in an artinatural realm that does not respect those false boundaries. It then behooves decision makers to be cognizant of the inevitable spillages that these practices entail: this is what I dedicate this chapter to achieving.

Fukushima's Artinatural, Multispecies Landscapes

On March 11th, 2011, a 9.0 magnitude earthquake violently shook the seas and lands surrounding Japan's Miyagi Prefecture. A tsunami that was up to 125 feet tall decimated cities, towns, and villages as far 6 miles inland. There were upwards of 15,000 reported fatalities as well as thousands of injuries and lost persons. 125,000 buildings were destroyed with an estimated $300 billion dollars in damages. In Fukushima, due south of the earthquake's epicenter, the Daiichi, or "number one" nuclear power plant, was severely damaged. The damages led to the release of radiation that caused the Japanese government to declare a 20 kilometer evacuation zone around the site.[74]

There is a growing movement to recognize the notion that there is no such thing as a "natural disaster." As Neil Smith writes, "In every phase and aspect of a disaster – causes, vulnerability, preparedness, results and response, and reconstruction – the contours of disaster and the difference between who lives and who dies is to a greater or lesser extent a social calculus." And, as Anthony N. Penna and Jennifer S. Rivers state in their introduction, "Natural disasters… are caused by accidents, nature, or human activities." Hurricane Katrina of 2005 and Haiti's major earthquake of 2010, for example, were disasters that were circumscribed by human social relationships, political, and economic factors. The ground in Haiti may have not been shaken by human hands, but the kinds of destruction caused by the shaking were certainly dependent on human factors. Similarly, the disasters brought forth by Japan's recent earthquake and tsunami

were dependent on the kinds of built environments that existed in the affected geographies. If there had been no nuclear plant, for example, then there would not have been widespread radioactive contamination. Thus it would seem correct to say that these kinds of disasters are not completely "natural"; indeed, they are social and human disasters, just as the words and language itself exists socially. But what kind of dichotomy does the claim that "disasters are not natural" imply? And how will this artificial-natural binary influence the future of these radioactive landscapes and the continued development of nuclear energy? The narratives that are spun around these events and topics will most certainly have a great impact on current and future social, political, economic, and even "natural" realities.[75]

Beyond exploring the various ways in which the Fukushima disaster can be theorized and understood, I will tease out the kinds of futures that are in store for those radioactive landscapes by examining other significant landscapes of the past and present: Hanford, Three Mile Island, Chelyabinsk, and Chernobyl. In this process I further develop the concept of the "artinatural," a term once used in landscape architecture, that can help academics and laypersons alike better understand what these disasters are really about. The term may also prompt us to ask broader questions concerning "humanity" and "nature." Some of these disasters may be described as anthropogenic, as they were caused by human error, and others might be deemed naturogenic – or caused by nature – such as earthquakes or volcanic eruptions. But, in a social context, these naturogenic disasters are still artinatural disasters. While the giant earthquake that struck San Francisco in 1906 may have been naturogenic in origin, its results were artinatural in that they involved the inextricable mixing of artifice and nature. After further thought it will also become clear that anthropogenic events always contain important elements of the naturogenic – another example of artinatural forces in action.

The 2010 BP oil spill in the Gulf of Mexico is an instance in which an artinatural perspective could have shifted policies and actions taken. Possibilities always exist for spillage between the "contained" realm of the artificial parts and machines that drill and capture crude oil, and the naturally contained oil that exists beneath the earth's surface. Some people might argue that the quest for, and use of oil, is quite a natural thing – in fact, the oil itself is completely natural and organic in the sense that it was produced over the millennia from organic materials under pressure. But the highly rapid capture and use of the energy-rich substance creates artinatural effects that reverberate in ecosystems and societies alike. The pollutants emerge as significant vectors of global change, largely uncontrollable by humanity once emitted. Human societies' use and reliance on petroleum is like a bad habit, a habit that leads to a variety of ecological problems, just as alcohol abuse can lead to diabetes, obesity and liver failure. It is the abuse, and not merely the small-scale use, that poses the real concerns.

In the past, questions like those of drilling oil were looked at in simplistic, linear ways with only some recognition and calculations of risk. These approaches did not account for the greater, more complex reactions that happen downstream from the original decision to drill. How much is a gallon or barrel of oil really worth if you take into account the costs—among others, the loss of species, ecosystem failure, and widespread asthma caused by petroleum industries—that will eventually affect the world and its inhabitants. How can these be weighed or valued?

…

Although close to terms like hybrid, cyborg, natureculture, and socionature, terms already in use in the field of Science and Technology Studies, the term "artinatural" offers something new in that it is an adjective (and/or noun) specific to built/altered objects and environments. A robust ethical approach to radioactive pollution will require ontological and epistemological approaches that that are realistic and honest, rather than dichotomies that have ignored fundamental inter- and intra- relationships. Special attention needs to be given to the personal, situated experiences relating to radioactive pollutions. These emotional and phenomenological accounts will help me weave together the material and the semiotic, the atomic and the discursive. I will explore the idea of "mutant ecologies" and offer another about "mutant mentalities," or the psychological impacts of radioactive landscapes. While Three Mile Island and Chernobyl highlight the significance of emotional impacts of radioactive contamination, Hanford and Chelyabinsk give strong examples of the visible, and lethal manifestations of these radioactive landscapes. All together, these four predecessor incidents will help to anticipate the kinds of existences and impacts that Fukushima's landscapes will endure.

In investigating these issues, I take a look at Fukushima's four major historical precedents: Three Mile Island and Chernobyl offer insight into the broader social impacts of radioactive landscapes, whereas Hanford and Chelyabinsk are examples of less well-known, and yet more chemically severe, sites of radioactivity. Finally, I will set out the specificities of Fukushima's radioactive landscape in order to conceptualize its potential futures. As Valerie Kuletz points out in *The Tainted Desert*, there is a "wasteland narrative" often surrounding these artinatural landscapes. Along with this narrative there is a process of "deterritoriality" of the land ("the loss of commitment by modern nation-states to particular lands"). Often embedded in these discourses is environmental racism – certain groups of people are "sacrificed" and de-humanized along with the sacrifice zone itself. One shall see examples of this throughout the following descriptions of radioactive landscapes.[76]

Fukushima's radioactive landscape comprises the dual aspects of "radioactivity," at once a severe material hazard that spreads across land and sea as well as the more mental, cultural and psychological hazards. It is therefore both a Three Mile Island *and* a Hanford at the same time. There will be both "mutant ecologies" and "mutant mentalities." It will challenge many cultural norms in Japan, just as Chernobyl shook up the Soviet worldview and its adherence to collectivity rather than individuality. Perhaps Japanese society, too, will question its collective ideals when in the face of individual harms and dangers?

In my year working as an English teacher in rural Japan I experienced the unusual social cohesion of the society, the powerful ways in which individuals sacrifice for larger social groups. When I see photos of the workers near the Daiichi reactors, I think back to those social ideals and customs I witnessed. But, of course, radioactive landscapes are not just going to influence the peoples and their cultures, they will influence the other-than-human persons, the flora and fauna therein.

There were reports of dogs, cats, and other pets and animals left behind, going hungry in Fukushima's "no-go" zone. These animals wandered the streets and hills,

unable to find and push the signals and communications that once provided them with regular feed, their human companions far away, unable to respond. Meanwhile, unbeknownst to them, their bodies are being exposed to radiation. It is reminiscent of the chimpanzees in the film "Project X," who were lethally radiated while operating flight simulators at a U.S. government facility. Except in this case the dogs cannot break into an airplane, with the help of Matthew Broderick and Helen Hunt's characters (spoiler alert), and fly away to Florida's everglades. So these dogs remain in the no-human zone, starving, thirsty, radiated, and lonely? Or perhaps they feel liberated? U.S. dog-enthusiast bloggers[77] have reported this: "According to Japan Animal Earthquake Rescue and Support (JEARS), there are 5,000 to 10,000 domestic animals in the exclusion zone. They are alone, scared, and hungry. Many have already died." This is not just a story about the domestic animals, however, it is also a story of those who now feel the pain of knowing that their once pet rests suffering, starving, and solitary without them, and that there is nothing that they can do to change it. Farm animals have it even worse; on May 13th, 2011, Prime Minister Naoto Kan has ordered the slaughter of all farm animals within the no-go zone. These animals may suffer even more if they are not killed – as they become increasingly radiated, starved, and weak, the likelihood of a slow and painful death for them increases.[78]

The trees and other plants in the no-go zone are now in the process of absorbing substances like cesium 137, radioactive material with a half-life of 30 years. The *Scientific American* article "How to Tear Down a Nuclear Power Plant" points out that once these trees have soaked up the radioactive material, forest fires can pose immanent threats to public health as they can spread, again, large amounts of radiation over large territories. In this way, even the trees speak for the landscape. The dialogue is not just between people, it is between all aspects of the landscape, living and dead. The artinatural landscape includes the built, the natural, the uninhabited and the habited.[79]

U.K.'s *Guardian* put out a story on May 11th, 2011, about dairy farmers returning to their farms despite dangerously high levels of radiation. The reporter, Jonathan Watts, declared that the radiation at Keiko Sanpei's farm, 17 miles downwind of the Daiichi disaster, "was so contaminated during the crisis residents are now exposed to almost as much radiation as someone standing outside the plant's west gate." Here one can see that a radioactive landscape does not play by the rules of human law and goes well beyond the 20 kilometer no-go zone. [80]

A school 37 miles (60 kilometers) from Daiichi, in Date, continued to have its students attend. Radiation levels remained somewhat low, relatively speaking, at "3.3 microsieverts an hour" (a chest x-ray is 100 microsieverts). The children, however, were forced to wear "masks, caps, and long-sleeved jerseys," and skirts were banned for the girls due to concerns about harm from radiation. Even if the radiation levels remained "manageable," it would be important to consider just how these kids might be affected by the stress and fear of the situation. And what about the kids who can no longer return to their homes, parks, schools, farms and neighborhoods? How will the radioactive landscapes affect them over the years? Might there be government-run visits for some of the residents of the no-go zone? Some once-residents of the zone have been able to go

back to their old homes and collect some of their things, but they must leave quickly. It seems only a tease, only a flaunting of the lives they once had and now have lost. These overall impacts are nearly impossible to measure. What is known is the extent to which people were displaced: "Nearly 80,000 people have spent two months away from their homes in the 20-kilometer (12.5-mile) zone around the plant, while tens of thousands more are awaiting orders to evacuate more distant towns where radiation levels are likely to raise the long-term cancer risk." The longer term impacts of this displacement are difficult to anticipate. [81]

Fukushima may not simply be a story of sadness or death. If the event helps to illuminate to the larger society the dangers and mistakes of certain practices, then it can eventually have positive impacts on the society, and other societies as they pay attention from afar. The radioactive landscapes of Fukushima, however, will more likely consist mostly of stories of sadness and death. The resilience of life in the face of mutations may leave some room for hope, but if Chernobyl, Hanford, and Chelyabinsk are any indication of what is to come, Fukushima's landscapes will see trying days ahead.

Hanford's Secret Radioactive Landscapes

Founded for the purpose of developing weapon-grade plutonium for the Manhattan Project, Hanford evolved into the primary nuclear weapon facility in the United States during the Cold War. Hanford's technological "momentum," as Thomas Hughes might say, was forceful enough that even after scandals, spills, and cover-ups, there still is a nuclear reactor working today, producing electricity. The Hanford Site, also known as the Hanford Nuclear Reservation, has become one of the United States' primary superfund sites. But what has become of its radioactive, artinatural landscape? How have the people and other living things around the site dealt with the radiation, and can the land ever become "wild" again?[82]

In "Mutant Ecologies," Joseph Masco argues that a radioactive landscape and ecosystem can be theorized or understood more effectively through the lens of mutation. He sees mutation as a sort of symbol for the ever-changing quality of natural systems:

> A concept of mutation implies, then, a complex coding of time (both past and future); it assumes change, but it does not from the outset judge either the temporal scale or the type of change that will take place. It also marks a transformation that is reproduced generationally, making the mutation a specific kind of break with the past that reinvents the future.[83]

Furthermore, Masco suggests that we can reconceptualize the nature-culture dichotomy through a theorization of mutation:

> I propose extending our theorization of the complexity of nature–culture forms via the concept of mutation. A mutation occurs when the ionization of an atom changes the genetic coding of a cell, producing a new reproductive outcome. As cells replicate over time, mutagenic effects can have three possible outcomes: (1) evolution, or an enhancing of the

> organism through a new adaptation to the environment; (2) injury, such as cancer or deformity; or (3) genetic noise, that is, changes that neither improve nor injure the organism but can still affect future generations.

This kind of theory may help to illuminate insights into sacrifice zones and impacts on living things therein. But one must be careful here too: can we see Masco's theory as writing off the dangers of radiation, by defining them as being speedy change? A quick death is also a speedy change, "a specific kind of break with the past that reinvents the future." This can also be called artinatural.[84]

Masco squarely confronts sacrifice zones and mutated wildlife in his essay. He writes that "the experimental projects that produced and now maintain the bomb have collectively turned the entire biosphere into an experimental zone—one in which we all live—producing new mutations, as we shall now see, in both natural and social orders." In other words, there was a process of normalization: radioactive organisms and sites with less than severe amounts of radiation became normalized in the shadow of the much more severely radiated places nearby: "Just as the current background radiation rate normalizes the atmospheric effects of aboveground nuclear testing as an aspect of nature, the new wildlife zones offer an image of a nature created through nuclear politics and radioactive practices." The whole area, as he writes, becomes a sort of "experimental zone," albeit one where experimentation is not necessarily done intentionally, i.e. it has become artinatural.[85]

At Hanford, there are examples of the radioactive quality of the land actually benefitting the other-than-human ecological community. As Masco points out, "Human contact is more immediately toxic for many ecosystems than are radioactive materials." Furthermore, the U.S. government has declared several ecological preserves at the Hanford site:

> This logic is trumped most convincingly at the Hanford Reservation in Washington State, which produced plutonium for the U.S. arsenal from 1945–92 and is now recognized as the most seriously polluted site in the United States. The DOE has recently devoted 89,000 acres of Hanford's 540 square miles to preserving the long-billed curlew, Hoover's desert parsley, and Columbia yellow cress.

The only problem is the radiation levels are so high that sometimes they rival the "toxicity" of human contact itself:

> Mulberry trees on the Hanford Reservation have been showing increasing amounts of strontium-90 over the last decade; and the Russian thistle plant has recently created a new kind of environmental hazard: the radioactive tumbleweed.

So we are left with the strange contradiction of a not-quite artificial, not-quite natural, radioactive eco-preserve. What will be made of such a thing? This landscape is a perfect example of the artinatural. The U.S. government's desire to purify and magnify their plutonium production, or nature itself, only led to the increased mixing of the artificial

and the natural – it was an illusion that one could ever keep one from "contaminating" the other. Masco holds that "This inability to enforce the distinction between wilderness and wasteland was further dramatized at Hanford in 1998, when fruit flies landed in liquid radioactive material and carried contamination far and wide over the next weeks, requiring nothing less than a $2.5 million dollar DOE cleanup operation." It is a "wilderness" that needs constant tending to: it is a special kind of artinatural wilderness.[86]

At Hanford it appears that the industrial-technological system bled into the surrounding ecological systems, human and otherwise, which then continue to spill back and forward into new, artinatural spaces and places. These new technological-industrial-ecological spaces then spread through contamination of various artinatural sorts – the fruit flies carry radiation, the human-made artifacts – in their presumably natural bodies with their presumably natural behavior; but how has their behavior been changed by these radioactive residues and isotopes? And, is it possible that these radioactive ecosystems can merely become systems in which mutation is more likely? Or are there broader, more detrimental implications to these new artinatures?

The secretive past of Hanford's radioactive contamination did not prevent many harmful physical manifestations in populations surrounding the site. In *Atomic Harvest*, Michael D'Antonio describes how one victim of Hanford's pollution did not learn about her radioactivity-caused illnesses "until 1987, when another ghostly pale woman, this one bearing a scar on her neck, enrolled in one of her art classes":

> That autumn, in a casual conversation, Jurji and the wan-looking student realized that they had both grown up in Pasco and attended Captain Gray elementary school. The student mentioned that the scar on her neck was from an operation she had had to remove her cancerous thyroid gland. She blamed the cancer on the Hanford releases, and advised Jurji to get a thyroid examination…. Alarmed, she [Jurji] rushed to her doctor and was soon diagnosed with hypothyroidism—her thyroid was almost inactive—and given medication. In a matter of weeks her vitality, her memory, and her dreams began to return.

It turned out that all five of her family members also had thyroid problems – they had all been affected by the secret radiation that had invaded their landscapes during the 1950s in the tri-cities of Washington State. This is the kind of physical harm that even secret radioactive landscapes can create. The harmful, artinatural aspects can be multiplied, as we shall see in the cases of Three Mile Island and Chernobyl, when they are combined with the mental terror of the awareness of being radiated.[87]

Three Mile Island, or The Terror of Radioactive Landscapes

The crisis of Three Mile Island highlights the psychological impacts of artinatural, radioactive contamination. Although the radioactive spillage was less severe in this case, it had broad impacts on the surroundings and the individuals who lived there. In *Three Mile Island*, J. Samuel Walker writes that "reports of increased risks of cancer and scientific uncertainties about the effects of low-level radiation fueled the high level of anxiety among the population around Three Mile Island." The uncertainty – and

invisibility – of the threat was central to its production of anxiety and fear. It is important to remember that emotions are an integral part of the artinatural realities of these nuclear events.[88]

The local newspaper, *Harrisburg Patriot*, echoed the anxious uncertainties of this time (May 4th, 1979), as quoted by Walker: "The layman will find little clarification or comfort in the scientific community, which is bitterly divided over the degree of danger posed by low-level radiation." Walker's description of the on-the-ground anxiety is vivid:

> Even as the patterns of life returned to normal in the area, indications of public uneasiness, without deteriorating into symptoms of panic, were abundant. Many pregnant women called their physicians or abortion clinics for advice on whether they should consider an abortion because of the accident. Psychiatrists were flooded with patients seeking relief from stress…. The uncertainties and apprehensions that citizens of central Pennsylvania experienced in the aftermath of the crisis were perhaps best summarized in a slogan on a T-shirt widely distributed in the area: "I survived Three Mile Island… I think." [89]

This ambiguity and uneasiness of the citizens near Three Mile Island signals one of the more forgotten elements of the physical damage done by radioactive landscapes, even with those situations in which the radiation levels are low: the psychological and emotional stresses caused affect peoples' mental and physical well-being. More recently there has been a similar phenomenon with the BP spill – BP Corporation's monetary reparations offered to account for lost business and livelihood that simply could not be accounted for. Difficult to measure or fix were the emotional and psychological tolls the people suffered – these artinatural aspects are often overlooked as they require a blurring or mixing of the typical categorizations of spaces, places, spheres and things.

Studies done to determine the measureable impacts of the radiation did not find that there had been significant harm around the Three Mile Island site. A study conducted by the Pennsylvania Department of Health and the CDC "found in April 1980 that, contrary to some reports, neither fetal nor infant mortality had risen in the six months following the accident within a ten-mile radius of Three Mile Island." A survey examining cancer rates from 1974 through 1983 "showed that cancer deaths were no higher than normal after the accident (indeed, the total number was slightly lower than expected)." Moreover, a second survey found that between 1982 and 1989 there was still no detected increase in cancer rates. The "Hatch investigation" did find a "small wave" of unusual cancer case increases that they thought "might be attributable to stress caused by the accident." Another group of researchers, these from the University of North Carolina, concluded that "radiation from the accident had increased the incidence of leukemia and lung cancer," but even this claim was in dispute. Just as it was difficult to measure emotional and psychological tolls, it may have been difficult to measure the cancer-related tolls of the artinatural disaster (as well as their causes, which tend to be multiple and dynamic).[90]

For many years, "Three Mile Island held the dubious distinction," Walker writes, "of being the site of the world's worst nuclear power plant accident," which is clearly a sign that Hanford, although much more severe, was under the radar for most Americans. "In April 1986 [Three Mile Island] surrendered that status after a monumental accident at the Chernobyl nuclear power station." Chernobyl, again, is a reminder that the severity of radioactive pollution does not correlate with its popular recognition. In the Soviet Union, as in the United States, a site of much more severe radioactive pollution remained under the radar for many years. The Mayak incident in the Soviet Union, like that of Hanford, is also a reminder that it is not simply the radioactivity of a landscape that does harm, it is also the *idea* of the radioactivity and the fear, anxiety and stress it can produce – these, in the aggregate, are truly multi-dimensional, artinatural disasters. It is often the artinatural aspects of these crises that are ignored or misunderstood – radiation is more that a physical, external phenomenon – it invades the human psyche as well in a distinctly artinatural way. [91]

Chernobyl and Chelyabinsk: Mutant Mentalities and Death Ecologies

A New York Times story, in its title, asked the question, "Did Chernobyl Leave an Eden for Wildlife?" It starts with the premise that in "recent years, there have been reports that the area around the Chernobyl nuclear plant had become something of a wildlife playground." The article continues: "The reports suggested that animals like wild boar, wolves and moose had flourished in the 40-mile-diameter 'exclusion zone,' which was contaminated by low-level radiation from the disaster in Ukraine 21 years ago." We then find out that, on the contrary, these artinatural ecosystems are far from flourishing:

> Close to 1,600 birds were counted, representing 57 species. But as the researchers report in Biology Letters, both the number of species and abundance of individual birds declined with increasing radiation levels. For example, the most contaminated sites had about two-thirds fewer birds than those with normal levels of radiation.
>
> The researchers suggest that several factors may be at work. The radiation may directly affect fertility and survival rates, birds may avoid contaminated areas because they are not prime habitats, or there may not be enough food. Because most of the contamination is in the soil, Dr. Mousseau said, "species that are feeding on invertebrates that live in top layers of soil are most likely to be ones that are missing or in lower numbers."[92]

They conclude by declaring that "Chernobyl is far from a paradise" and that the "contamination appears to have had an effect." This article clearly shows that "mutant ecologies" may be more than simply mutant-prone; they may be death-prone as well (and mutations can, of course, lead to higher death rates).

The 1986 Chernobyl disaster was a sociological nuclear phenomenon that was internationally unrivaled: it reached far past its epicenter in the Ukraine over Western

Europe and even the United States – it was a contamination of both radiation and panic. Chelyabinsk, or the Mayak Incident that involved a major nuclear explosion in 1957, on the other hand, was more akin to the situation at Hanford. Chelyabinsk, although it involved more dramatic amounts of released radiation, remained more localized and was less publicized. And like Hanford, Chelyabinsk left a severely radioactive, artinatural landscape in its wake.

In Chelyabinsk, "by 1959, the pine and birch trees around Kyshtym, exposed to a constant barrage of radiation, had begun to die" (Miller, 326). Even the flora around Chelyabinsk could not withstand the barrage of radiation. Again, rather than a "mutant ecology," one sees an artinatural "death ecology."[93]

A detailed account of the Chelyabinsk radioactive landscape is offered by Mark Hertsgaard in *Earth Odyssey*. Hertsgaard notes that the site, given the Cold War code name of "Mayak," "had been the Soviet Union's primary nuclear weapons production facility from 1946 until November 1990, when the last of its five plutonium reactors was shut down." It was, in short, the Soviet Union's version of Hanford. He writes that there been not one, but "three nuclear disasters at Mayak whose damages were comparable to, and probably worse than, the reactor meltdown in 1986 that made Chernobyl a household name." The difference between these disasters, he rightly points out, is that Mayak's "had never become media events." Even when he visited the site in 1991, the nuclear disasters at Mayak remained largely unknown.[94]

From 1949 to 1956, Hertsgaard notes, "Mayak officials poured their nuclear waste directly into the nearby Techa River," contaminating water for tens of thousands of people downstream and creating wild, new artinatural landscapes. "For the twenty-eight thousand people most acutely exposed, average doses were fifty-seven times greater than at Chernobyl. This was the first Mayak disaster. The second Mayak disaster took place on November 29th, 1957 and involved the explosion of a nuclear waste facility, which produced a blast with the force of 70-100 tons of TNT. This disaster emitted 20 million curies, "ten times more than had already been dumped in the Tech River." The "third disaster" at Mayak, in 1967, involved the dumping of radioactive waste into Lake Karachay, which produced the dispersal of 5 million curies over 15,000 square miles, affecting more than half a million people. [95]

On an exploratory walk into the Chelyabinsk landscape, Hertsgaard finds that radiation levels are nearly 40 times the normal background level. The Techa River and its surroundings were twenty times the normal background level. The landscape is thus still heavily inundated with toxic levels of radiation. At its severest location within the Mayak complex, by a pipe that emptied nuclear waste into the lake, "an adult male could die from radiation… within an hour." The Mayak disasters have thus created lethal, death ecologies, radioactive artinatures that still produce suffering.[96]

One Chelyabinsk resident, Hertsgaard relates, had suffered a growth the size of a golf ball in his neck, presumably from years of exposure to radiation. This man's brother was born with an "over-large head and shrunken chest" and his "mother died at sixty

after suffering for years from a variety of ailments associated with radiation sickness, including a weakened heart, high blood pressure, and fatigue." A report done by the Gorbachev administration showed that in the 1980s "growth in diseases of the blood circulation system increased 31 percent. Bronchial asthma increased by 43 percent; congenital anomalies, by 23 percent; and gastrointestinal tract illnesses, by 35 percent."[97]

With Chernobyl one can start to parse out the more personal, emotional, and psychological elements of the spill. In some ways the radioactive landscape reaches far beyond sites of radioactivity and into sites of the psyche. The artinatural radioactivity then damages not only the places where it is present, but also the persons where its story is present as well.

While both terrible, the difference in a nuclear disaster like Chernobyl and September 11th, 2001 is taken up by Keith Gessen's "Translator's Preface" to Svetlana Alexievich's book *Voices From Chernobyl*. Gessen maintains that these events were practically opposites in that the collapse of the twin towers left few "survivors" who needed medical treatment – so many of those trapped had simply been killed – whereas at Chernobyl, the initial blast had only caused one death; it was a disaster of *survivors* rather than victims. He follows this by noting that "the total number of attributable deaths will be four thousand." And although this number parallels the number for the World Trade Center attack of September 11th, 2001, the most telling, and more overwhelming, details of its effects go beyond the casualty figures themselves. Fittingly, Alexievich's book is comprised of first person accounts of Chernobyl derived from interviews that she wove together in the form of monologues. Together they display the hardships, sometimes in graphic detail, that ensued due to the radioactive landscapes in and around Chernobyl. Thus a newly wed wife describes the fate of her husband who had gone in to fight the fire at the very beginning of the disaster, his skin now falling off all over his body. [98]

The accounts in Alexievich's book show the terrible, confusing ways that artinatural landscapes can influence the people therein. The effects of radiation on the community as a whole – as it was and what it will become – are also significant. One account, from Zoya Bruk, a biologist and environmental inspector who lived and worked close to the Chernobyl radioactive pollution, succinctly describes some the more major, widespread sociological shifts:

> Chernobyl happened, and suddenly you got this new feeling, we weren't used to it, that each person's life was completely separate from everyone else's. But now you had to think: what are you eating, what are you feeding your kids? What's dangerous, what isn't? Should you move to another place, or should you stay? Everyone had to make her own decisions. And we were used to living—how? As an entire village, as a collective—a factory, a collective farm. We were Soviet people, we were collectivized.[99]

What is so significant about this account is that the radioactivity seeped not only into the environs, lands, meats, milks, fields, and waters surrounding Bruk, but it also seeped into the mental spaces and realities of the people. So the radiation had a two-fold kind of "radioactivity" – one that could literally affect or alter the pores and cells of one's body,

and another that could enter into the neurons, mentalities, and consciousness of individuals. Both forms of artinatural "radioactivity" are real and both are detrimental.

While there are certainly visible and genetic manifestations of the actual radiation from Chernobyl itself, there are equally physical, psychological and physiological manifestations in the bodies and minds of those who are concerned or stressed about the radioactive fallout and contamination. This was even more apparent with the Three Mile Island incident, a nuclear spill of a much smaller scale than these others, but still, a phenomenon that had drastic effects – partly by the "radioactivity" that entered mental spaces – on the surrounding communities and beyond. This brief overview of the effects of earlier nuclear accidents can help us understand the impacts of Fukushima's artinatural landscapes. Here, too, we must be aware not only of the physical radiation, but of the more far-reaching psychological manifestations of such complex, artinatural events.

From Efficient Destruction to Technologies of Justice

The central drivers behind the development of radioactive landscapes can be interpreted in various ways. One of these is surely related to the idea of "conquering nature," an approach that holds that nature was created (in the Baconian sense) to be harnessed and used by human beings. To operate within this framework is to assume that pure categories exist. The actual end products of these purist fantasies, of course, include the "means" and what the economists call "externalities," the pollution and radiation. In a twist of fate, those who try to outsmart get outsmarted – efficiency becomes waste and even destruction. The short-term benefits, in the long run, are heavily overshadowed by the radioactive, harmful, and long-lasting legacies of nuclear developments. What once appeared to be efficient production is finally revealed as being only efficient destruction. Ironically, efficiency itself may have been central to this destructiveness.

The adoption of a principle of "sufficiency," rather than one of efficiency, is recommended by Thomas Princen. By sufficiency Princen means "enoughness." Efficiency, on the other hand, involves the continuing need to produce more, produce more cheaply, and increase profits. Efficiency has no ceiling; it is an engine that keeps on pushing the limits. Nuclear technologies, as far back as the Manhattan Project (1942-1946), have not been about "enoughness" or sufficiency; rather, they have been about efficiency and the optimization of particular metrics (power, profit, electricity, weapons, etc.). In a similar vein, Sheila Jasanoff criticizes the "technologies of hubris" that involve "a kind of peripheral blindness toward uncertainty and ambiguity." Technologies of humility, on the other hand, "would engage the human subject as an active, imaginative agent, as well as a source of knowledge, insight, and memory," (and not simply as a potential source of profit…). For industry and government to shy away from the potentially catastrophic repercussions of their technologies is most certainly to practice a hubristic approach. On the other hand, to only move forward in ways that would not involve radioactive terrorism and death ecologies, would certainly be a step in the right direction. But where had that "peripheral blindness" toward these very negative things come from? To track the source of this "blindness" one must look back to its ontological/epistemological foundations. And for that, I believe that the artinatural perspective that refuses to use overly-simplistic categories to perceive these issues would

help promote what I deem "technologies of justice" – technologies that promote social and ecological well-being. These are as far ranging as educational improvements to renewable energies.[100]

Conclusion

To challenge the hubristic caste of efficiency, technocracy, and ontological dishonesties requires a formidable intellectual arsenal. Luckily, we have Haraway's cyborgs and situated knowledges, Latour's hybrids and actants, Harding's strong objectivity, Princen's sufficiency, and Jasanoff's technologies of humility to help understand the new complexities that have arisen out of these radioactive landscapes. To find a stronger objectivity, and to understand how the world works from the perspective of persons, it is necessary to utilize these conceptual tools. The concept of "artinatural," however, is more comprehensive. It provides a new, imaginative term for understanding the complexities of the natural and artificial elements that overlap and mix, especially in the case of "natural disasters" that are really actually artinatural disasters.

Preventing future radioactive landscapes, and their immense suffering requires that policymakers stop neglecting the inevitable interrelatedness of technological, ecological, sociological, and personal systems. These systems cannot help but bleed into each other, exposing and expressing their necessary relations. The radiation from Daiichi's reactors will be harmfully impacting the individual lives of many species, babies, trees, and nations for many years to come – this is certainly not what its engineers had in mind when they designed it. They neglected the more challenging, more complex artinatural realities; they wanted to live in a world where hubristic and simplistic approaches could still be called good science and good engineering – a world in which the human realm could somehow exist separately from the natural.

Chapter 6

Artinatural Self and Society

How would the recognition of "artinature" change one's personal identity? In the first place, the idea of a detached individual would be in flux. It would become clearer that not only does the physical human body intricately relate to, and rely on the air, water, food and climate that surrounds and feeds it, but that the psychological self also fundamentally relies on the local community, and beyond that, on the greater society. This would potentially suggest more communal policies, as it would become clearer that the individual suffering and hardship of others negatively impacts the larger community. These policies are largely already in place in countries like Japan, Denmark, Norway and Sweden. Access to free, quality healthcare and education would become standard, and revenue from artinatural energy sources such as oil or natural gas would be more evenly distributed across society, rather than stashed into the coffers of large corporations. Sooner, rather than later, these petroleum companies would be replaced with renewable energies (and this can happen when polluting industries are finally taxed commensurate according to the damages their industry inflicts on worldwide ecosystems and reservoirs).

In order to explore the potential impacts of an artinatural perspective on a social problem, I will turn to a much more specific, personal and creative exploration on the subject of race and identity.

Artinatural approaches to Race and Difference

"We must live together as brothers or perish together as fools."

-Dr. Martin Luther King Jr.

One hot sunny day on a walk in the hills I decided to sit down on a rock in a pasture and let my dog explore. I glanced down at my bare arm, which was resting on my thigh, just below my shorts, and I noticed that my arm and leg were starkly different colors – my arm, an olive-beige, looked alien on the pale-reddish hue of my thigh. Was my arm Jewish and my thigh Scandinavian? When I later looked in the mirror even more questions arose – is my reddish face Norwegian and my beige shoulder Ukrainian? How could I have so many categories of peoples and races written onto my body? These thoughts brought me to questions that have been on my mind since taking Professor Carolyn Finney's course on race and identity in September 2011. How could an artinatural understanding of the world affect ideas about, and understandings of, race?

First I must define "race." Dictionary.com says that race is "a group of persons related by common descent or heredity." I believe, rather, that "race" is a perspective that believes in, and perhaps even encourages, this type of categorization of people.

In this chapter, using various theories and examples, I explore how an artinatural perspective could shift thinking on race and identity. I make the argument that the categorization of different races conveys a certain shallowness of social, historical, and biological perspective that can be undermined (or ameliorated) merely by critically examining the artinatural aspects of one's own body. Through a creative, even humorous (what Richard Rodriguez might call "playful") exploration of my person, I want to see what my body can tell me about race and difference. How has the social construction of race and difference influenced my understanding of race and difference?

My Artinatural Body

It is certainly simplistic to assume that the color of one's skin corresponds to the social perception of one's race; and if so, the example of my arm and my thigh being different colors may be too superficial. Dictionary.com has an alternate definition of the noun "race," which is "Each of the major divisions of humankind, having distinct physical characteristics." Skin color clearly is a physical characteristic, but it is just one of many – so it may be helpful to extend my initial observation about the hues of my arm and thigh beyond skin color. When I look in the mirror I see that I have strange hazel eyes – inside these eyes rest browns, blues, greens, and grays each pertaining to a different racial, ethnic, and even biological past. And yet, somehow, all of these pasts have been collected into two pupils that seem distinct, unique, individual, and detached: they hide the histories behind them. Yellow, red and brown hairs: my facial hair tends toward dark brown and yet I can find many blonde hairs as well. I have dark birthmarks, bits of concentrated melanin – what past lies in them? And what of my facial structure – a structure seemingly shared by 99% of all people – a forehead, a jaw, a nose, eyes, ears. Even one body part can tell a story of an immense journey – what ancient histories, for example, can we start to see by looking at a human ear?

Indeed, the human ear is probably the most simian of all human facial characteristics. It is almost a carbon copy of a chimpanzee ear. And while all ears are unique, almost all human ears and all chimpanzee ears resemble each other. But even though this is no insignificant resemblance, the similarity between a simian ear and a human ear is still only surface deep.

Figure 1: chimp ear and my ear!

But the human/chimp ear connection is enough to make me start to think beyond the more surface level "indicators" of race to those of species. In *Our Inner Fish*, Neil Shubin points out the strange species connections that exist under human skin. There are, for example, bones in our body that were present in similar forms millions of years ago, when our species did not yet exist – these human-predecessors were aquatic mammals and even fish. In this light, one can begin to see many more things when one peers at one's own body.

Thus, for example, it is strange to notice and think about the existence of nipples on a male human being. Why are they there? Human men do not feed (usually) milk to their young (my male dog also has nipples, so this is not just a human phenomenon). The answer is generally understood to be this: that male nipples are a residual characteristic – men had no reason *not* to have them as well (they are vestigial), even if they could not be utilized for feeding.

Another body part that is fascinating to consider is the foot. I've noticed a number of times, when glancing at my own feet, how favorably they compare to hands. They look very much as though the palms of the hands were stretched out and the fingers were shortened to be toes. It makes me think that they really were more like hands not too many millions of years ago. And even my hands offer insights into what it means to be a human being – I am often caught in awe looking at how strange these everyday appendages truly are. Because we are so accustomed to our specific bodies and body parts, we don't realize just how "strange" they are. Why are they the way they are? What stories do specific parts of our body tell? There are surely tomes of stories, wisdom, and understanding wrapped up and stored away in the reasons for our bodies.

But what about "the social"– the more recent histories, circumstances, cultures, and spaces that bear on me presently, as a person in the year "2015" in Berkeley, California? What more recent things can the differences in skin color between my arm and thigh tell me about the world? Where are my parents and grandparents from, for example, and what have my ancestors been through in the last 100 years based on, or because of, those differences inside my family histories?

My mother's parents were born in Germany but had to flee Nazi Germany to escape a regime that would have killed them: my maternal grandfather, Jochen (later John) Paasche, had Jewish ancestry on his mother's side and Norwegian on his father's side. My grandmother, Maria Therese von Hammerstein, was active in the resistance in Berlin, was arrested by the Nazis, and warned that her life was in danger. At first they fled to a kibbutz in Israel but Jochen got very ill. Consequently, in 1933, they made their way to Japan in order to study language and Buddhism. This is where my mother was born; her family was one of the very few light skinned/blond-haired families in Japan. They lived there until 1948, when my mother was 7, and then moved to California. My mother identified very much as Japanese youth before moving away, despite her being fluent in German (as well as Japanese) and looking so physically different than the majority of Japanese people.

My father's parents were from Jewish families who emigrated from Europe: my paternal great grandfather transported lumber on the Dnieper River and my maternal great grandmother was from Austria. My father's little-known middle name is Hillel. His grandfather was a wise and respected Jewish elder in Brooklyn. This is an aspect of my family history that is not often talked about or expressed because my father stopped using

his middle name and never thought of himself as being Jewish, religiously or culturally. He considers himself completely secular, but still enjoys eating latkes.

In any case, I associate my darker skin with my father's side and my lighter skin with my mother's. My mother's maiden name, moreover, is Norwegian. She must always be aware of skin cancer. My father, on the other hand, is much darker, and has never had any danger of skin cancer. So, in some sense, my thigh truly is a different "race" than my arm. I have many "races" inside of me, and would surely be able to find many more if I were able to trace my ancestry back further. It is incredible how little of one's own ancestral past can be found. Some people can do 400 years or so. Maybe I can do that on my mother's side. But even 400 years is nothing for a species that has existed for 100,000-150,000 years. And what about before we were *homo sapiens sapiens*? How many species have we actually been during that evolution from single cell to what we see now?

The more recent ancestral histories illuminate more than enough for one short essay to cover: the racisms and colonialisms of my ancestral peoples in the last 100 years have contributed to the deaths of millions of people. More than 20 million people died in Russia during World War Two. Another 6 million Jewish people were massacred by the Germans in that same era. The disturbing thing is that both of these mass killings involved peoples of my own ancestral lineage. I am part Russian, part Jew, part Norwegian and part German. I have relatives, most likely, of all political factions. And, if you include my mother's Japanese cultural identity, even my own country (the United States) has now bombed my ancestors (and, indeed, my mother and her family were living in Japan during the overwhelming fire-bombings in Tokyo, as well as the two atomic bombings in southwest Japan). How can I reconcile the great violence and killing between my ancestral peoples? How can I come to terms with the violence that seems to flow through my racial, ethnic, and biological body? How have categories of difference, like race, influenced these histories? Furthermore, how could the development of an artinatural conceptualization of the self prevent more of these atrocities in the future?

What I hope to have made clear in the previous paragraphs is that while race is something that may relate, to some small extent, to surface-level natural characteristics like skin tone, it actually lives more fully in the world of the make-believe. The human being is thoroughly artinatural in the sense that she/he is at once entirely natural and powerfully cultural. Race and perceptions of race are firmly couched in cultural perspectives, languages and histories. Superficial categorizations of peoples—racial, religious and nationalist—have caused, and are still causing, an inordinate amount of suffering. Indeed, perfunctory categories of human difference allow for racism, sexism, ageism, ableism, speciesism, and, consequently, violence. How can people, on a personal level, reconcile the violence done in the name of these categorizations? In the next section of this chapter I explore the theoretical realm of the questions I have just posed.

Theories for the Artinatural Self

In *Race in North America*, Audrey Smedley situates "race" as a cultural notion: "accepting the fact that race is a cultural construct invented by human beings, it is easy to understand that it emerged out of a set of definable historical circumstances and is thus as amenable to analysis as other elements of culture." These comments—particularly the

idea that race is an invented, cultural construct—suggest that situating race in a cultural context can help us see through the superficiality and fallaciousness of the "idea" of race. This perspective may in turn implement my own personal post-race.[101]

But what does it mean that race is an idea? Ideas, Smedley observes, "should not be translated as prime movers of the cultural process, nor should they be considered as mere epiphenomena of culture." They are, rather, "critical, necessary aspects of culture that may vary in strength and form of expression over time and space, but invariably they meet some cultural need or advance the interest of those who hold them." Smedley asserts that the concept of race, and the seemingly inevitable categorizing that accompanies the concept of race, exist because people find them useful. Far from being tools to illuminate truths of some sort, these conceptions of race are tools that some people find very useful for living in society. The key point here is that concepts of race can be seen as illusions, and that they have a significant impact on peoples' lives.[102]

Smedley continues to describe how ideas about "race" are constructed and by whom: "They arise out of specific material and social circumstances and are constituted of individual and group perceptions, understandings, and decisions made by human beings who inevitably have an imperfect comprehension of the complexity of the situations that confront them." Here, for me, is the most telling and illuminating point that Smedley makes, that is, that people "inevitably" have "imperfect comprehension of the complexity" that surrounds them. It is this complexity, I would add, that makes it necessary to simplify and construct false notions of reality, and that makes an idea like "race" seem useful. Instead of seeing, or taking in, a person in his or her entirety, they are taking the person in piecemeal, and fitting those pieces into pre-existing categories. Smedley adds that these kinds of ideas can "provide explanations for, and often a means of controlling, social and natural forces."[103]

So Smedley defines "race" as a worldview, as "a cosmological ordering system that divides the world's people into biologically discrete and exclusive groups." If looked at this way, it may explain how the idea of race has simplified my own interpretations of self. It should have been clear to me – and in some sense it already was – that I have no one race, or any race at all for that matter. I am much more than "white" or even "half white." I may have what people call "Asian" background, as well as what people call "black"; but really, I have even more than simply human, cultural categories. I have fish, sea mammal, and even bacteria in my ancestral lineage.[104]

Somehow the fields of biology and biological anthropology have, in the past, and even in the present, developed positivistic notions of race. Biology has been used as a way of rationalizing societal constructions of race, a way of ideologically crystallizing what are otherwise weak conceptualizations. Charles Wohlforth gives a haunting account of some of these processes in his article, "Conservation and Eugenics." In this chilling history it becomes apparent just how much the eugenics practiced in Germany were also countenanced in the United States. Eugenics is something that grew out of, and parallel to, the theory of evolution. Ernst Haeckel was one of the scientists who patched together Darwin's theory of evolution with other teleological theories like the Great Chain of Being. Together, these theories suggested a tree of life in which light-skinned people were the most advanced, the most "descended." Clearly these were fantasies that were not grounded in the science of evolution itself. Evolution, for example, would tell us that all "races" are, in fact, the same species. It would therefore be preposterous to suggest

that one variation or characteristic variable in our species equates to advancement. Moreover, the in-fighting and inner-species violence that seem to accompany racial categorization may be indicators that our species has some serious problems in its ability to survive and/or thrive. Although human abilities to categorize may sometimes have contributed to our species' "success," it has more often given human beings an excuse, narrow-minded and ignorant, to fight, and even to kill each other, over trivial differences.[105]

Categorizations of race were also written into various cultural practices that seemingly had nothing to do with race. The conservation movement itself had a part in defining which race was deemed acceptable and civilized. The "wilderness," as Kevin DeLuca tells us, became a place where only wilderness travelers could temporarily visit – it was certainly not a place to live. One had to be civilized to visit the wilderness and those who lived there all the time were uncivilized. It helped to define the "whites" from the "natives." In this way the idea of wilderness became an important narrative to ground notions of whiteness. By delineating the city and the wild, the conservation movement was a process of categorization not unlike the system of racial categorization, as it, too, helped to define cultural roles, practices, and hierarchies. All together it seems that so many of these systems of categorizations exist for the purpose of social hierarchies, control, and power. I think it is important to remember, however, that there are some good systems of categorizations, and that one must be able to separate the good from the bad. Ethics and morality are both systems of categorization, and while they are not always good, they certainly serve their purpose. And people need to be able to know that cyanide is bad and that strawberries are good, that breaking a foot is bad and that clean air to breathe is good. But distinctions have perhaps gone too far when they over-simplify the complexities of human individuals.[106]

Some have argued that the wilderness adoration in environmentalism is intimately connected to racism. As Paul Outka (2008) argues, there is a "racially-tinged, antiurbanism that afflicts mainstream environmentalism to this day." Outka seeks to explore the "intersection of nature and race," what he calls "perhaps the two most perniciously reified constructions in American culture". He points to the legacy "in which whites viewed blacks as part of the natural world and then proceeded to treat them with the mixture of contempt, false reverence and real exploitation" that we also see in history of the American natural resource management. Outka uncovers more of the subtleties of the constructions of race and nature – how the "constructedness of race was obscured by its association with unconstructed nature." He insists that nature should be seen as both real and as a construction, and that as a construction, it is sifted into the two categories of pure (wilderness, sublime, white) and dirty (urban, black). The traumatic acts as glue that holds one construction of nature to the identity of the objectified other. The sublime, on the other hand, allows for the existence of a white subject isolated from nature's dirty, urban other. Outka shows how the environment becomes racialized and how environmentalism racializes urban and rural spaces.[107]

A number of scholars have also outlined the connections between cultural notions of "race" and the field of burgeoning field biology. Bruce Braun (2003), for example, looks how despite biological characterizations of race have diminished, "notions of cultural difference" may have supplanted them to form "equally immutable" aspects of "ethnicity, character and habit." Thus despite the fact that corporeal nature no longer

played a large role, ideas of external nature still can. Braun then explores the "risk culture" inherent in wilderness narratives that are predominately white and middle class. Later, Braun cites Denis Cosgrove and his analysis of wilderness ideation as colonialist, linking "nonhuman nature and non-Europeans" as a unit. Braun presents "a world divided in two: a European modernity alienated from nature, and a non-European premodernity peopled by natural cultures." This primitivism, Braun argues, reinforces the notion of "a racial hierarchy established through a discourse of progress." Nature and wilderness were understood as sites of "moral and racial purity." Braun reiterates at the end of that chapter that it is the white subjects who move, who can choose when and when not to take on risk, rather than the non-whites who are subject to risk and thus "spatially incarcerated."[108]

If race is a make-believe, scientifically inaccurate category that has a very narrow historical field of vision, then why is it used at all? Smedley answers this by asserting that people who have notions of race can advance their own interests. Scholars such as Susan Hangen have shown how the use of racial categories can be strategic, as well. Using the Mongol National Organization of Nepal as her primary example, Hangen argues that "while race has often been used to subjugate subaltern groups, subaltern groups may also find that framing identity in terms of race can be an effective political strategy." A group of people may choose to stand behind a racial identity in order to gain something or to take away something from another group of people.[109]

So why am I exploring the notion of race and its social-cultural construction? I think that in order for one to develop a sense of artinatural post-race, it is crucial to first understand social and cultural ideas of race in our society, how these work, and why people use them. It is important, for example, to realize that race is less than skin deep – it is extremely reductionist and blind – and that the consequences of race's ideation can be violent and destructive. Yet it may have benefits for some people who would choose to use it, either self-consciously or unselfconsciously.

But race can be even more powerful and transcendental than physical and material realities themselves. As Smedley writes, "a fact denied by none of the experts is that race in the American mind was and is tantamount to a statement about profound and unbridgeable differences." Thus although race may be an untrue, shallow social construction, it is still pervasive and powerful – it is a worldview that has incredible social force and can prevent people from getting along. Uncovering its inherent ignorance as a form of social categorization does not necessarily undo its power in society.[110]

Frantz Fanon makes a similar point in his book *Black Skin, White Masks*. He exclaims, "The white man is locked in his whiteness./The black man in his blackness." I think that his argument is that racial categories, constructed as they are, are as powerful as prison bars. A concept can define what is and what is not recognized to be; a concept orders the world before one's eyes in ways that one cannot always control. But how might one attempt to have better control over the power that concepts hold? First and foremost, one must engender the consciousness to be aware of which concepts one is using. As Fanon says on the last page of his book: "It is through self-consciousness and renunciation, through a permanent tension of his freedom, that man can create the ideal conditions of existence for a human world." One could also say that there is no freedom unless there is also tension of freedom: freedom is an illusion without the recognition of its causalities, contingencies, concepts and barriers.[111]

What Smedley, Hangen, and Fanon seem to be converging on is the issue of reality vs. perception (of reality). They all assert that the perception of reality is, in some ways, more powerful than the reality itself. The reality, however, is usually incredibly different than perception. Concepts of race, for example, are inaccurate or arbitrary categorizations, rather than material or physical entities in the world. The categorizations, however, can be incredibly intentional: they contain numerous political possibilities that can achieve numerous political and social ends for their users. And while we can argue that the "concepts" of race are not real, they can manifest real policies, systems of oppression and other real elements that affect peoples' everyday lives.

Intertwined bodies and theories: how to conceive of artinatural identities

Categorizational concepts like race rest on shallow, uninformed laurels that lack deep historical and biological perspectives – they are perceptions rather than realities and yet the perceptions still have powerful impacts. Even a critical perspective on the human body reveals that we are much more than a race, much more than "human beings." And for better or worse, notion of race is part of a much larger matrix of sociocultural ideation practices. Religion and even evolution exist in these categories as well, and are strongly linked into conceptions of race. For example, evolution often involves the assumption of a *telos* or goal: people assume that species are progressing, moving toward some desired outcome (and some even believe that human beings as they are today represent the final materialization of that very goal). These conceptions of evolution bleed into those about race and racial categories, but, as Smedley shows, there is no biological grounding for racial categories. Skin color and other characteristics clearly do not denote evolutionary progress or variations thereof. On the contrary, every animal on this earth is evolutionarily equal because they have evolved in the same amount of time (given the assumption that all life has derived from one major manifestation of bacteria a few billion years ago). Religion, however, does not necessarily permit this appeal to rationality. Religion is much more like the system of racial categorization: it tends to involve the utilization of arbitrary, ungrounded conceptual boundaries in its worldview. As false or ignorant as a religion can be, it can be among the most persistent of social and cultural forces. The persistence of religious beliefs, thus, provides an illuminating parallel to the persistence of racial categories. These kinds of beliefs also show the delicateness of the problem as they can be not only emotionally-charged, but faith-based as well. Moreover, faith-based beliefs specifically do not seem to require the same sort of scrutiny that other kinds of belief do. If beliefs in race mimic the behaviors of faith-based beliefs, then it may be time to give some thought to those similarities.[112]

Language itself involves false categorizations and kinds, categorizations and kinds that are not only ill-informed, but damaging as well. As the scholar Mel Chen recently said at a conference—and I paraphrase—"sometimes the necessity of speaking within a language makes me want to roll up into a little ball and hide away!" In order to ease the violence done by language, it is necessary to make whatever small steps one can in the right direction. The recognition of false, constructed, and hurtful categories is a good first step to a life of an artinatural, post-race perspective. But it cannot stop with race –other hurtful categorizations, dichotomies, and binaries must also be addressed. The human-animal binary has a lot of racial and hurtful rhetoric wrapped up in it, as do the

modern-traditional and natural-cultural binaries. The modern-traditional binary is a trademark of the idea of a "developing country," while "traditional" suggests that peoples must move toward what is seen as the superior, the "modern." These ideas, and their objects, are contagious – it is no simple task to challenge them, to move away from their use, especially when those around you are engaging in the same destructive discourse.

Another aspect of scholarly inquiry has explored how views on animals and biology, more specifically, are tied into racial categorization. The connection between racism and speciesism is a telling example of how dualistic hierarchies have led to social ills. Marjorie Spiegel (1996) argues that both humans and animals "share the ability to suffer… have been 'objectified' and treated as property rather than as feeling" and she links this to how "blacks… and animals were driven to a state of total psychic and physical defeat." She notes well that Darwin's ideas were misinterpreted to be understood as not only humans being superior to animals, but also whites being superior to blacks. She also uses a colorful example of an alien cat species coming down to earth and envisioning humans as a lesser form in comparison to their feline selves. Elder, Wolch and Emel (1998), claim that human-animal distinctions were historically used not only to dehumanize animals but also to dehumanize minority racial groups. The three authors provide a rehashing of the European attitude on evolution "beginning with 'lower' life forms, proceeding through stages inhabited by progressively 'higher' animals, and reaching its pinnacle with white man." This sort of Darwinism placed "exotic-looking peoples from distant lands as lower on the evolutionary scale, and thus closer to animals" (ibid). They reiterate that "colored bodies are viewed as primitive and closer to animals." Kay Anderson (2001) covers some of the same territory as Elder et al specifically by starting with Carleton S. Coon's work *The Origin of Races* (1962) as a place of departure. Coon typifies the "aboriginal savage" as the link between humans and animals, thus re-affirming the Euro-American, Darwinist elitism that Elder et all spell out. Anderson argues that "the notion of nature as an essence existing independently of human thought and action, and whose operations can be understood in the light of humanity's powers of reasoning, has been challenged and overturned." Here, I only partly agree. I believe that "nature" is still something *out there*, but it also should be understood and recognized as something human cultures are constantly trying to define in often rather narrow or pernicious forms. Race, however, is a concept that can be understood more clearly socially constructed, but still with clearly real and definite social histories and consequences. "Culture" like "nature" may be a concept, but it also sometimes describes and signifies things that are real, things that are out there and actually happening. Here we may find some of the limitations of always pointing to "social construction" as some sort of scapegoat or denotation of unreality. What these lines of inquiry show is how the social constructions of human/nature and human/animal dichotomies relate to racial characterizations and racism. [113]

In her book, *Animacies* (2012), Mel Chen argues that "Many nuances of racism, while in some ways articulated around "race," are themselves built upon many complex animacy hierarchies (animality being one), each of which can potentially implicate directly the charge of racial objection without reference to race itself." One of her key examples was Senator George Allen's use of the word "macaca," directed at S.R. Sidarth

at a campaign rally. Chen's work, in a sense, is to theorize "current anxieties around the production of humanness" through analyses of animacies and the many hierarchies related to the notion of animacy. Her work provides a new frame to look at many of the ideas about race, queerness, environment and animality. As Chen writes, "this book seeks to trouble this binary of life and nonlife as if offers a different way to conceive of relationality and intersubjective exchange." Instead of offering a new integrative term like hybrid or cyborg, Chen is offering something even broader, a new theoretical framework akin to Latour's "actor-network theory" (ANT). In this new framework, existing hierarchies are challenged through new claims to, and perspectives on, animacy. Animacy itself defies straightforward definition – but animacies even more so, as the plurality suggests complexity and interpretive struggle. Chen displays that "thinking and feeling about animacy encourages opening to the senses of the world, receptivity, vulnerability." To be sure, animacy in practice is replete with powerful, normative hierarchies – Chen wishes to expose and challenge these in part by exploring new, often counter-intuitive animacies. One of my favorite examples of this is how Chen points out that the phrase, "treated me like a dog," is "one of liberal humanism's fictions: some dogs are treated quite well, and many humans suffer in conditions of profound indignity." With this, Chen shows just how inaccurate and/or shortsighted normative hierarchies can be.[114]

The production of identities (as an important part of cultural production) means that the way in which nature and wilderness are conveyed to the public can influence how peoples relate to, and act on, their worlds. As Carolyn Finney states in *Black Faces, White Spaces*, when "black identity is narrowly defined or poorly articulated," in the context of the "environment," it often "results in limited interest and participation by African Americans in projects/work having to do with the environment." And it is not only a question of African Americans being motivated to participate, but also how participation in a narrow definition of "environment" could result in the perpetuation of colonialism, empire and control. And, more plainly, characteristic forms of these representations often do not allow for African Americans to be active participants in the "Wilderness" or "Science" projects that were so narrowly defined in colonial contexts of domination and civilization (in part because they were conveyed as *objects* of those realms rather than *subjects* who practice the realm). [115]

A solution to the destructive categorizations I've just discussed is proposed by Elder, Wolch, and Emel in their co-authored, "Race, Place and the Bounds of Humanity." Their article suggests that "humans of all varieties need to abandon drives for overarching control and choose a position of humility or marginality with respect to Earth that balances needs for safety and security with consideration for the needs of other life forms." They argue that this kind of abandoning of control needs to be "internally imposed," and must be taken on in a just way. Perhaps they are asking for too much? Perhaps those who want us humans to live better must suffer a little because of those who cannot figure it out yet? If it is internally imposed, then it must happen at different times for different people. One person's adoption of an artinatural worldview will not necessarily happen when other people do the same. They may, for instance, need to stay attached to certain categorizations for their own survival in a certain space and time. But for those of us who can, as Elder et al argue, we should exercise "all of our powers of empathy and imagination" in order to make the world a better place.[116]

Conclusion

The reality is that a human being is never simply one race but rather a cornucopia of races *and species*. These races exist only as social constructions. The artinatural realities of the self are much more complex than the categorizational and mythological systems imposed on them. The particularities of the human body, for example, include a shared ear with the chimpanzees (even in skin tone), shared bones with fish, and shared body traits with many billions of people, living and dead. A fear of difference can create unnecessary violence in society, and this violence reinforces the apocryphal tenets of social categorizations. The path to a peaceful society must happen, first and foremost, on a personal level, through the recognition of the artinatural – a realization that rejects simplistic categorizations of the complex organisms that we truly are.

Chapter 7

Conclusion

How would the world be transformed through new, artinatural perspectives and understandings of the self, society and ecosphere? As I have labored to show in this work, to confront the artinatural perspective would change the way one approaches science, wilderness, city life, energy production and even personal identities.

The familiar human home has been soiled in so many ways, with the poor, disempowered members of the human community taking on the brunt of the pain. This continues on into the future, seemingly inescapably. Some damage is not truly reversible; but can it be symbolically inspirational? Can it become its own kind of installation art form that moves its viewers toward renewal? One eventually wakes up from anaesthetization, sometimes to new sensitivities.

When those exposed to the toxic injustices around them wake up from the disaster, what they will see around them is an artinatural world – a new world that once was only imaginable as make-believe. But like a good installation piece, this world should incite wonder and curiosity – there should be something refreshing or renewing here and it should be a call not only for new perspectives, but also for new actions. To see toxicity should mean to begin to overcome it – the awakening after the 2016 disaster in Flint, Michigan should lead to many municipalities around the country both cleaning their water supplies and addressing structural racism. The awareness of the artinatural – the intermixing of nature and artifice – should lead to a new pro-justice sensitivity.

Perhaps it is a good time to bring up the subject of death. It is perhaps in the moment when death becomes startling close when one can feel just how much of one's self is in the overwhelmingly powerful grip of what one calls "nature" or, simply, the forces of the universe. What once seemed to be our own, "artificial," controlled sphere of the self becomes seen as what it always was: subject to the forces of nature, the very forces that allow the sense of self to exist in the first place. When the illusions are revealed for what they really are: a strange mixture of categories—artinatural—perhaps, then cultures can head towards sustainability in the fight against overwhelming toxicity and self-destruction. It is strange, tragic and more than minimally cliché to suggest that death is what makes one's life "real." And what's "real" is something that should reverse anaesthetization, replacing it with sensitivity, reverence, humility, and wonder.

Maybe the myth of the artificial is one that seeks to deny the existence of death, propelling even more mindless ecological destruction? Or maybe central to this myth of the artificial is a sort of comforting collective amnesia, one that effectively hides away

not only ecological destruction but an inborn habit of violence in which many people partake. Is there a streak in human cultures that seeks to "experiment" with extinctions and toxicities in order to "see what happens" - is the entertainment value of destruction simply too high for too many people? What if destruction is simply something people *like*? This is a kind of human possibility environmental thinkers rarely confront - perhaps because it simply would be too troublesome to have to do.

Consider again what it means to be situated, and what work theories really do within the context of a situated human perspective. It is an individual's experience itself from which theories exist. And it is the individual's experience that is at stake with potential apocalypse. If the last human being dies, the last human experience goes with it – and human experience itself is what gives that idea of apocalypse meaning.

In Chapter 1, I introduced the concept of the "artinatural," a term that can describe things that are simultaneously artificial and natural. This term fills a need for a way of talking about "artificial" categories and objects that clearly contain "natural" elements as well (a plastic cup or Toyota Prius can be deemed artinatural). It is a concept that tries to resist the separation between humanity, its artifacts, and nature. The city and wilderness do not need to be disjointed realms; human cultures are the entities that construct imaginary boundaries between them.

Chapter 2 explored understandings of nature through a few centuries of literature, film, philosophy and scholarship. Characters such as Franz Kafka's Gregor Samsa and Tim Burton's Edward Scissorhands convey the strange identities that the modern scientific, dualistic worldview has inadvertently produced. The human-as-organism and the human-as-machine are both notions that troubled human identity and the dualistic worldview that prevailed through much of modern European and American culture. These artists were displaying the great struggle of being pluralistic and artinatural in a monistic (natural *or* artificial) world. The worldviews did not match with the realities with which they grappled. Furthermore, a look at the history of the various meanings of "nature" and the "artificial" is a critical step toward formulating a better idea of the "artinatural." The myth of the artificial is something that has both simplified and mollified understandings of what is actually a much more complex and awe-inspiring world.

In Chapter 3, I examined the ways in which modern science and the contemporary representations of science at the California Academy of Science's natural history museum break the world down into distinct categories: nature, the scientist who analyzes nature, and the general public who then witnesses limited aspects of each. Although human beings are understood to be a part of nature, they are considered to be a *special* part of it, and hierarchies within human society are also implied. Thus Native American culture, for example, is displayed as an object of study, rather than as a source of scientific knowledge production. These cultures of nature keep the museum's visitors from realizing their own part in, and ability to practice, science. Nature, I suggest, is put in a bottle, thus conveying to visitors the myth that we, as human beings, exist outside of that bottled nature. I argue, instead, that not only is the bottle of science artinatural itself, but that the nature of both the museum and the visitor are complex aspects of an artinatural reality that fundamentally resist simplistic dualistic interpretations.

In Chapter 4, I considered how a similar dualistic, scientific approach to nature, mixed with other aspects of European culture, fostered a budding conservation movement that included a specific idea of "wilderness." To do so, I visited Muir Woods National Monument where wilderness is seen as something separate from humanity, something to look at but not touch, and something to keep pristine (certainly not a place for "civilized" human beings to live within). Oddly enough, the preservationism and conservationism developed by environmental thinkers such as John Muir, Rachel Carson, Bill McKibben, and E.O. Wilson reinforced the conceptual separation between the human-made, artificial world and the natural world. The artinatural truth of wilderness was never fully captured by the wilderness movement, but if it were it might enable recognition of the wild nature that exists both inside and outside of the fenced "wilderness areas" and inside every human being's body. I explored the ideas of technology excess disorder, biophobia, and biorealism in order to serve as tools for analysis and improved understanding of the core concerns.

In Chapter 5, I turned to one of the more pernicious examples of the artinatural: the radioactive landscape. While radioactive landscapes are artinatural, they did not arise out of practices that recognized the artinatural, or the artinaturality of a nuclear reactor itself. The contrived spheres of the "natural" and "artificial" inevitably display their spillages and intermixing over time, sometimes violently (as was the case in Fukushima). Whether caused by anthropogenic or naturogenic forces, these *artinatural disasters* need to be understood as such before they can be better anticipated and prevented.

Finally, in Chapter 6, I turned to an exploration of the self through the new lens of artinature. Race, ethnicity and identity can be seen from transformative new angles and contexts. The fish bones within the human skeletal structure, and the shared ears we have with other animals like chimpanzees, can be important reminders of a truer identity, one imbued within nature where we have so much in common with our other animal compadres. Simplistic and skin-deep differences can be exposed for what they are, and it becomes possible to formulate a deeper understanding of the cultural practices that are also part of humanity's artinatural identity.

While integrative terms like "artinatural" have proven to be valuable, the term "nature" itself might prove to fulfill or encompass a similar meaning. In using both nature and art together, Shakespeare in a sense anticipated the idea of the artinatural:

> Yet nature is made better by no mean
> But nature makes that mean: so, over that art
> Which you say adds to nature, is an art
> That nature makes. You see, sweet maid, we marry
> A gentler scion to the wildest stock,
> And make conceive a bark of baser kind
> By bud of nobler race: this is an art
> Which does mend nature, change it rather, but
> The art itself is nature.[117]

If the "art itself is nature," then human beings tampering with nature could be understood as nature manipulating nature. Nature itself can be used as an integrative term, but only if

the speaker or writer chooses to define it so broadly. Certainly, the broadest definition of "nature" that I've seen is "the universe in its entirety." There may be significant benefits to a more dedicated pursuit of these understandings and interpretations of nature, and the rich philosophical, literary, and religious histories that concern them.

But how could society improve its citizens' understanding and knowledge of the interconnectedness of the artinatural ecosystems? To begin, K-12 curricula that emphasize interdisciplinary thinking and problem-based learning would lend themselves toward greater awareness of the systemic processes that link politics, biology, pollution, economics, culture, and global climate destabilization. Moreover, curricula that involve a focus on farming, outdoor education, geology, and ecology would encourage students to experience firsthand some of these multifarious interactions and processes. In higher education, fields of study such as Nature Studies, that refuse to separate the ecosystems/natural realms from the human/cultural realms, and that also focus on interdisciplinary, problem-based learning would be appropriate. It is noteworthy that a concept as rich, historic and potentially enlightening as "nature" does not already have its own "studies."

The complex conceptualizations of nature to be found in integrative terminologies can improve, and meaningfully resituate, one's perspective. But complex and integrative cosmologies of nature must be learned. The concept of an "ecological crisis" is also a product of learning and knowledge. One does not simply arrive into the world with these ideas, and yet their extensive adoption, or lack thereof, can have substantial impacts in sociopolitical spheres, especially within a democracy. It could be contended, moreover, that these sorts of knowledge are matters of justice. There is a "knowledge justice" in being able to understand the significance, and interconnectedness, of ecosystems to human health. If people are not aware of the harms from various pollutants, then how can they behave in such ways as to try to evade them? The development of the field of Nature Studies could help to address these major gaps in educational systems. It can be argued that the field of Nature Studies has been taking place for decades or even centuries already (certain variants of Biology, for example). But, to give these kinds of studies a name, and a more extensive home, would allow for a more organized and extensive approach to these vital inquiries.

Raymond Williams points out that "ideas of nature" are really "ideas of men" – the ideas are not only made by human beings, but, perhaps even more importantly, they shape human identities and norms. Williams goes on to say that "nothing much can be done," or even *said*, "until we are able to see the causes of this alienation of nature, this separation of nature from human activity." Because they form a template for comprehending humanity, conceptualizations of nature have meaningful moral repercussions. Creative minds have been contending with the dissolution of, and alienation produced by, the human/nature binary to various extents. Conceptual approaches to nature have more critical consequences than ethical theories themselves. It is clear that bifurcated perceptions of nature lead to undesirable, unhealthy results, both in the area of "environmental" policies and with respect to equity and social justice: the term "environment" itself typifies this detrimental alienation, a kind of estrangement that is metaphorically embodied in artinatural characters like Tim Burton's Edward Scissorhands and Franz Kafka's Gregor Samsa. Although it is challenging to reconcile

and overcome deceptive dualisms and their implicit hierarchies, as well as the mechanisms that employ their harmfulness, it is essential that it be done. [118]

More progressive understandings of nature, along with knowledge of the interdependencies of ecosystems and societies, could limit the kinds of oppression, alienation, and destructive policies that have accompanied the dualistic conceptions of nature that have thus far endured. As Kate Soper notes, "The societies that have most abused nature have also perennially applauded its ways over those of 'artifice.'" The continued conceptual separation of notions like nature and artifice, and the hierarchies that are embedded within these distinctions, need to be confronted and amended. Stronger, more situated ontologies of nature – including terms like artinatural and other new materialisms – can create more integrative and realistic approaches to nature's complexities. But to achieve these considerable shifts in knowledge requires formidable educational support. The advancement of the field of Nature Studies could be an integral part of nurturing these crucial understandings.[119]

At the current phase of global ecological crisis, the most dire and pressing issues are not only socio-environmental, they are also *cognitive*-environmental. The improvement of these crises depends, in large part, on the dynamism and quality of individuals' knowledge and understanding. Complex worldviews of nature that better permit one to grasp ecosystems' mutual living interdependencies, if they become more widespread, would have positive, even transformative, effects on so-called "environmental" policies, and, in turn, both ecosystem and individual well-being. These kinds of cosmologies have existed, and even to this day exist, in various cultures and have promoted more sustainable communities.

The chapters in *Confronting the Artinatural* have aspired to a fuller appreciation and a stronger understanding of what is really happening inside of, and around us. The modern scientific worldview that gave American society its bridges, roads, cars, power plants, transplants, industrial farming, computers and smartphones is sometimes something for which to be thankful. It is a perspective that has helped to bridge the gap between insecurity and security. But now that view of a world that separates humanity and its artifacts from nature may put entire ecosystems, including our own, in danger. The possibility of global nuclear war is still the most frightening example of this mortal threat, but rising cancer rates, food and water insecurity, and rocketing species' extinction rates are all now immediate dangers. It is human ingenuity, and the ability to change and grow, that must steer the ship toward better horizons. It might begin with the seemingly small choices in individuals' everyday life that all add up. These small choices are very much influenced by the quality of educational programs to which individuals have access. Education can contribute to the awareness of the artinatural realities both of our lives and of the ecosystem in which we live. Schools and curricula need sweeping changes to support this understanding; the field of Nature Studies could help to encourage this subtler, complex and interdisciplinary view of humanity on our planet.

An artinatural understanding begs for revamped priorities that recognize the great dependence of the economy on earth's ecosystems. All wealth on planet earth was developed from, and made possible by, healthy ecosystems that produced both the animals to reside in them and the resources for those animals to survive. And we are one of those animals that earth's ecosystems have made possible. Confronting the artinatural

means working towards a better language for, understanding of, and approaches to humanity's role within the complex, fragile, and interwoven ecosystems that sustain all life on earth.

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Appendix A

Questions (circle your response please)

California Academy of Sciences is "natural": a) agree b) disagree c) don't know/unsure

California Academy of Sciences is "wilderness": a) agree b) disagree c) don't know/unsure

California Academy of Sciences is "artificial": a) agree b) disagree c) don't know/unsure

California Academy of Sciences represents "science": a) agree b) disagree c) don't know/unsure

California Academy of Sciences is "accessible": a) agree b) disagree c) don't know/unsure

California Academy of Sciences is "part of nature": a) agree b) disagree c) don't know/unsure

Humanity is "part of nature": a) agree b) disagree c) don't know/unsure

Artificial/"manmade" objects are "part of nature": a) agree b) disagree c) don't know/unsure

	Agree	Disagree	Don't know/unsure
California Academy of Sciences is "natural"	67	23	9
California Academy of Sciences is "wilderness"	29	55	16
California Academy of Sciences is "artificial"	47	38	13
California Academy of Sciences represents "science"	88	5	7
California Academy of Sciences is "accessible"	92	3	4
California Academy of Sciences is part of nature	26	17	7
Humanity is "part of nature"	93	4	2
Things made by humans are part of nature	31	36	27

Appendix B

Questions (circle your response please)

Muir Woods is "natural": a) agree b) disagree c) don't know/unsure

Muir Woods is "wilderness" : a) agree b) disagree c) don't know/unsure

Muir Woods is "artificial" : a) agree b) disagree c) don't know/unsure

Muir Woods represents "science": a) agree b) disagree c) don't know/unsure

Muir Woods is "accessible": a) agree b) disagree c) don't know/unsure

Muir Woods is "part of nature": a) agree b) disagree c) don't know/unsure

Humanity is "part of nature": a) agree b) disagree c) don't know/unsure

Artificial/"manmade" objects are "part of nature": a) agree b) disagree c) don't know/unsure

	Agree	Disagree	Don't know/unsure
Muir Woods is "natural"	87	8	4
Muir Woods is "wilderness"	50	46	7
Muir Woods is "artificial"	5	80	12
Muir Woods represents "science"	53	29	12
Muir Woods is "accessible"	89	9	4
Muir Woods is part of nature	98%	0%	2%
Humanity is "part of nature"	96%	4%	0%
Things made by humans are part of nature	24%	42%	28%

*All total responses except when "%" used – these had only half the respondents.