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GRADUATE COLLEGE

EXPLORATION IN THE *MARE INCOGNITA*
NATURAL HISTORY AND CONSERVATION IN
EARLY-TWENTIETH CENTURY AMERICA

A Dissertation

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

degree of

Doctor of Philosophy

By

GARY KROLL
Norman, Oklahoma
2000

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EXPLORATION IN THE *MARE INCOGNITUM*:
NATURAL HISTORY AND CONSERVATION IN
EARLY-TWENTIETH CENTURY AMERICA

A Dissertation APPROVED FOR THE
DEPARTMENT OF THE HISTORY OF SCIENCE

BY

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ABSTRACT

EXPLORATION IN THE *MARE INCOGNITA*. NATURAL HISTORY AND CONSERVATION IN EARLY-TWENTIETH CENTURY AMERICA

More a space than a place, the ocean had long occupied the American imagination as a geographical border to be crossed. The process of coming to know of the ocean as a place began in the nineteenth century, but it was not until the twentieth century that the ocean—the ocean beyond America's shores—became known as a part of nature, as a wilderness. This dissertation provides a cultural history of those explorers and naturalists who did the work of filling in the “blank spaces” of the ocean realm. More important, they were largely responsible for making the ocean known to the American imagination as a place to be managed and conserved, and as a place of beauty and recreation. This dissertation ends just at the point that Americans began including the ocean within a wider environmental concern—as a geography to be preserved. The oceanic naturalists discussed here were partly responsible for ensuring that the ocean would be included within the politics of modern environmentalism. They ventured into territories to examine a wide range of oceanic phenomena and then constructed representations for popular audiences back home.

The subjects of this dissertation were among the most popular spokespersons for the oceanic environment between 1910 and 1960: Roy Chapman Andrews, Robert Cushman Murphy, William Beebe, Rachel Carson, and Eugenie Clark. Two organizational histories—The Explorers Club, and the Pacific Science Board—are also provided to add context to the culture of natural history in which these naturalists

operated. Interdisciplinary in scope, this project addresses critical issues in the history of science, environmental history, and the literary studies of the environment.

Introduction

Having recently retired from the United States Fish and Wildlife Service after the spectacular commercial success of The Sea Around Us (1951), Rachel Carson sat at her typewriter to take stock of our knowledge of the ocean. Her first thoughts were of the human conquest of land.

The charting of the white wastes of Antarctica is accomplished, the conquest of Mt. Everest has passed into history. But although the flags of explorers have waved on the highest peaks of the world and fluttered on the frozen rims of the continents, a vast unknown remains, the world of waters. Even from those who have spent their lives in patient questioning, the sea knows how to guard its secrets well. To most it is, in very truth, a "mare incognita."¹

The closing of an era of land exploration highlighted the fact that the ocean was an unknown geography. More a space than a place, the ocean had long occupied the American imagination as a geographical border to be crossed. The process of coming to know the ocean as a place began in the nineteenth century, but it was not until the twentieth century that the ocean truly became a part of nature, a wilderness.² Carson's article was a small part of a wide body of oceanic representations that helped to unveil the secrets of the sea to a public audience. This dissertation provides a cultural history of those explorers and naturalists who did the work of filling in the "blank spaces" of the

¹ Quoted in Linda Lear, Rachel Carson: Witness for Nature (New York: Henry Holt and Company, 1997), 86.

² Helen M. Rozwadowski, "Small World: Forging a Scientific Maritime Culture for Oceanography," Isis 86 (September 1996): 409-429 for the origins of nineteenth-century oceanography, for the twentieth-century see Eric Mills, Biological Oceanography: An Early History, 1870-1960 (Ithaca: Cornell University Press, 1989), Mott Greene, "Oceanography's Double Life," Earth Sciences History, 12 (1993): 48-53, and Susan Schlee, The Edge of an Unfamiliar World: A History of Oceanography (New York: E.P. Dutton & Co., Inc., 1973).

ocean realm. More important, they were largely responsible for making the ocean known to the American imagination as a place to be managed and conserved, as well as a place of sublime wonder, beauty, and recreation.

It may seem counterintuitive to talk about the ocean becoming a place, but for some time now, cultural geographers have been busy showing how concepts like space and place are socially created. The distinction between space and place is best articulated by geographer Yi-Fu Tuan. "Place is security, space is freedom: we are attached to the one and long for the other. . . . Places are centers of felt value where biological needs, such as those for food, water, rest, and procreation, are satisfied." Given these definitions, one may be led to believe that the ocean can never become a place, and true enough, the ocean as place will have a set of meanings that differ from the homestead as place. On the other hand, the story of twentieth-century oceanic natural history concerns the redefinition of the ocean as a part of the American homeland: as a geography on which terrestrial human beings must necessarily rely. Yi-Fu Tuan also explains that "[w]hat begins as undifferentiated space becomes place as we get to know it better and endow it with value." Of course, only a small proportion of humans can get to know the ocean better through direct experience, but it has been the task of some of these people to create the popular representations that made the ocean a valuable place in the American imagination.¹

¹ Yi-Fu Tuan, Space and Place: The Perspective of Experience (Minneapolis: University of Minnesota Press, 1977), 3-6. Also helpful have been J. Nicholas Entrikin, The Betweenness of Place: Towards a Geography of Modernity (Baltimore: Johns Hopkins Press, 1991); David Harvey, Justice, Nature & the Geography of Difference (Cambridge: Blackwell Publishers, 1996); Francis Spufford, I May Be Some Time: Ice and the English Imagination (New York: St. Martin's Press, 1997); James C. Scott, Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed (New Haven: Yale

The subjects of this dissertation were among the most popular spokespersons for the oceanic environment between 1910 and 1960: Roy Chapman Andrews, Robert Cushman Murphy, William Beebe, Rachel Carson, and Eugenie Clark. They worked during a period in which oceanography was becoming a formal discipline, but the people discussed here were not oceanographers, nor did they consider themselves oceanographers. To refer to them, I have conjured the term “oceanic natural historian” because they considered themselves, above all, naturalists, and they happened to work on ocean topics like cetology, ornithology, and ichthyology. When these oceanic explorers went out into the field, they did so as natural historians. When they created their public portraits of the ocean, they did so as natural historians.

Twentieth-century natural historians were middling creatures who bridged science and public culture. As experimentalists began defining the cutting edge of biological research at the end of the nineteenth century, natural history became a vestige of a traditional, and somewhat outdated, method of examining nature.⁴ Naturalists were thus plagued with the problem of justifying their authority as scientific practitioners. But their declining status in the scientific community happened concomitantly with an increase in their participation within public and popular culture. Theirs was primarily the job of

University Press, 1998) and John Warfield Simpson, Visions of Paradise, Glimpsees of Our Landscape's Legacy (Berkeley: University of California Press, 1999).

⁴ Garland Allen, Life Sciences in the Twentieth Century (Cambridge: University of Cambridge Press, 1978); Jane Mainschein, Transforming Traditions in American Biology, 1880-1915 (Baltimore: Johns Hopkins University Press, 1991); Philip Pauly, Controlling Life: Jacques Loeb and the Engineering Ideal in Biology (New York: Oxford University Press, 1987); Ronald Rainger, Keith R. Benson, and Jane Maienschein (eds.), The American Development of Biology (New Brunswick, NJ: Rutgers University Press, 1991).

representing the natural world for American consumers of popular culture. Oceanic naturalists thus worked to legitimize their own ambiguous status as scientists at the same time as they assumed increasingly public roles in museums, zoos, research stations, and federal agencies. Historians of science, specifically historians of biology, will be interested in seeing how this tricky dynamic played out in the practice of natural history and the consequent representation of the ocean.

This dissertation also contributes to certain issues raised by environmental historians. On the broadest level, this project attempts to interrogate what Stephen Fox has referred to as the “amateur tradition” in environmental history. A continuing legacy of John Muir, amateur conservationists were the moral conscience of environmentalism, their beautiful and sublime portraits of the natural world made preservation feasible, if not necessary for the heritage of American citizens that were increasingly congregating in urban areas. In a way, what Muir did in representing the Sierra Nevada, oceanic naturalists did for the sea. Muir also figured in the formation of the Sierra Club, a move to involve the general public in exploring and experiencing the wonders of nature. Oceanic naturalists played a role here as well by portraying an ocean that was eminently habitable with the promise of seclusion, divine beauty, and a bit of adventure. More than pointing to watery analogs of the great public terrestrial naturalists like Muir, this dissertation attempts to explore the peculiar role of natural historians in environmental history. Environmental historians may be especially interested to see how conservationist

thought sometimes emerged from a naturalist's observations of foreign cultures⁵

Given that oceanic naturalists were literary figures, this dissertation also addresses questions stemming from the literary study of the environment and American Studies. While nature writing, as a genre, goes back to antiquity, it powerfully resonated within the modern era in the work of the great triumvirate of environmental thought—Henry David Thoreau, John Muir, and Aldo Leopold. Students of environmental writing have prized the writing of these figures as key indices to a new relationship between humans and nature. Instead of considering nature—and wilderness—as the antithesis of civilization, these writers invoked a Romantic tradition to show how the human spirit was nourished by nature's beneficence. Their writings created a natural world that functioned as a profound check to egocentrism and anthropocentrism. Oceanic naturalists elaborated on this tradition, and as a result, the ocean began to occupy the same cultural spaces as Maine forests, Yosemite Valley, and the Alaskan wilderness. Again, it is not enough to simply point to these ocean analogs, I have attempted to show how these biocentric conventions emerged from the practice of natural history.⁶

This dissertation employs a rather traditional and straight-forward methodological approach. Though my thoughts about history and science have been influenced by social

⁵ Stephen Fox, John Muir and His Legacy: The American Conservation Movement, (Boston: Little, Brown, 1981); Michael L. Smith, Pacific Visions: California Scientists and the Environment, 1850-1915 (New Haven: Yale University Press, 1987); Richard Grove, Green Imperialism: Colonial Expansion, Tropical Island Edens, and the Origins of Environmentalism 1600-1860 (Cambridge: Cambridge University Press, 1995).

⁶ Roderick Nash, Wilderness and the American Mind (New Haven: Yale University Press, 1967); Lawrence Buell, The Environmental Imagination: Thoreau, Nature Writing, and the Formation of American Culture (Cambridge, Mass: Harvard University Press, 1995).

constructivist arguments stemming from the cultural studies of science and the sociology of science, my methodological framework is best articulated by the great English naturalist Marston Bates writing in the 1950s. He said that

[n]aturalists are the causative organisms of natural history. One might, in fact, view natural history as a sort of secretion of naturalists—science as a secretion of scientists—and such a view makes clear the importance of studying naturalists (or scientists) in any attempt to gain an understanding of natural history (or science).⁷

Thus, most of the chapters are biographical and are intended to explain the culture and practice of the naturalists' activities. My approach has been especially influenced by the essays in a recent volume of *Osiris* that examine the practice of "science in the field" in order to highlight the distinctions between field-science and lab-science. The entire dissertation is guided by the principle that representations of the ocean emerged from the lived experiences, the active exploration of naturalists.

* * * * *

The dissertation begins with an exegesis on the nature of "exploration" in the early-twentieth century, mainly through an analysis of the New York-based Explorers Club—an organization of field scientists, hunters, explorers, and philanthropists engaged in the practice of defining the parameters of proper exploration. Two points emerge from such an analysis. First, a century of westward expansion left a cultural momentum, especially after the "closing of the frontier," that caused explorers to represent their travels to non-American territories as extensions of the American West. This was largely a fallout of an eastern establishment perspective that sought to ameliorate the degenerative impact

⁷ Marston Bates, *The Nature of Natural History* (London: Chapman & Hall, 1951), 280.

of urban existence by seeking renewal in the frontier West. Exploration of the western frontier thus became a cultural template for exploring the world. Second, the work of explorers lost scientific legitimacy in the eyes of the American public as a result of the rise of laboratory science and the chicanery of the race for the poles. "Adventure" and "heroism," virtues that previously had been incorporated into the natural economy of science, became marks of needless risk-taking, and at times, outright incompetence. Members of the Explorers Club thus set out to construct a modern practice of exploration as a thoroughly scientific endeavor. The entire chapter is about metropolitan spaces and the work of explorers existing within those spaces. It thus provides the context for three prominent members of the Club—treated in the following three chapters—as they ventured out into the field.

Chapter 2 discusses the cetological work of Roy Chapman Andrews, a naturalist at the American Museum of Natural History who is primarily known for his explorations of the Gobi in the 1920s and 1930s. The chapter focuses on his research into the evolutionary histories of whales off the coasts of British Vancouver, Alaska, Japan, and Korea, all of which took place through the support of modern whaling operations. Andrews believed that the modern practice of shore whaling provided naturalists with a fortunate tool, as a consequence, he believed that he was practicing, in contrast to his nineteenth-century predecessors, a modern and efficient natural history. Andrews' incorporation of shore-stations into his research program fostered a spirit of Progressive conservation. So in his popular accounts of his expeditions, he created an ocean that was full of natural resources in need of efficient scientific management. Thus, Andrews'

whales were akin to Gifford Pinchot's forests. Andrews also used the ocean for recreational purposes. He introduced the thrill of the hunt, long a staple of the Boone and Crockett Club, to the stormy seas of the Northern Pacific.

In marked contrast to Andrews' efforts to modernize natural history was the all-encompassing historical view of nature of his American Museum colleague, Robert Cushman Murphy. Chapter 3 follows Murphy to islands in the sub-Antarctic, the guano islands of Peru, New Zealand, and Long Island in pursuit of the evolutionary histories of oceanic birds. Murphy was responsible for using the tools of biogeography, long employed by terrestrial naturalists, to investigate the distinctive life-zones of a heterogeneous ocean. Oceanic lifeforms, he found, were inflexibly adapted to, and dependent on, local and specific oceanic conditions. Murphy's work also sheds light on the purportedly contradictory philosophies of conservation (emphasizing scientific management) and preservation (emphasizing outright protection from development). His historical view of nature provided an intellectual conciliation between these two seemingly irreconcilable ways of looking at nature. This chapter also analyzes Murphy's depictions of the life-histories of islands--histories in which humans became active participants in a wider natural history--in order to highlight Murphy as an environmental historian.

Chapter 4 examines the oceanic natural history of William Beebe in the context of his management of the Tropical Research Department, the scientific arm of the New York Zoological Society. Throughout the 1920s and 1930s Beebe was one of America's most followed explorers. His travels to distant oceanic regions--the Sargasso Sea and the Humboldt Current--on the Arcturus Expedition, and his descent into the perpetual night of

mid-ocean depths in a bathysphere, were the stuff of heroic adventure. Beebe's entrance into popular culture was a double-edged sword: it brought the popularity and fame on which he relied to maintain his research department, but at the same time it threatened to make his work too sensational, hardly science at all. The central focus of the chapter is an examination of Beebe's management of the DTR, one element of which was the management of sensationalism. This was the context of Beebe's nature writing. His representations of the ocean were notable for their biocentrism. The ocean, in Beebe's hands, became a source of awe-inspiring wonder, as well as a geography of sublime terror, a natural wilderness that served as a check on human egocentrism. Beebe's oceanic nature writing and especially his invocation of a sublime aesthetic, I argue, were strategies to manage his own socio-professional identity, a finding that sheds light on the intersection of science and popular culture, and which also helps us to understand from where a literary trope like biocentrism originates.

The conclusion of Beebe's oceanic exploration in 1934 occurred just before the ocean began playing an instrumental role in political affairs. The ocean figured largely in World War II as a geography for underwater military maneuvers, and also as a frontier of conquest as American forces battled the Japanese in the Pacific Theater. Chapter 5 examines the federal patronage of oceanography and natural history during and after the war. I argue that the ocean depths and Micronesia, a postwar American Trust Territory, became ambivalent frontiers of America. Similar to the way Lewis and Clark and other naturalists explored the western frontier that had fallen, or soon would fall under American sovereignty, so too did postwar oceanographers and naturalists explore the

ocean and Micronesia. But there were many competing interests at hand. As a Trust Territory, America's colonization of Micronesia was coupled with a responsibility to see to the welfare of native Micronesians, a factor that complicated the work of the American naturalists who wished to preserve the fragile ecology of Pacific islands and atolls. Similar to the way Chapter 1 examines the metropolitan setting of explorers, this chapter begins to analyze the competing American visions of new oceanic territories. The heart of the chapter is an examination of the work of the Pacific Science Board, a civilian organization that collaborated with the military to perform the anthropological and natural historical exploration of this new frontier, an initiative that I consider an example of "big natural history." The work of the PSB also provides important context for the next two chapters.

Chapter 6 considers the most important and most popular postwar treatment of the ocean: Rachel Carson's The Sea Around Us (1951). The ocean was beginning to play a larger role in American affairs. Militarily, it became a geography necessary for American security. Economically, the ocean contained the resources that would hopefully alleviate the world's population pressures, a social problem that gained widespread attention in the late 1940s. Carson wrote the book because she believed that Americans had plundered its terrestrial resources and a turn to the ocean was inevitable. The Sea Around Us represented a merger of two literary traditions: natural history (writing about nature), and science writing (writing about science). Within Carson's biography, the natural history side stemmed from her own love for nature writing, as well as her passion for experiencing nature first-hand. Her science writing was a logical outgrowth of her editorial work for the Bureau of Fisheries and the Fish and Wildlife Service. These traditions merged in The

Sea Around Us to ultimately send the message that the Earth is an ocean planet -Carson was the first and foremost spokesperson for an “oceanocentric” sentiment that was backed by an authoritative understanding of oceanographic research. At the same time, Carson called her audience to venture out onto America’s shores to participate in the work of exploration, to know the ocean by experiencing the ocean.

This message was powerfully articulated by Eugenie Clark, a participant in the Pacific Science Board who became a popular underwater naturalist specializing in the mating behavior of fishes, and particularly the study of shark behavior. In the early 1950s, Californians and Floridians entered coastal waters in large numbers as skin and SCUBA diving became popular activities. Clark’s natural history was an early manifesto in making underwater recreation a popular activity. Her work domesticated the ocean, making it a safe, beautiful, and habitable environment. Clark’s representations of the ocean were constructed during her struggles as a female explorer engaged in the thoroughly masculine activity of diving, and diving with sharks. In order to ameliorate the cultural dissonance caused by a woman working in a traditionally male sphere, Clark drew from a wider culture of domesticity to bring her work in line with the cultural expectations about women and work in postwar America.

* * * * *

Fieldwork is central to the naturalist’s identity. Making field observations is a method that many scientists—paleontologists, astronomers, geologists, ecologists—incorporate into their wider programs. For example, it is not uncommon for an ecologist to “do natural history” before analyzing data or performing experiments back at

the university lab. While the practice of fieldwork makes up only a small part of the ecologist's program (some ecologists even appear apologetic when describing their work as natural history), it remains at the core of what the naturalist does as an interpreter of nature. More than anything else, the naturalist is a person who gets up early to leave the university, the lab, the museum, and the metropolis to engage a field in order to come to a better understanding of that area. In short, the naturalist is an explorer. The naturalists discussed in this project became popular largely because they were explorers. To understand lives and work of oceanic natural historians, our story must begin with a dramatic shift in the rhetoric of exploration that occurred in the early-twentieth century.

Chapter 1

The Naturalist's *Apologia*: Adventure and Exploration in Post-Frontier America

In the prefatory remarks of his popular Exploration of the Colorado and its Canyons (1895), John Wesley Powell informed his readers that his “exploration was not made for adventure, but purely for scientific purposes, geographic and geologic, and I had no intention of writing an account of it, but only of recording the scientific results”¹ When the book appeared, twenty-six years had passed since Powell and his team had navigated and mapped the canyons of the Colorado plateau While accounts of the expedition could be found in newspapers throughout the early 1870s it was not until 1874 that Powell would write a series of four well-illustrated articles for Scribner's Monthly In the following year, Powell submitted his official report to the Smithsonian Institution This 1875 report was primarily drawn from his journals and would constitute the main body of the popular 1895 account of the expedition While the official 1875 report contained many of the same stories of danger and heroism, it did not contain the prefatory apology for writing “adventure” that was found in the popular 1895 account.²

Powell's apology marks a key moment of transition in the history of American exploration Throughout the nineteenth century, exploration was inextricably bound to

¹ J. W. Powell, The Exploration of the Colorado River and its Canyons (New York: Dover Publications, 1961), iii

² For the function of Powell's work as government exploration, see Scott Kirsch, “Regions of Government Science: John Wesley Powell in Washington and the American West,” Endeavour 223 (1999): 155-8.

frontier adventure. The experience of adventure in the practice of exploration was, for the most part, viewed as a serious scientific activity. But in the late-nineteenth and early twentieth centuries, explorers like Powell felt the need to distance themselves from adventure, especially in popular literature. Such statements were a strategy for legitimizing the scientific value of the adventurous practice of exploration that might be considered vain and dilettantish in the context of the increasing professionalization of science.

This chapter describes how naturalists characterized exploration in the early twentieth-century. It begins with a brief analysis of the links between adventure and science in the nineteenth-century American West. I then show how the purported closing of the frontier created a move to explore “new” non-American frontiers. An examination of the New York-based Explorers Club demonstrates how world explorers used America’s experience in the West as a cultural template for interpreting non-American geographies. This western frontier experience manifested itself in two ways. First was an embodiment of Frederick Turner’s frontier thesis—a desire to seek out new regions of cheap natural resources for American development. The second was Roosevelt’s frontier thesis—a desire to seek out new regions that would preserve American virility through a dangerous encounter with an exotic frontier. In the latter case, frontier adventure continued to be a standard trope for exploring the world. The final section examines how naturalists sought to separate adventure from science at the same time they embraced it.¹

¹ In an analysis of polar exploration that is largely reminiscent of Donna Haraway’s work on primatology, Lisa Bloom has pointed to this transition in Arctic and Antarctic exploration around the 1920s. She finds that the incorporation of technology into exploration (cars, planes, wireless radios)

The history of turn-of-the-century exploration addresses recent work on the practice and rhetoric of the “heroic sciences.” Mary Terrall has suggested that eighteenth-century travel was “a kind of subplot of the canonical large-scale narrative of cumulative enlightenment told by d’Alembert, Condorcet, and their intellectual descendants down to our own century. The characters in this particular subplot gain knowledge and authority through heroic physical effort.”⁴ In the context of nineteenth-century glacier science, Bruce Hevly has argued that “heroism, with its elements of direct action, lonely commitment, and manly risk, helped to shape arguments over glacier physics.” Similarly, Jennifer Tucker has shown how atmospheric scientists, making their observations in balloons, had to carefully achieve a balance between heroic adventurer and neutral observer.⁵ This research demonstrates how themes of heroism, daring, quest, and adventure fit into the fabric of eighteenth and nineteenth-century science. It should be no surprise that America’s West provided an ideal context for heroic science. Just as certain, heroism and adventure presented a challenge to many turn-of-the-century naturalists. With professionalization and the rise of the experimental sciences in the early twentieth-century, the virtues of the adventurous explorer lost much of its scientific appeal. Natural historians attempted to stabilize the shifting foundation of their scientific practice by

created a new kind of specialized ice explorer. She has helpfully identified what I believe is just a small part of a wider move to legitimize the practice of exploration as a whole. Gender on Ice: American Ideologies of Polar Expedition (Minneapolis: University of Minnesota Press, 1993), 78-9.

⁴ Mary Terrall, “Heroic Narratives of Quest and Discovery,” Configurations 6 (Spring 1998): 225.

⁵ Bruce Hevly, “The Heroic Science of Glacier Motion,” Science in the Field, Osiris 2nd series, volume 11, (1996): 66. Jennifer Tucker, “Voyages of Discovery on Oceans of Air: Scientific Observation and the Image of Science in an Age of ‘Balloonacy,’” in *ibid.*, 144-176.

distancing themselves from—and redefining the meaning of—heroic adventure

The Adventure of Exploring the Western Frontier

Historians of science have shown how science was enlisted in the service of nineteenth-century westward expansion.⁶ Cast in a Humboldtian mold, explorers mapped the contours of the frontier West and prepared those regions for development. The frontier explorer was often a figure that melded adventure with science. Nowhere is the link between adventure and frontier exploration more clear than in the case of John C. Fremont. Dubbed a “pathfinder” in the popular press, Fremont’s expeditions into the Oregon territory, the Rocky Mountains, and California were heralded for its leader’s ingenuity and daring.

Fremont was born into an Episcopal working class family of Charleston, South Carolina, and by 1835 had earned a Masters of Arts from Charleston College. That same year, the Navy commissioned him as Professor of Mathematics and thus began his long military career of surveying the western frontier. His contribution to science largely consists of the surveys and maps he scripted for the federal government, especially his Report of the Exploring Expedition to the Rocky Mountains (1845), and while such work may seem a bit unscientific to us today (given our experimental predilections), in

⁶ William H. Goetzmann, New Lands, New Men: America and the Second Great Age of Discovery (New York: Viking Press, 1986); idem, Exploration and Empire: The Explorer and the Scientist in the Winning of the American West (New York: W. W. Norton & Company, 1966); Michael L. Smith, Pacific Visions: California Scientists and the Environment, 1850-1915 (New Haven: Yale University Press, 1987).

antebellum America, explorers like Fremont were generally viewed as “men of science”⁷

Reports on Fremont were the daily fodder of metropolitan newspapers. In the 1850s he was at the height of his fame and was nominated by the National American Party to run for President of the United States. The party clearly thought that Fremont’s combination of scientific competence, heroic virtue, and compelling leadership made him an ideal candidate for President. Moreover, this combination of virtues was phrenologically written onto his body. Colonel Fremont, according to one phrenologist,

has a temperament of wiry toughness, and extraordinary elasticity. His entire organization is one of rare compactness, and body and head partaking alike of these qualities, account for the hardihood and activity of the former, and the clearness, persistence and unbounded energy of the latter. His head, face, and body, are very harmoniously proportioned, each one in itself, and each to the others. The head appears very high from the ears, indicating extraordinary firmness, with large veneration and benevolence. These faculties are an elevation and aspiring tendency of character, and a grasp after great achievements. Great length from the ears to the forehead is also seen, showing very large perceptive and prominent reflective organs. Thus all the organs necessary for the clear thinker, the civil engineer, and the scholar in natural science, are decidedly large.

In his organization are seen the elements of the patient scholar, the investigating critic, the mathematician, the pioneer, the ambitious, honorable, energetic, thorough, reliable character, and business man. . . . Few men have as much heroism and ability to lead and control difficult and dangerous enterprises, and fewer still exhibit as much simplicity and modesty in general intercourse with society.⁸

Fremont was thus the epitome of the scientist-adventurer with his combination of heroism,

⁷ On Fremont see William Goetzmann, Army Exploration in the American West, (New Haven: Yale University Press, 1959), 65-108, Ferol Egan, Fremont: Explorer for a Restless Nation (Garden City, NY: Doubleday & Company, Inc., 1977). For a less hagiographic treatment of Fremont that points to his many character flaws that resulted in a court-martial, cartographic disputes with Captain Charles Wilkes, and speculation controversies regarding the mining rights of his Mariposa land claims see Andrew Rolle, John Charles Fremont: Character as Destiny (Norman: University of Oklahoma Press, 1991).

⁸ “John Charles Fremont-Phrenological Character and Biography,” New York Times (August 7, 1856), 2.

leadership, and scientific acuity. His name could easily be placed on a list of western heroes including Kit Carson, Wild Bill Hickok, and George Armstrong Custer; men whose biographies revealed what historian Kent Steckmesser considers the four aspects of the nineteenth-century heroic legend: genteel qualities, clever traits, prowess, and epic significance.⁹

The explorations of Fremont and Powell were predicated on the notion that there existed an unknown frontier in need of mapping. But what would become of the explorer when the Census Bureau declared the end of this frontier? The closing of the frontier at the end of the nineteenth century precipitated a crisis in many Americans' conceptions of space and natural resources, especially for political leaders who scurried to discover new frontiers for conquest and development.¹⁰ This anxiety also resonated with those explorers—geographers, geologists, and naturalists—who had played a large role throughout the nineteenth century in creating the scientific knowledge of frontier territories. Simply

⁹ Kent Ladd Steckmesser, The Western Hero in History and Legend (Norman: University of Oklahoma Press, 1965).

¹⁰ David M. Wrobel, The End of American Exceptionalism: Frontier Anxiety from the Old West to the New Deal (Lawrence, Kansas: University of Kansas Press, 1993). The "F-word" as an analytical concept for structuring historical research has been thoroughly disputed. Those leading the charge are social and environmental historians who dispute the notion of frontier as process (a vestige of Turner's thesis) and opt for a reconceptualization of the west as "region." Their criticisms are sound. At the same time, what is the historian to do with the rhetoric of the frontier ubiquitous in American culture throughout the last two centuries? The frontier is not a place or a process, but rather a mental category for organizing space. The frontier operates at the cultural level in powerful ways that often manifests itself into practical action—scientific exploration e.g. We would be remiss to ignore this important cultural narrative for the sake of correcting previous historiographical problems by altogether banning the "F-word." See Kerwin Lee Klem, "Reclaiming the 'F' Word, or Being and Becoming a Postwestern," Pacific Historical Review (May 1996): 179-215; Stephen Aron, "Lessons in Conquest: Towards a Greater Western History," Pacific Historical Review 63 (May 1994): 125-48; David Wrobel, "Beyond the Frontier-Region Dichotomy," Pacific Historical Review 65 (August 1996): 401-429; and for an interesting take on the criticisms of the New Western historians, see Michael Steiner, "From Frontier to Region: FJT and the New Western History," Pacific Historical Review 64 (November 1995): 479-503.

put, theirs was the task of mapping the contours and cataloguing the natural resources of relatively unknown regions. When the Census Bureau declared that there was no longer a discernable line between civilization and the American wilderness, it also signified a kind of completion to the task of exploring unknown places. The movement of westward civilization had revealed all that was mysterious and unknown in the American landscape. It had lost its potential for harboring places and organisms that were- in the parlance of naturalists -"new to science." In practice, of course, the work of scientists in the West had just begun, but part of the popular rhetoric of exploration was the adventure of revealing what lay within mapped blank spaces. Put on the defensive, explorers attempted to legitimize their existence by pointing to the many blank spaces on the map that called for future exploration. To the question commonly asked in newspapers and magazines, "Is there anything left to discover?" these "men of science" enthusiastically answered in the affirmative.¹¹

In the first volume of The World's Work -an important organ of the nascent Progressive movement- Cyrus C. Adams, a commercial geographer, reviewed the previous "century of exploration," and outlined the possibilities for future exploration. In contrast to the great age of European discovery, this "has been not only the greatest era of the study of the land surface of the earth, but also of scientific discovery." He describes how the world had been investigated through military excursions and government-funded expeditions, and while certain regions of the world, such as Europe and the eastern

¹¹ "What Have We Left to Discover?" New York Times (September 12, 1909), pt. 5, 3.1, "What is Left for the Explorer to Discover?" New York Times (March 17, 1912), pt. 5, 4.1

seaboard of the United States, were well mapped and surveyed, detailed topographical work still remained to be done in many parts of South America, Asia, the polar regions, and the ocean depths. In short, Adams presents a catalogue of “new frontiers” ripe for exploration¹²

Adams believed that the work of scientific exploration served as handmaiden to the expansion of civilization. In a 1907 article for Harper's Monthly, he claimed that “scientific curiosity will continue to be a leading motive for these new researches.” But more than just a desire to fill those blank spaces on the map, frontier exploration was also given impetus by commerce and colonialism. Whether done by Spanish conquistadors or American 49ers, the search for material wealth was always an important reason for exploring frontier regions. In this context, Adams points to two leading motives in exploration

One is the present impulse to search out every nook and cranny not yet permeated by the forces of our own civilization, that we may see what they have to add, if anything, to the wealth and opportunity of the world. The other motive, important though subordinate, is the desire to clear the ground everywhere for human activity by wiping the words terra incognita off the face of the globe.¹³

Thus Adams saw no contradiction between scientific and developmental exploration

The rhetoric of the frontier pervades Adams' discourse on exploration. The frontier is coded as mysterious, as a literal blank space awaiting inscription by the modern explorer. Moreover, explorers generally do the pioneering work of western expansion. They find mountains and rivers, they point to probable lines of transportation, and they

¹² Cyrus C. Adams, “A Century of Exploration,” Worlds Work 1 (January 1901), 317-324.

¹³ Cyrus C. Adams, “Unexplored Regions of the Earth,” Harper's Monthly 114 (January 1907), 305-11.

catalogue a region's resources—in short, they prepare the groundwork for settlement. And so with the Census Bureau's announcement, Adams must have thought it an appropriate time to defend his profession: "in a broad sense exploration will never end."

Nathaniel Shaler also responded to the closure of the frontier in an Atlantic Monthly article on the motives, history, and future of exploration. The reason for writing such an article is clearly stated at the outset: "Now that the explorer's work seems to be done, the great lands all trodden to their recesses, the seas thoroughly searched by the plumbist, and only the poles awaiting his feet, it is time to take some account of his motive and the chance there may be for his successor to satisfy it in the age to come." Shaler offers a "natural history" of exploration by rooting the impulse in the instinctive curiosity found in mammals.¹⁴ While he refused to speculate on whether such an instinct is naturally selected, Shaler clearly links the tendency of animals to roam about an open field to the human "temptation of the horizon." As the pre-historic human race bound itself to a sedentary existence, the exploring instinct was lost and replaced by a fear of unknown nature and a desire to cultivate land, build fortresses, and construct villages. In contrast to Adams, Shaler felt that the act of creating civilization, of dwelling on a particular piece of land, killed the exploring impetus. This impulse was resurrected in a thoroughly modern sense with the scramble for empire, desire for trade, and religious fanaticism of the early modern period. It was only after the new world had been pillaged, that "the better and

¹⁴ For an analysis of Shaler's thoughts on the relationship between natural history and social history as applied to late nineteenth-century historical geography, see David Livingstone, Nathaniel Southgate Shaler and the Culture of American Science (Tuscaloosa: The University of Alabama Press, 1987), 158-191.

purser form of the exploration began to take shape.”

The eighteenth-century obsession with science and natural law, according to Shaler, spurred the motivation to explore for the sake of increasing knowledge. As exploration divested itself from commerce and empire it became a purified and noble pursuit of reputable science. Thus interpreted, exploration could continue as a valid practice of modern science. Despite the completion of the “pioneer” stage of exploration, geographical, geological, and paleontological investigations will keep the exploring instinct alive. Shaler even goes so far as to suggest that an encounter in the field is not necessary for exploration. The search for the secrets of radiation and the atom, i.e., experimental research, are also manifestations of the exploring spirit. By calling attention to the scientific aspects of exploration, Shaler also sets aside the race for the poles as a phenomenon outside the realm of true exploration. Explorers should abandon their desire to set foot on new ground for the sake of getting there first. “We see that the mad desire for the pole as pole is as chimerical as de Soto’s search, for we have come to set further and more rational goals for our quests than the men of his time.” Shaler addresses the problem in a fictional scenario.

The cause of true exploration will be vastly advanced when some real observer with the spirit of the naturalist finds himself within, say, fifty miles of the pole, with a sea beneath him that by soundings proves that there is no land polewards, who then deliberately gives up the satisfaction of putting his feet a little nearer to that field in which the wobbly axis of the earth ends, in order that he may save time and force for better uses. That man will stand for the new type of explorer who represents the motive of our time.

Shaler perceptively attempts to reconcile a kind of crisis in exploration. The dash for the poles had the potential for being interpreted as a non-scientific activity. Shaler agrees that

adventure and heroism may still exist as part of exploration, but activities that only satisfy personal ego and national pride are outside the province of true scientific exploration¹⁵

A number of points can be made from this preliminary examination of Adam's and Shaler's remarks. First, "exploration" has been reified as a subject of discourse itself. These are not pieces describing explorations, but treatises on the nature of exploration as a human practice. Why were they provoked to enter such a discussion? For Adams it appears that the closure of the American frontier threatened to symbolically end the work of explorers. His solution was to point to the many blank spaces on the globe still in need of mapping. The search for unknown territories is a logical extension of the nineteenth-century experience of exploring the western frontier. The symbolic capital invested within the notion of frontier expansion is called upon as a strategy to legitimize the work of explorers. Shaler's article demonstrates the scientific nature of exploration and the necessity for the practice of exploration to continue along scientific lines. As we shall see in greater detail below, the race for the poles seriously called into question the scientific value of the work of explorers. Similarly, the dominance of experimental methods, most importantly in the biological sciences at the turn of the century, also threatened to move exploration to the margins of proper science¹⁶. Shaler thus attempted to insulate the

¹⁵ Nathaniel S. Shaler, "Exploration," Atlantic Monthly 97 (February 1906), 145-156.

¹⁶ Historians of biology usually characterize this period as dominated by a decline in the status of natural history and the rise of experimental methods. There has been little said about the changing role of fieldwork at this time. Perhaps it goes without saying that fieldwork became secondary in importance to research like cell lineage studies at Woods Hole, perhaps even a necessary evil better left to practitioners of the rising discipline of ecology. If we assume a close affiliation between fieldwork and exploration, we can then understand why many naturalists were quick to defend—and redefine—the practice of exploration. Garland Allen, Life Sciences in the Twentieth Century (Cambridge: University of Cambridge Press, 1978); Jane Maienschein, Ronald Rainger, and Keith R. Benson (eds.), "Special section on American

practice of exploration by portraying it as eminently scientific. In short, Adams and Shaler were attempting to redefine the parameters and nature of exploration in order to secure a foothold in a new century which threatened to move exploration to the margins of science

The Explorers Club

It was under similar auspices that a small group of New Yorkers gathered in 1904 to discuss the creation of a new gentlemen's club devoted to the practice of exploration. Throughout the nineteenth century, men's clubs provided Britain's upper crust with a forum in which to smoke cigars while debating matters of business, industry, and politics. Toward the latter half of the nineteenth century, Americans began developing new world analogs to Britain's clubs—clubs that, according to historian G. Edward White, “served as a stairway to urban power and prestige.”¹⁷ But Henry Collins Walsh proposed a different kind of club, one “whose objects shall be to unite explorers in the bonds of good fellowship, and to promote the work of exploration by every means in its power.” In order to distinguish itself from similar organizations, like the Boone and Crockett Club and the London-based Traveler's Club, Walsh was emphatic about the serious scientific nature of the Explorers Club: “No amateur hunters or tourists these, but qualified

morphology at the turn of the century.” *Journal of the History of Biology*, 14 (1981): 83-191; Ronald Ranger, Keith R. Benson, and Jane Maienschein (eds.), *The American Development of Biology* (New Brunswick, NJ: Rutgers University Press, 1991); Lynn K. Nyhart, “Natural history and the ‘new’ biology,” in N. Jardine, J. A. Secord, and E. C. Spary, (eds.) *Cultures of Natural History* (Cambridge: Cambridge University Press, 1996), 426-443.

¹⁷ G. Edward White, *The Eastern Establishment and the Western Experience: The West of Frederic Remington, Theodore Roosevelt, and Owen Wister* (New Haven: Yale University Press, 1968), 27.

explorers”¹⁸

Walsh was an author, editor, war correspondent, and organizer of the Arctic Club of America, Henry Collins Walsh. He immediately enlisted future Brigadier General Adolphus Greely, the famous Arctic explorer, to serve as first president of the Club. Greely agreed and drafted a letter of introduction signed by Walsh, Donaldson Smith (Gold Medalist of the Royal Geographical Society for his work in Somaliland, the Upper Nile, and Manchuria), Carl Lumholtz (who lived among the indigenous populations of Australia and Mexico), Marshall H. Saville (Professor of Archaeology at Columbia University), Frederick S. Dellenbaugh (a veteran of Powell’s Colorado River Expedition in 1871-83), Caspar Whitney (editor of Outing Magazine and world traveler), and William H. Furness (traveler to Malaysia and the Far East and amateur ethnologist). Over fifty people showed up for the first meeting.¹⁹ The Explorers Club certainly appeared to be modeled after London’s Travelers Club, but Henry Collins Walsh was quick to distinguish the two. As he reported to the New York Times

¹⁸ “Explorers Now Have Their Own Club,” New York Times (November 5, 1905), pt. 3, 7.

¹⁹ As reported in the New York Times, the original members of the Explorers Club were: General A. W. Greely, Donaldson Smith, Caspar Whitney, F. D. Millet, Alfred H. Brooks, Henry G. Bryant, Dr. F. A. Cook, James Creelman, Frederick A. Ober, Charles P. Bowditch, Oscar F. Crosby, Frank M. Chapman, D. G. Elliot, Carl Lumholtz, Harlan I. Smith, F. W. Stokes, George Byron Gordon, W. H. Holmes, Verner Z. Reed, Marshall H. Saville, Col. William H. Furness, Ernest Ingersoll, Andrew J. Stone, John Hays Hammond, Alfred C. Harrison, Jr., Dr. H. M. Hiller, F. S. Dellenbaugh, Brig. Gen. Henry T. Allen, E. W. Nelson, Richard Harding Davis, Archer M. Huntington, Commodore Robert E. Peary, Commodore J. D. Jeroold Kelley, Frederic Falmer, Gen. Frederick Funston, R. T. B. Hyde, Major W. R. Abercrombie, John La Farge, Robert T. Hill, Tappan Adney, Herschel C. Parker, Roland B. Dixon, Henry C. Walsh, George Bird Grinnell, Davenat Dorsey, Dr. Berthold Laufer, Capt. E. L. Zallinski, Capt. G. C. Burnell, Capt. H. G. Mercer, Henry Fairfield Osborn, Dr. Tarleton Bean, George H. Pepper, Dr. H. C. Bumpus, Dr. N. L. Britton, Dr. W. J. McGee, F. W. Putnam, A. F. Bandelier, and Dr. D. T. MacDougal. “Explorers Now Have Their Own Club.” Also see Louis John de Grenon de Milhau, “The Beginning of the Explorer Club,” The Explorers Journal 38 (February 1960), 2-4.

The Explorers Club could not lend itself to the fictional touch of a man like Jules Verne, who based his story of 'Around the World in Eighty Days' on a wager made in the Travelers Club of London, because an explorer is a man of infinite patience, to whom speed and time are but frequently minor factors.²⁰

Where the Travelers Club easily lent itself to fiction and speed, the Explorers Club would hold fact and deliberate patience as its primary virtues. These explorers embraced science as one of the key ingredients for separating the explorer from the mere traveler. Notably, Walsh did not distinguish the Explorers Club from two other important clubs organized in the early 1890s, the Arctic Club of America, and Peary's Arctic Club. The relationship between Arctic exploration and the Explorers Club will be dealt with later.

The composition of the Club was nothing short of interdisciplinary. The original roster included an impressive assortment of New York scientists bringing together field workers from the American Museum of Natural History (Daniel Eliot, Marshall H. Saville, H. F. Osborn, H. C. Bumpus, Frank Chapman), the New York Zoological Society (George Grinnell, Tarleton Bean), the University Museum in Philadelphia (George Byron Gordon) Columbia University (Berthold Laufer, Nathaniel Britton), and Harvard (Roland Dixon, Charles P. Bowditch). Government scientists were also well represented. Edward W. Nelson was Chief of the Biological Survey, Nathaniel Britton at one time worked with the New Jersey Geological Survey, William Henry Holmes and John Hammand worked for the U.S. Geological Survey. Many of these scientists had conducted field work in the American West, and others were involved in exploring America's territorial possessions such as Alaska, the Philippines, and Hawaii.

²⁰ "Explorers Now Have Their Own Club."

A number of charter members had been actively involved in the recent Spanish-American war. Gen. Frederick Funston ably served as lieutenant-colonel in the Philippines. James D. J. Kelly served as a naval officer. Henry T. Allen graduated from West Point and fought in Cuba and the Philippines. A surprising number were correspondents during the war. James Creelman, Richard Harding Davis, Henry C. Walsh, and Caspar Whitney had all reported military developments to New York-based newspapers and magazines.²¹ Other than securing and reporting the appropriation of new territories, some members were actively engaged in the project of exploiting distant resources. Alfred H. Brooks served as a consultant for the Alaskan railroad commission. John H. Hammand had previously served as a consultant for the U. S. Geological Survey on gold mining valuations out west, as well as for the Union Pacific and Southern Pacific railroad companies. Shortly before the Explorers Club's first gathering, he was advising Cecil Rhodes on South African operations.

A handful of the Club's first members came from substantial wealth. Henry Walsh inherited a small fortune from his father's work in merchandising and publishing. John La Farge had amassed considerable wealth catering to New York's cultural elite. Caspar Whitney hailed from nineteenth-century iron money. Frederick Stokes came from a publishing family, and he would later capitalize on the vogue for exploration by publishing

²¹ The work of war correspondents in the Spanish-American War cast the military exploits into thoroughly western affairs. This was nowhere more evident than in the lionization of Roosevelt's Rough Riders. It is in such a way that the war with Spain became, from an "eastern establishment perspective," a replay of the western experience. "The violence and drudgery of Cuba had become a glorious cavalry charge, and the dismounted cowboy crawling through the underbrush had evolved into a dashing rider on a fiery horse." The inclusion of war correspondents in the Explorers Club thus ensured that "exploration" would continue to be defined by America's western and heroic experience. G. Edward White, The Eastern Establishment, 156, 170.

Robert Peary's accounts of Arctic travel. John Hammand was born into mining wealth. Henry C. Mercer and Berthold Laufer also came to the Club with sizable fortunes. The wealthy of the Club were not exempt from the requirement that all members add to the stock of knowledge of foreign lands. As opposed to the Peary Arctic Club, the Explorers Club did not begin as a gathering of wealthy patrons for the purpose of financing exploration.²²

This changed, however, when the Club decided to institute a new membership policy in the early 1920s. They introduced two classes of membership, Active and Associate. Active members must "1) have done actual exploratory field work with creditable results or 2) be one who has added to the world's store of knowledge concerning the countries he has visited." Associate members included those patrons who supported the financial burden of exploration. It is in this two-tiered structure that the Club most closely paralleled a scientific society. The American Ornithological Union employed a similar structure to distinguish between the serious scientific professional, and the rank-and-file amateur ornithologist, a distinction that caused many organizational battles. Indeed, Frank Chapman, a member of the AOU who spear-headed some membership reform in 1900, was also a charter member of the Explorers Club.²³

²² Despite Walsh's desire that no "travelers" be part of the group, there were a number. But a traveler would rise to the level of "explorer" if he had published an account of a relatively unknown region. This would change in the 1920s.

²³ Mark V. Barrow, Jr. A Passion for Birds: American Ornithology after Audubon (Princeton: Princeton University Press, 1998), 46-73. A parallel can also be made with the fraternal organizations rife in American cities at the turn of the century. The trophies, pictures, explorer artifacts, and native paraphernalia that littered the Club's space might be conceived as an analog to the ornate regalia of the Knights of Pythias or the Red Men. Mark C. Carnes, Secret Ritual and Manhood in Victorian America (New Haven: Yale University Press, 1989). This is not the place to analyze the Explorers Club as a site

The membership change made it possible to justify membership for wealthy men who may have hunted and traveled, but produced little in the way of new geographical knowledge. They were often the benefactors of the Club itself, as well as patrons for members on the active roster. It is unclear to what extent the Club served as a way to introduce explorers to wealthy persons, right now, all we can do is briefly highlight some of the relationships that resulted in expeditions or scientific ventures. James B. Ford, for example, quickly became something of an Explorers Club institution through his patronage of the Club library. He later became the primary benefactor for the George Heye Foundation that saw to the construction of New York's Museum of the American Indian. Lincoln Elsworth financed Roland Amundson's 1925 flights to the North Pole at a price tag of \$100,000. In 1926, Harrison Williams, George Palmer Putnam, Henry Fairfield Osborn, Fred Walcott, Fitzhugh Green, and Lester Jones contributed monies for an American Museum of Natural History expedition to the west coast of Greenland that was manned by Club members Robert Bartlett, H.E. Raven, Van Campen Heilner, and Knud Rasmussen. Gregory Mason almost singlehandedly funded the Yucatan explorations of Peabody Museum archeologist Herbert Spinder. Charles Stoll financed the Stoll-McCracken Expedition to North Alaska where mammalogists H.E. Anthony and Harold McCracken secured specimens of Pacific walrus for the AMNH's Hall of Ocean Life. William Beebe's oceanographic work in the 1920s was largely funded by Club members.

for reconstructing notions of manhood, but such a project would be very valuable in helping us to understand gender around the turn of the century. See Anthony Rotundo, "Boy Culture: Middle-Class Boyhood in Nineteenth-Century America," in Mark Carnes and Clyde Griffen (eds.) Meanings for Manhood: Constructions of Masculinity in Victorian America (Chicago: University of Chicago Press, 1990), 15-36.

Henry Whiton and Harrison Williams. We might consider these patron/client relationships as acts of philanthropy, but we should also keep in mind the fact that there is an exchange going on here. Explorers brought back tales of their travels to New York City. Club lectures and presentations were particularly useful to members "who have not had an opportunity to stray from the streets of New York. It is a pleasure to note how unselfishly those members who have wandered to far-off lands have revealed to us what their active brains and searching eyes have found of interest."²⁴

The work of Club member George Palmer Putnam as a publisher of the adventure genre, and therefore a key point of connection between patron and client, is worthy of special note. Putnam was a third generation publisher of the great Putnam house. Before taking the reins of the business, however, he traveled west as was typical of members of the "eastern establishment." He wrote of his Oregon adventures with great fondness:

Cuddled up with a copy of "The Last of the Mohicans" or "Mr. Midshipman Easy" many a boy has wished he had lived among Cooper's and Marryat's adventures, lamenting the dull modern world without savages, sailing men-o-war or even frontiers. Sometimes in Oregon I felt that way too. I was sorry for myself because I had not been in on the making of the "real west," in those roaring days of Bret Harte heroes and Remington cowboys.²⁵

No doubt he became interested in the literature of exploration in part to alleviate his regret for having not experienced the truly wild west. Among the members who had books published with Putnam were Roy Chapman Andrews, Robert Cushman Murphy, William Beebe, Richard Byrd, Martin and Osa Johnson, and Charles Lindbergh. Putnam also

²⁴ "Club Lectures," The Explorers Journal 3 (January-March, 1924), 4.

²⁵ George Palmer Putnam, Wide Margins: A Publisher's Autobiography (New York: Harcourt, Brace and Company, 1942), 76.

played a large role in publicizing exploration. For instance, he orchestrated much of the media frenzy caused by the daring flights of his wife, Amelia Earhart. We will meet Putnam again in Chapter 4.

The exchange between patron and client took place in the intimate quarters of the Club's posh Manhattan clubhouses. The clubhouse served as the meeting place where members could gather to chat to one another in lounges where "an abundance of easy chairs and couches supply comfort for the weary and indolent, while walls are decorated with animal heads, trophies of the chase and interesting pictures."²⁶ One of the great prizes of the Club was its library. According to James B. Ford, the library's greatest early patron, "the most important single factor in the development of the Explorers Club has been the formation of a library of discovery, exploration, and travel."²⁷ Originally, the library contained books, magazines, maps, and journals donated by Club members. Depending on its financial situation, the Club would also purchase important books on exploration. Used by members and visitors, the library became a clearinghouse for documentary records of expeditions and general geographical knowledge. The library staff also kept abreast of new material in which the membership would be interested, and beginning in the mid-1920s, printed book reviews in the Club's official publication, The Explorers Journal. Many regions were represented, but books on the American West far outnumbered those on other areas. In 1922—a landmark year for library acquisitions—of

²⁶ Louis J. de Milhau, "The Club Rooms on Amsterdam Avenue," Explorers Journal 40 (December 1962), 13-22.

²⁷ "In Honor of James B. Ford," The Explorers Journal 2 (April-June 1923), 3.

the nearly 2000 new books, over 500 were treatises on North America (mostly the Western United States), while South America and Europe boasted only 250 apiece.²⁸

More than anything else, the Club was a place where explorers gathered to swap stories over tea and scones. Much was made of the Club's "long-table" around which "brave men meet to plan new expeditions, to exchange adventures, to match hair-breadth escapes and to tell an expectant world what they have accomplished."²⁹ The table was located in a lounge with walls covered by pictures of foreign lands, animals, and developing societies, taken by Club members. Trophies were also scattered throughout the lounge—elephant tusks, mountings of wild game, archeological artifacts, Eskimo canoes and so forth. In one corner was a mammoth globe around which members would stand while planning future expeditions, at least until someone took a picture.

The Club was always a place where explorers could visit on a daily basis for informal conversation, but another Explorers Club signature was its series of bi-monthly "smokers" held in the off season. Members would meet in the lounge or auditorium to be introduced to foreign territories through travel narratives accompanied—almost universally—by still and motion pictures. More than just a forum for boasting tales of brushes with death, the smokers' main function was to paint a picture of the geography, ethnology, and natural history of unexplored regions. Take, for example, the lineup for the 1923 smoker series.

February 9, Mr. William Beebe—"A Naturalist in British Guiana"

²⁸ "Report of the Library Committee," The Explorers Journal 1 (January-February 1922), 10.

²⁹ "The Club Makes Itself at Home," The Explorers Journal 8 (January-March 1929), 12.

February 23, Mr. Martin Johnson—"Wild Game in Africa"
 March 9, Dr. G. Kingsley Noble—"Days and Nights on Santo Domingo Trails"
 March 22, Dr. Sven Hedin—"My Last Journey in Tibet"
 April 13, Dr. William D. Matthew—"Evolution Up to Date"
 April 27, Clyde Fisher—"With John Burroughs in His Favorite Haunts"
 May 11, Mr. H. C. Raven—"In the Australian Bush"
 May 25, Prof. Henry Fairfield Osborn—"Roy Chapman Andrews' Leadership of the Third Asiatic Expedition"
 October 26, Mr. William Beebe—"The Galapagos Islands"
 November 9, Mr. Horace D. Ashton—"By Caravan Through the Garden of Allah"
 November 23, Mr. Herbert Lang—"In the Interior of British Guiana"
 December 14, Mr. Roy Chapman Andrews—"The American Men of the Dragon Bones"
 December 28, Col. J. C. Faunthorpe, M.C., C.B.E., A.D.C.—"Jungle Life in India"¹⁰

The main purpose of these lectures was to introduce foreign territories to the Club's urban membership, to help the sedentary New Yorker take stock of the other world beyond the five boroughs.

Most of the exploratory discourses dealt with actual geographies, i.e., presentations that introduced a foreign region to the Club's urban membership. Club directors often boasted that the Explorers Club flag had been planted in unexplored regions the world wide: Arctic pack ice, Antarctic tundra, Aleutian glaciers, the alpine forests of Canada, Brazil's rainforest, Sonora's desert, Andean peaks, Kenya's grassland, Egypt's Upper Nile, Africa's Sahara Desert, Siberia's Gobi Desert, Tibetan mountains, Japanese volcanos, the American West, the upper reaches of the atmosphere, and the mysterious depths of the ocean deep. However, there were two regions of the world unrepresented on the explorer's agenda: Europe, and eastern United States. Exploration was a thoroughly western practice. It meant a movement from civilization to the wilderness, from the known world to the "unmapped territory," from settlement to the

¹⁰ Lecture list in The Explorers Journal 2 (July-December 1923), 5.

untamed frontier

Another important function of the Club was to publicize information about exploratory activities to the wider community. While smokers were officially designated for Club members and members' guests, the Club-house doors were occasionally opened to non-members. The Club was exclusively a male province up until December 18, 1925 with the institution of "ladies' night."¹¹ The first ladies' night was doubly significant because it marked the first presentation given by a woman, Harriet Chalmers Adams, who spoke of her ethnological work on the plateau of southern Brazil.¹¹ In 1929, the Club added a "library course" to its schedule of presentations. Opened to the public, an admission fee of \$1.00 was charged, the proceeds of which went to the maintenance of the Club library.¹²

An important ritual of self-identification was the annual dinner. While the typical dress of the Club member included skis, bush jacket, alpenstock, or sun helmet, the annual dinner was a black-tie event held in one of New York's premier hotels. It was a reminder of this group of exclusive explorers' class identity. For one night a year, the Club members gathered for a rather unusual dinner. For example, the 47th annual dinner (1951) featured a morsel of 250,000 year-old hairy mammoth meat, boiled Pacific spider crabs, cocktails with glacial ice, a bowl of *Chelonia Mydas Cheduba* (green turtle soup), a steak of Saskatchewan bison, and for dessert, a helping of *Buche Roosevelt* (an ice-cream

¹¹ "Picturesque News from the Wilderness," The Explorers Journal 4 (July-December 1925), 9. Though the first ladies' night featured a presentation from a woman, this was not a matter of policy. Most ladies' nights thereafter featured presentations from men.

¹² "An Alluring Course of Lectures Open to All," The Explorers Journal 8 (July-September 1929), 69.

delicacy)¹³ After dinner, they would present awards and honors, and sing accolades to members' accomplishments over the year past. This would be followed by a number of short illustrated presentations from Club members.

The Explorers Club and Frontier Anxiety

The members of the Explorers Club carried the torch of their Western pioneer predecessors during a period of American history in which the myth and ideology of the frontier was undergoing sweeping change. The impulse to search for new frontiers was a manifestation of what historian David Wrobel has called "frontier anxiety."¹⁴ Wrobel convincingly argues that at the end of the nineteenth century, Americans perceived the closing of the frontier and responded by calling attention to America's shrinking base of land and resources in an attempt to save America for Americans. They also feared that the closing of the frontier would jeopardize those characteristics often associated with the frontier process: ruggedness, virility, abundant space, free or cheap land, broad opportunity, and a heightened democratic consciousness. In a manner similar to Peter Schmitt's analysis of the "back to nature" movement, Wrobel shows how this frontier anxiety fostered America's Progressive conservation movement, an argument recently echoed by William Cronon.¹⁴ This is to say that one option for Americans who were

¹³ Herbert B. Nichols, "Mammoth Appetites Explore a . . . Mammoth," The Christian Science Monitor, Boston (January 17, 1951); reprinted in The Explorers Journal 29 (Winter-Spring 1951), 42-55.

¹⁴ David M. Wrobel, The End of American Exceptionalism; Peter J. Schmitt, Back to Nature: The Arcadian Myth in Urban America (Baltimore: Johns Hopkins University Press, 1990); William Cronon, "The Trouble with Wilderness, or, Getting Back to the Wrong Nature," in William Cronon, (ed.), Uncommon Ground (New York: W.W. Norton & Company, 1995), 69-90. Given that a frontier anxiety manifested itself in the twin movements of preserving old frontiers and finding new frontiers, we can

troubled with the closure of the frontier West was to conserve that region to save resources for American capitalism, as well as an untamed land for the preservation of American virility. A second option, however, was to search for new frontiers to conquer and colonize. Wrobel contends that the Spanish-American war and a new interest in Hawaii, Alaska, and Canada were manifestations of a desire to continue the frontier experience. Members of the Explorers Club were also motivated by a similar desire.

That the work of the Explorers Club was a logical extension of frontier exploration was clearly stated by Mr. Dan Beard who gave a short presentation at the Club's 1925 "Annual Outing" at the Bellechaire Golf and Country Club. As reported in the Journal,

[h]e spoke of the high moral quality of the old frontiersmen like [Kit] Carson and [James] Bridger and designated those now engaged in exploratory work as their spiritual descendants—men who are blazing the trail in new regions of the earth now that the old frontier of America has been pushed all the way to the Pacific Ocean.¹⁵

Other bits of evidence are less direct. In an editorial comment, Ernest Ingersoll noted that "the pioneer's plow on our western plains cuts across the still visible buffalo trails and wallows forsaken half a century ago. Along such ancestral roads, the early explorer everywhere pursues his investigation, and subsequent civilization must perforce, in many cases, lay its highways."¹⁶ Scattered through the pages of the Journal is the rhetoric which refers to "pioneering" Americans as the forerunners of modern explorers. Another hint is

better understand the relationship between organizations like the Boone and Crockett Club, a leader of the Progressive conservation movement, and the Explorers Club, which had very limited conservationist leanings.

¹⁵ "The Annual Outing," The Explorers Journal 4 (April-June 1925), 5.

¹⁶ Ernest Ingersoll, "Paths Before Men," The Explorers Journal 8 (July-September 1929), 2.

that the first books bought by the Club Library were the full set of Lewis and Clark's western expedition notes

Seeing themselves as a continuation of a tradition of exploring the frontier West, Explorers Club members were linking themselves to a broad nationalistic vision. The point was stated by General A. W. Greely during the 1923 annual dinner. Greely noted that exploration was vital for the sake of progressing scientific knowledge. But it has also "played its part in the destiny of nations, opening up new fields to colonization and directing the trend of population. Finally, through the locating of unsuspected natural resources, exploration has played an important role in the commercial sphere."¹⁷

Similarly, Johns Hopkins geographer Isaiah Bowman argued in The Pioneer Fringe (1931) that far from the frontier being closed, an American frontier still awaited further exploration and exploitation. The context for Greely and Bowman's statements is the rising number of "prospectors" that were requesting Club membership throughout the 1920s. For instance, Joseph Bolan, Carvell Wells, and Colonel Brooks were actively engaged in railroad construction in Central and South America, Malaysia, and Alaska. Hawthorne Daniel, Edward S. Bleecker, and William H. Cook were involved in petroleum prospecting and refining in the American west, Alaska, and parts of South America. Real and imagined frontiers serve a double purpose. Other than a trove of cheap natural resources, frontier geographies were places of adventure and excitement, the playground of the western man.

¹⁷ "The Annual Dinner," The Explorers Journal 2 (January-March 1923), 7.

Exploration and Frontier Adventure as Genre

Adventure lay at the very heart of the frontier narrative. According to Whit Burnett, writing in the early 1950s, adventure was an event of “human excitement in which man, daring the utmost, has walked into the unfamiliar, challenged the elements, and, human and fallible, has fought out his personal battle with his fate and, in most cases, won.” The encounter with an unknown and possibly dangerous frontier is what gives “adventure” its dynamic energy. “Adventure is an atmosphere and essence, a climate of the mind. It is the man plus the place and the event, a man out of the ordinary in daring, endurance, and vision, and a place out of our common ken, even perhaps out of this world.”¹⁸ But more than a state of mind that functions to structure encounters between human and other, adventure is the representation of that encounter. An event scarcely counts as an adventure unless it can be made a part of an adventure narrative, a story.

The adventure story was a popular genre of entertainment in the first half of the twentieth century. Audiences were eager to participate in a new mass culture of entertainment consisting of pulp magazines like the Doc Savage series, Western movies, the increasing popularity of movie stars, and the skyrocketing status of legendary heroes like Charles Lindbergh. The adventure story was a popular brand of entertainment, hardly the stuff of conversations around New York’s Algonquin Round Table, the genre appealed to an uneducated audience fast becoming consumers of mass-media. Richard Slotkin’s work on the frontier myth makes clear that heroism, individuality, conflict, and

¹⁸ Whit Burnett, Introduction to The Spirit of Adventure: The Challenge and the Fascination of the Strange, the Impossible, and the Dangerous (New York: Holt Publishing, 1955), ix-xiv.

the movement across borders (civilization/wilderness and white/Indian) were central themes around which Americans developed a political and social ideology of Americanness. In politics, social action, and popular culture, the myth of the frontier provided the underpinnings for an ideological and historical consciousness of American progress. Moreover, these cultural currents did not die with the disappearance of the frontier; they lingered into the twentieth century and poignantly resonated with the audiences of Western movies.³⁹

Like frontier myths, the adventure story also included the fundamental ingredients of heroism, individuality, danger, conflict, and border-crossing.⁴⁰ It should not be surprising that Lowell Thomas' missive on adventure states that he was

reared in a town where roaring adventure was a recent memory and still a living thing in the Cripple Creek mining district, most famous of the gold camps of the west. In the golden age of Colorado mining it had been a golden hell of riotous living and dying. . . . I heard of flamboyant adventure and saw it.⁴¹

For Thomas, as the listeners of his popular adventure radio series in the 1930s fully realized, adventure meant an encounter with a dangerous Western environment. Furthermore, the adventurer's incessant desire "to go" was also part of the mythic story, as in the case of the East Coast urbanite who left civilization in the nineteenth century for a new life in the frontier West. The impetus for such an action might be that "adventure

³⁹ Richard Slotkin, Gunfighter Nation: The Myth of the Frontier in Twentieth-Century America (New York: Harper Perennial, 1993), 29-62; Paul Zweig, The Adventurer: The Fate of Adventure in the Western World (Princeton: Princeton University Press, 1974).

⁴⁰ See Richard Phillips, Mapping Men and Empire: A Geography of Adventure (New York: Routledge, 1997), 45-67.

⁴¹ Lowell Thomas, Pageant of Adventure (New York: Wilfred Funk, Inc., 1940), 2.

alone can restore values which have been worn thin by domesticity”⁴² This variant of the myth forms the center of Dorothy Johnson’s “A Man Called Horse,” which narrates the movement of a Boston man from his upbringing where “all his life he had known every comfort and privilege his father’s wealth could provide,” to the “West, far beyond the country’s creeping frontier.” Here he lived a “primal and violent” existence when adopted into the fold of a Crow tribe.⁴³ In short, the frontier experience promised an almost certain encounter with unknown danger and conflict—an environment that tested the mettle of American individuality, and one in which heroes were made. Thus, the American western frontier was the geographical locus of adventure. The western landscape became the template and the rule through which American adventure would be metaphorically extended and relocated outside U.S. borders.⁴⁴

Such adventure lay at the center of the exploring motive almost as a psychological necessity.⁴⁵ According to Roy Chapman Andrews, “to the born explorer, adventure is a vital flame. Without it life would be a poor thing indeed. And the desire to see unknown

⁴² This is what separates Turner’s frontier from Roosevelt’s. The former stresses agricultural development while the latter takes the form of heroic adventure. See Slotkin, *Gunfighter Nation*, 34; Paul Zweig, *The Adventurer*, 239; G. Edward White, *The Eastern Establishment*, 171-83.

⁴³ Dorothy Johnson, “A Man Called Horse,” in *Spirit of Adventure*, 154-55.

⁴⁴ Slotkin remarks that “Applying the Frontier Myth to the imperial project begins with a metaphoric extension of Frontier categories to a new situation in which Asians become figurative Apaches and the Philippines become the symbolic equivalent of Boone’s Kentucky or Houston’s Texas.” Slotkin, *Gunfighter Nation*, 53.

⁴⁵ For the relationship between Romantic exploration and natural history, see Stephen Pyne, *The Ice: A Journey to Antarctica* (Iowa City: University of Iowa Press, 1986), 82.

lands, to discover new facts, becomes a resistless drive that will not be denied”⁴⁶ That adventure was a popular motif among exploring naturalists is evidenced by such popular titles as Osa Johnson’s I Married Adventure, Grace Barstow Murphy’s There’s Always Adventure, T. C. Bridges’ Heroes of Modern Adventure, and William Beebe’s The Arcturus Adventure, and Zaca Venture. These narrative accounts of naturalists’ fieldwork link the practice of exploration with adventure. Indeed, the two almost seem inseparable. Both adventure and exploration contain a certain movement from the metropolitan core to the unknown and mysterious periphery. The encounter with this unknown element is the work of scientists, explorers, and adventurers.

The adventure story was the primary genre for narrating the work of Explorers Club members. The exploration narrative could be told at a smoker, or around the lounge Long Table to a small group of members. It was often a personal anecdote including an introduction, setting, rising action through an encounter with the unknown, a close brush with death, and denouement. Of course, many of these tales are lost to the wainscoting of the Club Lounge. But between 1931 and 1941, the Club compiled three thick volumes of exploratory narratives for public consumption. We can use these volumes as a sample of tales, as the 1931 edition was titled Told at the Explorers Club.

Most of the stories follow a similar rhetorical strategy. They start with the practice of preparing for an expedition—clothes, equipment, guns, motor cars, airplanes. Explorers surrounded themselves with elements of western technology to ensure survival

⁴⁶ Roy Chapman Andrews, Beyond Adventure: The Lives of Three Explorers (New York: Duell, Sloan and Pearce, 1952) xi.

in foreign territories. Often, the explorer would employ the knowledge and labor of indigenous people as guides, hunters, cooks, and porters. Thence commences a section on the actual exploration with descriptions of exotic life and sublime landscapes. But what makes these tales interesting is not so much the description of the region explored as the encounter between explorer and frontier. Almost inevitably, the subject of the exploratory narrative runs up against some difficulty that must be overcome.

One common source of difficulty was nature itself. Despite scrupulous preparation, sometimes nature throws up unforeseen obstacles. Take Robert Bartlett's tale, "Bringing the Crippled Roosevelt Home" as an example. In 1906, the Arctic-bound Roosevelt had wintered in Cape Sheridan and, with the onset of spring, Bartlett navigated his ship south through the thawing Arctic ice. Unfortunately, a massive floe struck the quarter of the ship and, sliding along aft, dug its point into the skeg, breaking the rudder-post, the rudder, a portion of the skeg, and two blades of the propeller. The tale that follows is a story of human ingenuity. The test was to use the limited resources available to make the ship sea-worthy for a safe return to New York. Bartlett and his crew patched, tarred, and roped the vessel back together. A calm demeanor in the face of adversity is another ingredient to the exploratory narrative. So when Admiral Peary returned from his Arctic survey to find the Roosevelt in a state of disrepair, Bartlett was amazed by "the way Peary took the accident. . . . He didn't turn a hair. It was this attitude in the face of privations and dangers that made us love and respect him."⁴⁷

⁴⁷ Robert A. Bartlett, "Bringing the Crippled Roosevelt Home," in Told at the Explorers Club: True Tales of Modern Exploration (New York: Albert & Charles Boni, Inc., 1931), 33.

Bartlett was able to overcome every obstacle in his way

Another common encounter fraught with danger was with exotic wildlife. Big-game hunters were well represented on the membership roster, and their tales of close calls were always popular among members. Tales Told by Explorers (1936) includes Arthur B. Cleaves' anecdote of a jaguar hunt in the Matto Grosso of Brazil. Cleaves, a geologist for the Pennsylvania Topographic and Geologic Survey, was on a mission to survey the upper Paraguay and Sao Laurneo rivers. The story begins in situ with a quick description of the Matto Grosso swampland that emphasizes the region's wildlife. The action begins on the season's final hunting trip. The explorers wake from their slumber, frighten off an alligator from their bathing place, breakfast, load up the horses and then set off for a day of hunting. They had employed Anastacio, a mestizo guide who tracked the jaguars and cared for the group's four hounds. Twenty-eight miles later the group beds down for the night after discovering only one cold trail. The following morning the group is anxious to be under way. "The tang of the air filled one with the desire to ride hard, we felt like conquerors."⁴⁸ By nine o'clock, the dogs strike a fresh trail. The jaguar is discovered on the edge of a forest, rifles are aimed, shots are fired, but wide of their mark. Dogs followed by men on horses enter the jungle hot on the jaguar's trail. Quite suddenly, the jaguar doubles back on the group and charges the men. Shots are fired as the beast seizes upon the hounds. More shots are fired, the jaguar falls to the ground. "Victory, however, had become tragedy, and we were sorely distressed by the disaster wrought

⁴⁸ Arthur B. Cleaves, "The Man and the Tiger," in Explorers Club Tales: True Stories of Exploration, Research and Adventure, as Told at the Explorers Club by Men of Daring and Achievement (New York: Dodd, Mead & Company, 1936), 53.

among our dogs”⁴⁹ So despite the explorers’ triumph, the potential costs of dangerous exploration are outlined in the tale. The deaths of the dogs function to underscore the great peril which the explorers faced.

A final common encounter was with a region’s indigenous people. These “contact narratives” come in many forms. Perhaps the most basic concern was that of being killed while traveling through an unfamiliar region. For instance, Harry Foster and a group of “khaki-clad, flannel-shirted fellows who might recently have stepped from the pages of some tale of the old, wild, woolly West,” dared to travel through a dangerous stretch of Sonoran desert where the Yaquis Indians were thought to be “bad hombres.”⁵⁰ The party reached their destination, a mining operation, after a tense night of travel. Another common story told by visitors to Latin American countries was that of the native rebellion. It seemed to the explorers that there was an ever-present danger of revolt among the newly decolonized indigenous Latin American population. Gordon MacCreagh tells of one such revolt where a drunken mob of Aymara Indians set out to kill all the white people they could find. MacCreagh was hiding with a “half-breed” who “broke his revolver and, with a certain nervous determination, spun the barrel to see if it was loaded.” The revolt never materialized, “the turbulent Aymara reverted to their accustomed dull, sullen subjection. And I dug some rare bronze godlings out of the ground.”⁵¹

The threat of the dangerous Indian is particularly important because the theme is a

⁴⁹ Ibid., 58.

⁵⁰ Harry L. Foster, “In the Land of the Yaquis,” Told at the Explorers Club, 100.

⁵¹ Gordon MacCreagh, “Malos Hombres,” in Told at the Explorers Club, 252, 254.

clear manifestation of the American myth of the frontier. Slotkin argues that turn-of-the-century popular culture was not dominated by Turner's frontier thesis, but instead by Roosevelt's. The closing of the frontier did not signify the loss of a democratic safety-valve, but rather "the loss of those elements in national life that made Americans virile and vigorous." The problem for a post-frontier America is how to preserve and develop those leadership virtues that were fostered by hunting and Indian-fighting in a world without wilderness or savages."⁵² Dime novels, Wild West shows, Western fiction, and Western movies all employed Roosevelt's hero-centered narratives to preserve those elements of the frontier experience that fostered virility, conquest, and the taming of the wilderness. Members of the Explorers Club used similar frontier images to evoke deep-seated cultural narratives, like hunting and Indian fighting. The tales told in the Explorers Club's three volumes fit squarely into the Rooseveltian frontier genre.

This thesis is not so surprising given that tales of explorers in foreign countries were mingled with stories about the conquest of the American West. For instance, William H. Jackson, a popular photographer of western landscapes, contributed an anecdote, "Bullwhacking Across the Plains," that told of his 1866 experience of leaving Burlington, Vermont for an adventure out West along the Oregon Trail. The story has all the ingredients of a traditional exploration narrative: provisioning an expedition, travel through unfamiliar territories, tests of human ingenuity (fixing wagons), and encounters with dangerous Indians. Jackson, a "tenderfoot" from the East, thus tests his own strength and virility by taking on the frontier experience. This story may have had special

⁵² Richard Slotkin, *Gunfighter Nation*, 56.

significance, for the faceplate of Told at the Explorers Club, bears Jackson's representation of his story—a picture of the convoy fording a river and pushing westward. In short, the non-Western exploration tale uses the same rhetorical devices employed in Western frontier narrative tales. Furthermore, both kinds of stories bear a close resemblance to the “red-blooded fictions” and “strenuous life” scenarios examined in Slotkin's treatise on early-twentieth-century popular culture. Now, if explorers employed the frontier adventure genre to describe their own work, they did so with caution. Adventure could too easily detract from explorers' scientific status. Exploration itself had to be carefully nurtured to meet this balance.

Controlling “Exploration” and the Problems with Arctic Exploration

The topics discussed at the Explorers Club, whether in the context of a smoker, around the Long Table, or in an Explorers Club publication did much more than introduce a new frontier or relate a frontier adventure. One of the most important functions of the Club was to create and control the proper parameters of the practice of “exploration.” Who can be an explorer? What are the proper methods of exploration? What is the relationship between adventure and exploration?

One way to define the practice of exploration was to hold lectures focused on exploration methodology. This usually revolved around new innovations in equipment. For instance, the first issue of The Explorers Journal includes a reprint of an address given by Colonel John Caswell on “Rifles and Shotguns for Explorers.” The rifle should be dependable and require ammunition that is easily procurable in the region to be explored.

The caliber should be chosen to overcome the heaviest game the explorer expects to meet. Bolt action is preferable to the lever.”⁵⁴ In 1924, Professor Frederick K. Morris expounded “The New Meaning of Exploration,” by discussing the use of the modern automobile on the American Museum of Natural History’s Third Asiatic Expedition.⁵⁴ Throughout the 1920s, there were many presentations on the use of the aeroplane in exploration. In 1937, P. R. Bassett delivered a paper on “The Gyroscope in Exploration.”⁵⁵ Shortly thereafter, J. E. Williamson presented a paper on the use of the photosphere, a proto-diving-bell for examining shallow waters.⁵⁶

As an organization defined not by any discipline, but by a common practice, these explorers sought to separate true explorers from charlatans. A common problem was the popular misconception that exploration was more sensational than scientific. In an editorial comment in the Explorers Journal, Ernest Ingersoll remarked that the popular appeal of exploration

is evidence of the urgent need of education as to the serious, scientific nature of the modern investigation of the globe. . . . These would-be adventurers do not realize that ‘exploration’ now implies close research, often at the cost of immense hardship, by trained men.”

Roy Chapman Andrews remarked in a presidential address that “another function of the

⁵⁴ Colonel John Caswell, “Rifles and Shotguns for Explorers,” The Explorers Journal 1 (December 1921): 3-12.

⁵⁴ “Illustrated Talks,” The Explorers Journal 3 (August-December 1924): 2.

⁵⁵ “Smoker Lectures,” The Explorers Journal 15 (April 1937): 9.

⁵⁶ “Smokers,” The Explorers Journal 17 (Fall 1939): 8.

⁵⁷ “Ernest Ingersoll, “Mistaken Views of Exploration,” The Explorers Journal 7 (April-June 1928): 2.

Club is to put the stamp of approval or disapproval upon explorations which are projected. In other words, we should be a court of appeal as to whether or not a projected exploration is or is not a worth-while character."⁴⁸ One way of "stamping" an approved expedition would be to divvy out the Explorers Club flag which members brought into the field as a symbol of the Club's official sanction.

The motivation to control the meaning and practitioners of exploration was a direct fallout of the Explorers Club's involvement with Arctic exploration, and the race for the poles in particular, an involvement that did almost irreparable damage to the scientific nature of exploration. The seeds of the controversy lay in the roster of the very first Explorers Club meeting, which included Frederick A. Cook and Commodore Robert E. Peary, who were both engaged in a race for the North Pole. As late as 1904, Arctic exploration still was a matter of serious geographical inquiry. Just as James Cook sought a hypothetical southern continent, so too were Arctic explorers seeking land in northern latitudes. Portions of coastal and inland topography of northern Canada and Greenland were also in need of the most basic surveying. Throughout the nineteenth century, these were matters of serious scientific inquiry.⁴⁹

Within this context, the pole itself became something of a prize for personal valor and national honor. Cook and Peary coveted the object more than all. Cook had served

⁴⁸ Roy Chapman Andrews, "Report of the President for 1932-1933," The Explorers Journal 12 (May 1932-May 1934), 4.

⁴⁹ Though even in the early-nineteenth-century the quest for such artificial geographies as the pole did possess the sheen of a certain ambivalence in the English imagination. Francis Spufford, I May Be Some Time: Ice and the English Imagination (New York: St. Martin's Press, 1997), 49-78.

as physician on Peary's 1891 expedition to Greenland, but the two eventually mounted separate efforts to reach the pole. Two gentlemen's clubs mobilized to help finance the expensive expeditions. The Peary Arctic Club came together in 1899 under the leadership of Morris Jessup, a wealthy New York banker and trustee of the American Museum of Natural History. By the first decade of the twentieth century, the Club boasted a list of millionaires—Henry Parish, Anton Raven, Henry Fairfield Osborn, James Colgate, Herman Bumpus, John Flagler, Zenas Crane, Lewis Delafield, Benjamin Strong, and Thomas Hubbard—all contributing financial aid for Peary's success. Both Osborn and Bumpus had overlapping memberships with the Explorers Club.

The Arctic Club of America took form in 1894 and was largely composed of the survivors of Cook's ill-fated Miranda expedition. The Arctic Club was a natural analog to Peary's supporters, though the former did not boast of the incredible wealth at Peary's disposal. Henry Collins Walsh, the founder of the Explorers Club, was a founding member of Cook's club. Cook had other Explorers Club friends, notably Herschel Parker, who accompanied Cook on part of the Mt. McKinley ascent of 1903, and fellow Arctic explorer Knud Rasmussen. Frederick Cook was elected as President of the Explorers Club in 1906. The following year, the Explorers Club prevailed upon Peary to take over as President. Peary said that he would accept on the condition that the Club would demand proof from Cook if he claimed to have reached the pole the following year. By all appearances the Explorers Club position on polar exploration was a nonpartisan affair, so

the Club acquiesced. But the powder keg was set to blow.⁶⁰

Both Cook and Peary could be found on Arctic ice-fields in the summer of 1908, both with the pole in mind. A triumphant Peary returned to the mainland on September 6 only to hear the claim that Cook had already captured the pole. Thence ensued five years of bitter controversy, personal slanders, and Congressional inquisitions. Much of the fighting stemmed from the two Arctic clubs. Indeed, historian Hugh Eames holds the members of the Peary Arctic Club responsible for dragging the name of Cook through the mud. The Explorers Club—far from immune in the affair—was deeply divided over the competing claims and was almost torn asunder as comradeship and good cheer turned into acrimony. The situation came to a head when the Explorers Club formed a committee to investigate Cook's claim on Mt. McKinley. Evidently, Cook had submitted a fraudulent picture of the McKinley peak, and this was his undoing. Failing to show up at the hearing, Cook left the country in disgrace. The Explorers Club and the Arctic Club of America voted unanimously for his expulsion. The controversy raged on in papers and magazines for the next five years, and sentiment continuously swung—though never definitively—in Peary's direction.⁶¹

The damage to exploration itself was inestimable. Neither Cook, nor Peary, nor

⁶⁰ The controversy has been chronicled in numerous publications. Details of the specifics can be found in Hugh Eames, Winner Lose All: Dr. Cook and the Theft of the North Pole (Boston: Little, Brown and Co., 1973), Pierre Berton, The Arctic Grail: The Quest for the North West Passage and the North Pole, 1818-1909 (New York: Viking Press, 1988), John Edward Weems, Peary: The Explorer and the Man (Boston: Houghton Mifflin Co., 1967), John Edwards Caswell, Arctic Frontiers: United States Explorations in the Far North (Norman: University of Oklahoma Press, 1956).

⁶¹ On the surprising role of New York's media circles that did much to smash Cook's reputation, see Beau Riffenburgh, The Myth of the Explorer: The Press, Sensationalism, and Geographical Discovery (New York: Oxford University Press, 1994), 165-90.

any of the participants involved believed that there was any scientific value in the dash for the poles. It was, in their estimation, a sporting contest. Scientifically, the entire practice of polar exploration, as distinct from Arctic exploration, was delegitimized. Directly after Cook's return, John Bradley—a Cook supporter—told a reporter that the dash for the pole was “not scientific in aim.”⁶² He started out simply to make a dash for the Pole. He made it. He won.⁶³ Explorer Club member Vilhjalmur Stefansson continued to castigate the competitors in the race for the poles. “Few of them,” he wrote in Friendly Arctic (1921) “have been scientists, and polar exploration has never been a science. It has rather been something between an art and a sport.”⁶⁴ Despite such disclaimers, “exploration” as a whole had been called into question as a scientific activity. The final result was to cast a shadow on all expeditions that sought to go where no one had gone before: an attack on Everest's summit, a nonstop flight across the Atlantic, the heights of the stratosphere, the depths of the ocean, even a trip to the moon had its skeptics. Such exploratory field work was perhaps too sports-like and too adventurous to fall under the rubric of a scientific endeavor. We will see how this dynamic influenced the underwater expeditions of William Beebe. On a general level, however, the Arctic dispute was palpably felt by Explorers Club members and it caused them to make an assessment of the nature of exploration itself—an assessment that caused explorers to distance themselves from a tradition of

⁶² Quoted in Hugh Eames, Winner Lose All, 131.

⁶³ Vilhjalmur Stefansson, Friendly Arctic (New York: The MacMillan Co., 1921), 31. Incidentally, Stefansson's thesis on the benign nature of Arctic geographies falls squarely into the move to distance exploration from adventure discussed below. Also see William Hunt, Steff: A Biography of Vilhjalmur Stefansson, Canadian Arctic Explorer (Vancouver: University of British Columbia Press, 1986), 145-62, and Hugh Eames, Winner Lose All, 63-4.

adventure that was deeply ingrained in the lore and practice of exploration.

Adventure in Crisis

Members of the Explorers Club, and American explorers in general, represented a continuation of a nineteenth-century adventure-filled frontier legacy into the twentieth century. But adventure was a double-edged sword that explorers wielded with great care. In the early twentieth-century, the laboratory, experimental procedures, and well-funded research institutes dominated the American scientific scene. The new hero of the 1920s, perhaps best exemplified by Sinclair Lewis' *Arrowsmith*, was often the ascetic scientist who put controlled experiments and mathematical knowledge at the center of his research program.⁶⁴ In this context, the daring adventures of explorers could easily appear foolhardy.⁶⁵ Indeed, Nathaniel Shaler's thoughts on exploration, mentioned earlier in this chapter, reflect precisely this concern. The changing culture of science, coupled with the fallout of the Cook-Peary dispute, meant that explorers, especially naturalists, had to work hard to reconstruct exploration as a valid scientific practice.⁶⁶

One common strategy employed to deflect such criticism was to distance the work of exploration from "adventure." In a popular account on the nature of exploration, Roy

⁶⁴ See Charles E. Rosenberg, *No Other Gods: On Science and American Social Thought* (Baltimore: Johns Hopkins University Press, 1976), 123-31.

⁶⁵ For how this impacted the National Geographic Society, see Catherine A. Lutz and Jane L. Collins, *Reading National Geographic* (Chicago: University of Chicago Press, 1993), 19-27, and Philip Pauly, "The World and all that is in it: The National Geographic Society, 1888-1918," *American Quarterly* 31 (1979): 517-32.

⁶⁶ See Pierre Berton, *The Arctic Grail*, 602-626.

Chapman Andrews suggested that

[a]dventures, of course, are always associated with exploration. Yet they are the one thing which a real explorer tries to guard against. My favorite quotation is Stefansson's dictum 'Adventures are a mark of incompetence.' It means that if you have an adventurous expedition you did not prepare yourself adequately

Andrews was responding here to a subgroup of explorers who he perceived as "travelers seeking adventure. They welcome every opportunity for a hairbreadth escape or some thrilling experiences because it is their stock in trade." The true explorer may encounter danger or adventure, but he can not deliberately seek it out. "If the explorer has a clear-cut problem to solve and an honest desire to contribute to the world's knowledge he will prepare against adventure."⁶⁷ Compare this sentiment with Andrews' seemingly contradictory claim that adventure is the "vital flame" of the explorer. Andrews was a hugely popular expedition leader in the 1920s and 1930s. During this time he led extravagant expeditions into central Mongolia that were followed by the popular press. In the public eye, he epitomized modern exploration. As such, he knew that "adventure" had both positive and negative elements. He sought to bridge the gap between the heroic age of exploration, and the modern age in which carefully business-planned scientific objectives came to supersede the haphazard meandering of the adventurous explorer.⁶⁸

⁶⁷ Roy Chapman Andrews, "Explorers and their Work," Saturday Evening Post 204 (August 22, 1931), 85. Andrews quotes Vilhjalmur Stefansson's quote from the latter's My Life with the Eskimo (New York: Macmillan, 1913), 165-67.

⁶⁸ Also see Roy Chapman Andrews, "Through the Wilderness of Northern Korea to the Long White Mountain," in Told at the Explorers Club, 3; Roy Chapman Andrews, This Business of Exploring (New York: G.P. Putnam's Sons, 1935). Stephen Pyne views the 1910s as the key era for this shift in the explorer's character. "As participants in intellectual history, the explorers of the heroic age were splendid anachronisms, the last and purest of a breed for which Antarctica had offered a final refuge." The Ice: A Journey to Antarctica (Iowa City: University of Iowa Press, 1986), 89. I am fully sympathetic with Pyne's claim, though I hold that Antarctica was not the only landscape of refuge.

Andrews' message was echoed by many of his colleagues at the Explorers Club (between 1931 and 1934 Andrews served as president). In the 1931 collection of tales Told at the Explorers Club, Vilhjalmur Stefánsson contributed an article entitled, "The Royal Road to Humdrum." He began with the sentiment that adventures are to be avoided at all cost in the work of exploration. When they are unavoidable, it is not so much brute strength and endurance as intelligence and clear-thinking that helps explorers survive adventures. Stefánsson thus subverted the traditional discourse where adventure involves a physical encounter with nature, and replaced that order with introspection, perhaps more in keeping with the scientific mind. Monroe Thorington, too, eschewed associating exploration with the encounter of hardship. "Opinion of hazard in exploration has clearly changed during recent years. The modern explorer knows that hardship is a mistake if it can be avoided, opprobrium, rather than glory, attaches itself to a tale of starvation." William Morden, naturalist for the American Museum of Natural History, followed suit. "Contrary to popular impression, most of those who go into distant and little-known lands in the interests of science . . . are not impelled by a desire for 'adventure' . . . What I mean is that their purpose is to procure their information and collect their specimens with as little labor, as little danger and as little 'adventure' as possible."⁶⁹ In the 1936 compilation of stories, Explorers Club Tales, Walter Granger, a naturalist for the American Museum of Natural History and then president of the Explorers Club, wrote that "when the first Protozoon split its single cell into two parts,

⁶⁹ Vilhjalmur Stefánsson, "The Royal Road to Humdrum," 323; J. Monroe Thorington, "Tracing the Columbia to its Source," 339; and William J. Morden, "Mongolian Interlude," 265, all in Told at the Explorers Club.

and those divided units floated off to live independent lives, Adventure and Exploration were born. But today, true Exploration joins with Science in the quest of Enlightenment.”⁷⁰ The implication was that science has replaced adventure in the practice of exploration. Alanzo Pond, an anthropologist, started his narrative by wondering if he was to write “A story or adventure? I might tell of an impromptu ducking from a cranky canoe on a storm-swept lake, a forced swim in the rapids, but those are adventures which, as Roy Chapman Andrews and Vilhjalmur Stefansson say, ‘are marks of incompetence.’”⁷¹

The volumes that contained these disclaimers were intended for the public. The books themselves were published to raise funds for the Club in a period of Depression-era financial crisis. But these texts also had the wider goal of making the work of exploration known to as many as possible. There is evidence that some members of the Club were not enamored with the idea of distributing a collection of adventure stories. At the twenty-eighth annual dinner, a verse was sung that criticized the project: “Thirty-three explorers wrote a snappy book. The only author who stayed out was Dr. Cook. It makes you weep to read the trash/ But boy, oh boy, we need the cash.”⁷² Nevertheless, it would be wrong to believe in the functional explanation that members employed the narrative solely to appeal to the commercial tastes of American consumers. Contributors had to balance their

⁷⁰ Walter Granger, Forward to Explorers Club Tales, True Stories of Exploration, Research and Adventure, as Told at the Explorers Club by Men of Daring and Achievement (New York: Dodd, Mead & Company, 1936), vii.

⁷¹ Alanzo Pond, “Sahara Adventures,” in *ibid.*, 202.

⁷² W. A. MacDonald, “When Explorers Get Together,” The Explorers Journal 11 (January-April 1932), 7.

stories with enough adventure to provide an interesting tale, and at the same time portray their work as a serious scientific endeavor. Their aversion to “adventure” was one such strategy.

The distancing from adventure was part and parcel with the embrace of scientific values. Take, for example, the rhetorical meanings of exploration used by members of the Explorers Club who gathered to pay tribute to the work of Sir Ernest H. Shackleton, who had died in Cumberland Bay, South Georgia after making an arduous dash to save his stranded crew. The eulogies praised him for his “manly strength,” his heroism, and leadership. But they also emphasized the notion that “the advancement of scientific knowledge was always one of Sir Ernest’s important objectives.” Robert Cushman Murphy suggested that for Shackleton, “scientific gain stood always higher than love of glory or adventure.” In Shackleton’s last planned expedition “no provision had been made for even approaching the South Pole.”⁷¹ Murphy’s statements reveal the potential tensions between adventurous exploration and scientific pursuit. When the explorer courts adventure, either for the sake of testing the body’s endurance, or in a race to an uncharted region, that explorer risked losing his status as a “man of science.”

Murphy went on to describe the proper virtues of exploration, again, using the race for the poles as his example. He was obviously dealing with the problem of eulogizing an explorer who had failed in his objective to achieve the South Pole.

When we contemplate Peary’s victory, for example, is it the planting of a flag at the North Pole on a fair April day that takes the measure of his spirit? No! It is

⁷¹ “The Memorial Meeting in Honor of Sir Ernest H. Shackleton, R.N.,” The Explorers Journal 1 (March-May 1922), 3-8.

the long years of discipline and experiment, the concentrated purpose, the unsparing drive. It is the aim, not merely the bullet, that kills."⁷⁴

So the scientific explorer was defined less by adventure and the glory of achievement than discipline, concentration, and unsparing drive--these were unquestionably virtues that both the explorer and the scientist could share. Other naturalists attempted to alter the definition of adventure in order to make it more compatible with science. In a popular account of an oceanographic expedition to the Gulf of California, William Beebe used the word adventure to refer to "the sudden breathless glimpse under the microscope of unexpected beauty and dynamic living in the world of life on a sliver of kelp, quite as much as the harpooning of a forty-two-foot whale shark."⁷⁵

In a 1931 compilation of a lifetime of Adventure!, Carveth Wells drew attention to the factual nature of his many adventurous tales:

It was not until I wrote my book Six Years in the Malay Jungle, the preface of which was written by Doctor Frederick Lucas, Director of the American Museum of Natural History, who vouched for the truth of all my 'lies,' that it occurred to people that, after all, I only had the faculty of making the truth sound like a lie.

Wells clearly thought of Lucas' preface as a kind of scientific seal of approval for his travel tales. Moreover, the spectacular knowledge acquired from such adventures, whether it be fish that climb trees, lizards that break off their tails, singing earthworms, or bushes that lie down when they notice you are coming, is in no way incompatible with scientific knowledge. The truth may sound like a lie, but this is just a testament to the exotic and seeming incomprehensible non-Western world.

⁷⁴ Ibid., 7.

⁷⁵ William Beebe, Zaca Venture (New York: Harcourt, Brace and Company, Inc., 1938), xii.

Explorers also attempted to bring their practice into the modern world by drawing from social developments of the early twentieth century. Perhaps the eclectic composition of the Explorers Club membership, including academic naturalists and wealthy businessmen, provided the environment for explorers to integrate advertising and business-like efficiency into the practice of exploration.⁷⁶ For instance, Vilhjalmur Stefansson pointed to the necessary work of publicity in the world of exploration. The act of “discovery” was of little value in and of itself, it had to be connected to a wider popular culture. “Christopher Columbus is the discoverer of America chiefly because he and what he was supposed to have done got the right preliminary publicity.” Bringing the matter up to more recent times, Stefansson suggested that “Peary would not have become an immortal had the North Pole not been a well-advertised place.” For those wondering whether or not “explorers are to join the Dodo,” Stefansson had a heartening, if not slightly cynical response: “the tribe of Great Discoverers will not become extinct till the Age of Advertising has passed.” In no uncertain terms, Stefansson situated modern exploration into the burgeoning realm of commercial advertising.⁷⁷

The subtext of Stefansson’s remarks is that publicity was absolutely necessary in order to secure the funds of exploratory work. Publicity for both Columbus and Peary was integrally tied to patronage. But as much as proper advertising could lead to funding,

⁷⁶ On advertising see Jackson Lears, Fables of Abundance: A Cultural History of Advertising in America (New York: Basic Books, 1994) and for an important study on the relationship between exploration and the media see Beau Riffenburgh, The Myth of the Explorer.

⁷⁷ Vilhjalmur Stefansson, “Are Explorers to Join the Dodo?” The American Mercury 11 (May 1927), 13-18.

publicity presented some serious challenges for the explorer, particularly daunting was the publicizer's tendency to manufacture spectacular events. E. M. Nicholson wrote that an expedition leader may have to clear off a deficit "by the sale of exclusive Press rights to some newspapers which will demand, and if necessary concoct sensational accounts quite out of keeping with the spirit of modern scientific exploration." Newspapers often portray exploration as a "stunt show," according to Nicholson, and few "will print details of any serious investigation at all."⁷⁸ So publicity had the virtue of opening the wallets of the wealthy, but with the constant danger of jeopardizing the serious side of scientific exploration. Indeed, members of the Explorers Club were constantly vigilant in preventing exploration from becoming too sensational.⁷⁹

While America entered a new phase in the history of popular culture, the media seized upon those aspects of exploration that seemed the most heroic. Similar to the adulation given to new "stars" like Mary Pickford and Douglas Fairbanks, heroic explorers became natural history stars.⁸⁰ This could often prove detrimental to the serious and scientific element of exploration, a practice that often appeared diametrically opposed to the new culture industry with its somewhat questionable moral outlook. Earl Hanson addressed just this problem in a 1929 volume of the Journal

Those who have followed the work and aims of modern explorers must realize

⁷⁸ E. M. Nicholson, "Modern Tendencies in Exploration," The Nineteenth Century 107 (June 1930), 825-35.

⁷⁹ This is the central thesis of Gregg Mitman's, Reel Nature: America's Adventure with Wildlife (Cambridge: Harvard University Press, 1999).

⁸⁰ Larry May, Screening Out the Past: The Birth of Mass Culture and the Motion Picture Industry (Chicago: University of Chicago Press, 1980).

that in some respects we are still at loose ends. Before it can be completely rationalized as one form of scientific endeavor, exploration must be divorced from showmanship. It is true that a bit of sensationalism often enables explorers to raise funds for important expeditions, but it is also true that the demands of sensationalism are often in conflict with those of science.⁸¹

Echoing these remarks in an editorial regarding the sloppy presentation of lectures at Club functions, Ernest Ingersoll remarked, "[a] lecture is not a 'show'—does not attract an audience primarily as an entertainment but as a means of learning something worth knowing."⁸² We will see in chapter 4 the importance of publicity and managing sensationalism in the scientific practice and representations of William Beebe.

Another way to ameliorate the contradictions between adventure and exploration was to incorporate both modern technology and business-like efficiency into their work. James Clark, then Vice-Director in charge of preparation and exhibition at the American Museum of Natural History, noted that "it must be the spirit of adventure coming down to us from roaming primitive man and still lingering in our blood that causes this word 'expedition' to be so alluring." Clark then provided a recipe of elements required in order to become an explorer. Of special note is the way he distanced the practice of exploration from its traditional heroic qualities: "We who do go forth on expeditions are neither heroes nor athletes." At the same time, he distinguished proper expeditions from "aimless pleasure jaunts." Instead, expeditions are "carefully planned trips with definite purposes and objectives." In this context, the modern explorer had much in common

⁸¹ Earl Hanson, "Exploration as a Scientific Endeavor," The Explorers Journal 8 (October-December 1929), 85-6.

⁸² Ernest Ingersoll, "A Meditation on Lectures," The Explorers Journal 9 (January-March 1930), 3.

with the Progressive “organization man.” For “his success in raising the money depends on his reputation and his salesmanship.” More than just securing necessary funds, the expedition leader was to be a model of efficiency, and one method for improving that efficiency was through the use of modern equipment such as automobiles and airplanes. Certainly, the personal and vigorous experience of manly exploration would be abrogated with such technologies—“Romance lost, but efficiency gained.”⁸³

Clark concluded on an interesting note that served to emphasize the value of expeditions. He claimed that without expeditions, science and education would not be possible at all. But then his logic took an interesting twist by way of distinguishing the “expedition” from the practice of “exploration.”

It was the wanderings of primitive man in search of food and shelter that led to the first beginnings of scientific observation and research. As these uncouth ‘explorers’ of long ago sat around their fires and told of what they had seen in their chance journeys, they recorded the findings of our earliest expeditions. Such journeys are our Expeditions.

Clark’s statement moves in two directions. First, it situates modern expeditions into a long history—indeed, a primitive instinct—of searching. At the same time, he drew attention to the changed practice of the thoroughly modern expedition. “Journeys are made with intelligent purpose, deliberately planned and painstakingly carried out to achieve a knowledge and understanding of our world.”⁸⁴ Clark moves his reader from the uncouth and adventurous explorer to the business-minded and efficiency-obsessed expedition.

⁸³ James Clark, “Expeditions,” *Natural History* 23 (September-October 1933), 485-496.

⁸⁴ Ibid.

Another example of the changing nature of exploration was articulated by Fitzhugh Green, who wrote something of a eulogy to the age-old concept of the lone explorer - "the ablest executive is superseding the romantic adventurer " The leader of the modern expedition, according to Green, "sets about his work much as would the promoter of some new industry " Green's extraordinary essay described how the expedition leader must be an effective salesman in courting the necessary patronage for often expensive voyages He must secure the proper equipment from companies, and then promise endorsements for those products, for one of the leader's most important tasks was to secure the publicity of his expedition The expedition must receive wide attention in newspapers and the periodical press, and when the explorer returns, he must undertake speaking engagements and write up essays to narrate their encounters "He finds himself the administrator of a huge business enterprise Pure physical courage and indifference to incidental hardships are trifles as compared with the terrific responsibility he owes to his scores of backers " So Green attempts to distance the qualities of manly vigor and courage from exploration Instead, the explorer must be a modern business-man who courts necessary patronage through the work of publicity ⁴⁵

Roy Chapman Andrews expressed a similar sentiment in an article for the Saturday Evening Post "There never was a time when exploration was more attractive than it is today But it is not the same job that it used to be fifteen years ago " Andrews suggested that "the old days of the Arctic explorer, foot slogging behind his sledge, are

⁴⁵ Fitzhugh Green, "The Explorer Passes: The Able Executive is Superseding the Romantic Adventurer," Century 114 (October 1947), 697-703.

for the most part gone. Exploration has entered a new phase.” The key to the modernization of the explorer was a change in method, and just as Clark suggested, nothing was more imperative to exploration than the use of modern automobiles and aeroplanes. Moreover, the modern explorer must be a specialist in science. “Outdoor men” are expensive luxuries, “[e]very white man who goes with me must do either a technical or a scientific job.” So the most efficacious way to become an explorer was to stay in school, because “just brawn and endurance won’t get you very far in the exploration of today and tomorrow.” Just like Clark, Andrews distances modern exploration from the older tradition of manly vigor. There is a popular misconception, according to Andrews, that the explorer must encounter hardships. “Personally I do not believe in hardships. Live as comfortably as you can while you can, is a pretty good motto.”⁸⁶

As we shall see in chapter 2, exploration was a business for Andrews, a highly bureaucratic endeavor in which efficiency, planning, and organization were the keys to success. This managerial ethos was a key characteristic of the Progressive period—Taylor’s Principles of Scientific Management stands as one of the most representative texts. Efficiency, calculated motion, organization—this was the code of Progressive corporate America. The organization man became a new American hero.⁸⁷ But business culture was also a key ingredient to Andrews’ recipe on how to explore

⁸⁶ Roy Chapman Andrews, “Explorers and Their Work,” Saturday Evening Post 204 (August 22, 1931), 6-7, 84-85.

⁸⁷ Peter Filene, “Between a Rock and a Soft Place: A Century of American Manhood,” The South Atlantic Quarterly 84 (Autumn 1985): 339-355.

properly. Exploration's scientific validity was thus bolstered through the integration of a Progressive era culture of managerial efficiency.

* * * * *

Since the nineteenth-century, the practice of adventurous exploration has been rooted in the rhetoric of exploring the Western frontier. Far from ending the work of daring explorers, the Census Bureau's closing of the frontier brought interdisciplinary groups of naturalists together in organizations like the Explorers Club that attempted to define what exploration was really all about. When naturalists set their eyes on the Arctic, Antarctica, Africa, Alaska, and the Philippines, they were looking through lenses ground out of the history of Western frontier exploration. Key to this practice were the traits of adventure and heroism. But the new climate of dispassionate science, as well as the opprobrium heaped upon explorers by the Cook-Peary debacle, caused explorers to distance themselves from those adventurous traits that they had once relied upon to legitimize scientific claims. Throughout the twentieth century, both the rhetoric and the practice of exploration would continue to be filled with the romance, danger, and adventure that characterized the expeditions of Fremont and Powell. Just as certain, naturalists also had to call attention to the serious scientific nature of their work. They needed to present their work in a way that was adventurous enough to receive popular acclaim and with a seriousness that legitimized them as members of a scientific community.

Just as certain, geographical metaphors have been increasingly appropriated by the wider scientific community. Shaler's comments that atomic research falls within the

rubric of exploration, and Beebe's redefinition of adventure to encompass the examination of a specimen through a microscope are just two early examples of such a move. It is now a commonplace for scientists to characterize their work as the stuff of exploration. References to frontiers have also flourished. The title of Vannevar Bush's postwar Science: The Endless Frontier (1946) capitalized on the cultural cachet of the frontier in an effort to court funding for basic science. More recently, a National Public Radio series and a University of Florida speakers series shared the household title of "Frontiers of Science." Such metaphors operate on a titular basis to evoke the power of the frontier myth (usually meaning the undiscovered country as opposed to virtues of heroism and manliness) before moving on to the proper and usually peer-reviewed scientific subject. As opposed to naturalists in the early part of this century, there no longer seems to be a danger in invoking these metaphors. In contrast to the ubiquitous "frontiers" of science, "adventure" has been discarded into the wastebin of scientific virtues. It still lives on in popular culture, most recently in the popular "Animal Planet" series "The Crocodile Hunter." Despite Steve Irwin's outstanding knowledge of natural history, it is interesting to note how quickly his hair-breath adventures have been subject to the satire of "Saturday Night Live."

Such is the story of rhetorical exploration—an ideology carefully reconstructed within posh men's clubs of America's burgeoning cities, an ideology that pressed explorers to move beyond America's West in search of new regions ripe for investigation. We must now leave our comfortable armchairs and follow a few of them into the field and view how exploration was actually practiced. All of the central naturalists discussed

in this dissertation had dealings with the Explorers Club. We have seen a bit of what Roy Chapman Andrews, Robert Cushman Murphy, and William Beebe might have done when they inhabited New York environments in the off season. Now we must board ships departing from the West River and watch these naturalists at work as they attempt to learn of the ocean and its inhabitants.

Chapter 2

Roy Chapman Andrews and the Business of Exploring: Cetology and Conservation in Progressive America

Whale Croquettes--3 cups left-over cold roast whale, finely chopped; 1 ½ teaspoonfuls salt, trifle pepper; 3 tablespoonfuls melted butter; 1 1/4 teaspoonful savory (optional); 2 sprigs parsley, finely chopped; 1 large onion, finely chopped; 6 to 8 walnuts, finely chopped (optional); ½ cup dried bread crumbs.¹

In the estimation of some of these gentlemen the value of a scientific pursuit is as inversely as the size of the objects studied. What the value of cetology can be in such eyes we do not know, unless it be something to be promptly sat upon.

Roy Chapman Andrews' early career as a cetologist more or less fell into his lap. He had been mopping the floors of the American Museum of Natural History for seven months when Hermon C. Bumpus, then director of the Museum, requested that Andrews and taxidermist Jimmy Clark secure the skeleton of a North Atlantic right whale that had been killed by fishermen in Long Island's Amagansett Bay. They purchased the whale for thirty-two hundred dollars and then began the work of extracting its bones from the beach. The task was too daunting for the two young museum workers, so they hired a dozen sympathetic fishermen who hacked away at the carcass with great knives in sub-freezing weather. "It was a slow business, but at last the head was separated and, on the beach, also the ribs of the upper side." Adding to their troubles was a storm that blew in from the east and lashed the coast with "hurricane force" winds. After the storm had passed, they

¹ C. H. Claudy, "The Whale as a Food Factor," Scientific American 118 (March 9, 1918), 208.

² E. D. Cope and J. S. Kingsley, editorial, American Naturalist 24 (January 1890), 51.

found the bones deeply buried in the sand. "It would have been difficult enough in the best circumstances to uncouple the huge vertebrae and get the ribs of the lower side, but now it was almost impossible. . . . We had to grope blindly with small knives, our arms in the freezing water up to the elbows, to disarticulate each vertebra." Three days were required to get the specimen fully extracted and ready for shipment. Andrews took great pride in succeeding in his task to secure every bone, even the pelvic rudiments, which he found in the fishermen's try-pots. Shortly after bringing the specimen home, Andrews would proudly publish his first scholarly article describing the right whale's osteological details in the *Museum Journal*. Such was Andrews' baptismal expedition in what would become a long history of exploration for the American Museum. He would later reflect upon the job: "I never have suffered more in any experience of my life than I did then."

The details of Andrews' first expedition contain many of the themes that would continue to define his practice as a natural historian: the experience of pain and suffering, overcoming difficult obstacles, and the successful completion of a valuable contribution to science. But what is distinctive about this first endeavor is the inefficient and almost amateurish manner in which the two museum workers bumbled around in the freezing surf. It is hard not to smile at Andrews' complaint that "as soon as we dug out a shovelful of sand to get at a bone, the depression filled with water."⁴ A tremendous investment of time, labor, and capital went into securing this lone specimen; the entire affair was marked

³ Roy Chapman Andrews, *Under a Lucky Star: A Lifetime of Adventure* (New York: The Viking Press, 1944), 26-29.

⁴ *Ibid.*, 28.

by its inefficiency. But if this was true of his first expedition, the rest of Andrews' career as a naturalist would be characterized by a practice of the very opposite nature. He would spend a life attempting to reform and modernize the practice of exploration, and while Andrews is still fairly well known for his management of the popular Central Asiatic expeditions of the 1920s and 1930s, it is not realized that his penchant for efficient exploration was forged in his early work on cetaceans.

The primary objective of this chapter is to show how the practice of natural history—focusing on the case of Roy Chapman Andrews—could be transformed into an efficient business in the context of Progressive America. Historians of science have described how Gilded Age philanthropists and Progressive foundations altered and influenced the practice of science.¹ They have demonstrated how the interests of incorporated foundations—like the Rockefeller Foundation and the Carnegie Institution of Washington—directed science in specific directions. In this context, new scientific players—managers like Warren Weaver—were introduced to facilitate collaboration between foundations and scientists. These historians have made clear how the incorporated environment of the early twentieth-century directed scientific research in very tangible ways. But their analyses show more the “external” influences on science, rather than how the culture of American business seeped into the quotidian practice of scientists. Historian Bonnie Clause, however, provides an analysis that differs from the rest. She has shown how Frederick Winslow Taylor’s notion of scientific efficiency provided the organizational

¹ Robert Kohler, *Partners in Science: Foundations and Natural Scientists, 1900-1945* (Chicago: University of Chicago Press, 1991); Lily Kay, *The Molecular Vision of Life: Caltech, the Rockefeller Foundation, and the Rise of the New Biology* (New York: Oxford University Press, 1993).

principles by which the “Wistar Rat” became the right organism for conducting cancer research.” Similarly, Andrews sought to incorporate the virtues of scientific efficiency into the practice of natural history, and in the process he turned the ocean into a new frontier of commercial resources.

Andrews’ cetological work also sheds light on the nature of a natural history in flux. As the investigation of life became increasingly dependent on experimentation at the end of the nineteenth century, the practice of natural history became marginalized as an outmoded science. Andrews never addressed this epistemological divide, but his efforts to modernize natural history take on added significance in the context of the shift to experimental methods. Throughout the twentieth century, naturalists have had the thankless task of justifying their roles as interpreters of nature. Andrews’ work can be viewed as an attempt to transform an antiquated practice of natural history into a modern and efficient science.¹

But invoking the rhetoric of Progressive era efficiency also presented a challenge to the gender-laden practice of exploration. Just as Andrews fashioned himself into a business man, he also nurtured those values that made him a man. Modern and efficient business practices possessed a potential for producing wealth and luxury, and an excessive dependence on luxury, according to Andrews, undermined the moral character that makes

¹ Bonnie Tocher Clause, “The Wistar Rat as a Right Choice: Establishing Mammalian Standards and the Ideal of a Standardized Mammal,” *Journal of the History of Biology* 26 (1993): 329-330.

² Lynn Scharr, “Natural History and the “New” Biology,” in N. Jardine, J. A. Secord and E. C. Sparry, (eds.), *Cultures of Natural History* (Cambridge: Cambridge University Press, 1996), 426-46; Garland Allen, *Life Sciences in the Twentieth Century* (Cambridge: University of Cambridge Press, 1978); Ronald Ranger, Keith R. Benson, and Jane Maienschein (eds.), *The American Development of Biology* (New Brunswick, NJ: Rutgers University Press, 1991).

a people great. Andrews sought to alleviate this fear of decadence by transforming himself into a sportsman, a hunter.⁵ More than a resource for commercial exploitation, the ocean was also a hunting ground for sport, and during this period of his life, Andrews' primary trophy was the largest and perhaps the noblest of game species: whales. He sought to preserve the virtues of rugged masculinity so as to fend off the decadency of the sedentary business efficiency expert. Indeed, these two themes form the constellation of values that epitomized middle-class Progressive culture.⁶

Andrews would spend most of his adult life running away from cities crowded with people: he termed this his "wanderlust." But earlier on, graduating from Beloit University in his home state of Wisconsin, he ran to the throngs of New York City with the sole aspiration of becoming a naturalist for the American Museum of Natural History. The oft-repeated story of Andrews' inauspicious introduction to the Museum highlights his *ad hoc* attitude of achieving objectives. He met with Bumpus and asked for a job as staff taxidermist, a post that James Clark had secured a few years before. The director replied that there were no available positions. Then Andrews blurted out, "I'm not asking for a position. I just want to work here. You have to have someone to clean the floors."

⁵ Andrews never delivered a critique of decadence in America, but his general thoughts on the degenerative effects of wealth and luxury can be seen in his remarks about the peoples he encountered in the field. See Roy Chapman Andrews, Across Mongolian Plains: A Naturalist's Account of China's Great Northwest (New York: Blue Ribbon Books, 1921), xiv, and *idem*, Whale Hunting with Gun and Camera (New York: D. Appleton and Co., 1916). On decadence see Donna Haraway, Primate Visions: Gender, Race, and Nature in the World of Modern Science (New York: Routledge, 1999), 26-58.

⁶ Joe Dubbert, "Progressivism and the Masculinity Crisis," in The American Man, Elizabeth Pleck and Joseph Pleck, eds. (Englewood Cliffs, NJ: Prentice Hall, 1980), 303-320, and Peter Filene His/Her/Self: Sex Roles in Modern America, 2nd ed. (Baltimore: Johns Hopkins University Press, 1986), Kim Townsend, Manhood at Harvard: William James and Others (New York: W.W. Norton, 1996).

Couldn't I do that?" Bumpus acquiesced, and thus Andrews' first association with the Museum was as a janitor.¹⁰

Modernization of the Whaling Industry

Born and raised in rural Wisconsin, Andrews was isolated from the economic and cultural changes that swept through urban America around the turn of the century. These changes were tangibly manifest in the whaling industry that Andrews would come to know so intimately. The American fondness for organization, bureaucratization, centralization, and efficiency were at the heart of the dramatic changes taking place in American whaling in the early twentieth century.¹¹ The "golden age" of whaling lasted from 1820 to 1860, when Nantucket and New Bedford brigs harvested sperm whales for conversion into heating oil. The practice of nineteenth-century whaling is burned into America's collective memory through books like Melville's *Moby Dick*. Fleets of wind-driven brigs leave New England harbors and set sail for the foraging grounds of the world's oceans. A cry from the mast-head lookout issues notice for the captain to set course for the spout, men load into the whaling boats, and boats are lowered. Then ensues the classic chase and capture

Until better sources become available, descriptions of Andrews' early life will depend on autobiographical and anecdotal accounts: Roy Chapman Andrews, *Under a Lucky Star: A Lifetime of Adventure*, (New York: The Viking Press, 1944); Geoffrey Hellman, *Bankers, Bones & Beetles: The First Century of the American Museum of Natural History* (Garden City, NY: The Natural History Press, 1968), 171-191; Douglas J. Preston, *Dinosaurs in the Attic: An Excursion into the American Museum of Natural History* (New York: St. Martin's Press, 1986), 96-110.

¹¹ Louis Galambos, "The Emerging Organizational Synthesis in Modern American History," *Business History Review* 44 (Autumn 1970), 279-290; Robert H. Wiebe, *The Search for Order 1877-1920* (New York: Hill and Wang, 1967); Alan Trachtenberg, *The Incorporation of America: Culture and Society in the Gilded Age* (New York: Hill and Wang, 1982); Alfred Chandler, *Strategy and Structure: Chapters in the History of the Industrial Enterprise* (Cambridge: Harvard University Press, 1962).

of the sperm whale with harpoon and lance. Sperm whales were targeted because they were slower than other species, and so could be approached through power of wind or muscle. Also, sperm whales, as opposed to many other cetaceans, generally float when killed. After a kill, the main ship closed the gap between itself and the floating carcass and then the entire crew began the work of “cutting in,” flensing the flesh of the whale, which was cut up and boiled in try-pots aboard the ship. The onset of the Civil War, the diminishing populations of sperm whales, and the discovery of petroleum in Pennsylvania were reasons enough for the industry’s decline after 1860.

Around 1870, two technological innovations breathed new life into the stagnant industry. First was the wide application of steam power that enabled whalers to chase down the faster swimming species—rorquals, bowheads, and finbacks. The second innovation was of Norwegian design. In 1868, Svend Foyn invented an explosive-headed harpoon gun that allowed whalers to shoot and kill the whales from the security of the main deck. This invention cut down the amount of time required for securing a whale; whaling became a matter of getting close (which was no easy task for fast-moving rorquals) and firing a harpoon from a cannon. The whale would often be killed instantly when the bomb exploded in the specimen’s lungs.

A good day could bring in as many as 12 or 15 whales, which would then be towed to a “shore station” where a team of men took their positions on a line through which the whale moved. As the whale was towed up the landing “slip,” the carcass would be dissected and converted into oil and fertilizer. In contrast to Ford’s assembly line where natural resources were molded into commercial goods, these “whale factories”

could be called “disassembly lines” where the organism was systematically broken down into its constitutive marketable products, as in the meat-packing industry. Despite this contrast, the disassembly of the whale as it moved up the slip very much resembled the assembly line process: labor on a common project was divvied out to different workers along the slip.¹² The use of shore stations also made more efficient use of parts of the whale that were formerly neglected. While the old style of whaling would collect the oil and then set the rest of the carcass to drift, the shore-stations of the late nineteenth century were much more effective in utilizing the entire carcass. The newer techniques were employed with terrifying celerity by Norwegian and British whalers starting in the 1870s. America would boast similar outfits in New England harbors in the 1890s. Again, cetacean populations were quickly decimated, and in the first decade of the twentieth century the entire Atlantic industry moved to the South Atlantic where cetaceans off the Sandwich Islands and South Georgia produced great wealth. American whalers also turned their attention to Pacific species with the establishment of similar operations in Alaska and British Columbia.

Shore stations were located in areas where great populations of whales would be harvested and easily towed to the processing plant. These stations were always short-lived since it took very little time for steamers to exhaust whale resources within a given area. For instance, ten vessels operating off Newfoundland harvested 1,274 whales in

¹² On Ford, see Thomas P. Hughes, American Genesis: A Century of Invention and Technological Enthusiasm (New York: Penguin Books, 1990), 184-294.

1904. In 1907, fourteen vessels took only 481 whales.¹³ It did not take long for company managers to realize their point of diminishing returns at which time they relocated or went out of business. This changed with the final development in the history of modern whaling--the creation of "floating factories." The floating factory made the processing station mobile. Large ships were outfitted with the facilities to process whales in a manner similar to shore stations. These factories were accompanied by a small armada of steamers equipped with harpoon cannons.¹⁴

The modernization of the whaling industry was part of a much wider move to reform the practices of American business and industry. Progressive Americans had a commonly felt confidence in "efficiency" and "scientific management." While it would be wrong to portray American businesses as undergoing a shift from inefficiency to efficiency, it is true that the rhetorical objective of efficiency, under the banner of authority established by Frederick Winslow Taylor's Principles of Scientific Management (1911), became an omnipresent concern. The goal of business, industry, and even politics, was to direct and control the movements of workers with a precision that would lead to increased corporate profits. The ideal of efficiency also found a voice in Progressive-era conservationists who sought to scientifically manage America's natural resources in order to stabilize the continued growth of American industry. Robert Kanigel has recently argued that after his widely-publicized 1909 New York hearing, Frederick Taylor--and his

¹³ Frederic Lucas, "The Passing of the Whale: The Economic Effect of Extinction," Scientific American 99 (November 28, 1908), 344.

¹⁴ By far the best and most comprehensive account of the history of whaling is Richard Ellis, Men and Whales 2nd edition, (New York: First Lyons Press, 1999).

idea of scientific management were on the minds and tongues of most American urbanites ¹⁵

The Modernization of Cetology

Cetaceans had long been a subject of ancient and medieval bestiaries, but it was not until the nineteenth century that their natural histories would be more systematically investigated. The increasing sophistication of cetological studies developed concomitantly with whaling. Several liberally educated ship captains and surgeons acted as both company agents and amateur naturalists, similar to the way nineteenth-century natural historians were town parsons, wealthy amateurs, museum workers and university professors alike. Moreover, natural history could be pursued by marginal communities, such as Victorian laborers ¹⁶. Whaling personnel were no exception to this order, their careers aboard whaling vessels gave them a unique opportunity to dispel the many myths about the size, structure, and behavior of whales and dolphins. William Scoresby, a British whaling captain, published an account of the Arctic dwelling Bowhead in his Account of the Arctic Regions (1820). Ship surgeon Thomas Beale detailed his

¹⁵ Samuel Haber, Efficiency and Uplift: Scientific Management in the Progressive Era 1890-1920 (Chicago: University of Chicago Press, 1964), Samuel P. Hays, Conservation and the Gospel of Efficiency (Cambridge: Harvard University Press, 1959), Robert Kangel, The One Best Way: Frederick Winslow Taylor and the Engine of Efficiency (New York: Viking Press, 1997).

¹⁶ Ann Secord, "Science in the Pub: Artisan Botanists in Early Nineteenth Century Lancashire," History of Science 32 (1994): 269-315, idem, "Corresponding Interests: Artisans and Gentlemen in Natural History Exchange Networks," British Journal for the History of Science 27 (1994): 383-408, idem, "Artisan Botany," in Cultures of Natural History, 378-93, Adrian Desmond, "Artisan Resistance and Evolution in Britain, 1819-1848," Osiris, 2nd series, volume 3 (1987): 77-110, Roger Cooter, and Stephen Pumfrey, "Separate Spheres and Public Places: Reflexions on the History of Science Popularization and Science in Popular Culture," History of Science 32 (1994): 237-67.

experiences with the sperm whale in The Natural History of the Sperm Whale (1839). American whaling captain, Charles Melville Scammon, compiled his natural historical knowledge in his widely cited Marine Mammals of the Northwest Coast of North America (1874).

To be sure, these treatises were amalgams of natural history and economic enterprise. Scoresby was attempting to provide a general survey of the Arctic as a potential geography of natural resources for British extraction. Similarly, Scammon envisioned his manuals as guides in aiding his fellow mariners to locate and harvest populations of marine mammals. These works also described the mechanics of whaling in as much detail as they depicted the cetaceans under investigation. All four were written during the era of classical whaling, and they are filled with anecdotes of daring races and courageous battles. Nevertheless, historian Lyndall Baker Landauer has argued that these nineteenth-century whaling-naturalists established the foundations for twentieth-century cetological science.¹⁷ The point here is that this foundation was laid during the days when whalers still traveled under the power of sail. How did the practice of cetology change when whaling entered the modern era?

Andrews was not the first naturalist in the modern era to study whales. But, with the exception of Frederick True of the Smithsonian Institution, America could boast of no formally trained whale naturalists at the start of the twentieth century. However, a number of naturalists, many of them who lived and worked close to the New York

¹⁷ Lyndall Baker Landauer, From Scoresby to Scammon: Nineteenth Century Whalers in the Foundations of Cetology (Ph.D. dissertation: June 1982).

metropolitan area, had conducted some investigations of whales during their lifetimes. Edward Cope, one of the paleontologists of the famous “battle for bones” who was backed by Henry Fairfield Osborn and the American Museum, had done some systematic research on whale fossils and skeletons. Frederick Lucas, then Director of the Brooklyn Museum of Natural Science and eventual Director of the American Museum, had done work on a number of Atlantic species. Joel Allen, curator of the Department of Mammals at the American Museum, had also researched the Greenland bowhead whale. So there was a network of individuals with whom Andrews interacted that could provide direction for the study of whales.

Perhaps more than anything else, it was the patronage of George S. Bowdoin, partner of J. P. Morgan and trustee of the American Museum, that spearheaded the initial move to make whales a subject of AMNH science. In 1907 Bowdoin donated \$10,000 for the construction of a life-size model of a blue whale. The task eventually fell to Andrews and James Clark who spent some eight months constructing a 76-foot model made of iron ribs, a wooden frame, and papier mache. The sulphur bottom model was not only hailed for its mammoth presence over the Hall of the Biology of Mammals, but also because it represented “a notable forward movement in the policy of the museum.” As opposed to stuffing a carcass with arsenic paste, this policy employed new taxidermy techniques to create educational exhibits that were a “correct representation of the animal as it lived.”¹⁸

The American Museum, almost from the start, put great emphasis on its

¹⁸ “The Whale in the American Museum of Natural History,” Scientific American Supplement 64 (September 14, 1907), 161-2.

educational mission and became something of a cathedral for the public display of nature. Under the presidency of Morris Jesup, the public exhibition of a spectacular natural world became one of the Museum's most important reasons for existing. Jesup kept this objective in mind when he hired Joel Allen and Henry Fairfield Osborn.¹⁹ Whether they worked with stuffed North American mammals, or gigantic dinosaur fossils, one of the goals of these two curators was to create exhibits that dazzled and awed Museum visitors. They thus created a natural world that moved far beyond the scale and scope of a typical New York citizen's everyday observations. Dinosaur bones became the order of the day.²⁰ It was in this context that the Museum's program to publicly exhibit a sample of cetacean skeletons makes perfect sense. A writer for Scientific American noted that Andrews' sulphur bottom model "is the largest species known, and is indeed larger than any of the reptilian monsters of geology."²¹ With two whale projects completed—the blue whale model and the retrieval of the North Atlantic right—and with one thousand dollars of Bowdoin's money left over, Andrews requested permission to further his naturalist career by undertaking field work in the North Pacific Ocean.

¹⁹ John Michael Kennedy, Philanthropy and Science in New York City: The American Museum of Natural History, (Ph.D. dissertation, Yale University, 1968), 76-155; Douglas J. Preston, Dinosaurs in the Attic, 66.

²⁰ W. J. T. Mitchell, The Last Dinosaur Book (Chicago: University of Chicago Press, 1998). Mitchell draws from the work of Haraway and Ranger to explain the American Museum's fondness for dinosaurs as a function of the race, class, and gender assumptions of Henry Fairfield Osborn. I am still fond of Stephen Jay Gould's explanation (disputed by Mitchell) that dinosaur exhibits merely are "big, fierce, and extinct." Dinosaur in a Haystack (New York: Harmony Books, 1995).

²¹ "The Whale in the American Museum of Natural History," 162.

Eastern Pacific Whaling

Andrews' first protracted experience as both an explorer and cetologist began with his April 24, 1908 departure for the Pacific whaling stations on the coast of Vancouver Island. The purpose of the expedition was to secure photographs, notes, and measurements relating to cetaceans of the Pacific. Andrews was challenging the commonly held belief that the world's whale population was cosmopolitan in nature. No doubt influenced by the evolutionary ideas of Henry Fairfield Osborn, he set out to describe variations in Pacific whales with the hope of revealing the species' evolutionary histories, histories which may contain, according to Andrews, variation and speciation from the much more widely known Atlantic species. Moreover, Pacific cetology was still relatively unexplored. "The entire scientific knowledge of these forms," Andrews noted, "rests on the observations of Captain Seammon, made more than thirty years ago, which have never been verified." A second, and perhaps more important objective of the expedition, was to add several skeletons to the Museum collection of Cetacea.²²

The success of the expedition, and those that followed, relied on the generosity and good will of Pacific whaling companies. Andrews' first contact was Captain Balcom of the Pacific Whaling Company which operated out of Secart, Vancouver. Andrews requested permission from Balcom to conduct observations of whales and whaling operations from both steamers and shore stations.²³ He also delicately assured that his

²² Andrews to Dr. H. C. Hovey, (April 10, 1908) Andrews Papers/DM, Folder VII-1, "Whale Collecting."

²³ Frederick True, cetologist for the Smithsonian Institution, was probably the first American natural historian to make use of Newfoundland shore-stations in his study of North Atlantic baleen whales.

"investigations would not interfere in any way whatever with the work at the station"²⁴

Andrews was attempting to achieve a rapprochement with industrial interests, but more important, at this point in his career, the practices of natural history and business interests were two separate entities that required careful boundary work. This distinction became increasingly blurred the more Andrews enmeshed his exploration in the business realm of modern whaling.

The first stop on Andrews' itinerary was Vancouver Island, where the Pacific Whaling Company managed two shore stations near Barclay Sound and Kyuquot Sound. Starting in 1905, these stations had hunted humpbacks, blue whales, and an occasional finback, which whales were converted into oil and fertilizer. The Barkley station was situated in a small bay not far from the open sea where the whales were hunted. The Pacific Whaling Company had expended no small amount of capital in erecting engine houses, wharves, bunk houses, offices, and the machinery required for refining whales. Quickly erected and often just as quickly abandoned, stations like the Barkley site resembled the stereotypical Western ghost town that flowered in times of prospecting and disappeared when the wealth of a region had been exploited. Every morning, the station's two steamers went to sea. With crews of twelve, these vessels were about one hundred tons burden, ninety to one hundred feet in length, and round bottomed to facilitate speedy manipulation.

At the end of May, Andrews made his first observations of whaling operations on the Orion. After storing his equipment below deck, he engaged the captain, gunners, and

²⁴ Andrews to Captain Balcom, (April 10, 1908) Andrews Papers/DM, Folder VII-1, "Whale Collecting."

crew in conversation. On his first trip out, he spent much of his time sitting on a great coil of towing line and asked questions about the specific species of whales encountered, and he prodded the crew for interesting stories of close encounters and hairbreadth escapes. Immediately following the cry from the masthead indicating three humpbacks off the port bow, Andrews scurried to gather his camera, notebook, and pencil. He stood next to the captain, who taught him to identify whales by observing the shape of their spouts. Still without his sea-legs, Andrews had great difficulty taking notes, fiddling with his camera, and trying to keep dry at the same time. The ship would move to the whales, which would promptly dive, and then stay stationary until the whales were spotted again. Each time they approached, the whales dived. This cat and mouse game continued as the whales' dives became shorter and shorter, all the while the captain making predictions of the length of the next dive. The Orion chased after this group of three humpbacks for two hours before striking one with the cannon. It was on this excursion, and the many that would follow, that Andrews would make notes on the behavior of whales: spouting, diving, swimming, feeding, and mating. Not to be understated was the knowledge he received from the crew itself. Indeed, many of Andrews' popular and scientific articles are riddled with anecdotal evidence supplied by gunners and captains.

After several weeks of work on Vancouver Island, Andrews went to a station in Admiralty Island, Alaska that was operated by the Tyee Company. His three weeks working off the coast of Alaska yielded far superior photographs. He "got a magnificent collection of photographs taken outside without having to go through the terrors of seasickness. I got one of the harpoon in the air, and another after it had hit the whale,

and photographed Humpbacks and Finbacks from every conceivable point.”²⁵ Clearly stated in the title of his popular account of whaling, Whale Hunting with Gun and Camera (1916), Andrews’ camera functioned as a metonymic substitute for the harpoon cannon. On his first trip out while at the Alaska station, Andrews reported that as the steamer neared one particular humpback he quickly removed himself and camera to the harpoon deck. After some anxious minutes, “the roar of the gun almost deafened me and instinctively I pressed the button of the camera.”²⁶ Andrews’ instinctive impulse thus linked photography and hunting as analogous practices in the work of natural history.²⁷

When Andrews was not taking notes and photographs aboard whaling ships, he spent his time onshore measuring, photographing, and describing the daily catch. As humpbacks, sperms, and blue whales moved up the slip, Andrews would busy himself measuring their features and inscribing the details into a table. He noted the variation in coloration, dissected their stomachs, and even found time to do some osteological work. During his two months in the Pacific, he observed over one hundred whales, before the age of the shore station, he often remarked, a naturalist might have to be content with observing only a handful in a lifetime.²⁸

Even upon his return to the metropolis, Andrews continued to call on whaling

²⁵ Andrews to Mr. J. Quinton, (September 16, 1908) Andrews Papers/DM, Folder VII-1, “Whale Collecting.”

²⁶ Roy Chapman Andrews, Whale Hunting with Gun and Camera, 49.

²⁷ Gregg Mitman, Reel Nature: America’s Romance with Wildlife on Film (Cambridge: Harvard University Press, 1999), 5-25; Donna Haraway, Primate Visions, 42-46.

²⁸ Incidentally, this was not exactly true for all naturalists, especially those ship captains and surgeons in the business of nineteenth-century whaling.

personnel for information. Shortly after his Vancouver expedition he wrote to an official of the Pacific Whaling Company: "I am wondering how the Page's Lagoon station is turning out this winter, and whether you found that the whales which were there really had been killed off, or whether new ones were appearing."²⁹ Andrews was becoming aware that modern shore stations were severely, if not irreparably, affecting the populations and even the behavior of Pacific cetaceans. The decreasing numbers of these animals were a dual loss: they were a loss to science and thus inhibited the naturalist's potential for discovering the evolutionary histories and processes of cetaceans, but they were also a loss to the whaling industry which was rapidly over-harvesting its natural resources.

Perhaps Andrews did not foresee the consequences of bringing this latter subject into popular discourse. Upon his return, metropolitan newspaper reporters harried Andrews for reports of Alaska, whales, and whaling. In this venue, Andrews hinted—though what he precisely said is unknown—that the whaling industry "conducted the whaling in such a way, that within a very few years all the whales would be killed out and extinct on this coast." The shareholders of the Pacific Whaling Company were incensed by these reports and instructed the management not to allow any more visitors at the stations and also not to sell or give away any more skeletons no matter the purpose. They claimed that their commercial interests had been hurt and that the value of their stock had been damaged by Andrews' statement.³⁰

²⁹ Andrews to Mr. A. Garcin, (December 5, 1908) Andrews Papers/DM, Folder VII-1, "Whale Collecting."

³⁰ Letter from a stockholder of the Pacific Whaling Company to Andrews, (February 9, 1909) Andrews Papers/DM, Folder VII-1, "Whale Collecting."

Andrews responded to the accusation by placing blame on the newspaper reporters "I was besieged with reporters on my return and when I did not give them the sensational stuff which they desired, they made up the remainder from their own ideas " "You must know," he went on, "that I would not intentionally do anything to injure the interest of the men who made possible the work which I was able to do last summer ""⁴¹ Such problems, caused perhaps by Andrews' lack of foresight, called for delicate diplomacy between Andrews and the patrons who supported his work. This was by no means the last time Andrews would encounter such problems. Many years later, when the AMNH sold one of the famous dinosaur egg fossils uncovered in the Gobi desert, the Chinese government protested against their natural history treasures being sold on the capitalistic market. Andrews' response to the Pacific Whaling Company also demonstrates the murky relationship between the sensationalism of adventure and the higher calling of science. He claimed that he was reluctant to give the newspaper reporters sensational copy, he wanted to hue close to an objective report of his scientific findings. He was becoming aware through this episode that the popular attention to his natural history must include some element of sensationalism. This event set into motion an implicit strategy, which would characterize Andrews' career as a popular explorer, to balance adventure with science.

What is most intriguing about this incident is that Andrews did indeed report on the possible "commercial extinction" of whales. The first New York Times article

⁴¹ Andrews to stockholder of the Pacific Whaling Company, (February 26, 1909) Andrews Papers/DM, Folder VII-I, "Whale Collecting "

appeared shortly after his return to New York. The only statement which could be considered even slightly controversial to shareholders was that the main patron of the expedition, AMNH Director H. C. Bumpus was "convinced that the whale is rapidly becoming extinct, and in a comparatively few years will take its place beside the dinosaur and the three-toed horse of the shadowy prehistoric ages."¹² While this coverage did not make any reference to Andrews' thoughts on the over-fishing of whales, he did make such statements over which he had direct control.¹³ Referring to the three stations he visited on the eastern Pacific coast, he would later remark that "after two years work, practically all of the whales were killed off and no others have come in these Island waters."¹⁴

One way of interpreting this episode is to frame Andrews' actions in the context of Progressive conservation efforts. In his autobiography, Andrews playfully minimized his conservationist efforts: "Always I have been a believer in conservation. I conserve old hats, old shoes, old pants and particularly old slippers, to the disgust, I may say, of my wife."¹⁵ It is true that during the highpoint of his career as an explorer of Central China, conservation concerns were far from his mind. But during this early period, he did make some efforts that fit into the context of Progressive conservation. Andrews viewed the practice of shore whaling as brutally efficient in the short run, but hardly sustainable over time. When Andrews did talk about the possibility of extinction, he used the phrase

¹² "Camera Hunt for Whales," New York Times (September 14, 1908), 13-2.

¹³ Roy Chapman Andrews, "Shore-Whaling: A World Industry," The National Geographic Magazine 22 (May 1911), 413.

¹⁴ Andrews to J. Edmund Clark (July 21, 1911) Andrews Papers/DM, Folder VII-1, "Whale Collecting."

¹⁵ Roy Chapman Andrews, Under a Lucky Star, 135.

"commercial extinction," by which he meant a decrease in populations of whales at which point their pursuit would no longer be profitable.¹⁶ While it is unclear whether or not Andrews actually advised station managers on the best way to perpetuate the economic viability of the fishery, he demonstrated a concern that whaling was being conducted without the wisdom of scientific management. That the shareholders of the Pacific Whaling Company vociferously reacted to Andrews statements should serve as a minor corrective to Samuel Hays' thesis that science and industry formed a conciliatory relationship in order to place the conservation of national resources, on which industry depended, on scientific grounds.¹⁷

While we do not know whether or not Andrews was directly involved in the management of shore-stations, he did make some effort to affect such policies on the legislative level.¹⁸ Andrews drafted a bill, apparently never introduced to the floor of the House, to prohibit shore whaling off the coast of Alaska without a licence issued from the governor and approved by the Commissioner of Fisheries. Factories should be conducted "in such a manner that no injuries or deleterious matter will be introduced into any public waters." Factory equipment should be approved for their efficiency based on industry

¹⁶ Roy Chapman Andrews, "Shore Whaling: A World Industry," National Geographic Magazine 22 (May 1911), 426; idem, Whale Hunting with Gun and Camera, 297. Andrews likely was aware of the term "commercial extinction" from Joel Allen. See Joel Allen, "The North Atlantic Right Whale," Bulletin of the American Museum of Natural History 24 (1908), 278.

¹⁷ Samuel Hays, Conservation and the Gospel of Efficiency, and Jessica Teisch, "The Drowning of Big Meadows: Nature's Managers in Progressive-Era California," Environmental History 4 (January 1999) 32-53.

¹⁸ Andrews would later meet officials from the Japanese Government Bureau of Science to go over whale statistics for composing a report on the future economics of whaling. He also exchanged several letters with J. Edmond Clark, a British official who was interested in regulating the whaling industry off the coast of South Africa.

standards. In order to prevent excessive clumping of shore stations, and the inevitable whale population declines which followed in their wake, each station was to be separated by a distance of two hundred and fifty miles. Finally, in contrast to the common practice of each station employing numerous steamers, Andrews thought that a one factory-one steamer restriction would also ease over-harvesting. In short, Andrews was attempting to use his expertise as a naturalist to create policy that would bring the principles of scientific efficiency to the whaling industry. While Andrews no doubt believed that the extinction of various whale species would be a tragic loss to the earth's natural history, the wording of his bill demonstrates how ocean dwellers were resources destined for human use, and only scientific management could ensure the sustainability of those resources.³⁹

Andrews was not the only naturalist concerned about the problems that shore stations presented to whale populations. In November 1909, the U. S. Fisheries Commission held a conference in which David Starr Jordan, and Commissioner of Fisheries George Bower, laid a recommendation on the desk of the Secretary of Commerce. They called for an international conference with a view to regulating the killing of seals, whales, and all other mammals of the sea.⁴⁰ The specific stations visited by Andrews in 1908 were singled out by Commissioner Bowers as having a particularly devastating effect on whale populations.

In recent years the establishment of whaling stations on the British Columbian

³⁹ Roy Chapman Andrews, "A Bill for the protection of whales and the regulation of the shore whale fishery in Alaska," nd, Andrews Papers/DM, Folder VII-1, "Whale Collecting." Also see Andrews to J. Edmund Clark, (July 21, 1911) Andrews Papers/DM, Folder VII-1, "Whale Collecting." Apparently, Andrews never submitted the bill. The draft is undated, but was probably written in 1911.

⁴⁰ "To Protect Sea Mammals," New York Times (November 25, 1909), 7-4.

Coast and one in Southwestern Alaska has caused a rapid decrease of whales off that coast. One or more of the species are so near extinction that a closed period really ought to be provided. This, of course, could be brought about by international agreement.⁴¹

International cooperation was hardly new to conservation in the first decade of the twentieth century. Beginning in the 1890s, international conservation between the United States and Canada became a concern of politicians, naturalists, and businessmen alike, inland fishes and the North Pacific fur seal were the dominant concerns.⁴² Despite this precedent, whales did not become subjects of international conservation until the late 1930s with the formation of the International Whaling Commission.

No one was more fervent about the plight of whales than Andrews' colleague, Frederic A. Lucas.⁴³ Lucas linked the problems of whale over-fishing with the changing practices in the industry. "The old sailing boats equipped with hand harpoons," he stated in an almost nostalgic editorial, "have been displaced by shore stations near the breeding grounds, from which, at a signal from the lookout, swift steam vessels dash, hurling their shot harpoons and bomb lances at the cetaceans." Such practices would result in nothing short of extinction. Perhaps more alarming was the proliferation of shore stations throughout the world—the Pacific Coast, Patagonia, Iceland, the Faroe Islands, New

⁴¹ "Closed Season for Whales," New York Times (June 30, 1912), pt. 7, 7-7.

⁴² Kirkpatrick Dorsey, The Dawn of Conservation Diplomacy: U.S.-Canadian Wildlife Protection Treaties in the Progressive Era (Seattle: University of Washington Press, 1998).

⁴³ Frederic Lucas, Fifty Years of Museum Work: Autobiography, Unpublished Papers, and Bibliography of Frederic Lucas (New York: American Museum of Natural History, 1933). There was at least some concern as early as the mid-nineteenth century. See Herman Melville, Moby Dick, or The Whale (Norwalk, Connecticut: The Easton Press, 1971), 490-4; Lee Clark Mitchell, Witnesses to a Vanishing America: The Nineteenth-Century Response (Princeton: Princeton University Press, 1981), 189-211.

Zealand, and South Africa "Something must be done by international agreement, or the fisheries will destroy themselves and the whales with them."⁴⁴

Lucas expressed similar views in articles and letters that appeared in the Scientific Monthly Supplement. The most interesting theme of these pieces was the philosophical tone of his concern. More than an industry falling on hard times, the overfishing of whales was just one more indication that nothing "can escape the all-grasping and all-powerful hand of man." Furthermore, man's grasp on nature had become increasingly tighter in the modern period. In contrast to the "old method" of whaling which required incredible amounts of capital, labor, and danger, "steam and the whale gun have changed all this and largely destroyed the romance of whaling. There is little excitement save in the chase, which is often prolonged." Shore stations became a symbol for the danger posed to ocean dwellers when capitalism joined hands with technological advance. Romance was replaced by efficiency, and in the latter's wake, nothing was more certain than the "passing of the whale."⁴⁵

Lucas also framed his concern in terms of the "myth of inexhaustibility." "Another fallacy was the belief that the supply of whales was practically limitless and that one might 'slay and slay and slay' continuously. There is not a more mischievous term than 'inexhaustible supply,' and certainly none more untrue." Very much echoing the sentiments of George Perkins Marsh, Lucas believed that "man is recklessly spending the

⁴⁴ "Conservation of Whales," New York Times (November 1, 1910), 8-3.

⁴⁵ Frederic A. Lucas, "The Whale-Hunting Industry," Scientific American Supplement 65 (January 11, 1908), 30.

capital nature has been centuries in accumulating and the time will come when his drafts will no longer be honored.” The history of Newfoundland shore stations had made abundantly clear, according to Lucas, that the world-wide proliferation of such methods meant the possible elimination of an entire biological order. Laying the foundation for Andrews’ bill, Lucas believed that the only solution to the problem was through strict regulation of the industry through licensing.⁴⁶

The call for restrictions on whaling spurred one Scientific American reader from Christiania, Norway to write a series of letters that pointed to the huge populations of whales that continued to inhabit the oceans, especially in the South Atlantic. Lucas agreed, but thought that the relocation of Norwegian, British, and even American whaling to those waters would result, as in the Newfoundland case, in population decline. Both were in agreement that a complete biological survey of oceanic mammals south of the 40th parallel was much in need. J. A. Morch even suggested that in contrast to putting scientific personnel on modern steamers, the most “expedient way would be the combination of a sailing whaling and sealing expedition combined with thorough scientific research.”⁴⁷ In 1911, Lucas had located one such American vessel whose captain

⁴⁶ Frederic A. Lucas, “The Passing of the Whale,” Scientific American Supplement 66 (November 28, 1908), 337, 344-46.

⁴⁷ Letters to the editor from J. A. Morch, “The Passing of the Whale,” Scientific American Supplement 67 (March 13, 1909), 171; F. A. Lucas, “The Passing of the Whale,” Scientific American Supplement 67 (April 24, 1909), 27, and J. A. Morch, “The Passing of the Whale,” Scientific American Supplement 67 (June 12, 1909), 379. Perhaps to defray similar criticism, Scientific American published an un-authored piece on the history of whaling. The article was entirely optimistic claiming that “[i]n] undeveloped industry presents such possibilities of profit and expansion. It is yet in its infancy. The raw material upon which it is based (the whale) is to be found on the Washington and Alaskan coast in abundance.” “History of the Whale Industry,” Scientific American Supplement 67 (April 10, 1909), 237-8.

enthusiastically offered to host a naturalist during a one year whaling/sealing expedition Lucas opened the opportunity to Andrews who declined because he had recently planned a number of expeditions to Japanese stations ⁴⁸ As detailed in chapter 3, Lucas then turned to a recent graduate from Brown University, Robert Cushman Murphy, who accepted

It is beyond doubt that Andrews' thoughts on the conservation of whales were heavily influenced by Lucas. But there were also major distinctions. First and foremost, Lucas was troubled by the extinction of an order of fauna. Simply put, it would be better for the oceans if these leviathans continued to inhabit them. This is a value judgement that operated on aesthetic and emotional levels. It ties into an environmental sentiment which pervaded turn-of-the-century American culture in such manifestations as the Sierra Club, the American Ornithological Union, and the Boone and Crockett Club. These organizations worked to preserve some vestige of a natural landscape that would inevitably be threatened at the hand of American expansion. This sentimental motive is absent from Andrews' thoughts and writings. He falls into the realm of Progressive conservation in which nature must be scientifically managed for American industry. To be sure, these two traditions often merged. Lucas' call for regulations were identical to Andrews'. The difference, however, is in motivation, where Lucas was concerned with the future of whales, Andrews was concerned with the future of whaling.

It is true that Andrews was also concerned with the passing of the whales, but only in so far as the extinction of these animals would be a detriment to naturalists, indeed to

⁴⁸ Lucas to Andrews, (May 16, 1911) and Andrews to Lucas, (May 18, 1911) Andrews Papers/DM, Folder II-4 "Lucas."

his own work. Echoing Bumpus' declaration that the work of whaling necessitated immediate expeditions from the Museum, Andrews wrote a letter attempting to convince Joel Allen that the Museum should ardently pursue the acquisition of as many whale skeletons as possible. In reference to Japanese whaling, he remarked that "[t]he whales are going fast here, all except the sperm and sei whales, and will not last more than three or four years."⁴⁹ It was the duty of the Museum, according to Andrews, to salvage specimens that were in danger of being overfished to possible extinction.

The expedition to the eastern Pacific also publicly marked Andrews as an adventurous naturalist in the same tradition of explorers like Robert Peary who at the same time was racing toward the North Pole. The delicate balance between adventurer and scientist was articulated in a New York Times article that appeared shortly after Andrews' return. "Primarily, [Andrews] is a scientist, but his love of adventure in unknown worlds of his science runs a close second." Science and adventure, according to the author of this piece, are mutually exclusive terms that can be incorporated into the body of a single person, but at the same time remain distinct practices. The author's characterization of Andrews as a "scientific adventurer" was an innovation of an early twentieth-century culture in which the adventure of exploration appeared increasingly non-scientific.

The article emphasizes the manly characteristics requisite for the work of exploration. Delving into Andrews' past, we find that "[a]t the university he used to play baseball and take a hand at athletic sports generally. That gave him a lithe, muscular

⁴⁹ Andrews to Allen, (March 9, 1910) Andrews Papers/DM, Folder II-2, "Allen, J."

body just what he needed to chase a bull whale to his habitat and look him squarely in the eye.” That Andrews was on the “chase” is a theme which permeates the article. Theodore Roosevelt provided the archetypical narrative of the explorer’s chase or hunt. Shortly before Andrews’ expedition to the North Pacific Ocean, readers of the New York Times could find daily reports of Roosevelt’s latest trophies hunted down in the heart of the African Congo. Just as Africa was fashioned into a new province for testing the manly strength of Roosevelt, Carl Akeley, and the like, so too did Andrews represent the ocean as something of a playground in a geography of virility. Moreover, whales functioned like the lion, elephant, and okapi as a most noble and prized game. One worthy specimen, a sulphur bottom, Andrews told the Times reporter, “reared and charged furiously and kicked up a perfect tempest in the sea when the whaler got into his front yard. He was madder than an exposed politician and didn’t care a campaign whoop who knew it.” The taming of this beast, both by the whaler and the naturalist busy taking pictures, is a testament to the courage and daring of the scientific adventurer.⁶⁰

Also of note is the article’s coverage of the whaling industry. Andrews learned that “there is no longer any romance in the whale-hunting industry. It has fallen hopelessly into a deadly dull business. Yes, the old Nantucket whalers have had their day. The industry is devoid of the romance and poetry of other days.” Now, this is most likely the sentiment of the reporter; Andrews’ attitude was less nostalgic. Take, for instance, his commentary on the epitome of nineteenth-century whaling romance, Moby Dick. He was surprised to see how much all New Bedford people seem to think of [Melville]

⁶⁰ “Hunting Whales in the Far North with a Camera,” New York Times (September 27, 1908), 9-1.

Some parts of it seem to me to be good, but as a whole I think it is uninteresting and tremendously inaccurate in many parts. The story would be good if about one-third of it were cut out and Melville had learned something about whales before he tried to write it. He seems to know nothing whatever about the anatomy and very little of the natural history of whales. I presume its appeal to New Bedford people is because it does give a good picture of New Bedford during the time of whale days. From the standpoint of the whale, the "Cruise of the Cachalot" by Bullen is a good deal better, I think, and he knows a good deal more about whales than Melville did. These critical comments, however are for you alone, so don't get me in 'bad' with the other whalers up there by reading this letter in one of your 'gams' about the stove.⁴¹

Clearly, Andrews was not captivated by the history and lore of nineteenth-century American whaling. While others would characterize modern shore-whaling as a "deadly dull business," Andrews was much more sanguine about the efficiency-minded practices of modern whaling. This sentiment was more fully articulated after further exploration in Japanese whale fisheries.

Oriental Fisheries

Andrews intended to make a second Alaskan visit in the summer of 1909, but a long trip to the St. Lawrence river on a quest for beluga whales made a western trip impossible. Andrews' next exploration of Pacific Cetacea concentrated on the whale fisheries of Japan and Korea. His longest and most successful whaling expedition began with an invitation from the U. S. Bureau of Fisheries to serve as a naturalist of porpoises on an expedition to the East Indies aboard the exploring ship Albatross. Early in September 1909 Andrews left Seattle for Yokohama aboard the S.S. Aki Maru. He was

⁴¹ Quoted in Geoffrey Hellman, Bankers, Bones & Beetles: The First Century of the American Museum of Natural History (Garden City, NY: The Natural History Press, 1968), 174-5.

captivated by the Orient, especially its social life. Andrews made good use of the network of quasi-colonial social clubs that functioned as safe harbors for world travelers. In Yokohama he was fond of lodging at Number Nine, “the most famous house of prostitution in the world.” Similarly, his work in China, Korea, and the Philippines often included visits to the British, American, French, Army and Navy Clubs—all institutions “important to the eddying currents of cosmopolitan life which flowed through its doors.” These clubs were foreign analogs of the many social clubs for the elite that peppered the metropolitan landscapes of New York and London. They thus served as “clearing houses” for information and provided important starting points for explorers of Andrews’ kind.⁵²

The Aki Maru left Yokohama and traveled south across the East China Sea to Shanghai, then through the Formosa Strait and on to Hong Kong. Here he left the Aki Maru for the S.S. Tamin and traveled across the China Sea to Manila where for two weeks he waited for the Albatross’ arrival. In the meantime, the Philippines’ secretary of the interior arranged a government steamer to drop Andrews’ off on the uninhabited tropical island off the coast of Mindoro for a bit of collecting. Mindoro was also supposed to be a location where cetaceans could be observed in great numbers. What was supposed to be a five-day excursion turned into a fortnight of living what he happily termed as—a Crusoe-like existence isolated from civilization and at one with primitive nature.⁵³

⁵² Andrews, Under a Lucky Star, 52. For the practice of natural history in colonial environments see Jane Cameron, “Wallace in the Field,” in Science in the Field, Henrika Kuklick and Robert E. Kohler, Osiris, 2nd series, vol. 11 (1996), 44-65.

⁵³ This “Crusoe” narrative comes from his autobiography, but the reports of his field work only tell of a short trip to Calapan where several beached whale skeletons were reported. Andrews shipped back only

Shortly after his "rescue," Andrews boarded the Albatross and steamed south through the Sulu Sea, made a brief stop in British North Borneo, and then to the Celebes Sea where the ship had been conducting a hydrographic and biological survey of the region under United States mandate since the Spanish-American War. Andrews had no role in the many dredges that were the daily work of Albatross naturalists, every time the crew made a dredge close to an island, he would remove himself to the shore to collect birds and mammals. Andrews enjoyed the thrill of the hunt. Up to this point in his career as a naturalist, he had had to live the hunt vicariously through the harpoon gunners aboard whaling steamers, Andrews hunted with his Graflex. The East Indian expedition no doubt reminded him of his fond love of hunting in the Wisconsin hinterlands. Andrews did not restrict his hunting to land animals. Aboard the Albatross he made targets of dolphins and small whales with the use of a bomb gun that fired an explosive from a rifle.⁴⁴ But the quick stop and go pace of oceanographic surveying made it impossible for him to do any work in serious detail. Moreover, Andrews was frustrated with the lack of a rigorous work ethic among the ship's naturalists. "I have had hard work at times," he reported to Joel Allen, curator of mammals at the American Museum, "to keep from getting worked up over the easy way things go on board ship. no one kills themselves working."⁴⁵ Completing their survey off the coast of Celebes, the Albatross headed northward and dropped Andrews off in Nagasaki before heading back to America.

the cetacean skulls of which he would later write descriptions in the American Museum Journal

⁴⁴ Andrews to John B. Trevor, (September 5, 1911) Andrews Papers/DM, Folder III-1 "Expeditions."

⁴⁵ Andrews to Joel Allen, (February 1, 1910) Andrews Papers/DM, Folder II-2, "Allen J."

Andrews was supposed to be on board the Albatross as it returned to America, but the chance event of walking through a Yokohama fish market changed the course of events. He noticed that whale meat was being sold in great quantities and soon realized that Japanese whaling stations would offer opportunities to study cetaceans similar to those encountered in Vancouver and Alaska. It is difficult to accept Andrews' autobiographical statement that he had been unaware of Japanese fisheries, but in any case, continued work at these stations was not on his original itinerary. This was a lucky turn of events in that the next six months would be his most successful as a whale naturalist. The American Consul arranged an interview with officials of the Oriental Whaling Company based in Shimonoseki. The President of the company was kindly disposed to Andrews' work and granted him permission to visit the shore stations.

His first stop was at a station at Shimidzu on the Island of Skoku, but the catches were disappointingly meager and so he moved on to Oshima where he reported to Joel Allen he could

deliver the goods this time in unlimited quantities. This is absolutely the time of all others to load up with whales. The Company has given me carte blanche to get anything I want and they treat me like a king. . . . Never again will we have a chance to get so much for so little money.⁵⁶

Allen enthusiastically replied, "such an opportunity for observation and field research in this line as you now have has probably never before fallen to the lot of any cetologist, and you deserve your good luck and I am sure will make the most of it."⁵⁷

⁵⁶ Andrews to Allen, (March 9, 1910) Andrews Papers/DM, Folder II-2, "Allen J."

⁵⁷ Allen to Andrews, (May 20, 1910) Andrews Papers/DM, Folder II-2, "Allen J."

Andrews was increasingly spending more time on shore than aboard whaling steamers. He spent his days observing the operations of the shore stations and absorbing the niceties of Japanese culture. Akin to his work in eastern Pacific stations, he took descriptions and photographs of the daily catch. When larger specimens arrived, Andrews went about the work of cleaning and preparing the skeletons for shipment back to New York. At Oshima he secured a 79-foot blue whale, a 46-foot sei whale, and a 26-foot killer whale. A large sperm whale was also on his list of desired specimens, and this he sought from the Company station at Aikawahama in the Province of Rikuzen. Here he stayed over three months accumulating data both on shore and aboard station steamers. A prize 60-foot sperm was finally taken as a special favor to Andrews. Indeed, Andrews received special favors from Company officials who occasionally issued orders to help him fill out his list. In return for their favors, Company officials received miniature models of the whales they had given Andrews—models laboriously crafted by Jimmy Clark back at the American Museum.

The specimens that Andrews sent back to New York were not intended so much for scientific as for exhibitionary purposes. As such, there were only two requirements for selection, first that the Museum did not already possess the species, and second that they be big.⁴⁸ Smaller whales simply did not qualify as organisms desirable for shipment back to New York. When a particular sperm came into Aikawa, Andrews told Allen that “[i]t is a perfect specimen—an old male sixty feet long. I think I would wait a long, long time

⁴⁸ For the paucity of specimens held by Museums see Joel Allen, “The North Atlantic Right Whale,” Bulletin of the American Museum of Natural History 24 (1908), 279.

before I'd get either a larger or a better specimen."⁵⁹ "So far as I know, this is the largest of any specimens now in a Museum."⁶⁰ In one sense, it may seem peculiar for a naturalist to select specimens based on the criterion of its bigness. But what made whales interesting for Andrews was precisely their size. He viewed whales as game, and the bigger the better. Moreover, he was thinking ahead to exhibiting these specimens at the American Museum. What made both whale and dinosaur bones interesting to the general public was their scale. It was to create in the Museum spectator a sublime sense of awe and wonder that Andrews sought out the most mammoth specimens possible.

The acquisition of large specimens also tied into the culture of sportsmanship that imbued Andrews' practice as a naturalist. For it was this expedition to the Orient that presented Andrews with his first opportunity to get behind the harpoon cannon. Thus far, he had restricted his work to taking photographs aboard the steamers; in Andrews' popular publications concerning the expedition, the camera and the harpoon cannon were connected on a symbolic level. Throughout his stay in the Orient he cultivated many friendships with the Norwegian gunners who were employed by the Oriental Whaling Company for their extraordinary skill and experience. Perhaps with a twinge of envy, Andrews thought of them as the archetype of the modern courageous hunter. He later wrote that he "wanted to shoot a whale myself, but the gunners weren't very keen about it and I wasn't surprised. It wasn't sport to them. . . . But I was determined to add the

⁵⁹ Andrews to Allen, (July 25, 1910) Andrews Papers/DM, Folder II-1, "Allen, J."

⁶⁰ Andrews to C. H. Wells, (January 11, 1911) Andrews Papers/DM, Folder VII-1, "Whale Collecting."

biggest of all animals to my game list”⁶¹ Photography did not suffice to sate the aspirations of Andrews the hunter. He convinced one gunner to let him try his hand, and after grazing the first harpoon off one unlucky specimen’s head, Andrews sent the second successfully to the mammal’s lungs.

Always a keen observer of whaling operations and procedures, Andrews’ work abroad helped to fashion a second plank in his conservation ethic—for the Oriental Whaling Company was also a meat canner and butcher that brought whale meat to Japanese markets. The Japanese people, according to Andrews, made much better economic use of whale products than their American and European counterparts who wastefully converted whale meat into fertilizer. “A large whale in Japan is worth \$4,000, for a whale in any other country in the world \$1,000 would probably be its greatest value. Then, with the present use of whales for guano and oil, there is a tremendous amount of waste”⁶². While American shore stations practiced marked efficiency over their nineteenth-century predecessors by not setting whale carcasses adrift, the Japanese were even more efficient as they converted cetacean meat into human food, intestines into leather, and finback baleen into cigar cases, charcoal baskets, sandals “and other beautiful things created by their clever brains and skillful fingers from the material which in the hands of Western nations seems to be almost useless”⁶³.

Using the Japanese case as an example, in 1917 Andrews wrote to F. C. Walcott

⁶¹ Andrews, Under a Lucky Star, 90-1

⁶² Andrews to Dr. Ephraim Cutter, (May 13, 1915) Andrews Papers/DM, Folder VIII-3, “Whale Use as Food.”

⁶³ Andrews, Hunting with Gun and Camera, 90

of the U. S. Food Commission, and catalogued the multifarious products that could be derived from whales

A large whale will yield something like thirty tons of edible red meat, to say nothing of the other parts of the carcass. Whale oil can be refined for food in the same way as cotton-seed oil. Very strong and light leather can be made from the intestines, and this may perhaps be of use in the construction of aeroplane wings, heavy leather can also be made from the envelope of the heart (pericardium) and the rib sheath (periosteum), also portions of the stomach. At the present time flesh of whales is largely used for fertilizer, and the oil in soap making.⁶⁴

Andrews wrote to Walcott in order to initiate a publicity campaign to encourage Americans to break with their prejudices against consuming whale meat. Andrews was in contact with the superintendent of Pacific fisheries who informed him that some stations were retrofitting their factories in order to ship canned and fresh meat to market. A move was afoot to do likewise with all American and British Columbian whale-fisheries, but the effort would prove fruitless if Americans refused to buy the product.

At the same time, the Museum was anxious to contribute to the national good by helping to alleviate the war-time shortages of beef, poultry, and pork. Through the leadership of President Wilson, the Federal Food Administration mounted a campaign calling for conservation of these staples. Henry Fairfield Osborn invoked Andrews' knowledge of whales to publicly demonstrate a potential alternative to American meat consumption. Andrews organized a luncheon at the Museum which featured whale hors d'oeuvres and planked whale steak à la Vancouver. In attendance were scientific and professional notables such as Andrews, Osborn, Lucas, Charles Townsend, William

⁶⁴ Andrews to F. C. Walcott, (November 19, 1917) Andrews Papers/DM, Folder VIII-3, "Whale Use as Food."

Hornaday, Admiral Peary and Caspar Whitney, the event was billed as a "conservation luncheon" demonstrating "the utility of whale meat as a substitute for beef." This group of New York scientific and business elite unanimously expressed the sentiment that whale meat was as "delicious a morsel as the most aesthetic of sophisticated palates could possibly yearn for."⁶⁵

The politics of social class was a subtext of the event. Andrews had previously noted that whale meat was the staple of impoverished Japanese classes that were too poor to buy beef.⁶⁶ After consulting Andrews, Osborn stated that the great appeal of introducing whale meat into the national war diet was that it could be supplied annually at only 12 1/2 cents per pound. The New York Times printed an editorial that highlighted the contradiction of an epicurean luncheon for elites that nominated the whale "as a candidate for the poor man's table." Despite the purported low price of whale meat, there was no guarantee that prices would remain low and that whales would become provender for the masses. The United States Fishery Service had previously introduced the tilefish with similar economic promises only to have the price skyrocket. Whale meat had its greatest potential as a curious victual for elites. Taking a thumb-the-nose attitude at such social snobbery, the Times reported that "Dr. Osborn's diners testified that whale had a rich venison taste, which suggests an accompaniment of full-fruited burgundy."⁶⁷ Some eight months later the Times wrote a followup piece reporting that whale meat was selling at 25

⁶⁵ "Whale Meat Lunch to Boost New Food," New York Times (February 9, 1918), 22-1.

⁶⁶ Andrews, Whale Hunting with Gun and Camera, 86-7.

⁶⁷ "The Praises of Whale Meat," New York Times (February 10, 1918), 4:4.

cents per pound and that while the sale of whale meat started in the poorer quarters of the city, it “ended in the uptown district, which considers itself to have higher standards of living than downtown.” To be plain about it, the richer classes bought the 25 cent meat away from those who needed it more.⁶⁸

The gender implications of whale consumption were perhaps more subtle. The Great War gave rise to a feminist/pacifist critique which linked the butchery of animals with the brutality of war—both being the province of men. Cookbooks like Meatless and Wheatless (1917) and The Golden Rule Cookbook (1916) at the same time advocated vegetarianism during a time of war shortage and criticized Americans’ failure to act passively towards their human enemies as well as cows, pigs, and chickens. A full blown modern vegetarian movement thus simultaneously called into question the male desire to hunt for food and kill in war.⁶⁹ It is not insignificant that Andrews had characterized much of his cetacean work as a manly hunt, and many of his specimens as game. Meat was also thought to be crucial to the diet of America’s fighting men. The link between whale meat and soldiers was interestingly articulated by Admiral Peary in a recommendation that the Army use jerked whale meat in soldier rations. “It is the only prepared meat food with which I am acquainted,” Peary wrote to General Goethals, “that men at hard work in the field at low temperatures can eat twice or three times a day—and keep in the best of health.”⁷⁰ In response to vegetarians who called for the abandonment of male/meat

⁶⁸ “Whale Meat and Fish Oddities,” New York Times (October 5, 1918), 12-4.

⁶⁹ Carol J. Adams, The Sexual Politics of Meat: A Feminist-Vegetarian Critical Theory (New York: Continuum, 1990), 120-42.

⁷⁰ “May Use Whale Meat in the Army Ration,” New York Times (March 4, 1918), 9:2.

dominance and Wilson who encouraged Americans to go meatless as a sacrifice to soldiers on the front, Andrews and Peary attempted to secure the place of whale meat in the American diet of both soldiers and civilians. Again, we can interpret Andrews' activities as motivated (at least partially) by an attempt to preserve the virile traits threatened in the modern era.

But it was more likely the inability of Andrews and Museum officials to change Americans' attitudes about whale meat than the social implications of the event which led to the quick demise of whale butchery for the American diet. Indeed, Andrews never made whale meat a staple of his diet, nor did Museum naturalists, nor did the American public. While whale meat enjoyed continued boosterism, and even some success on the west coast, whale canneries quickly fell on hard times.⁷¹ The important point is that in Andrews' hands, the whale was transformed into another commercial product. Again, his actions fit squarely into a Progressive conservationism that demanded the wise use and scientific management of natural resources. Andrews took this message to heart, but what is more intriguing is that his contact with Japan served as a model for his American-style conservationism. Richard Grove has convincingly argued that the earliest thoughts on conservation in the seventeenth century "developed as an integral part of the European encounter with the tropics and with local classifications and interpretations of the natural world and its symbolism."⁷² Andrews' thoughts on conservation seem to be another, and

⁷¹ C. H. Claudy, "The Whale as a Food Factor," Scientific American 118 (March 9, 1918), 208-9.

⁷² Richard Grove, Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism, 1600-1860 (Cambridge: Cambridge University Press, 1995), 3.

much later, example of this dialectic. Progressive conservation was not always a home grown American movement, it was time and again forged in the field where the naturalist engaged the non-Western world. We will visit this point again with Robert Cushman Murphy's work on the guano islands of Peru.

The Korean Expedition

With specimens en route to the Museum, photographs taken, and descriptions encrypted in his notebooks, Andrews decided to take a westward path home in order to examine the collections of natural history museums in Egypt, Italy, Austria, Germany, Belgium, France, and England. He arrived in New York in November 1910 after a fifteen-month excursion. It was only one year later that Andrews would pack up his equipment for what would be his final serious work on whales. Andrews had heard reports that Korean whaling stations were taking gray whales, a species that was then thought to be extinct in the eastern Pacific. He wished to collect data and secure a number of specimens of the gray and also the many killer whales which were a staple harvest of the Korean fisheries. His second goal had nothing to do with whales. Always searching for those little explored "blank spots" on the map, Andrews decided to explore portions of northwest Korea.

Again, the Korean expedition was brokered by officials of the Oriental Whaling Company, then in charge of Korea's whale-fisheries. In Ulsan he spent some of his time on board whaling vessels taking photographs and making observations of the natural histories of gray and killer whales, but he mostly stayed ashore and waited for the whales

to arrive at the stations where he took his measurements and secured his specimens. Andrews believed that such factories presented naturalists with a unique opportunity to secure large amounts of data in a short period of time. In short, the natural history of cetaceans could be most efficiently investigated by working hand in hand with whaling operations.

He clearly thought that he was practicing a thoroughly modern natural history which had many advantages over the work of nineteenth-century naturalists. Previous naturalists relied on the occasional beached whale, which had often deteriorated before adequate descriptions could be made. As a result, naturalists only made a handful of observations, and those observations—especially variation in color—were often tainted by changes that occur right after death. The result of such a practice was a needless multiplication in taxonomic names. Those naturalists aboard whaling vessels were also beset with the problem of making accurate measurements on whales that were immediately “cut in” as soon as they were attached to the hull. Until shore whaling began, accurate photographs, notes, measurements, and descriptions were rare and unsatisfactory; anatomical work was out of the question. In contrast, “a naturalist who is fortunate enough to remain for some time at one of the shore-stations has before him wonderful opportunities.”⁷¹ One advantage was that a carcass on the slip was easy to measure, photograph and describe. Another was that a great number of whales of a single species quickly paraded past the naturalist observing the daily catch, the sheer volume of whales

⁷¹ Roy Chapman Andrews, “What Shore-Whaling is doing for Science,” *Nature* 88 (December 28, 1911), 281.

facilitated the study of individual variation

The latter was especially helpful for investigating evolutionary questions pertaining to cetaceans. Henry Fairfield Osborn's influence on the Department of Vertebrate Paleontology, and gradually over the entire Museum, led many Museum naturalists to embrace evolutionary projects. Andrews was no exception. Early in his career as a naturalist, he decided to investigate the conventional wisdom which held that whales were cosmopolitan in nature, i.e., finbacks and right whales of the Atlantic were the same species of corresponding organisms in the Pacific.⁷⁴ Osborn's theory of radiational adaption suggested that the wide dispersion of cetaceans would lead to significant variation and speciation. It was therefore a logical conclusion that organisms as widely dispersed as whales could have differentiated into separate species. The critical monograph of Atlantic species had already been written by Frederick True at the Smithsonian. Using this volume as his model, Andrews wanted to author the definitive monograph on Pacific whales. The question of whether or not Atlantic and Pacific species were different would be solved through the careful analysis of a multitude of data from as many specimens as possible, and this is where the value of shore-stations was most evident.

While Andrews made photographs and descriptions of the daily catch in all the stations he had visited, it was only on his final Korean expedition that the data would amount to a formal publication. He never produced the comprehensive monograph of

⁷⁴ Andrews was working under the guidance of the curator of mammals, Joel Allen, who held a similar belief in the differences between Atlantic and Pacific representatives of the Right Whale. See Joel Allen, "The North Atlantic Right Whale," Bulletin of the American Museum of Natural History 24 (1908), 279.

Pacific cetacea, perhaps because he came to realize that whales were, in fact, more or less cosmopolitan organisms. He became aware of this after his first expedition to the Eastern Pacific when he admitted the possibility that “Pacific species are exactly the same as the Atlantic. This, of course, is only a preliminary conclusion.”⁷⁵ Andrews claimed that continued field work and many interruptions delayed the assembling of a single text. He did, however, write natural histories of two species, the California gray and the sei whale. His work on the gray was based entirely on his field work in Korea, and it is here that we see how a modern and efficient practice of natural history translated into a scientific treatise.

The American Museum’s Memoir series was the most comprehensive of the institution’s three publications, the other two being its Bulletin and the Journal. Published in quarto form, it gave Museum researchers sufficient space to write long reports on their work. Both Henry Fairfield Osborn and Joel Allen, curators of the Department of Vertebrate Paleontology and the Department of Mammology respectively, were first to publish their work in the new Memoir series. Therefore, Andrews was receiving high honors for his work in writing up his research for the Memoirs. Indeed, his Monograph on Gray Whales (1915) was perhaps his most important direct contribution to natural historical knowledge.

After paying his respects to the owners, managers, and gunners of the Oriental Whaling Company, Andrews summarized the work of Captain Scammon, Edwin Cope and W. H. Dall on the natural history of the gray whales. The latter two were working solely

⁷⁵ Andrews to Victor H. Street, (July 14, 1909) Andrews Papers/DM, Folder VII-I, “Whale Collecting.”

with skeletons, and only Scammon had written of the habits and external anatomy of the gray, some forty years before Andrews picked the species up again. Indeed, due to Western whaling, this easy-to-catch, shore-hugging species “had been lost to science and many naturalists believed it to be extinct.”⁷⁶ While California grays were rarely sighted off America’s coast, the species was abundantly represented in the western Pacific. It was Andrews’ intention to reintroduce California grays to the annals of natural history.

Andrews then presented the life history of the species, mostly culled from his own notes and anecdotal evidence received through conversations with whalers. Subjects include migration, period of gestation and rate of growth, spouting and diving, speed, food, affection, attacks by Killers, and diseases. He then gave a quantitative summary of the overall sizes (from the notch in the fluke to the tip of the head) of one hundred and fifty-five specimens that were captured by Korean fisheries between 1909 and 1912. Andrews measured twenty-three himself, and at his request, the whaling company had taken notes on one hundred and thirty-two. Detailed measurements of the twenty-three specimens Andrews himself observed were also presented in a table. Next is a table that compares the proportions of detailed features (e.g., length of snout to eye) to overall size for the twenty-three specimens. Andrews moved on to a discussion of their color and presented individual data on the twenty-three. He then described the external anatomy of the gray, drawing both from his previous tables and his notes. Finally, using the one gray skeleton that was shipped to the Museum, he completely detailed the gray’s bone

⁷⁶ Roy Chapman Andrews, “Monographs of the Pacific Cetacean, I—The California Gray Whale,” Memoirs of the American Museum of Natural History, New Series, Volume 1, Part V (1915), 232.

structure. Now, it should be noted that this type of study, compiled to note individual variation, was by no means an uncommon practice by natural historians. But such a study had not yet been conducted on grays because of the difficulty inherent in studying variation among cetaceans. According to Andrews, it was only by practicing an efficient natural history, one intimately connected to the modernization of the whaling industry, that allowed him to compile his figures on individual variation.

From this data, Andrews drew relationship, systematic, and phylogenetic conclusions. First, the western Pacific grays were identical to those that had traveled along the eastern shore in the past. Whether or not the Californian and the Korean herds mingled in their northern sojourn Andrews was hesitant to answer, though he leaned towards keeping them separate. His systematic conclusion was simply a confirmation of a prior taxonomy that placed grays in their own subfamily. He arrived at this through an examination of the osteological traits of the single Museum specimen and comparing them to other specimens. Finally, Andrews thought that the gray was a "living fossil," an ancient organism that resembled an extinct species (*Plesiocetus*) more than either finbacks or right whales; it had therefore preserved many of the traits developed in the past without increasing specialization. Again, this conclusion was drawn from a comparison between the Museum skull and fossils of the extinct species. The irony of these comments is that they are mostly based on a single specimen. The tabulation of over one hundred and fifty grays, information that marked the pinnacle of an efficient natural history, played only a small role in Andrews' conclusions.

But in general, his Monograph was received as an exceptional piece of natural

history. Indeed, Andrews was on his way to becoming one of America's leading naturalists of cetacea. Henry Fairfield Osborn thought as much and wrote that "[t]hrough the lamented death of Doctor True, you have suddenly become the principal worker upon Cetaceans in the United States. It is a great opportunity and I feel that you will rise to it."⁷⁷ He did not. Always the fashioner of his own fate, Andrews' interests quickly turned as a result of the second half of his Korean expedition. His exploration of the Korean White Mountains spurred his wanderlust and his desire to conduct research in little known regions. In November 1915, Andrews decided to specialize in the study of Asiatic zoology, thus setting into motion a chain of events that would eventually bring him fame as a Gobi explorer.⁷⁸

Managing Natural History in Central Asia

Though Andrews gave up the waters of the stormy northern Pacific for drier regions, he continued to call for—and practice—an efficient and modern natural history. His first two expeditions, 1916-17 and 1919, were small affairs; his only companions were his wife and a few other kindred sportsmen. Despite its size, Andrews considered his job to be “the management of the party.”⁷⁹ His itinerary for the 1919 expedition contains a set of regulations that reveal the wit and charm that no doubt made him a congenial leader: “1) No cussing the weather, 2) No insinuations if there is sand in the soup, 3) No

⁷⁷ Henry Fairfield Osborn to Andrews, (July 7, 1914) Andrews Papers/DM, Folder II-5C, “Osborn re 3rd Asiatic.”

⁷⁸ Andrews to J. A. C. Smith, (November 11, 1915) Andrews Papers/DM, Folder III-1, “Expeditions.”

⁷⁹ Roy Chapman Andrews, “Traveling Toward Tibet,” Harper's Magazine 136 (April 1918), 618.

profanity unless of picturesque variety. . . . 9) If male members of the expedition cannot supply fresh meat on any one day they will not be allowed to smoke after dinner.”⁸⁰

Indeed, these two expeditions appear to be primarily hunting excursions of the Roosevelt genre. Six months of field work in the central plains and forests of Mongolia yielded some 1,300 mammals and 100 birds, some of which he secured for exhibition in the then future Hall of Asiatic Life. But Andrews was more struck by the expeditions’ failures than their successes. “In all my work as a zoologist I had felt the lack of expert knowledge in other branches of science.” He was unable to take advantage of his various findings because he “had neither the time nor the highly specialized training” required to answer important zoological questions. It was thus apparent that “an effective attack upon the problems awaiting us in Central Asia could be made only by a correlation of the different sciences i.e., by a group of highly trained specialists all of whom were concentrating upon a single broad problem.”⁸¹

Shortly after his return from the second Asiatic expedition, Andrews proposed to Osborn plans for a series of comprehensive expeditions into the natural history of China and central Asia. The first aim was to secure specimens for the Hall of Asiatic Life. The second was to find evidence supporting Osborn’s thesis that primitive humans first evolved in central Asia.⁸² This was to be done by a paleontologist, a zoologist, and an

⁸⁰ Roy Chapman Andrews, “Mongolian Journal,” #1, (1919), AMNH Special Collections.

⁸¹ Roy Chapman Andrews, On the Trail of Ancient Man: A Narrative of the Field Work of the Central Asiatic Expeditions (Garden City: Garden City Publishing Company, Inc., 1926), 4.

⁸² Ronald Rainger, An Agenda for Antiquity: Henry Fairfield Osborn and Vertebrate Paleontology at the American Museum of Natural History, 1890-1935 (Tuscaloosa: University of Alabama Press, 1991), 99-104.

archeologist, along with natives who would be trained and employed as assistants Andrews' proposal modestly projected an initial outlay of \$15,000 with a \$16,000 per year budget for between three and five years ⁸³ Instead of this conservative plan, the Third Asiatic Expedition became the most grandiose of Museum expeditions involving the labor of several hundred people and over \$250,000 which Andrews himself largely collected by soliciting New York's monied elite with the characteristic grace and charm that made him so popular to New York's social scene

Andrews later provided a kind of recipe for successfully raising such a large sum of money. Finances, according to Andrews, are the bête noire of every explorer. "Unless you have the personality and ability to sell yourself as well as your plan you are just out of luck. Enthusiasm is the sine qua non." He gave further advice to aspiring explorers. It is easier to convince philanthropists to donate money once you have built a nest egg out of one or two individual contributions. The philanthropist will then realize that someone else thinks the plan is worthwhile. Never solicit money through letters, it is the personal interview that counts. "You must be able to infect the other fellow with your own enthusiasm, and it is pretty difficult to do that on paper" ⁸⁴ He also informed his reader that a business manager can help a lot along these lines, but the brunt of financing an expedition usually falls upon its leader. This scheme seemed to have worked, for Andrews was able to secure over a quarter of a million dollars from various New York wallets, most notably that of J. P. Morgan

⁸³ Andrews to Osborn, (April 23, 1920) Andrews Papers/DM, Folder II5-C "Osborn re: 3rd Asiatic."

⁸⁴ Roy Chapman Andrews, This Business of Exploring (New York: G. P. Putnam's Sons, 1935), 14

Publicity was just as important as financing. It was vitally important to keep the reading public interested in the findings and activities of any expedition. Of course, one must carefully tread the line, according to Andrews, between beneficial and harmful publicity. The newspaper reporter out for sensational copy will often distort the story. So the best mechanism for publicity is in the popular writing and lectures by expedition members.⁴⁵ Andrews did this in spades. Mostly through his orchestration, the Third Central Asiatic Expedition became one of the most popularly followed expeditions in the 1920s. A testament to this popularity is the continuously running newsreels of the expedition that are played today at the entrance of the AMNH's Hall of Vertebrate Origins.

The accounts of the Asiatic Expeditions were the stuff of adventure and intrigue. The political situation in Mongolia was volatile at the time. In 1921 Outer Mongolia became an independent state, Bolsheviks and Czarists from revolutionary Russia were battling for influence over the new region, and the Chinese were also aiming their territorial ambitions at Mongolia. Adding to the political problems were the groups of bandits and brigands that made the story of the expedition one of dangerous close calls. It fell to Andrews to clear the political obstacles that continuously arose. He became something of an American diplomat clearing the bureaucratic channels, and on more than one occasion he had to draw his six-shooter to fight off bands of marauders.

The mammoth nature of the expedition brought Andrews' managerial sensibility to a new level. Moreover, it was in this context that Andrews made his most fervent calls for

⁴⁵ Ibid., 15-16

the modernization of natural history. This is illustrated in the first chapter, "Preparations," of his popular account of the early Third Asiatic Expeditions:

I believe that this type represents the exploration of the future. Today there remain but a few small areas on the world's map unmarked by explorer's trails. Human courage and endurance have conquered the Poles, the secrets of the tropical jungles have been revealed. The highest mountains of the earth have heard the voice of man. But this does not mean that the youth of the future has no new worlds to vanquish. It means only that the explorer must change his methods.⁸⁶

Andrews had in mind here the correlated team approach to exploring a given region. A group of individuals well represented in various sciences, Andrews thought, would reveal much more about the natural history of the Gobi than the sporadic explorations of individual scientists. Andrews had in mind a kind of natural history bureaucracy—a centralized expedition requiring "careful organization and a wider background of scientific knowledge."⁸⁷

What stood for the modernization of natural history more than anything else was the expedition's reliance on automobiles. The exploration of Mongolia presented some very pragmatic problems: how do you quickly get an expedition from one place to another in so vast a region? How do you provision an expedition when settlements were so dispersed?

After analyzing these difficulties it was obvious that some means of rapid transportation would largely solve them and that without it an expedition of high-powered men, such as I had in mind, could not be carried out successfully. I believed that the automobile was the answer to the problem.⁸⁸

⁸⁶ Andrews, On the Trail of Ancient Man, 5.

⁸⁷ *Ibid.*, 6.

⁸⁸ *Ibid.*, 8.

With the help of five Dodge cars and two Fulton trucks, Andrews was able to whisk his teams of scientists over vast stretches of Gobi sands in short order. In his words, the auto transport enabled the expedition “to do ten years’ work in five months.”⁸⁸ But make no mistake, the efficiency gained for the traveling naturalists entailed massive expenditures of money as well as the labor of a small army of Mongolian servants and several hundred beasts of burden. The town of Urga, (present day Ulan Bator) was the expedition’s home base of operations. From Urga, Andrews arranged to have caravans of camels, laden with gasoline, water, and provisions, travel to strategic sites on the itinerary. The 1922 expedition required a caravan of seventy-five camels, each carrying four hundred pounds of supplies. The 1925 expedition required a caravan of one hundred twenty-five camels.⁸⁹

Andrews’ responsibilities were more or less restricted to managing the expedition. When it came to the work of actually doing natural history, Andrews left it up to the members of the scientific staff. He was more likely to be hunting dinner or chasing herds of antelope in one of the Dodges than brushing sand from a fossil with a camel-hair brush. When he did wield a tool, it was usually a pickaxe, and it was a common joke among expedition members that every mangled fossil specimen was said to have “gotten the RCA.”⁹⁰ Andrews had the potential, but not the patience, for making a life-long career as a naturalist. One of his greatest pleasures was in observing the parade of scientific publications that emerged from the field work of the Central Asiatic Expedition that was

⁸⁸ Ibid., 9.

⁸⁹ Lyle Rexer and Rachel Klein, “The Gobi: Men of the Dragon Bones,” 125 Years of Expedition and Discovery (New York: Harry N. Abrams, Inc., Publishers, 1995), 52-69.

⁹⁰ Ibid., 59.

under his guidance. From his New York home he took the culture of modern business—efficiency, division of labor, organization, salesmanship, and publicity—and put them to good use in the management of natural history. It was perfectly appropriate for him to entitle the final popular account of his Gobi work This Business of Exploring (1935).

* * * * *

Andrews' thoughts on the modernization of natural history through the incorporation of business culture were more than strategies to court favorable publicity for a scientific expedition. Organization, preparedness, efficiency, economies, diplomacy, focusing on a single goal—these were the virtues—virtues forged in the rough and tumble oceans of the North Pacific—that he believed were key to the practice of modern natural history. To be sure, large scale expeditions of the Central Asia variety were not new to natural history. What was truly innovative was the role that Andrews played as a “manager” of natural history. Just as Warren Weaver became a scientific manager caught in a complex network of philanthropists and molecular biologists, so too was Andrews the administrator of a modern natural history.

In the 1930s Andrews turned his administrative skills away from field work and towards the institutions that had supported him over the years. He took the reins of the Explorers Club and successfully navigated it through a period of economic strain brought on by the Depression. In 1934 he became director of the American Museum where his leadership was, and continues to be, marred by criticisms of a lack of foresight and claims of “careerism.” In 1941 he retired to a small ranch in suburban Connecticut where he and

his new wife worked on various autobiographical accounts of his life. His work on Pacific cetaceans did not endure for long and his two important monographs are rarely cited in cetacean literature. As early as 1927, Robert Cushman Murphy was considered to be the Museum's main expert on cetaceans. All that remained of Andrews' legacy to oceanic natural history was the life-size model of the blue whale that he and Jimmy Clark constructed in 1907.

In 1969, the Museum introduced a dramatic centerpiece to the "Hall of Oceanic Life," a new ninety-four foot blue whale that replaced Andrews' model. "Knowledge, acquired since 1908, more than age, doomed the old plaster whale," the New York Times reported. "It did not bulge properly . . . and its eyes were not protuberant. The new whale, apart from greater scientific accuracy, will look more dramatic."² It did not go without notice that the blue whale's existence was in considerable doubt. When Andrews constructed his model, there were more than 50,000 still alive; in 1969, there were but a few thousand. Two generations of Museum visitors grew up with Andrews' whale, one of the most popular of the Museum's exhibits. But "the old whale is made of plaster and cannot be salvaged. In about two years, it will be broken up and swept away."³

The replacement of Andrews' whale symbolized a shift in the way the ocean was perceived. The Andrews model was suspended from wires that might recall the mechanical apparatus used to move the specimen over a shore-station slip. It was positioned horizontally, not as if floating lazily, but rather assuming the bodily position of

² "Museum Trades Man-Made Whale for Bigger One," New York Times (November 15, 1969), 1.

³ Press release, (nd , ca. 1969) AMNH Special Collections, Exhibit File "Hall of Ocean Life II."

a whale being drawn out of the ocean for butchering. Andrews' ocean was inhabited by resources ripe for human consumption. In contrast, the new model was suspended at a single point with the connecting materials completely hidden. It was jack-knifed as if sounding through the massive Hall of Oceanic Life. Erected in a time of new environmental concern, the new whale symbolized a fragile creation on the brink of extinction.

Andrews attempted to propel natural history into the modern era. As biology continued to adopt experimental methodologies, Andrews tried to transform natural history into a modern science. On ships powered by steam with harpoon cannons filled with gunpowder, Andrews' modernization of natural history was intimately connected with innovative technologies in the whaling industry. It will be remembered that in 1911, Frederic Lucas presented Andrews with an opportunity to make an expedition aboard a whaling vessel that still moved under the power of wind. Andrews declined. We now turn to the naturalist who went in his stead. The historical nature of Robert Cushman Murphy's natural history, symbolized by his work on a nineteenth century sperm whaler, is a fitting contrast to the Andrews' forward-looking natural history.

Chapter 3

Viewing Nature Historically: Robert Cushman Murphy and the Natural History of the Ocean

*"Man's intelligence has changed little if at all for thousands of years, but the effects of his intelligence for good and evil, have suddenly become strongly enhanced. The future has descended upon us to a degree that is unique in human history."*¹

Robert Cushman Murphy's predilection for history first manifested itself in the environs of his childhood home on Long Island. He trekked through the salt-marshes and swamps close to his home near Stonybrook with rifle, notebook, and Frank Chapman's field-guide in hand. He quickly learned to distinguish swamp, sea-shore, and forest as distinctive environments with characteristic inhabitants. He picked up rocks from the terminal moraine of the Wisconsin ice-sheet and learned of Long Island's fascinating geological history. Then he turned to his own front-yard and examined bird-life and the inhabitants of the soil in such a way as to learn of the effects of human inhabitants on the natural history of the island. He then observed the human population of Manhattan flood the entire island leaving a path of destruction in its wake. He often imagined what Long Island would have been like before human occupation, before the swift pace of human history had threaded the pulse of nature's history. He would later travel to libraries for first-hand accounts of the earliest settlers in Long Island. The natural environments of Mt. Sinai Harbor, the Fire Island seashore, and the Hamptons were just a few of the beautiful

¹ Robert Cushman Murphy, miscellaneous note for presentation to the Long Island chapter of the Nature Conservancy, (nd., ca. 1955), Murphy Papers, Folder "Murphy: Miscellaneous #1."

areas threatened by residential development. Maybe he pondered the fate of his natural haunts while he sat with chin in hands on the breakers of Old Field Point while gazing to the north. He would have noticed merchant ships from Bridgeport steaming through the shipping lane of Long Island Sound and then nostalgically thought back to the whalers of Long Island and New England that had traveled the same channel a few years before with top-sails squared.

Growing up on an island that was experiencing the changing wind of progress, Murphy became a historian—a historian of birds, grasses, snakes and snails; a historian of Long Island geology; a historian of the insular natural world of the island—a historian of people and progress; a historian of ships and whaling. In short, he was an environmental historian who described the role of nature in the lives of humans, and the role of humans in heedlessly destroying nature. But he was, first and foremost, a natural historian, and it is the task of this chapter to outline what “history” meant to Robert Cushman Murphy, and how history was implicated in his representations of oceanic environments.

Murphy was never far away from the sea. While his titular designation as an ornithologist of the American Museum of Natural History may mark him as a terrestrial naturalist, his true love and expertise was the sea birds whose life histories tied them to the oceanic environment as intimately as fish and cetaceans. Whether he was working in South Georgia, the northern and western parts of South America’s coast, New Zealand, or even the littoral environment of his suburban home in Stonybrook, Murphy could be found on boats conducting surveys and observing oceanic phenomena, or on shore where he would note the feeding and mating behaviors of sea birds. In a very real sense, he was an

oceanographer who described, both in his popular writings and his formal scientific work, the natural history of the ocean and its inhabitants

Three themes characterized Murphy's representations of the ocean. First, oceanic flora and fauna were not inexhaustible resources that were able to endure rampant mining. Instead, marine life was a dynamic resource and a product of complex evolutionary histories. Second, the influence of the ocean did not end at the shore. Its currents, temperatures, layers, upwellings, and chemical composition all conspired to influence the climate and organisms—nonhuman and human alike—both on land and in water. Finally, Murphy's ocean was characteristically heterogeneous. Just as land was separated into distinct geographies to which organisms were adapted, so too did the ocean possess a biogeography of life-zones to which ocean flora and fauna were inflexibly adapted.

Murphy never achieved the national fame enjoyed by many of the other figures discussed in this project. His audience was local, but his influence was formidable. He wrote several popular books that enjoyed modest success on the market, but his bibliography is filled with references to National Geographic, Natural History, the Nature Magazine, and countless newspaper articles and editorials. Aficionados of classic New England whaling knew him for his chronicles of the tradition of Nantucket and New Bedford whaling. Though eclipsed by the fame of his American Museum of Natural History colleague, Ernst Mayr, most ornithologists recognized Murphy as the premier authority on oceanic birds. Geographers and oceanographers esteemed his pioneering work on the Peruvian littoral environment and—most notably—the Humboldt Current and the El Niño phenomenon. Scientists and government officials from both Peru and New

Zealand had high regard for his work on local conservation matters. And if you lived on Long Island while he was alive, it was hard to avoid newspaper coverage of either his work on Long Island natural history, or his—and his wife's—advocacy of Long Island conservation. While we do see change in Murphy's thoughts and practice over time, what is truly startling is the degree to which his life was marked by a continuity given force by his historical view of nature.

Murphy's story sheds light on the character of natural history during a period in which it was losing much of its authority as interpreter of the natural world. In a time when the cell lineage studies of Edward Conklin, the chemistry of Jacques Loeb, and the experimental genetics programs of T. H. Morgan were defining the front line of biological research, naturalists like Murphy seemed to be a vestige of an antiquated practice of taxonomical research.² Roy Chapman Andrews attempted to mitigate this stigma by calling for the modernization of natural history. Murphy, in contrast, embraced the history of natural history. Historians of science have demonstrated how early twentieth-century natural historians distinguished themselves from experimentalists, the contrast was between the observation of nature and the experimental manipulation of nature. But this explanation is a gloss of a more nuanced use of history by naturalists.

Natural historians often set out to describe the history of the world, whether it be through Lyell's principles of geology, or Darwin's theory of evolution, the objective was

² Not to leave the impression that this shift in biology was total and complete, it should be noted that there was some continuity between older morphological traditions and newer experimental methods. See Jane Maienschein, Transforming Traditions in American Biology, 1880-1915 (Baltimore: Johns Hopkins University Press, 1991).

to design a proper methodology to investigate the actual history of the world. As such, these naturalists viewed nature historically, as a product of historical and often unpredictable forces. Furthermore, as other researchers have shown, the naturalist employed a wide chronology of texts often harking back to the writings of Aristotle, Pliny, Linnaeus and Buffon. In contrast to experimentalists who often believed they were breaking from their scientific predecessors, naturalists viewed their work as a continuation of a long history of natural investigation—very much a vestige of the Romantic critique of Enlightenment ideals in the early-nineteenth century. Moreover, naturalists sometimes drew from contemporary currents in civil history, i.e., the history of human civilization, to inform their views of the natural world's history.³ The objective of this chapter is to examine how “history” imbued Murphy’s practice as a natural historian and his representations of the ocean, especially in his depictions of the environmental histories of islands.

Lynn Nyhart suggests that twentieth-century natural historians did not so much disappear from the scientific scene, as move into new arenas: they found old and new homes in museums, zoos, aquaria, state and national parks, they also moved into government services such as the Biological Survey, and the Fish and Wildlife Service.⁴ Nyhart points to the movement of naturalists into more public and popular discourses, a

³ Stephen Jay Gould, Wonderful Life: The Burgess Shale and the Nature of History (New York: W.W. Norton & Co, 1989), 277-291; Robert Richards, “The Structure of Narrative Explanation in History and Biology,” in Methodologies of Historical Explanations Matthew H. Nitecki and Doris V. Nitecki (eds.), (Albany: State University of New York Press, 1992), 19-53.

⁴ Lynn K. Nyhart, “Natural History and the ‘New’ Biology,” in Cultures of Natural History N. Jardine, J. A. Secord and E. C. Spary (eds.), (Cambridge: Cambridge University Press, 1996), 426-46.

move necessitated one might argue--by their own lack of legitimacy within the structure of twentieth-century science. I would like to follow her suggestion by showing how natural history moved into the sphere of American conservation. As stated by Richard Pough, curator at the AMNH, "conservation is little more than applied natural history."⁶ And to join this sentiment with my first statements, I believe that history, the act of viewing nature historically, was the key trope for the natural historian who actively moved into the realm of conservation. Viewing nature as a product of historical forces, and -most importantly- viewing the history of humans as an active agent within nature's history, created the ideal matrix for a conservationist ethic.

Murphy's historical view of nature, and its embodiment in his work as a conservationist and preservationist, also helps to recast environmental historians' treatment of this period. Two paradigms of thought and practice characterized early twentieth-century reforms of the relationship between humans and nature. On the one side were those scientists, and backers of scientific expertise, who sought to efficiently utilize natural resources for the health of American industry. These utilitarian reformers -conservationists- like Gifford Pinchot- were less interested in the aesthetic appreciation of the natural world than in placing resource management on a firm scientific foundation. In contrast, preservationists -like John Muir- fought for the protection of America's most beautiful landscapes from the destructive sweep of development. Protection was their first and foremost concern, even at the expense of efficient resource

⁶ Richard H. Pough, "The Museum and Natural Resources," (October 4, 1950) Murphy Papers, Folder "Pough, Dick."

utilization “

Environmental historians have attempted to reconcile the split between preservation and conservation in the late-19th and early-20th centuries. Richard Sellers has problematized the concept of preservationism by challenging the long held assumption that the formation of national parks was an initiative that sought to preserve a “pristine” remnant of American nature. Instead, the development of national parks was mainly driven by a desire to utilize American nature for recreational purposes. Kurkpatrick Dorsey has attempted a kind of synthesis by showing that only combinations of aesthetic and utilitarian perspectives, often held by different people, led to the successful passage of international wildlife treaties in Progressive America. But can the aesthetic and the utilitarian coexist within a single individual? Donald Worster has recently pointed to the irreconcilability of “the sublimity of nature’s wilderness and the sublimity of man’s technology” in the case of John Wesley Powell. Worster attempts to make sense of both the aesthetic and utilitarian perspectives that framed Powell’s vision and representation of the American West. He concludes that “they must always be in tension, resisting any philosophical reconciliation in some single way of thinking.” So Worster’s answer to the question is that a synthesis can be achieved in one individual, but only in an irredeemably contradictory manner.⁷

⁶ Samuel Hays, Conservation and the Gospel of Efficiency (Cambridge, Mass: Harvard University Press, 1959), Stephen Fox, John Muir and His Legacy: The American Conservation Movement (Boston: Little, Brown and Co. 1981).

⁷ Richard West Sellers, Preserving Nature in the National Parks: A History (New Haven: Yale University Press, 1997). For a similar thesis see John Reiger, American Sportsmen and the Origins of Conservation (Norman: University of Oklahoma Press, 1986). Kurkpatrick Dorsey, The Dawn of Conservation Diplomacy: U.S.-Canadian Wildlife Protection Treaties in the Progressive Era (Seattle: University of

The case of Robert Cushman Murphy demonstrates not only that a synthesis is possible, but that it can be achieved without a kind of philosophical schizophrenia. Murphy straddled the preservationist-conservationist divide, but instead of drawing from two different sets of tools and values, preservation and conservation shared a unifying foundation in Murphy's practice of viewing nature historically. He was an ardent Progressive conservationist in desiring to use the tools of science to efficiently manage the harvesting of natural resources. But he held—in a manner not dissimilar to Pinchot—that businesses would profit most by heeding to the life histories of nature's organisms. The life history was the cornerstone of his conservationism. But an organism's life history was the result of its longer evolutionary history. As a naturalist concerned with evolutionary questions, Murphy viewed every organism's ecology as a consequence of its geological and biological history. The destruction of a unique environment or the extinction of a plant or animal was more than the elimination of a place or a thing. Murphy became a vociferous preservationist because he felt that the wanton destruction of nature was also the destruction of its evolutionary history. The historical character of Murphy's practice as a natural historian thus unified his conservationism and preservationism into a non-contradictory whole.

The point becomes especially clear when we consider Murphy's life histories of islands. Insular geographies were valuable for numerous reasons. They were territories on which evolution practiced a special magic due to their relative isolation from

Washington Press, 1998). Donald Worster, "Landscape with Hero: John Wesley Powell and the Colorado Plateau," *Southern California Quarterly* 29 (1997), 37. Also see Paul Cutright, *Theodore Roosevelt: The Making of a Conservationist* (Urbana: University of Chicago Press, 1985).

mainlands. They therefore possessed a unique and fragile beauty, an aesthetical value that stemmed from their evolutionary histories. An integral part of an island's natural history was its colonization by humans, especially by Westerners who often viewed islands as troves of resources, a mode of thinking that did not appreciate nature as a historical entity. This resulted in the deterioration and destruction of the historical beauty of nature. Murphy desired to remedy the situation by achieving a balance between a historical aesthetic and resource utilization. If Westerners could learn of an island's natural history, its life-cycle, and modify resource utilization in such a way as to bring the two in harmony, then islands could simultaneously become places of beauty and economic resources. Richard Grove has explained the importance of the Romantic fondness for islands in fostering conservationist thought.⁸ Murphy's work was a continuation of British scientists on St. Helena and Mauritius. There is an important difference, however. Murphy's aesthetic emerged from an appreciation for the evolutionary history of island inhabitants, an aesthetic that was possible only after 1859. Pre-Darwinian island conservationists were certainly aware of the rapid destruction of islands at the hand of colonialism, so their practical attitude differed little from Murphy's. The difference was in the scientific legitimation that stemmed from Murphy's evolutionary histories—a consequence of his historical view of nature.

⁸ Richard Grove, Green Imperialism: Colonial Expansion, Tropical Island Edens, and the Origins of Environmentalism 1600-1860 (Cambridge: Cambridge University Press, 1995), 16-72.

General Remarks on the Naturalist as Classicist

Murphy's historical approach of observing nature was rooted in his fondness for the classical tradition, a kind of antimodernist sensibility.⁹ This sentiment was most likely a function of his liberal arts education at Brown University, which culminated in his 1911 commencement address where he spoke of the value of knowing Greek and Latin in an age when science was coming to dominate human interests. "The scientific movement," Murphy told his fellow graduates, "carries with it certain results which have by no means been hailed with unanimous acclaim, and which many thinkers consider unfortunate and even unsound." Even at this young age Murphy had the ambition to embrace the age of science by becoming a naturalist, but a love for science should not sublimate "the position of the humanities in higher education, and particularly . . . the complete or partial substitution of modern languages . . . for the classical tongues of Greece and Rome." A knowledge of these languages, he went on, is necessary to appreciate the artistry of Euripides, Homer and Virgil, but more important, knowing these works "in their original tongue" leads to an appreciation of the "surpassing culture of the classical age." This appreciation leads to a deeper comprehension of "the evolution of man's life and emotions." Murphy did not intend to belittle the study of modern languages. A working knowledge of French and German was absolutely essential for the "practical" needs of scholars and scientists in particular. He concluded with the same backward glance as his introduction: "In an age of science, when the natural trend is toward the practical, a

⁹ For a treatment of the culture of antimodernism during this period, see T. J. Jackson Lears, *No Place of Grace: Antimodernism and the Transformation of American Culture, 1880-1920* (New York: Pantheon Books, 1981).

countermovement is a salutary check”¹⁰ It is this countermovement, a look over the shoulder to the historical past, an appreciation for classical literature, that marks the vague line between scientist and naturalist in the early twentieth century

Murphy continued to nourish his love for the classics, literature, and poetry Among the books in his library while on board the Daisy, his first expedition as a naturalist, were Dante’s Divina Commedia, Bunyan’s Pilgrim’s Progress, Horace’s Carmina, an Oxford Shakespeare, and Melville’s Moby Dick When the brig encountered doldrums and marine fauna was scarce, Murphy would retire to the quarterdeck with book in hand He waxed nostalgically in his journal on the declining status of the classical languages “I’m glad that I lived before the end of the transition, because the apogee of my college course, for sheer fun, came when I faced the inspired countenance of Johnny Green [Professor of Roman Literature and History at Brown] and read Horace, Catullus, Tibullus, and Propertius”¹¹

Just as a knowledge of the classics fostered a deeper understanding of the history of the human condition, so too was an appreciation of classical naturalists helpful in understanding the history of science as well as the history of nature Aboard the Daisy, Murphy read from the journal of Joseph Banks during Captain Cook’s first voyage on the HMS “Endeavour,” Darwin’s “Voyage of the Beagle,” and Moseley’s “Challenger Narrative” Reading these journals served two important functions First, since these

¹⁰ Robert Cushman Murphy, “Greek and Latin in the College Curriculum,” (June 1911) commencement address at Brown University, Murphy Papers, Folder “Murphy Greek and Latin”

¹¹ Robert Cushman Murphy, Logbook for Grace (New York: Time Incorporated, 1965), 126.

naturalists all described, at least in part, places on the Daisy's itinerary, it made good sense to become familiar with their descriptions. Reading these sources also highlighted how nature had changed—especially as a result of human agency—in the intervening period. Second, Murphy believed that he was following in the footsteps of these naturalists. He saw them as his scientific forefathers and thus wanted to take up where they left off. It did not escape his mind that Darwin, too, began his professional career with a similar voyage. In her autobiography, Grace Murphy recalled telling her fiancé “You’ll be like Darwin sailing around the world in the Beagle. . . . Perhaps you will publish a diary that will rank with the Voyage of the Beagle.”¹² Indeed, he admitted to using the journal of the youthful Darwin as a model for his own jottings.¹³ Along similar lines—and many years later—he reflected on his own observations of the Long Island environment for the Southampton chapter of the Garden Club of America, “And, who knows, but that I might develop into a modern Gilbert White of Selbourne?”¹⁴ Murphy fashioned his own identity as a person continuing a long tradition of natural history.

Murphy was deeply concerned with the depreciation of the history of natural history, a consequence of the mathematization of nature. He expressed such a sentiment in a review of H. U. Sverdrup’s The Oceans: Their Physics, Chemistry and General Biology (1942). The Oceans was a pivotal text in the history of oceanography in that it

¹² Grace E. Barstow Murphy, There’s Always Adventure: The Story of a Naturalist’s Wife (New York: Harper & Brothers, 1943), 5-6.

¹³ Robert Cushman Murphy, Logbook for Grace, viii.

¹⁴ Robert Cushman Murphy, “Talk at Southampton,” (August 26, 1942), p. 2, Murphy Papers, Folder “Murphy: Addresses: Untitled #8.”

used the tools of physics, chemistry, and mathematics to comprehensively reduce complicated oceanic phenomena to dynamic equations¹⁵ As a definitive oceanographic textbook, Murphy had high regard for The Oceans Indeed, he used similar quantitative data in his own work on the Humboldt Current At the same time, Murphy felt there was something distressingly absent in the text If one set The Oceans next to Matthew Fontaine Maury's The Physical Geography of the Sea (1855), often cited as one of the first comprehensive works in oceanography, "the transition between the past and the present takes on a truly ruptive aspect Maury's first chapter is devoted to the Gulf Stream, and its opening paragraph has a Miltonic, if not Biblical, sound" This tone is silenced in The Oceans by the staid language of differential equations A reader of The Oceans, he went on, will learn nothing of the long evolution of oceanography "Of speculation or experiment by the Greek philosophers, there is not a hint" There is no mention of the great names of navigation and hydrography Captain James Cook, Humboldt, Maury, the Prince of Monaco, and Schokalsky The Humboldt Current is even divested of its history and re-baptized as the Peru Current¹⁶

The Oceans marked a transition, according to Murphy, in which oceanography was becoming a science in its own right¹⁷ Oceanography began with observation and the

¹⁵ Eric Mills, Biological Oceanography: An Early history, 1870-1960 (Ithaca: Cornell University Press, 1989)

¹⁶ Robert Cushman Murphy, manuscript draft of review of The Oceans, (ca. 1942), 1-4, Murphy Papers, Folder, "Murphy Book Reviews The Oceans"

¹⁷ For an interesting historiographical discussion of this topic, see Mott T. Greene, "Oceanography's Double Life," Earth Sciences History, 12 (1993), 48-53, and Eric Mills, "The Historian of Science and Oceanography after Twenty Years," Earth Sciences History, 12 (1993), 5-18

verbal description of natural phenomena. It was a non-specialist field, often interdisciplinary in nature, that included zoologists, botanists, geographers, and geologists. In contrast, “only in certain chapters of this book . . . does the geographer, geologist, marine biologist, naturalist, hydrographer or other ‘fellow traveler’ of the Simon Pure oceanographer find himself in a reasonably familiar milieu.” This kind of specialization was simply a result of oceanography developing into a branch of the “exact sciences” whose field lies beyond the range of sensory observation.¹⁸

Murphy was careful to note that his comments were made to explain, not to criticize The Oceans. But his thoughts reveal what distinguished natural history from modern oceanography: an appreciation for the history of the discipline and a certain resistance to specialization. Oceanographers like Sverdrup began with a fresh slate; they started their research in the present and moved forward. Murphy was part of an older vernacular oceanographic tradition, a tradition in which the naturalist viewed his or her research as a continuation of the work of naturalists in the past. To be certain, Murphy wanted to move forward in such a way as to create a more advanced knowledge of nature. But Murphy, and the naturalist in general, faced the past and was blown backwards into the future.

One final example will round off this little exegesis on the naturalist as classicist. Some years after the “evolutionary synthesis” in biology, Douglas Burden wrote a “Statement Regarding New Philosophy of Progress and Development” for the American Museum of Natural History. He declared that the taxonomic work of the Museum, and its

¹⁸ Murphy, “The Oceans.”

consequent status as a repository for specimens, "has long since reached the stage of diminishing returns." He thus proposed a new philosophy that would reorient research toward behavioral and developmental questions. "Change," he declared, "is the first law of the world." Murphy forwarded a copy of the statement to Theodosius Dobzhansky and solicited his comments. Dobzhansky was fairly dismissive of Burden's attitude and thought that it reflected the conflicts earlier in the century when taxonomists reacted to the experimental practices of T. H. Morgan and Jaques Loeb. He was confident that this attitude was becoming rare. Most biologists hailed the arrival of the "new systematics" which used "the same apparatus of research which the old taxonomy has assembled" but used "dead specimens not merely in order to arrange them on museum shelves, dead specimens are used as means to discover the new laws of life."¹⁹

Murphy responded at length to Burden's proposal. He listed the many Museum naturalists who had received wide acclaim for their contributions not only to systematics, but to new ideas in evolution, migration, biogeography, the life-zone concept, ecology, behavior and psychology. He went on to underscore the value of the collections not only for Museum naturalists, but also for a spate of international scientists who made use of them. He noted that the age-worn tradition of systematics was enjoying a "resurgence in the opinion of biologists representing other fields," most notably geneticists. "Change is," Murphy agreed, "the first law of the world, and the study of systematics as carried on by the staff of our Museum is in the forefront of that change. This change, incidentally, is

¹⁹ Douglas Burden, "Statement Regarding New Philosophy of Progress & Development," (January 27, 1947) Murphy Papers, Folder "American Museum of Natural History," and Dobzhansky to Murphy, (March 7, 1947) Murphy Papers, Folder "Dobzhansky."

due largely to new light which has penetrated the eyes and reached the brains of the experimentalists!" Murphy was clearly echoing the arguments of naturalists, made during the period of the evolutionary synthesis, that the older tradition of field-based systematics had much to offer the experimental sciences in its quest to understand speciation. He was not saying anything original. But we can better appreciate Murphy's sentiment on this matter, and perhaps those of naturalists who made similar arguments, if we set it into the context of the naturalist as classicist.²⁰

The Classical Expedition of the Daisy

Upon completion of his undergraduate education at Brown University, Murphy was presented with an opportunity that would frame his life's work. Frederick Lucas, then director of the Brooklyn Museum of Natural Science, offered Murphy a position—the same offered to, but declined by Roy Chapman Andrews—as ship naturalist aboard an Antarctic-bound whaling brig for the purpose of examining the natural history of the sub-Antarctic island, South Georgia. Reluctant to leave his newly betrothed on a long expedition, he declined. But Grace Barstow responded to the proposition with unexpected enthusiasm. In Robert Cushman Murphy's words, she claimed that "the projected voyage would serve the best possible launching of my career, and that we would be married immediately so as to have several months together before my departure." The

²⁰ Robert Cushman Murphy, "Comment on the So-Called 'New Philosophy of Progress and Development,'" (ca. March 1947), Murphy Papers, Folder "American Museum of Natural History." "On the evolutionary synthesis see Vassiliki Betty Smocovitis, Unifying Biology: The Evolutionary Synthesis and Evolutionary Biology (Princeton: Princeton University Press, 1996), and Joseph Allen Cain, "Common Problems and Cooperative Solutions: Organizational Activity in Evolutionary Studies," Isis 84 (1993): 1-25.

two were wed in mid-February of 1912 and honeymooned in the Carribean while Robert Murphy waited to rendezvous with the good ship Daisy.²¹ This South Georgian expedition would be the first of many in his life as a naturalist. And while Murphy's practice both afield and in New York would continuously evolve over the years, this expedition serves as a fitting microcosm for Murphy's life as a naturalist, historian, and conservationist. For the South Georgia expedition highlights Murphy's historical view of nature.

The classical impulse of natural history was not merely a rhetorical tool for Murphy. His voyage aboard the Daisy highlights how historical or classical overtones seeped into the very practice of natural history. While the Albatross steamed naturalists around the world and wealthy owners of powered yachts gave passage to marine biologists, the AMNH Sub-Antarctic Expedition of 1912-1913 was a voyage into history. Most oceanic vessels at this time were propelled by the power of screw and steam. The Daisy was a relic of the past. Technically a half-brig, the ship was of 384 gross tons, 123-foot length, two-decked, framed with oak and chestnut, planked with yellow pine and copper fastened. Two square-rigged masts, headsails, and a quadrilateral gaff sail aft of the mizzenmast had caught the winds in both north and south Atlantic ever since it was launched out of Setauket Harbor—coincidentally very close to where Murphy spent his childhood summers. In 1907, the Daisy was purchased by a New Bedford group and refitted for whaling operations. Benjamin D. Cleveland, who Murphy venerably referred to as the "Old Man," was a shareholder and captain of the brig. The Old Man was a relic in his own right, a sea-goer of New Bedford sperm whaling stock who looked gloomily on

²¹ Robert Cushman Murphy, Logbook for Grace, xxii-xxiv.

the mechanization of whaling practices and had an equally disparaging opinion of the modernization of sea travel

Cleveland was not alone in his failure to welcome the mechanization of ocean transport. While traveling to America aboard the luxury cruiser Tuscania in 1923, Joseph Conrad penned a short analysis of the radical psychological changes that ensued as a result of the drastically shifting material technologies of ocean travel. As with many of his writings, Conrad thought back to a more innocent past, a past when people traveled under the machinery of sails. With the advent of steam propulsion, Conrad thought, “[t]he whole psychology of sea travel is changed.” “The old-time traveler “had to become acclimatized to that moral atmosphere of ship life which he was fated to breathe for so many days.” The modern traveler brings along all the trappings of civilized life and looks forward to the moment of quick disembarkment, “but the other lived the life of his ship, that sort of life which is not sustained on bread alone, but depends for its interest on enlarged sympathies and awakened perceptions of nature and men.”²² This change in the traveler’s psychology, deeply rooted in the material practices of ocean travel, had a significant impact on the practice of Murphy’s natural history. While Roy Chapman Andrews traveled on steam-powered whaling vessels and called for the modernization of natural history, Murphy traveled on a ship of yore and relished the history of natural history.²³

²² Joseph Conrad, “Ocean Travel,” in Last Essays, (ed.) Richard Curle (Garden City, NY: Doubleday, Page & Co., 1926), 35-38.

²³ For an analysis of the effect of the sail to steam transition on American fiction, see Bert Bender, Sea-Brothers: The Tradition of American Sea Fiction from Moby-Dick to the Present (Philadelphia: University of Pennsylvania, 1988), 99-166.

If the Daisy was a sort of museum piece during an era of technological change, so too was South Georgia Island a place that was undergoing massive transformation. It was for this reason that Murphy brought aboard copies of Cook's first expedition and an account of the oceanographic "Challenger" expedition. Of course, these sources introduced Murphy to the region. But they also were the primary documents for the construction of a life-history of South Georgia. Years after his return to New York, Murphy penned a number of travel narratives for popular magazines such as Harper's and National Geographic. Spurred by Ernest Shackleton's death in South Georgia's Cumberland Bay in 1922, he thought it "of timely interest to recount the history and to describe the geography and life conditions of the island." In typical Murphy style, the article begins with the history of South Georgia's exploration, and in this case, the honors belong to James Cook's 1775 search for a southern continent aboard the H.M.S. Resolution. In the course of the expedition, Cook happened upon South Georgia. Murphy then draws the reader's attention to Cook's sentiments about the value of the island by quoting directly from Cook's journal: "'To judge of the bulk by the sample, it would not be worth the discovery.'" Murphy went on: "most of all, he was impressed with the worthlessness of his landfall and the futility of his search."²⁴

Pointing to Cook's statements regarding the lack of utilizable resources in South Georgia was deliberate, for Cook's sentiment stood completely opposed to modern

²⁴ Robert Cushman Murphy, "South Georgia, An Outpost of the Antarctic," National Geographic 41 (April 1922), 413. The importance of islands as a unique place that gives rise to conservationist ideas has been discussed by Peter Coats, "Amchitka: Alaska: Toward the Bio-Biography of an Island," Environmental History 1 (October, 1996): 20-45, and Richard Grove, Green Imperialism: Colonial Expansion, Tropical Island Edens, and the Origins of Environmentalism 1600-1860 (Cambridge: Cambridge University Press, 1995).

commercial interests on and off the Island. Murphy was imbued with the Progressive notion that natural resources ought to be efficiently and scientifically managed. So while he had a proper naturalists' respect and awe for nature, he also viewed the natural world as a commodity for human consumption. Murphy thus viewed humans as active agents in changing the landscape. Populations of animals would wax and wane at the willful hand of the human species. So Murphy brings up Cook's depiction of South Georgia's worthless landscape in order to juxtapose the more recent history of commercial exploitation.

Using Cook's observations of South Georgia's fauna, and the subsequent observations of more recent visitors, Murphy pieced together a narrative of environmental decay. The article takes up the sad story of South Georgian fur-seals that fell victim to Yankee sealers' clubs throughout the nineteenth century. "When the supply of lucrative fur-seals first began to fail, the other amphibious monsters mentioned by Cook, the sea-elephants, were forced to pay the costs of the ruthless voyagers." Indeed, elephant oil made up half of the cargo on Murphy's 1912 trip. Here too, he predicted doom unless the British government established and enforced protective measures.²⁴ The problem was simple to understand. Humans were removing animals from the island at a rate which the natural populations of sea-elephants could not withstand. So we see at the juncture of the human history of commercial colonialism, and an organism's life history the emergence of a conservationist sentiment, a sentiment shared by scientists like David Starr Jordan who

²⁴ Robert Cushman Murphy, "South Georgia," 415. Also see Robert Cushman Murphy, "The Status of Sealing in the Sub-Antarctic Atlantic," *Scientific Monthly* 7 (August 1918), 112-119.

was at the same time learning of the Northern Fur Seal's reproductive cycle in an attempt to manage the harvest on and around the Pribilof Islands. This dynamic is perhaps most clear when Murphy considered the life histories of cetaceans.

Murphy's attitude toward the modernization of the whaling industry is laid out in a series of four articles written for the popular nautical magazine Sea Power in 1917. The first three articles are entitled, "The Way of the Sperm Whaler: A first-hand view of an American industry that was once of immense importance." The first article introduced the readers to the history and structure of both Daisy and her crew: a rare look, generously illustrated, into the history of Nantucket and New Bedford whaling. Murphy was something of an ethnographer of the culture of these whaling vessels. He noted that "the whaler is a poor observer of things in general. Living creatures interest him when he can eat them or boil them down to oil, but he cares nothing for the wild plunge of the tropical bird." The showpiece of the second article is a capture story of a "forty-barrel bull," an adventure in which Murphy directly participated. This particular mid-sized sperm whale put up a terrific fight and required the cumulative labor of three whaling boats. In what makes for a dramatic chase and capture narrative, Murphy describes how the crews of these vessels spent nine hours rowing, pulling in ropes, and casting harpoons and lances into the sperm.²⁶

In marked contrast to Andrews' hands-on slaying of a whale, Murphy did not view the bull as game; this was no sporting event. He was participating alongside his fellow

²⁶ Robert Cushman Murphy, "The Way of the Sperm Whaler, Part I," Sea Power 2 (June 1917), 50-54, *idem*, "The Way of the Sperm Whaler, Part II," Sea Power 3 (July 1917), 52-57.

shipmates in a commercial activity. Indeed, Murphy received a 1/200th lay of the ship's haul, more a symbolic gesture than remuneration. But more important, he was recreating a historic practice of whaling, a tradition that was becoming the material of books and museums. Even though he was aware of the commercial nature of the bull, Murphy confessed

to a certain sympathy with the enemy. It seemed reasonable at least that after being pricked with the harpoon that still galled him, and pierced through with the horrible lance, the whale should wish to steer clear of us. This, however, was not at all the mate's idea of good form and fair play.²⁷

Part of the reason for such sympathy may have been Murphy's appreciation for cetacean intelligence. Research on this matter still lay some forty years in the future, but after an encounter with a half-dozen beaked whales, Murphy noted that their behavior was of a sort "that required good mammalian brains. Whatever dim ideas were in them were quite unfishlike." Comparing them with sea lions that learn to toss balls, he accurately predicted "that a whale's predilection for becoming chummy and companionable might astonish the world."²⁸

The third article depicts the massive amount of energy invested in hauling these beasts on board and converting them into barrels of oil. What should be clear is that the traditional practice of whaling required enormous quantities of energy and labor. Whalers came to know their subjects only through a life-time of arduous work; whale oil became an artifact of whale-blubber and human sweat. In contrast, the fourth Sea Power article

²⁷ Robert Cushman Murphy, Logbook for Grace, 110.

²⁸ *Ibid.*, 115.

describes the practice of modern steamer-whaling. Here Murphy tells of the twenty-four hours he spent aboard the Fortuna in Cumberland Bay. The power of wind and human muscle were made obsolete by coal and powered engines, the ropes for securing sperms to the hull were replaced with heavy gauged wires and winches, the need for whaling boats replaced by what Murphy termed as "unsportsmanlike" explosive-tipped harpoon cannons. The oil extracting try-works were moved from ship to either shore-stations, or massive "floating factories." In short, modern whale fisheries were "conducted according to the most approved modern methods." Human muscle and sinew were replaced with the efficiency-minded technologies of the modern world.²⁹

More than just detailing an important shift in whaling practice, this article also pointed to the species-destroying potential of the new practice. The facts were all too obvious: the total annual catch in the year 1912 was equal the sum paid for all the oil and bone brought home by New Bedford ships during the fifty most lucrative years of the old port's history. The new whalers had "killed the goose that laid the golden egg and only international conservation," according to Murphy, could "limit and regulate the industry so that it may some day yield a sure and reasonable perpetual return." The formation of a conservationist ethic therefore meets at the confluence of a number of histories: the history of human technology, the history of whaling fisheries, and the evolutionary history of cetaceans. Echoing a sentiment articulated some fifty years before by George Perkins

²⁹ Robert Cushman Murphy, "The Way of the Sperm Whaler, Part III" Sea Power 3 (August 1917), 50-54; Robert Cushman Murphy, "Sub-Antarctic Whaling," Sea Power 3 (September 1917), 44-47. For the relationship between labor and knowledge, see Richard White, Organic Machine (New York: Hill and Wang, 1995).

Marsh, Murphy held that when human history supercedes the history of nature, the natural effects are often devastating, and conservation becomes the only mechanism for redressing the balance ⁴⁰

The Daisy herself was absolved of the sin of cetacean harvesting. For in the world of twentieth-century whaling, the ship was a dinosaur. In 1904, Norwegian whalers began to use steamers equipped with cannon-fired harpoons tipped with explosives. This new technology enabled a single whaling ship to bring in up to twelve whales in a single day. The Daisy, on the other hand, harked back to the “classic” days of whaling. As a two-masted brig, her sole source of propulsion was the often unreliable winds that swept along the Atlantic fetch. When the cry of “bloooooows” sounded from the crow’s nest, Captain Cleveland would order the whaling boats lowered and their crews began the hunt with hand-thrown harpoons and lances. To the 20 steamers in Cumberland Bay, the Daisy was an anachronistic throwback to a time when whaling was inefficient and labor intensive. Manifesting an anti-modernist sentiment, Murphy was captivated by the historic endeavor; indeed, he thought that much of the charm, nobility, and grandeur of the voyage was a function of the Daisy’s antiquated practice. Just as Darwin’s Voyage of the Beagle functioned as a kind of template for his work as a naturalist, so too did Melville’s Moby Dick serve as a model for the sperm whaling activities of the Daisy.

The process of transforming classical whaling into a historic entity began around the turn of the century. A spate of published histories and commemoratives were a manifestation of the desire to scribe Yankee whaling in New England’s historical identity

⁴⁰ Robert Cushman Murphy, “Sub-Antarctic Whaling,” 44

The Nantucket Historical Association, incorporated in 1894, established America's earliest whaling museum in 1904. The Old Dartmouth Historical Society opened the doors to a New Bedford whaling museum in 1916. George Sarton even spared a few pages of Isis, a journal covering topics in the history of science, to praise New England's whaling museums. He believed that the centers of all municipal districts should possess a museum that displayed the area's natural history, as well as one dedicated to the area's civic and economic history. Making a point that would certainly have been contested by most early-twentieth century naturalists (concerned with preserving specimens in danger of extinction), Sarton privileged the civic history museum since "historical objects are unique or rare, and when they are lost, they are lost forever." Such museums afford a "pleasant opportunity for young and old alike to remember the deeds of their predecessors and to provide some inspiration from them." Herein lies the value of New England whaling museums.

Upon his return, Murphy became something of a minor historian of classic whaling. When the Daisy was recommissioned to transport foodstuffs during World War I, he was able to secure one of the whale boats fully equipped with oars, paddles, sail and spars, harpoons, lances, darting gun, line tubs and line, compass box "and every other item, which would make her ready to lower for sperm whales." The American Museum of Natural History purchased the outfit from Murphy and in 1928 put it on display in the newly dedicated "Hall of Ocean Life." In an action that Murphy regarded as a "serious error of judgment," the Museum's exhibit committee later voted to have the exhibit

stowed away in permanent storage ¹¹ In 1936, Murphy besought Charles Davenport, director of the biological lab at Cold Spring Harbor, to provide a good home for the whale boat Murphy's contribution became part of a larger push to create a museum "for the preservation and exhibition of antiquities and relics pertaining to the whaling industry and era" ¹² In 1943 the Museum was finally erected and Murphy provided his services as a consultant and also presented a series of Graflex photos he had taken back in 1912 In 1963 Murphy ceded to the Museum a small library of whaling books, logbooks, several pieces of scrimshaw and various other ship gear that he had collected throughout his life The Whaling Museum was so indebted to Murphy's contributions that they placed a visage of the Daisy on their letterhead

The American Museum justified the removal of the whaling boat from the Hall of Oceanic Life by pointing to four murals of classic whaling painted in the lunettes on the north side of the hall that, in their view, adequately represented the historic industry When the Hall of Ocean Life was being designed in 1927, Murphy coaxed the Museum into commissioning John Benson -a marine artist of high repute- for murals that would "present the romantic and beautiful side of whaling life, with the attendant dangers and the human courage displayed by the early American whalers, rather than the squalid, modern commercial side" ¹³ After much dispute over whether the function of the murals was to

¹¹ Murphy to Charles Davenport (June 9, 1936), Murphy Papers, Folder "Davenport "

¹² Form letter from "The Whaling Museum Society, Incorporated" to a Mr. Fisher, (October 27, 1941), likely penned by Charles Davenport, Murphy Papers, Folder "Davenport "

¹³ Minutes of meeting, "The Four Whaling Scenes," (January 12, 1927), AMNH Special Collections, Exhibits Folder "Hall of Ocean Life "

portray the habits of sperm whales or memorialize the whaling industry, the committee decided to give Benson the commission

Most of the immense hall was a testament to the modernization of ocean travel. The Arcturus Exhibit portrayed the operations and specimens of William Beebe's 1925 expedition made possible through the loan of Henry Whiston's massive coal powered cruiser. Roy Waldo Miner's Coral Reef Group (later updated to the still extant "Pearl Divers" group) was the product of Templeton Crocker's loan of the Zaca, a powered-schooner yacht. The habitat group for the northern elephant seal contained specimens from Charles Townsend's 1911 expedition to Guadalupe aboard the U.S. government research vessel, Albatross. And above them all were Andrews' whale skeletons, gifts from modern whaling companies. The hall was one of the largest in the world, 160 feet by 130 feet with a 60 foot high ceiling painted blue as the sky. H. E. Anthony wrote that "the general appearance . . . is somewhat suggestive of a cathedral."¹⁴ Amidst this sublime display of oceanic relics, bankrolled by New York's wealthy elite and obtained through the modernization of ocean travel, was Murphy's whale-boat. This technology of humble means thus became an artifact of natural history itself. It is not altogether unsurprising that it was later removed to make room for William Beebe's bathysphere.

While the whaling story of the Daisy expedition was a topic that Murphy would revisit throughout his life, he was really an ornithologist by trade, so his main objective was to examine the populations of albatrosses, petrels, and penguins that inhabited the southern Atlantic. On board the mother ship, Murphy often trailed a line of baited hooks

¹⁴ H. E. Anthony, "Glimpses into the Hall of Ocean Life," Natural History 33 (July-August 1933), 365.

off the stern, “fishing” not for swimming creatures, but for the sea birds that swooped down to take the bait. The captain ordered his crew to bring anything of interest to Murphy’s attention. So on many occasions he was awakened from his berth by a masthead who had seen a bird or whale. He was even presented with an albatross that a crew member had shot from the sky, and a large squid that a lanced sperm had regurgitated. From time to time, he left the confines of the Daisy and boarded a small dory with notebook and rifle in search of albatrosses, despite the Old Man’s rebukes for disobeying Coleridge’s warning. As they traveled further south, sea-birds showed up in greater numbers. By the time they found safe harbor off South Georgia, Murphy had already amassed the collection of albatrosses, petrels, shearwaters, and Mother Carey’s Pigeons that would constitute the material for his masters thesis.

Harking back to a nineteenth-century mainstay of natural history, Murphy’s daily practice consisted of the construction of organismic “life histories.” Life histories outlined all aspects of individual species, including morphology, life-cycles, distribution, behaviors, and connections with the past. Observing organismic life cycles occupied the lion’s share of Murphy’s time: breeding behavior, nesting, and brooding. He was also interested in animals’ mechanisms of locomotion, how their structure was suited to moving through particular environments. Feeding habits concerning both type of prey and style of capturing prey were also noted. Though Murphy’s proclivities already leaned toward ornithology, he also examined as many vertebrates as possible: cetaceans, island rats, and sea-elephants. But the bulk of his time was spent examining the life-histories of the sub-Antarctic oceanic birds whose incredible numbers caught him by surprise.

The life history laid the foundation for the description of a wider evolutionary tale. That is, life history details were the evidence used to investigate a species' evolutionary past. Murphy was particularly fascinated with the order of Tubinares consisting of albatrosses, giant fulmars, cape pigeons, whale-birds, and Antarctic petrels. The Tubinares were dear to Murphy's heart because he considered them an "archaic" order as indicated by "the joint evidence of their structural isolation, ontogeny, psychobiological reactions, distribution, and the fossil record," which demonstrated that the order had reached its radiational climax by the late Tertiary.¹⁵ Also of note was their great range of interordinal size, which finds no parallel in other ordinal groups of birds. To explain this variation among close relatives, Murphy endorsed the adaptive radiation theory of American Museum Naturalist, Henry Fairfield Osborn. Finally, Murphy was overwhelmed by the order's huge population. Though species-poor, the sub-Antarctic waters were teeming with these birds. Here, again, Murphy took a page out of Osborn's Origin and the Evolution of Life (1918) and pointed to the homogenous and archaic nature of the polar oceanic environment. The absence of denitrifying bacteria in frigid polar waters explains the overwhelming abundance of nitrates which support marine algae, upon which zooplankton subsists, thus founding the base for the ecological chain that supports pelagic birds.¹⁶ So in order to explain the existence of such an archaic order, Murphy pointed to the historical oceanic conditions that supported the great populations

¹⁵ Robert Cushman Murphy, "Avian Orders of the Tubinares," thesis for M.S. in zoology at Columbia University (May 22, 1918), p. 471, Murphy Papers, Folder "Murphy - Avian Order of Tubinares."

¹⁶ The somewhat counterintuitive fact that ocean productivity varies inversely with temperature was discovered by the German marine scientist Victor Hensen in 1889. Peter Bowler, The Environmental Sciences (New York: W. W. Norton & Co., 1992), 386.

of oceanic birds. Tubinares was his most beloved order and one of the primary objects of his life study. The book that he wanted to write on the subject never found its way to a publisher. But a general course of study was set in place: ocean environments, distant islands, the ecology of bird populations, and conservation.

The Geography of Ocean Currents and Peruvian Guano

A string of stark islands rises prominently out of the Pacific Ocean along the coasts of Ecuador, Peru, and Chile. The stretch between Point Parina, just south of the Gulf of Guayaquil, and the vicinity of Corral, Chile is peculiar for its extreme aridity. In contrast to the desert-like nature of this region, the frigid Humboldt Current, that runs northward along the coast before turning west at the Gulf of Guayaquil, flourishes with life, especially with the anchovetas that are the chief food source for the populations of sea birds that live on the Peruvian islands. These birds exist in numbers of staggering proportions, often so dense as to completely block out any view of land. When not gorging themselves on sea food, they are found nesting, mating, brooding, and scattling on the islands. Anyone who has walked under a bird's nest hanging over a city side-walk that has not been recently washed by rain can appreciate the quantity of scat produced by a small bevy of birds. The massive populations of cormorants on Peru's desert islands are similarly able to produce thick layers of commercially valuable guano in short order. Starting in 1919, Murphy undertook a series of expeditions to this unique and complex environment to further explore the relationship between ocean, birds, and humans.

Despite their proximity to the equator, Murphy's interest in the Peruvian islands

was actually a continuation of his first sub-Antarctic expedition. For the same type of fauna he had examined aboard the Daisy—southern kelp gulls, white-breasted cormorants, diving petrels, penguins, and the southern sea-lion—were also present in the confines of the Humboldt Current. Murphy had a number of objectives in mind on his 1919 expedition. First and foremost, he wanted to explain the extraordinary abundance of littoral animal life along the coast of Peru by studying oceanic conditions. His work in the sub-Antarctic made clear the relationship between abundance and the cool phytoplankton-rich ocean that supported these birds. The Peruvian studies refined this base of knowledge by bringing his attention to how specific populations of birds were distributed within definite littoral bio-geographies. A necessary corollary of this was to investigate “the life histories of the birds, mammals, and fishes, in order to understand and interpret their ecology.” As always, he went to the islands to secure preserved specimens for Museum collections and material for a permanent Museum exhibit that would eventually be part of the Whitney Hall of Pacific Birds. He also took 350 pictures and 9,000 feet of motion pictures that was later edited to become “The Bird Islands of Peru.” The expedition was not without its commercial purposes. He was to report back to his primary patron, an American import firm, on the possibility of acquiring access to guano and anchovy resources. Lastly, Murphy was invited and hosted by Francisco Ballen, a naturalist of the Guano Administration of Peru, for the purpose of providing the advice and authority of an American scientist on the conservation of guano resources.¹⁷

¹⁷ Murphy to Francisco Ballen, (January 31, 1920) for quote; also Murphy to Mr. Loiseau, (January 25, 1920), and Murphy to R. H. Eggleston (December 27, 1919), all pasted in the back on Murphy's bound expedition notes, Murphy Papers, “Journal #12, Peruvian Littoral Expedition 1919-1920.”

Giving up the romance of the sail for the efficiency of the screw, Murphy steamed through the Carribean at August's end of 1919, crossed over the canal and skirted the Ecuadorian coast before landing in Pacasmayo and thence to Lima where he passed the time reading up on the tumultuous history of guano and the Peruvian economy while waiting for his papers to clear. In mid-September Murphy had the good fortune to meet with President Leguia. Leguia was of the mind that the survival of the Peruvian economy depended on the efficiency of foreign brains and capital. Murphy was a small part of this equation, and was received with the honor and dignity of a foreign ambassador. He was then tied up in Lima for another two weeks due to a general strike, which oddly solicited little comment from Murphy's ever scribbling pen. When the strike was settled, he traveled by rail to the nearby coastal city of Calloa where a corporate office of W. R. Grace and Co., his primary benefactor, served as a lab-equipped shore station. Shortly thereafter he boarded the Alcatraz bound south for the Chinchas Islands, the first research station on his northward sweep along the full length of Peru.

The Chinchas struck him as beautiful and at the same time stark and tragic, a combination of geological, natural, and human history.

Three tiny, bare, splintery granite rocks are these, evidently all one islet at some time in the distant past, yet small as they are, their name is known to the farthest ports in the world, and their share in making fortunes and in abetting tragedies, in debauching not only men but governments, has given them a place in history all out of proportion to their size. The flat top of North Island, now occupied solely by a dense colony of guanays, is said to have been the site of a town of eight thousand inhabitants. No trace now remains.¹⁸

The Compania Administradora del Guano had erected a house in which company officials

¹⁸ Robert Cushman Murphy, "Journal #12, Peruvian Littoral Expedition 1919-1920," 81.

and scientists lived and worked. The chemist had provisioned a well-fitted laboratory on the lower floor. On the other side of the wharf were the storehouses and sack-huts of the Indian peons employed by the company for menial labor. This office, and more like it on many of the Peruvian guano islands, was his home base for research.

Just as he had done on South Georgia, Murphy spent much of his time in the field observing the feeding, nesting, mating, and brooding behavior of the sea birds. He carefully noted the amount of time they had left the island to feed in the ocean, and tried, to the best of his ability, to discover exactly where these animals foraged. He spent an equal amount of time aboard skiffs and schooners taking down the temperature of the surface water in both longitudinal and latitudinal profiles, tracking the winds, attempting to measure the rate of flow of the current with a Gurley current meter, and saving samples of water for analysis of biological and chemical content.¹⁹

Murphy also used a tow-net to sample the diatomaceous flora of the current along the 700-mile coast. It was well known that phytoplankton was the energy base of an ecological pyramid that sustained copepods and crustaceans that became the food for the anchovies on which the guano birds were completely dependent. Of course, taking plankton samples from the ocean would only give a present profile, and Murphy was interested in the history of this current, the evolutionary tale of how it came to be that the guano birds became so intimately linked with this region. So, in the same way a geologist

¹⁹ Murphy was building on the work of R. E. Coker who had recently worked in the region. The main difference between their work seems to be Murphy's analysis of phytoplankton content. R. E. Coker, "Ocean Temperatures off the Coast of Peru," Geographical Review 5 (February 1918): 127-135; idem., "Peru's Wealth-Producing Birds," National Geographic Magazine 37 (June, 1920): 537-566; and idem., "The Fisheries and the Guano Industry of Peru," Proceedings of the Fourth International Fishery Congress, Bulletin of the Bureau of Fisheries 28 (1908): 333-365.

turns to the strata of an outcropping to investigate geological history, Murphy took guano samples from various layers built up over time, especially the so-called "fossil layers" from the beds on Lobos de Afuera and Lobos de Tierra. These samples were sent back to Washington, D.C. where an analyst identified and quantified the diatom content. What came as a surprise to both Albert Mann and Murphy was the extraordinary uniformity in species type and number, both over time and space. Such uniformity was an important finding, for it explained how the life of the Humboldt Current "must have become thus inflexibly adapted through the long duration of substantially invariable conditions." Furthermore, it explained how slight variations in the current—like the El Niño phenomenon—could have such a dramatic effect on all oceanic life.⁴⁰

If the oceanic life of the Humboldt Current was marked by inflexible continuity in species type and number, the opposite was the case for those areas outside the Antarctic flow. Murphy came to know these transitions intimately as his schooner continuously zigzagged through Peru's littoral ocean environment. In a popular account of the expedition he pointed to the dramatic transitions:

If we sail out across the current, we encounter a change in fauna which is closely correlated with change in surface temperatures, after a few miles the rich 'soup' of microscopic life, the sea lions, the penguins, cormorants, kelp gulls, and sub-Antarctic petrels—an aggregate of thousands of species—all disappear. A new oceanic region, with a distinctive assemblage of life, rich in species, perhaps, but poor in the relative number of individuals, spreads away across the vast expanse of the tropical South Sea.⁴¹

⁴⁰ Robert Cushman Murphy, "The Oceanography of the Peruvian Littoral with Reference to the Abundance and Distribution of Marine Life," Geographical Review 13 (January 1923): 71-72.

⁴¹ Robert Cushman Murphy, Bird Islands of Peru: The Record of a Sojourn on the West Coast (New York: G. P. Putnam's Sons, 1925), 181.

The 1919 Peru island expedition marked Murphy's first rigorous entry into the fields of biogeography and generally speaking geography. Murphy was attempting to bring the tools of geography to describe the ocean. Of course, the heterogeneous and dynamic nature of the current had not escaped the attention of marine biologists and oceanographers. But the geography of oceanic phenomena- currents, convergences, upwellings and the like- was still in need of more systematic investigation. Very much akin to those geographers who declared that the initial work of exploration was just the starting point for more detailed surveys, so too did Murphy wish to understand the movements, temperature profiles, chemical composition and biology of an important current that had had a long history of exploration. Such was the reason for creating profiles of the current's temperature, chemistry, and life.

Murphy's contributions to understanding the current were quite modest. He explained why the current became steadily warmer the greater the distance from the coast and at the same time remained constant (both on and off the coast) as the current drifted northward. He attributed this phenomenon to the fact that the Humboldt was not a surface current, like the Gulf Stream, but a deep water current. A steady southern wind caused coastal surface water to push out to sea, being replaced by an upwelling of cold and phytoplankton-rich deep water. Perhaps his most important findings related to the El Niño countercurrent. This was before the era when El Niño was viewed as an ocean-wide alteration in energy cycles, accordingly, Murphy's explanation was extremely local. He called into question the common belief that El Niño events were caused by the swinging of

the Humboldt current offshore and found that the actual cause for high water temperatures was the invasion of a warmer countercurrent from the north⁴²

These notes were printed in the Geographical Review, the publication of the American Geographical Society. Isaiah Bowman was then editor of the journal and the two became life-long friends. No doubt Murphy viewed Bowman as the quintessential geographer whose all “pervading soul . . . sees the basic bearing of the frame of the earth and the physical as well as social ties of its inhabitants.”⁴³ Indeed, Bowman’s climatic and geographic work, published in the Andes of Southern Peru (1916), played no small role in Murphy’s description of the coast.⁴⁴ Murphy’s name became increasingly present in notes, reviews, and articles of the Geographical Review. He also became involved in the Society’s affairs, serving on organizational and conservation committees. In 1943, the AGS presented Murphy with the Cullum Medal for his outstanding contributions in the field of geography.

Murphy’s foray into geography may seem easily understood given his interest in the biogeographical distribution of ocean birds.⁴⁵ But the move takes on added significance when we consider the “historical” nature of geography. In the same way that

⁴² Robert Cushman Murphy, “The Oceanography of the Peruvian Littoral,” 64-71.

⁴³ Quoted in Robert Cushman Murphy, “The Progress of Science,” Scientific Monthly 56 (June 1943), 570.

⁴⁴ Robert Cushman Murphy, Bird Islands of Peru, 23-35.

⁴⁵ Murphy was oddly silent regarding developments in ecological biogeography in the 1920s and 1930s, though it seems that his work can be characterized as nothing but that. He did express, however, some misgivings with W. C. Allee and Karl P. Schmidt’s 1937 rewritten edition of Richard Hesse, Tiergeographie auf oekologischer Grundlage (1924) mostly for their handling of oceanography. Robert Cushman Murphy, “Animal Geography: A Review,” Geographical Review 28 (January 1938), 140-44.

“natural history” is historical in its descriptions of structure, behavior, and environment (absent considerations of time), so too was geography a historical science devoted to describing the local structures and processes of landscapes. Both geography and natural history share epistemological and ontological trends that distinguish them as historical sciences. They come to know nature through a non-experimental inductive process of gathering masses of data through observation, even as Murphy became increasingly technologically savvy, the instruments he employed were only used to extend his observational capabilities. Second, both sciences generally do not make nomothetic claims. Murphy would talk about “nature’s ways,” or the “principles” of nature, or nature’s “balance,” but he eschewed any talk of natural law. Both geography and natural history are thus united in their use of such a “historical method.”

Nowhere was this more present than in Murphy’s most significant contribution to natural history, Ocean Birds of South America (1936).⁴⁶ The essential problem with previous accounts of South American sea-birds was that they stemmed from specimens that were taken out of context, i.e., most of the collecting had been done on the continent, not in the ocean where they lived. Murphy’s own work in the sub-Antarctic and Peru, as well as the specimens that returned from the Sanford Whitney South Pacific Expedition, provided the data that enabled him to situate ocean birds in their pelagic and littoral contexts. Separating South America waters into fourteen regions, he depicted an

⁴⁶ Roy Chapman Andrews, then director of the AMNH, thought that Murphy was being a little too optimistic in requesting a run of some two thousand volumes. He only saw to printing five hundred. Oceanic Birds of South America sold out faster than any other publication in the Museum’s history. It was because of decisions like this that Andrews’ directorship often raised the ire of Museum naturalists.

ocean that “abounds in invisible walls and hedges . . . [T]he majority of oceanic birds are bound as peons to their own specific types of surface water.” Breaking from the myth that ocean birds were free to roam at will, he showed how thirty-two species of ocean birds were inflexibly bound to historically specific types of surface water environments. And as has been previously noted, nowhere was this more clearly demonstrated than in the Humboldt Current.

While it is clear that Murphy’s Peruvian expeditions were conducted in the interest of natural history, he also played an important role in conservation matters. The Peruvian Guano Administration was founded in 1909 to resurrect Peru’s defunct guano industry by applying biological principles of life cycles that promoted guano production. In the mid-nineteenth century, Peruvian officials seized upon these massive accumulations as a natural resource to be mined and traded to foreign countries. This industry produced enormous short-term wealth, but the government quickly exhausted the islands’ reserves and in the process almost decimated sea-bird populations. The Administration therefore strictly enforced a protection policy that, in effect, transformed islands into bird sanctuaries.

If Murphy lent his scientific authority to the Administration, then the relationship was far from one-directional. Murphy highly esteemed the conservationist strategies of the Guano Administration. In a letter to Francisco Ballen he reported that “the extraction of guano is, fortunately for the nation, no longer a mere matter of exploitation, it has become an industry.”⁴⁷ Instead of considering guano as a resource to be “mined,” the

⁴⁷ Murphy to Francisco Ballen, (January 25, 1920), Murphy Papers, pasted in back of ‘Journal #12, “Peruvian Littoral Expedition.”

Administration considered it a commercial product dependent on the contingencies of the sea-bird population. Protecting these populations was the most important objective of administrators. So by calling Peru's guano extraction an "industry," Murphy was highlighting the Administration's efforts to conserve and produce a profitable natural resource by protecting the birds that sustained it. Where nineteenth-century Peruvians were bent on accumulating massive wealth in the short term, their twentieth-century counterparts kept long-term sustainability foremost on their minds. Murphy was equally impressed with the Administration's ability to adjust harvesting policy to accommodate for wild swings in sea-bird populations, usually a result of the El Niño countercurrent. In short, guano-producing sea-birds had become the "friends" of the Peruvians, and this friendship preserved, in Murphy's words, "the balance of nature" and at the same time provided fertilizer for Peruvian agriculture and profits for the nation.⁴⁸

Murphy's appreciation for the national management of the guano islands highlights both his preservationist and conservationist tendencies. Tightly guarded with stiff penalties levied on poachers of guano, birds, and eggs, the islands were, Murphy wrote, "the most impressive sanctuaries of their kind to be found anywhere on the face of the globe." Moreover, these were sanctuaries that fostered the life cycles of the guano-producing birds. Company workers roamed the islands with rifles potting shots at the

⁴⁸ Robert Cushman Murphy, "The Most Valuable Bird in the World," National Geographic Magazine 46 (September 1924), 278-302. Richard Grove has complicated the traditional story of a Euro-centric environmentalism by showing how British colonialism provided the key matrix for environmental ideas to emerge from scientists and bureaucrats who came in contact with indigenous knowledge. A similar case can be made for American conservationism. Just as Andrews had incorporated Japanese strategies of resource use into his own conservationist ethic, so too did Murphy draw from the Peruvian example. Richard Grove, Green Imperialism, 73-94.

introduced feral animals that preyed on bird eggs, and in stressful El Niño years, the company would adjust their harvesting schedule instead of continuing operations at a steady clip. Highlighting his leftward politics, Murphy also appreciated the fact that this was a nationalized effort that did not immediately respond to the vagaries of market capitalism.⁴⁹ At the same time, the company was a business effort, their goal was to rationally and scientifically conserve a national resource vital to Peru's political economy. Murphy referred to this case as an example of "Conservation's Silver Lining," the absolute preservation of nature that results in economic payoff.⁵⁰ This synthesis of the aesthetic and the utilitarian was founded on a knowledge of the life histories of individual species, the human history of rampant guano extraction in the mid-nineteenth century, and the evolutionary histories that tied guano-producing birds to the Humboldt Current.⁵⁰

Murphy felt that Peru's style of conservation was a paradigm to be followed. For example, he accepted the 1941 Cullum Geographical Medal with a speech on "Conservation and Scientific Forecast."⁵¹ The basic thrust of the address was that conservation required sound scientific principles that regulated industries by heeding to nature's cycles of development. Efforts to conserve resources that were industry-led or politically-based were doomed to failure. For instance, too often, according to Murphy, politicians and industrialists base their harvesting plans on the assumption of

⁴⁹ Murphy was often silent on political issues, but was a Democrat who believed strongly in labor reform. See Murphy to Samuel Gompers, (February 10, 1922) Murphy Papers, Folder "Gompers." On his recommendations to improve the living conditions of Native American laborers on the Peruvian islands, Murphy to Ballen, (January 21, 1920) Murphy Papers, pasted in back of "Journal #12 Peruvian Littoral Expedition," and for his appreciation and encouragement of organized labor in conservation see "The President's Page," Bird-Lore 39 (November-December 1937), 411.

⁵⁰ Robert Cushman Murphy, "Conservation's Silver Lining," Natural History 46 (December 1940), 298.

stable rates of plant and animal productivity. Such an assumption is a fallacy, the key to effective conservation lies in understanding how all organisms “seem to share in the rhythmic fluctuations that are among the most familiar phenomena in our world and in the universe outside it.” Science is the tool for understanding those fluctuations, which are often determined by climatic cycles, and with this knowledge it can forecast the most efficient and productive management of resources. It seems obvious that Murphy had in mind Peru’s management of guano given the climatic fluctuations of El Niño.⁵¹ But Murphy put a fine point on his speech by citing the recent history of Peruvian guano management as “one of the greatest examples of practical conservation that the world has yet seen.” After a long history of heedless extraction, he continued, Peruvian naturalists realized that operations must permanently be attuned to the seven-year periods that affected the wanderings and reproductive capacity of seabirds. With this knowledge, guano administrators learned not to expect stable guano production from year to year, instead they adjusted their harvests to come in line with climatic fluctuations. “Here is scientific forecast in pragmatic operation,” Murphy concluded. “Here is a case in which a South American republic holds up a beacon for all other nations to admire and emulate.”⁵² Just as Andrews took his model for the utilization of whale meat from Japan, so too did Murphy hold up the conservation of guano birds in Peru as an example to be followed by Americans.

⁵¹ Robert Cushman Murphy, “Conservation and Scientific Forecast,” Address to the American Geographical Society, New York, December 20, 1940. Reprinted in *Science* 93 (June 27, 1941), 604. Also see Murphy, “Peru Profits from Sea Fowl,” *National Geographic* 115 (March 1959), 359–413.

⁵² Murphy, “Conservation and Scientific Forecast,” 607–9.

Murphy did more than cite the Peru case as an example to be followed the world over. He also used the principles of this experience in the realm of international conservation (New Zealand in the late 1940s and Antarctica in the early 1960s)⁵³ and notably, for the conservation of American resources. In a series of lectures delivered to the Garden Club of America in 1937 and 1938 Murphy explained that current conservation problems have a historical lineage that goes back to American pioneers who regarded nature, in a fashion similar to nineteenth-century Peruvians, “not as man’s friend but rather as an enemy that had to be overcome.” Using the economic metaphors he had employed to discuss the guano administration, he suggested that Americans have squandered the “interest and a good share of the capital of a fortune that we received for the asking.”⁵⁴ But more recently, politicians and industrialists were heeding the advice of naturalists who study the relation of all living things to their entire environment.⁵⁵

If Murphy had set the story of Peru’s long history of guano exploitation and conservation alongside the narrative of America’s relationship with its environment, he would view America as emerging from a phase similar to Peru’s of nineteenth-century exploitation. Pre-colonial American nature was in a historically constructed balanced state. Colonists destroyed that balance by dipping into the trough of natural resources—forests, wildlife, fish, the fertile plains—with little regard to the natural

⁵³ Robert Cushman Murphy, “The Seventh Pacific Science Congress,” Scientific Monthly 69 (August 1949), 84-92, and Robert Cushman Murphy, “Antarctic Conservation,” Science 135 (January 19, 1962), 194-197.

⁵⁴ Robert Cushman Murphy, “Conservation,” Bulletin of the Garden Club of America (May 1937), 33.

⁵⁵ Robert Cushman Murphy, “Conservation II,” Bulletin of the Garden Club of America (January 1938), 43.

processes that sustain such extraction. And just as Peruvian naturalists restored guano production to a profitable and sustainable level, so too were American naturalists beginning to gain a voice in matters of conserving natural resources.

Further historical explorations in South America

Murphy continued to write about the north-western coast of South America. He returned to the region in 1937, 1941, 1945, and again in 1953 to continue his research on littoral phenomena. This elaboration on his Peruvian studies is worthy of mention since it highlights some elements crucial to his historical view of nature. The 1937 Choco Expedition along the littoral Pacific coast of Colombia and Ecuador was intended to be a general purpose natural history expedition of a region “least known in every geographic aspect,” including the antipodes.⁵⁶ Despite the region’s proximity to one of the busiest shipping routes in the world, the coast’s bays, rivers, mountains, climate, flora, fauna, and human population had not received systematic attention. As always, Murphy turned to the paper trail of travel narratives left by conquistadors, buccaneers, explorers and naturalists to get some sense of what they had viewed and to ascertain how the littoral geography had changed in the intervening years.⁵⁷ Again, he was exploring the historical relationship between nature and humans. His entry into these sources was somewhat frustrating in that many of the conquest-era testimonials were highly contradictory, he

⁵⁶ Robert Cushman Murphy, “The Littoral of Pacific Colombia and Ecuador,” *Geographical Review* 29 (January 1939), 1.

⁵⁷ Robert Cushman Murphy, Murphy Papers, “Journal #38 Choco Expedition,” p. 1.

therefore drew from his own knowledge of the region to write a more sensible historical narrative of the earliest period of Spanish conquest ⁵⁸

If this expedition marked Murphy as an amateur historian of the Spanish conquest of Peru, it was also a period in which he donned the cap of a human geographer, and something of an environmental determinist at that. Not possessing the needed language skills, nor the time required to conduct a rigorous anthropological study of the Choco Indians, who had previously been a "riverine people" of Columbia's littoral region, Murphy was more or less scouting the area, taking pictures and the most general of notes. Of special interest were several populations of blacks who were occupying the Choco's historical littoral territory, the Native Americans having moved inland along the River Baudo. Murphy thus set out to discover the reason for this change in the distribution of human populations.

His solution to the problem, unsurprisingly, was that a struggle had existed between the two populations, "a struggle, biological rather than warlike, in which red and black people are the chief competitors." Noting some comments on adaptation that he had written in a review of four recent animal geography studies, he suggested that "the negro . . . enjoys the typical 'preadaptations' of Cuénot, which imply that an organism wins out if it possesses traits that particularly suit it to a given environment or that enable it to find a new environment where such traits confer relative advantages." The low altitude rain forest terrain, similar to tropical west Africa, enabled the "transplanted"

⁵⁸ Robert Cushman Murphy, "The Earliest Spanish Advances Southward from Panama Along the West Coast of South America," Hispanic American Historical Review, 21 (February 1941): 3-28.

blacks to become "superior" natives. As forest game became scarce, the black inhabitants, due to their physiological preadaptations, were better able to harvest scarce resources than the native Chocos who were forced to move upstream. Murphy thus viewed the rules that governed the historical distribution of oceanic sea-birds and those that determined the history of human demography as cut from the same cloth.⁵⁹

In the early 1940s his attention turned increasingly to the Panamanian Bight which, again, he considered one of the last remaining unexplored bodies of water in the world. The Askoy Expedition was important because for the first time the bathythermograph, an instrument designed to take accurate vertical temperature profiles, was used in the Pacific.⁶⁰ When the war in the Pacific broke out, Murphy's BT data was seized by the United States Navy. Such sensitive material was very useful for the navigation of Allied submarines and the tracking of Japanese subs, the seizure was thus a preventative measure to keep what amounted to a kind of thermal map of a North American coastal region from falling into the wrong hands. Of all Murphy's journals currently held at the American Philosophical Society, this is by far the largest. It is also distinctive in that it possesses little of the charm and style characteristic of the rest of his journals. It contains page after page of temperature readings, both vertical and horizontal, of the entire bight. Although very little came of the quantitative data, it is significant that Murphy was, for a brief moment, using the most cutting-edge of oceanographic technology.

⁵⁹ Robert Cushman Murphy, "Racial Succession in the Colombian Choco," Geographical Review 29 (1939): 461-471; idem, "Animal Geography: A Review," Geographical Review 28 (January 1938): 140-144.

⁶⁰ Robert Cushman Murphy, Murphy Papers, "Askoy Expedition of 1941," no journal number, pp. 1-3.

Immediately after the conclusion of World War II, Murphy was invited by Lieutenant Colonel Thomas G. Thompson, in charge of the Chemical Warfare Installation of the Army Service Forces in the Pearl Islands, to conduct a general natural history of the fauna on San Jose Island. Murphy was struck by the massive changes that the military had made to the island's geography. "The labor expended here is simply unimaginable. Highways were cut and bulldozed, enormous gradings and fills completed, and the roads were surfaced and rolled with stone quarried and crushed on San Jose." More than new roads sprawling over the landscape, Murphy feared the "heavy destruction of life all over the island by the war experiments." This suspicion was confirmed when he deduced the reason for the alarming paucity of bird life on the island. A naturalist who had visited the island prior to Murphy's visit went into the forest after a cyanogen chloride "shoot" and filled several gunnysacks with unmarked birds killed by the gas. Many of the birds on San Jose had met a similar fate. During the war in the Pacific, the U.S. military left a similar path of development and destruction throughout Oceania. The end of the war only promised further development. Murphy's Pearl Island expedition thus made clear that the militarization of Pacific islands could result in massive damage to these fragile environments. One of the consequences of this realization was his advocacy for conservation in the Pacific.⁶¹

⁶¹ Robert Cushman Murphy, *Murphy Papers*, "Journal #28 Pearl Island Expedition of 1945," pp. 1-2, 24-25, 47.

The Environmental History of Islands: New Zealand and Long

A visitor at the American Museum of Natural History would begin his or her tour outside by viewing the bronze statue of Teddy Roosevelt perched high on his horse with two native guides at either side. Passing between the fifty-foot classical columns and through the mammoth front doors one is greeted by three mounted *Barosaurus lentus* skeletons from the Jurassic posed as if in violent battle. Carved into the granite on the front and back sides of the Teddy Roosevelt Memorial Hall are four brief passages from Roosevelt himself that instill messages about duty, honor, nationalism, masculinity, and the curing powers of nature. These imposing first sights are layered with meanings that reveal structures of power that continuously reestablish early twentieth-century assumptions of race, class, gender, culture, and nature. If one continues westward into Carl Akley's Hall of Africa, stories of race, class, and gender can be read in the history and structure of the dioramas. If, instead, one headed south into the Hall of Asiatic Mammals one might succumb to a certain "agenda for antiquity."⁶² Now, if one takes a right turn and heads north into the Whitney Hall of Pacific Birds, a far less imposing, but no less impressive spectacle enters the field of vision. Positioned in the middle of the hall, one would be standing underneath a vaulted blue sky in what the curators of the exhibit believed was the center of the Pacific Ocean. As the visitor moved from exhibit to exhibit, they would be

⁶² For an analysis of race, class, and gender in the American Museum of Natural History's Roosevelt Memorial and Akley's Hall of Africa see Donna Haraway, *Primate Visions: Gender, Face, and Nature in the World of Modern Science* (New York: Routledge, 1989), 26-58. For a similar analysis of Henry Fairfield Osborn, see Ronald Rainger, *An Agenda for Antiquity: Henry Fairfield Osborn and Vertebrate Paleontology at the American Museum of Natural History, 1890-1935* (Tuscaloosa: University of Alabama Press, 1991). It is odd that the Hall of Asiatic Mammals gets no mention in Rainger's treatment of Osborn's role in the Museum's Asian explorations.

traveling similarly along the map in such a way as to outline how the dynamics of ocean and climate vary geographically. Moreover, each bird group depicts an actual landscape, i.e., not a general distillation of what, say, the Peruvian guano islands look like, but rather “a view from the South Chinha Island looking toward San Gallán, the Ballestas and Pracas Peninsula.”⁶³ In short, the entire hall was a microcosm of the Pacific.

At first glance, this seems to be a harmonious paradise, an Eden, just as the Pacific should be according to Gauguin and Melville. Every diorama tells a story of a community of birds and the ocean that is painted into almost every background. They are lighthearted natural histories about family and courtship. They are also historical stories. The tooth-billed pigeon was a conspicuous representative of the Somoan group because it had “no very near relatives and is probably a relic of a branch of the pigeon group that has long since died out.”⁶⁴ A model of the extinct New Zealand moa, completed in 1953, marks a diorama as a representation of that which once was, and no longer is. These representations of nature are not about strength or virility or conquest. They calm the spirit and soothe the soul. They bespeak of a prelapsarian paradise, an Eden not only before the Fall, but a paradise untrammelled by the destructive feet of European homo sapiens. Above all, these exhibits exuded a profound fragility. The peculiar evolutionary histories of oceanic and island sea birds had produced some of nature’s most sublime organisms, but just as certain, they were organisms that would easily fall victim to the

⁶³ Robert Cushman Murphy to Señor Francisco Ballén, (July 21, 1938), Murphy Papers, “Ballén, Señor F.”

⁶⁴ Robert Cushman Murphy, “Whitney Wing,” Natural History 44 (September 1939), 101.

heedless onslaught of human history

Visitors who had toured the Hall when it was completed in 1953 had been privy to a quite different image of the Pacific during the previous decade. World War II introduced a Pacific theater to the American consciousness that was sometimes at odds with the literary and artistic representations of the Pacific as paradise. Far from the scene of beauty and tranquility represented in the bird groups, the Pacific was all too often associated with war, death, atomic bombs, forced migrations of indigenous islanders, and the terra-forming bulldozers of the fighting seabees. The actual Pacific had undergone massive ecological changes well before the 1940s, a consequence of the long history of European and Asian colonization of the islands. This process was dramatically accelerated as the Pacific became America's new western frontier as well as a postwar military buffer zone. A museum visitor wrote to Murphy that she was "amazed at the beauty of the settings. We felt as though we had actually visited some of the spots that are in the head lines today, and now we can think of them in terms of their real natural beauty and charm, instead of just devastation and death."⁶⁵

The Hall of Pacific Birds was the "show piece" of the Whitney Wing at the AMNH, a full eight floors devoted to the Museum's ornithological work. The wing was funded by the Whitney family and the city of New York, an arrangement that dated back to 1928 when Dr. L. C. Stanford convinced H. P. Whitney to bankroll a new wing for the

⁶⁵ Julia Norton Babson to Murphy, (nd) Murphy Papers, Folder "Babson, Julia Norton "

then overcrowded ornithological collection ⁶⁶ The department inherited several massive bird collections from museums around the world, and a great many of its cabinets were devoted to the birds obtained during the famous Whitney South Sea Expedition in the 1920s and 1930s. The new Whitney Wing also boasted of a fully equipped laboratory on the eighth floor in which the behavior of living birds was studied. The wing opened in mid-1939 with the Hall of Pacific Birds nearly half complete. Murphy's own history of oceanic exploration was well represented: one group dedicated to the petrels and albatrosses of the "roaring forties," and two to the guano birds of Peru. Late in 1942 came the dedication of four new groups that represented landscapes in New Caledonia, Solomon, Fiji and Australian Barrier Reef. The war in the Pacific put a stop to the Hall's progress as travel to the region became impossible and the time of the staff was swallowed up by war duties. Cornelius Whitney felt that the cessation of work was "a great disappointment. . . . I felt very strongly that the public interest in the South Pacific Ocean at this time was very keen" ⁶⁷

Two years before America had declared war against Japan, Robert A. Falla, then a premier ornithologist and director of the Dominion Museum at Wellington, New Zealand, spent a month at the Museum's collections to study its specimens of sub-Antarctic birds. He very much admired the ocean geography approach of Murphy's Ocean Birds and was attempting to do a similar analysis of New Zealand's population of ocean-dwelling

⁶⁶ Murphy to C. V. Whitney, (June 2, 1939), p. 2, Murphy Papers, Folder "Whitney, Cornelius Vanderbilt #1."

⁶⁷ Cornelius Whitney to Murphy, (December 15, 1943) Murphy Papers, Folder "Whitney, C.V."

organisms. He and Murphy became immediate friends and collaborators, especially since the western Pacific possessed many of the petrels and albatrosses that had been Murphy's primary research interest since the Daisy expedition. Falla suggested two New Zealand locations that the Museum would be wise to consider for the Hall.⁴⁸ Shortly after America had dropped two atomic bombs on Japan, the Hall committee made plans for several expeditions to find the material for the five remaining spaces. Murphy volunteered to take charge of the New Zealand groups and in 1947 set off for the two islands with \$3,500 in Museum funds and the twin objectives of securing exhibit material and conducting further research on sub-Antarctic sea birds at the Museum under Falla's care.

Substituting rail for screw, Murphy boarded a train bound for San Francisco, stopping for a few days in Topeka, Kansas to visit his son and get a hair cut. He noted how Topeka was being rapidly built up: "a new and shiny shopping center threatens to make the shop of the nice barber even more of an anachronism." And he delivered a paper on the "forests, water-table, vegetation, and animal life in North America as the colonists found it, of what has since taken place, and of the new and necessary trend in which the children will have a part."⁴⁹ On his way to San Francisco he brushed up on various literature on New Zealand natural history. He read the story of "Pelorus Jack," a white dolphin of Cook Strait that became famous among mariners for its playful antics off the bows of passing ships. In 1904, Murphy took note, the New Zealand government passed

⁴⁸ Robert Cushman Murphy, "Digest of the History, Status and Program of the Exhibits in Whitney Memorial Hall," (December 21, 1943) Murphy Papers, Folder "Murphy-Digest of the History."

⁴⁹ Robert Cushman Murphy, Murphy Papers, "Journal #16 New Zealand Expedition," pp. 10-11.

an injunction that protected the species because the Maoris had built a cultural fabric of legends and rituals around the grampus. He also read literature from the Waipoua Preservation Society that was spearheading a movement to make a National Park out of the “virgin” Kauri stands of Waipoua Forest in North Auckland. The original 28 million acre stand of native conifers had been whittled down to 13 at the hand of early settlers and was being supplemented by plantings of North American pines. The entire affair was marked by bitter controversy between preservationist and utilitarian concerns.⁷⁰ Soljak’s history of New Zealand brought Murphy up to date on contemporary theories of indigenous settlement. He then boarded a steamer bound for New Zealand, but stopped at Pago Pago to find that “everything was as it should be. . . . The houses looked as airy, and almost as neat as the first explorers found them.”⁷¹

For one of the Museum bird groups, Falla and Murphy had chosen the Snares Islands, a series of hard-to-reach promontories off the southern coast of the South Island. The Snares featured the wonderfully charismatic crested penguin that would play a prominent role in the exhibit. The islands were also important because of the complete absence of humans. Here they could gather material to construct a representation of an environment that “has never been occupied by human inhabitants . . . and remains in its wholly primitive state.”⁷² An incessant rain fell on the ten scientists of the Snares excursion, and in short order, they had taken the pictures, made the sketches, collected the

⁷⁰ New Zealand Herald (September 1 and October 2, 1948)

⁷¹ Murphy, Murphy Papers, “Journal #16,” p. 42

⁷² Murphy to Albert Parr, (May 6, 1948) Murphy Papers, pasted in back of “Journal #16.”

samples of dirt, rocks, and flora, and preserved a number of specimens that were transported back to New York for assembly

The second site was on the shores of Lake Brunner in Pyramid Valley Swamp, a famous South Island location where fossilized moas had recently been found—a perfect place for executing Murphy’s intention “to depict primitive New Zealand bird life of a time antedating European settlement”⁷³. The objective was to create a diorama that reconstructed a New Zealand scene of some five centuries ago, before the European introduction of invader species. Pyramid Valley Swamp consisted of a yellowish, elastic, anaerobic, organic jelly contained between limestone ridges. The matrix preserved the bones of birds that had passed into extinction in the recent colonial past, so the excavation (which seems reminiscent of paleontology) was not intended as a journey into deep time, but rather a short jump into a pre-colonial landscape.⁷⁴ Murphy secured one small moa and an extinct rail-like takahe, when he returned to New Zealand in 1949 he would obtain the skeleton of the large moa that was reconstructed in the Hall.

The two excursions, and the consequent Museum dioramas, describe a moral tale about colonization and conservation. The Snares group was intended to depict a pristine landscape untouched by humans and invading species. Its peculiar island flora and fauna were the results of long evolutionary histories, the message is clear: here is a natural world that still exists but only because the Snares’ inaccessibility prohibited human colonization.

⁷³ Murphy, Murphy Papers, “Journal #16,” p. 200.

⁷⁴ Robert Cushman Murphy, “A New Zealand Expedition of the American Museum of Natural History,” Science 108 (October 29, 1948), 463-64.

In contrast, the Pyramid Valley exhibit depicted a historic landscape, one that could only be explored by excavating material from a miraculous yellow preservative. The evolutionary oddity of a completely wingless bird was the product of the moas having lived in an environment free from predatory pressures (Murphy often described the oblivious behavior of penguins, which display absolutely no fear of humans, in the same manner). The rapid introduction of human beings and their companion organisms sounded the death knell of some for New Zealand's most peculiar fauna.⁷⁵ The conservation story written into the structure of the dioramas was closely paralleled by his own concerns about conserving New Zealand's landscape. In his expedition report to Parr, he noted that "New Zealand has already gone dangerously far in the exploitation of forests, soil and river erosion, a fact well known to the biologists but realized scarcely at all by the mass of the population." This nascent conservationist ethic became full blown when he returned to New Zealand in 1949 to attend the seventh conference of the Pacific Science Congress.

On his second New Zealand sojourn, Murphy served as a representative of the National Research Council's "Pacific Science Board" at the first postwar Pacific Science Congress. High on the conference's agenda was the promotion of collaborative research into the ecological effects heaped on the war-torn Pacific landscape, as well as designing a plan to bring the tools of science to bear on questions of conservation and politics, issues that became of utmost importance in the rapidly changing cultural, political, and economic

⁷⁵ Murphy was fully aware that most moa species had taken their leave from this world even before New Zealand was populated by Europeans. Several species, however, remained and were hunted into extinction by European settlers.

milieu of the postwar Pacific (See Chapter 5) ⁷⁶ Robert Falla, presiding over the Auckland conference, asked Murphy to deliver the keynote address. The result was a remarkable synthesis of ideas that Murphy had tackled throughout his life; he wrote an environmental history of the islands of New Zealand, an environmental history that made explicit the moral tale of the New Zealand exhibits in the Hall of Pacific Birds.

Murphy delivered the address, entitled "The Impact of Man upon Nature in New Zealand," to a packed amphitheater of some 1400 scientists and citizens. He introduced New Zealand as a landscape that had undergone massive ecological changes, especially in the 100 years antedating the address. These changes were magnified because of the region's isolation, some 1000 miles from the coast of continental Australia. New Zealand, he noted, consisted of incredible diversity, in both life and climate. North Island possessed environments that he characterized as subtropical, while South Island contained communities that were sub-Antarctic in nature. The islands' varied topography and the winds and currents of the South Pacific Ocean conspired to tie island flora and fauna intimately to the ocean, just as in the case of the Peruvian guano islands.

He called historic New Zealand a "primitive" landscape by which he meant "the pre-European condition, existing when actual ecological disturbances were begun by Captain Cook." Now, Murphy was not so naive as to believe that these primitive islands were static; he noted the occurrence of climatic cycles, and plant and animal successions. Floristically, New Zealand had attained a climax, "a term not to be understood as an

⁷⁶ Robert Cushman Murphy, "The Seventh Pacific Science Congress," Scientific Monthly 69 (August 1949), 84-92.

ultimate state but rather as a long-enduring state of succession” He also noted the changes in the landscape by the predecessors of the Maori, but “racial or tribal mores, which seem to function so much more purposefully than systems of cause-and-effect perceived by civilized man, held destructive changes to a minimum Like most primitive folk, the Maori were effective conservationists” Primitive New Zealand was most unique in its absence of quadrupedal mammals, again a function of its isolation Without rodents or ungulates browsing forest underbrush, all grazing was left to specialized birds, flightless and even wingless birds, which developed to occupy such ecological niches This unique environment, a product of New Zealand’s oceanic climate and geographic isolation, was also quite fragile, in Murphy’s words, it was “preadapted” for organisms like European sheep”

Thence came the opening of “Pandora’s Box” when Captain Cook introduced five Geese to the islands in 1769 On following visits he sowed cabbage, turnips and potatoes, and let loose sheep, pigs, goats, stoats, and fowl to browse the forest underbrush In 1772, the French explorer Crozet sowed fruits and vegetables The true period of European colonization began in the mid-nineteenth century, and with the early settlers came rats, weasels, ferrets and rabbits which continued to compete with indigenous life Acclimatization societies all deliberately attempted to transform New Zealand into a replica of their English homeland through the introduction of European birds All these introduced organisms were beginning to have a cascading effect that caused both Darwin

⁷⁷ Robert Cushman Murphy, “The Impact of Man upon Nature in New Zealand,” address to the Pacific Science Congress (November 5, 1958), printed in Proceedings of the American Philosophical Society 95 (December 1951), 570-72.

and Hooker to suggest that old world species had an intrinsic competitive advantage that resulted in the demise of endemic life. Murphy noted that such was not the case. "European plants were superior only in being the dominants in a long-established man-made kind of terrain, to which much of New Zealand in turn was being rapidly converted."⁷⁸

The introduced organisms brought rapid and widespread change. Introduced wildlife thrived in the "alien biota." Endemic birds and plants succumbed to new predatory pressures. "Even more effective in all probability are the indirect causes of extinction stemming from a widespread upsetting of the balance of nature." Pathogenic organisms, too, played a role in killing off two flightless rails, the weka and the takahē. Of course, the landscape was further transformed through the more direct actions of humans who cleared forests for farming and agriculture. More than the loss of native stands of old growth forests, human-induced landscape changes also precipitated massive erosion problems. Echoing a growing sentiment that the globe was coming to grips with a population crisis, Murphy cautioned that "it would be difficult to conceive a further marked and swift growth of population without a concomitant decline in the standard of living." Murphy could only point to some partial solutions to New Zealand's changing environment. Scientists, like those gathered for the Pacific Science Congress, should serve as advisors for making decisions regarding landscape use. The creation of sanctuaries and national parks would also cordon off the little "primitive" landscape that remained. But more broadly, and perhaps more vaguely, he intimated the need for a

⁷⁸ Murphy, "The Impact of Man," 572-74.

country-wide change in attitude toward New Zealand. He concluded, "today [the New Zealander] is not only meeting the requirements of the Dominion but is also gallantly and persistently shipping 1,000 tons of food a day to Britain, his spiritual 'home' at the northern antipodes." Murphy thought that if New Zealanders could make New Zealand their spiritual home, then the future of the fragile oceanic island would be a bit brighter.⁷⁹ The paper received overwhelming applause.

"The Impact of Man on Nature in New Zealand" is an important document because it is, more than anything else, an early example of environmental history. It is difficult to read this and not immediately think of the work of leaders in the modern discipline of environmental history: William Cronon, Richard White, and especially Alfred Crosby. The point here is not to argue for priority, but rather to show how the declensionist narrative of changes in the land, and the concomitant call for environmental reform, were almost a logical extension of the naturalist's practice of viewing nature historically. The careful reader might be led to believe that Murphy's style of conservation had changed from his previous work on Peru's guano industry. There is, after all, none of the talk of business, efficiency, and utilization that we found in his earlier work—clear evidence of the transition from conservation to preservation. I do not, however, think this is the case. Murphy went back to Peru in the early 1950s and continued to hold to his line of argument regarding the business of conservation. He also continued to publish similar pieces on the guano islands. Actually, the New Zealand environmental history includes many of the same elements as the previously written "natural histories" of the Peruvian

⁷⁹ Murphy, "The Impact of Man on Nature," 577-82.

islands, as well as South Georgia. We should not expect otherwise, for one of the main objectives of this chapter is to show not only what is historical about natural history, but what is continuous in the practice of natural history. If there was anything truly different about the New Zealand environmental history, it was its synthetic scope and its more overtly moral call for reform.

South Georgia. Peru's guano islands. New Zealand. As Murphy was reaching the twilight of his career, he had already traveled to the ends of the earth and had hewn closely to his 1938 call for "The Need of Insular Exploration."⁸⁰ I would like to conclude this chapter by briefly discussing Murphy's work on a similar oceanic and insular landscape, but one very much closer to his heart: Long Island. Just as Murphy was taken by the sublime wildness of the Snares Islands, so too was he impressed with the natural world in his own back yard.⁸¹

Murphy's first experiences as a naturalist were in the pine barrens and brackish swamps of his Mt. Sinai home on north central Long Island. The stories of young

⁸⁰ Robert Cushman Murphy, "The Need of Insular Exploration as Illustrated by Birds," Science 88 (December 9, 1938), 533-39.

⁸¹ William Cronon has received much criticism for a recent essay that argued that a fondness for the sublimity of wilderness distracted, and continues to distract, American citizens from worrying about the environmental problems in their own backyards. Many of the critics are incensed by his dismissive attitude (more apparent than real) for wilderness conservation. They seem to be missing Cronon's broader cultural point. But we can blame Cronon for not pointing to the multitudinous examples of activists who fought for local concerns, certainly more a sin of expediency than of ignorance. This is the main point of Robert Gottlieb's Forcing of the Spring: The Transformation of the American Environmental Movement, (Island Press: Washington, D.C., 1993). Murphy is an example of a person that combined a love for wilderness and a call for wilderness conservation. But his call for conservation in South Georgia, Peru, New Zealand, and Antarctica served to reinforce his conservation activities of his local Long Island. Murphy thus does not fit into Cronon's categorization, though it remains to be seen whether or not Murphy was exemplary or a peculiar case. William Cronon, "The Trouble with Wilderness; or, Getting Back to the Wrong Nature," in Uncommon Ground: Toward Reinventing Nature William Cronon, (ed.) (New York: W. W. Norton & Company), 69-90.

naturalists entering the field with a sense of play and exploration are pervasive in the literature of environmental history. Murphy did likewise, with the one exception that his childhood tramps did not only instill a love of nature, but they also imbued a fondness historically specific to Long Island. Here he honed the journal writing skills that became a life-long daily practice. Birds, of course, were the object of his truest affection, but nothing seems to have escaped his eye. Before setting off for Brown University he had amassed a not inconsiderable "annotated list of the species and subspecies of birds known to occur on Long Island, State of New York, and the neighboring waters"⁸². After residing in Providence and New Jersey for a time, he and his wife moved back to Stony Brook where they lived for the rest of their lives. Grace Murphy later wrote of the coastal shingle-sided house with fondness. Speaking for her entire family, she noted that "whatever any of us do we owe at least in part to our home in Crystal Brook. It has seeped through and through the core of each of us"⁸³. When not on an expedition or working at the American Museum, Robert Murphy could be found exploring his backyard, the Mt. Sinai harbor, or on a mini-expedition to various parts of Long Island.

The couple became ardent defenders of the Long Island environment. They played instrumental roles in protecting Fire Island and Gardiner's Island from development, and through the hard work of Grace Murphy's Long Island Conservation Association, the Fire Island seashore saw its way into the state park system. Robert Murphy continuously criticized attempts to dredge coastal regions of the Long Island Sound. In 1966, he

⁸² Robert Cushman Murphy, Murphy Papers, "Journal #42, The Birds of Long Island," title page.

⁸³ Grace Barstow Murphy, There's Always Adventure, 28.

vociferously opposed SUNY Stony Brook's attempt to down-zone private land in the village for the erection of multi-family dwellings for temporary student dormitories. He founded a Long Island chapter of the Nature Conservancy. When the state of New York attempted to control the mosquito population through marsh drainage, Murphy was up in arms. Finally, he was an energetic litigant in fighting for an injunction against the USDA to prevent the indiscriminate spraying of DDT over Long Island citizens' property.⁸⁴ This case was the launching pad for Rachel Carson's Silent Spring (1962). Robert Murphy was a prominent figure to the citizens of Long Island. Both his fame as a world traveling naturalist and his efforts to fight for the environmental protection of Long Island made him a source of local pride.

Murphy's final environmental history was that of Long Island. He delivered it in front of the American Philosophical Society in 1962, and it was published in 1964 as Fish-Shape Paumanok, also the title of a poem by Murphy's beloved Walt Whitman. Here again, he repeated the declensionist narrative of balanced nature to ruined landscape, but this time Murphy focused on the case of Long Island. He could have just as well been talking about South Georgia, one of the guano islands, or New Zealand. He described how the retreat of the Wisconsin ice sheet resulted in Long Island's insular geography. Over time, the island developed a unique flora and fauna with intricate connections to the sea. After exploring Long Island's natural history, he turned to the written record, those

⁸⁴ Richard Hammond, "Robert Cushman Murphy and Environmental Issues on Long Island," Long Island Historical Journal 8 (Fall 1995): 76-82; Murphy to Stuart Gracey, (January 6, 1959) Murphy Papers, Folder "Brookhaven, NY Trustees of the Freeholders," Robert Cushman Murphy, "Mosquito control through marsh drainage," (nd) Murphy Papers, Folder "Mosquito Control," Murphy to Charles Jackson, (September 22, 1939) Murphy Papers, Folder "Jackson, Halseted."

archived papers left by the early colonists that told of what they saw, and of how they transformed the landscape. Murphy then told the story of how Dutch colonists, suffering from the “fallacy of the inexhaustible,” quickly exploited “the greatest store of natural treasure that has ever fallen into the hands of mankind.”⁸⁵ Forests were cleared, fauna squandered, game birds indiscriminately killed, and wetlands drained and developed. In the more recent past, he noted, increasing encroachment from New York City’s population further threatened the few remaining undeveloped landscapes. In short, Long Island’s natural history was one of reckless exploitation with little regard for nature’s history. The preface of the published volume spoke of the brilliant success of Murphy’s lecture. It noted of Murphy that “in later years, as a naturalist of far-ranging experience, he views these scenes of his youth with deeper understanding, through the eyes of a scientist and student of human history.”

* * * * *

Murphy was a classicist, a person with a fond devotion to ancient languages and classic literature who had many misgivings about the sweeping cultural and technological changes of the modern world. His scientific method was a historical method, which meant composing the life-histories of organisms as they interacted within definite landscapes. While his albatross and petrel book never came to fruition, evolutionary concerns were one of his chief interests.⁸⁶ He was a voracious reader of the explorers and naturalists who

⁸⁵ Robert Cushman Murphy, Fish-Shape Paumanok (Philadelphia: American Philosophical Society, 1964), 37.

⁸⁶ It is very difficult to explain Murphy’s failure in writing this book. More than just a monograph on the Tubinares, this study was to look at these sub-Antarctic birds to answer evolutionary questions. Perhaps Murphy’s fondness for Goldschmidt’s theory of hopeful monsters discouraged him as Goldschmidt came

had previously discussed the landscapes that he visited. He viewed his own work as a continuation of an older natural historical tradition. He read historical accounts that shed light on the relationship between humans and their environments. His first expedition aboard the Daisy was literally a journey into history and he consequently became a historian and spokesperson for the nineteenth-century tradition of Nantucket-style sperm whaling. He also composed environmental histories that described the fate of nature at the hands of humans. All these historical interests conspired to form a foundation for his call for the conservation and preservation of nature.

The practice of modern science, and especially the experimental sciences, is notable for its profound ahistoricism. In both the testing of biological organisms and sub-atomic particles, the consequence of laboratory sciences is to erase all that is contingent and locally specific. This erasure of nature's history at the hand of modern science is one of the most regrettable outcomes of a scientific epistemology that has gained preeminent sovereignty in making claims about nature. The practice of natural history cuts across the grain of experimental science in its profound affection for the role of local and historical forces. This history of Robert Cushman Murphy has demonstrated, however, that the practice of viewing nature historically works on many different levels. Because natural historians do not work from lab-benches and because their work is always in the field, they are not able to turn off their historical methodology. This explains why so many

under steady attack. In any case, I think there is much to learn about the history of evolutionary theory by examining the notes to Murphy's uncompleted text. Especially interesting would be the relationship between Murphy's Oceanic Birds of South America (1936) which employs a geographical ecology of bird populations and Ernst Mayr's Systematics and the Origin of Species (1942), one of the classic texts of the evolutionary synthesis.

conservationists in the early-twentieth century hailed from museums. Murphy's way of looking at nature was shared by museum naturalists across the country, and even today they continue to be ardent environmentalists.

When Murphy's historical vision was aimed at oceanic phenomena he began describing an ocean full of complicated geographies similar to those found on land. He found organisms ecologically bound to specific oceanic conditions just as diamond-back rattlers are bound to south-western deserts. The islands that he examined were full of life that had slowly evolved within specific life-zones, phenomena whose fragility highlighted the moral tale of destruction by the hand of Western colonialism. Murphy's world-view was characteristic of the museum naturalist, and his position with the American Museum of Natural History ensured that he would receive sufficient funding to pursue his exploration of ocean environments. He never needed to rely on royalties from his writing, and only rarely did he engage in the work of pleasing patrons. Other oceanic naturalists worked from less financially secure establishments and thus needed to fashion oceanic natural histories for public consumption.

Chapter 4

Sensational Management: William Beebe, Biocentrism, and the Department of Tropical Research

Beebe's life has been one story-book expedition after another: to the Galapagos, to jungles of Guinea, to the Sargasso Sea; on distant Asian quests for pheasants; to record ocean depths in his bathysphere. But always he explored as a scientist, his large thrills the discovery of small things. The microscope has meant more to him, I am sure, than the spy-glass.¹

The name of William Beebe is synonymous with oceanic exploration. His widely followed 1930 dives in the bathysphere to mid-ocean depths were the stuff of bold adventure and scientific curiosity. Throughout the 1920s and 1930s Beebe opened up the mysteries of the Sargasso Sea, the beauty of the Galapagos Islands, and the strange life of mid-ocean depths—all of which received treatments in newspapers, magazines, books, radio programs and world's fair exhibits. More than an ocean explorer, he was a general naturalist interested in studying ornithology and tropical ecology. Harking back to the writings of Romantics and Transcendentalists, Beebe's popular representations of nature were notable for their sense of awe and wonder of nature's most beautiful and fantastic creations. Beebe's wonderment of nature was imbued with a profound humility that served as a critique of human egotism, an egotism swollen with pride in the human ability to know and control nature. In Beebe's mind, humans had the potential to understand only the thinnest layer of the grand mysteries of life, and the purported belief that humans could control nature actually veiled the human tendency for destroying nature. He was

¹ George Palmer Putnam, Wide Margins: A Publisher's Autobiography (New York: Harcourt, Brace and Company, 1942), 249.

thus expressing a “biocentric” sentiment. His writings repudiated the notion that humans were the pinnacle of evolution, the center of the world, the center of the universe. By examining and appreciating a world filled with life, humans can better understand the wonder of nature as a check to their own self-aggrandizement. Beebe’s biocentrism emerged in the tropical jungles of British Guiana, but it was most powerfully articulated in ocean depths. Beebe’s ocean was not, like Andrews’, a commercial seascape. It was a place of wonder and dreams and sublime terror. The objective of this chapter is to describe Beebe’s ocean and explain how this ocean emerged from his biocentric view of nature and his management of sensationalism bearing on the New York Zoological Society’s Department of Tropical Research. It will be argued that Beebe’s representations of the ocean were carefully constructed to manage his own socio-professional identity as a naturalist who was at the same time a scientist and a popular showman.

William Beebe is not known for his contributions to biological theory, and justifiably so, he was an archetypal “stamp-collector” who devoted the lion’s share of his time to the minutiae of systematic biology. In actuality, Beebe’s contribution lies both in his leadership of the Department of Tropical Research (the scientific arm of the New York Zoological Society), and in his work as a popular writer of natural history. Throughout its history, the DTR operated various tropical research stations in British Guiana, Venezuela, Trinidad, and Bermuda. These stations were the home-base for Beebe’s staff as well as visiting naturalists like William Morton Wheeler and Alfred Emerson.² Beebe was the organizer and front-man of what amounted to a considerable structure of facilities that

² Also see Edward O. Wilson, *Naturalist* (New York: Warner Books, 1995), 239–40.

provided the resources for the Department of Tropical Research. More than organizing a scientific campaign on tropical and oceanic regions, Beebe was also taxed with the problem of financing the station, an activity that called on his ability to publicize the scientific work of the department.

Beebe was perpetually concerned with the financing of the operation. Funding generally came from New York philanthropists, the New York Zoological Society, and from Beebe's own pocket.³ Publicity was the key to all three sources. Money came into the DTR only when Beebe presented the impression that it was doing valuable work. In a sense, Beebe was the "ad-man" of natural history; the fate of the DTR and its tropical research stations relied on Beebe's immense popularity and his ability to highlight the department's contribution to scientific knowledge. Writing from the tropical forest of Venezuela in 1942, Beebe crystalized the issue:

Here was my problem. From this silent expanse of giant trees, lianas, orchids and bamboos, I must extract something which will satisfy my own intellectual curiosity, as well as trusting sponsors, fellow scientists, and those stay-at-homers which cannot travel but are eager to learn more of the wilderness life which shares this revolving planet with us.⁴

It is absolutely crucial to view Beebe's nature writing, his representations of the ocean, as a part of the publicity work for the Department of Tropical Research. Given this context,

³ A retrospective history of the Department of Tropical Research, probably written in the late 1920s, gives a helpful glimpse into the patrons of the DTR. Vincent Astor gave \$10,000 for the *Arcturus* Expedition; AMNH gave \$6,800 for Kartabo and *Arcturus*; George Baker gave \$7,000 for all oceanographic expeditions; Robert Brewster gave \$5,000 for oceanographic work; Andrew Carnegie gave \$3,500; Clarence Dillon \$10,000 for *Arcturus*; Marshall Field \$12,000; Anthony Kuser \$12,000; Mortimer Schiff \$11,500; Harrison Williams \$149,000. Total Contributions: \$302,000. Beebe Papers/ NYZS, DTR, General Records, Box 1, Folder "History of the DTR."

⁴ William Beebe, draft of article on "exactly how we go about getting facts and specimens in the jungle," (ca. 1942) Beebe Papers/PUL, Box 14, Folder 30.

it is necessary to examine how those representations functioned to further the interests of Beebe's management of the entire department. Beebe's biocentric representations of the ocean helped to legitimize Beebe's own status as a serious scientific practitioner.

His entire oeuvre needs to be placed alongside the work of some of the most important biocentric nature writers: Emerson, Thoreau, Muir, Leopold, Carson, and Dillard.⁵ Though scholars of nature writing have not yet considered the importance of Beebe's work, there is ample evidence to rank him among the great contributors to environmental thought.⁶ Beebe had won the first Burroughs Medal for excellence in natural history writing of popular and scientific interest. His articles were regularly printed in the Atlantic Monthly, the magazine of record for popular natural history. He was a great influence on the work of Rachel Carson, the doyenne of all great American nature writers. Despite his popular acclaim, or maybe because of it, Beebe has received no contemporary consideration.

⁵ Beebe's writings actually should be situated at the juncture between nature writing and travel writing, two literary genres with as many similarities as differences. For the purposes of this paper, I focus on Beebe as nature writer simply to highlight his use of a biocentric aesthetic, specifically, an aesthetic of the sublime. While the sublime is also invoked in travel writing, in nature writing it is an essential theme. On nature writing, I am drawing primarily from Lawrence Buell, The Environmental Imagination: Thoreau, Nature Writing, and the Formation of American Culture (Cambridge, Mass.: Harvard University Press, 1995); Don Scheese, Nature Writing: The Pastoral Impulse in America (New York: Simon & Schuster Macmillan, 1996); Peter Fritzell, Nature Writing and America: Essays upon a Cultural Type (Ames: Iowa State University Press, 1990); Leo Marx, The Machine in the Garden: Technology and the Pastoral Ideal in America (London: Oxford University Press, 1965). On travel writing: Casey Blanton, Travel Writing: The Self and the World (New York: Simon & Schuster, 1997); and Mary Louise Pratt, Imperial Eyes: Travel Writing and Transculturation (London: Routledge, 1992).

⁶ If one turns to Lawrence Buell's four-part rubric of environmental texts, it becomes clear that Beebe's work should be considered "environmental texts." The Environmental Imagination, 7-8. The only critical analysis of Beebe's writing harks back to 1930: George Reuben Potter, "William Beebe: His Significance to Literature," in Essays in Criticism (Berkeley: University of California Press), 219. Beebe's truest medium was the natural history essay, a genre with a long history in American literature: Philip Marshall Hicks, The Development of the Natural History Essay in American Literature (Philadelphia: Ph.D. dissertation, University of Pennsylvania, 1924).

Including Beebe within this list of great nature writers is somewhat problematic, for the simple reason that Beebe, like other scientist-adventurers, achieved public attention because he was the epitome of the modern explorer. Explorers' tales are rife with the glorification of human progress, the human penetration of an unknown frontier, the activities of human prowess and heroism, of putting one's physical body in danger for a greater cause.⁷ Narratives of heroic exploration and discovery are often the antithesis of biocentrism.⁸ But Beebe used biocentrism to mitigate his status as a hero. More precisely, a biocentric discourse functioned to distance Beebe from the sometimes odious nature of heroic adventure. His exploration of strange distant lands and the ocean depths cast him into the category of adventurers like Theodore Roosevelt, Roy Chapman Andrews, and Carl Akeley. In the midst of discussions in the first three decades of the twentieth century as to whether or not adventures like the races for the poles or August Piccard's ascent into the stratosphere (considered below) had any scientific value, the bathysphere dives had the potential for becoming another popular "stunt." Beebe developed a number of strategies to mitigate this criticism, foremost was his articulation of

⁷ Tales of heroic exploration could also be found in science fiction, especially in the 1930s, with the advent of pulp fiction that presented, according to Roslynn Haynes, scientists "chiefly as adventurers, the successors of Verne's heroes, voyaging through the galaxy, where no man had gone before, doing battle with the forces of evil and breaking through spacial, temporal, and psychological barriers." From Faust to Strangelove: Representations of the Scientist in Western Literature (Baltimore: Johns Hopkins Press, 1994), 16.

⁸ This claim needs qualification. The heroic travel adventure, as genre, has incorporated descriptions of nature's sublimity. Lawrence Buell holds that "the excursioner can efface himself to the point of becoming little more than a recording device. . . . Even the most protagonist-centered narratives can build to a culmination in which the speaker's egotism is overwhelmed or dissipated." Both of Buell's exceptions apply to Beebe's narratives of discovery. But the point remains. The heroic adventure, barring exceptions, is necessarily ego-centered. The Environmental Imagination, 220.

an oceanic sublime that effaced him as a hero and highlighted his status as a scientist”

The consequence of this dynamic is that the ocean became, in Beebe’s hands, a region of unsurpassable power and glory

This chapter begins with an analysis of Beebe as the manager of two tropical research stations. I briefly highlight the many facets of his managerial responsibilities that included the establishment of the DTR, its funding, and some of the publicity work required to maintain the stations. I then digress from Beebe’s biography to discuss his biocentric philosophy of nature, a general framework that imbued most of Beebe’s popular writings throughout his career. This is followed by a treatment of the 1925 Arcturus Expedition, an oceanographic voyage of discovery to the Sargasso Sea and the Galapagos Islands. Given the high profile nature of the expedition, I concentrate on Beebe’s management of sensationalism. I then discuss the move of the DTR to Bermuda in 1929 and the uneasy integration of the bathysphere into Beebe’s wider research of ocean life in 1930, 1932, and 1934. I move on to treat the way the ocean was represented in his writing during these years. Here, Beebe’s biocentrism takes the form of an oceanic sublime, an aesthetic that allayed the sensationalism caused by his record-breaking dives in the bathysphere. The chapter ends with an analysis of the bathysphere as a movie making technology and a brief analysis of the bathysphere’s role in the 1939 World’s Fair. This

⁹ Michael Smith has made a parallel argument for the writings of Clarence King and John Muir. He suggests that King invoked two different traditions of the sublime, one articulated by Tyndall emphasizing the heroic quest, the other by Ruskin, which is more akin to traditional aesthetic theory. While I have reservations regarding Smith’s characterization of Tyndall, he makes the key point that the two traditions worked dialectically to negotiate problems created by conceptions of gender and science. I’ll be concentrating on this latter tradition as it impinged upon Beebe’s narrative of discovery as a strategy for distancing himself from the heroic narrative. Michael Smith, Pacific Visions: California Scientists and the Environment 1850-1915 (New Haven: Yale University Press, 1987).

conclusion reemphasizes Beebe's vigilant concern to manage the scientific image of himself and the DTR, but we also see here a small effort to democratize exploration. More than representing an ocean to a public audience, Beebe wanted to help make explorers out of his general audience.¹⁰

The Department of Tropical Research

Because Beebe began his career as a New York Zoological Society curator of birds, his early explorations were sporadic and wide-ranging. His primary responsibility was to maintain the aviary at the Bronx Zoo, so his early exploratory expeditions to Mexico, Venezuela, and Virginia were brief and limited in scope. But in 1912, Anthony Kusar, a wealthy Society trustee, offered to finance a two year Asian expedition to prepare a monograph on pheasants, an opportunity that required Beebe to forgo his responsibilities at the zoo, much to the consternation of the NYZS director. Then in 1915 Beebe spent a season in Brazil collecting birds during which he spent extra time exploring the general wildlife of sections of jungle. On one of his outings he concentrated his attention on a four square foot area of debris and a single tree. In what may be the earliest

¹⁰ The larger context for situating Beebe's oceanic representations was the problem with reconciling science and popular culture that began at the end of the nineteenth century with the nature faker controversy. The crisis concerned the representation of nature and the value of science and sentiment in understanding wild animals. A similar dynamic was played out over the use of photography and moving pictures as technologies for investigating the natural histories of animals. Here the critical issue was balancing the delicate relationship between the authentic and the artificial. Beebe's dynamic was to embrace and differentiate the worlds of science and sensationalism. The problem was to not let sensationalism, his heroic efforts, abrogate the validity of his scientific knowledge and the professionalism of his scientific endeavor. And at the same time, he had to make his work sensational enough to draw the attention of a broader non-scientific audience. Ralph Lutts, The Nature Fakers: Wildlife, Science and Sentiment (Golden Colorado: Fulcrum Publishing, 1990). Gregg Mitman, Reel Nature: America's Romance with Wildlife on Film (Cambridge: Harvard University Press, 1999).

articulation of our concept of biodiversity. Beebe was awed by the myriad life forms that coexisted in such a limited area ¹¹ The experience hatched in his mind a plan to develop a permanent tropical research station that stressed intensive examinations of specific places instead of extensive explorations of specific life forms (e.g., his pheasant work)

William Hornaday, director of the NYZS, feared the worst. He did not want to lose the aspiring ornithologist, and at the same time, he could not have his curator of birds absent from the zoo six months out of every year. Beebe sought and received the support of Theodore Roosevelt, who no doubt ensured the approval of the New York Zoological Society. Thus the Department of Tropical Research, including Beebe, an embryologist, an entomologist, one collector, and two artists, set off in 1916 to found a permanent research station in the tropical jungles of Guiana ¹²

Between 1916 and 1926, Beebe and his staff summered in the tropical jungles of Kalacoon, and later Kartabo, Guiana. After locating a suitable stretch of tropical wilderness the staff set up shop in the former house of Guiana's Protector of Indians. The house was retrofitted with modern equipment and converted into a "wilderness laboratory." Since the Department of Tropical Research was considered the "scientific" arm of the New York Zoological Society, the objective of Beebe's tropical research stations was simply to "study the wild things about us." Its goal was "not to collect [animals] primarily, but to photograph, sketch, and watch them day after day, learning of

¹¹ William Beebe, "A Yard of Jungle," Atlantic Monthly 117 (January 1916), 40-47, (idem, Jungle Peace (New York: H. Holt and Co., 1918), 239-262.

¹² For an accessible account of the DTR and the only biographical treatment of Beebe see, Robert Henry Welker, Natural Man: The Life of William Beebe (Bloomington: Indiana University Press, 1975). Welker's account is based almost singly on published resources.

those characters and habits which cannot be transported to a museum. This had not been done before, hence it took on new fascination."¹³ With their connection to the Zoological Society, Beebe's DTR stations could expect some funding. Indeed, the Society covered the start-up costs of these stations, but they did not do so disinterestedly.

The Society was dedicated to the dissemination of natural knowledge to American citizens, especially New Yorkers, and directors wanted to get some tangible materials for their trouble. So when Beebe moved his station to Kartoba in 1920, William Hornaday charged Beebe with securing specimens of Red Howlers, giant otters, hoatzins, and giant armadillos for display back at the Bronx Zoo. The Society was not able to cover all of the costs of these stations, so it was up to Beebe to devise methods for securing additional funding. Producing popular natural histories on film, in Beebe's mind, was one avenue. He reported to Hornaday that "the station work is going splendidly, and I have got my first movie of hoatzins, thirty on one branch. The young are not hatched yet. If these and the ones of leaf-carrying ants, etc., turn out well they should go far toward paying the Station's way next year."¹⁴ Beebe would take these films on lecture tours when he returned to the States. It is in such a manner that representations of nature became multi-functional as artifacts of science and mechanisms of funding.

It was important that Beebe's efforts brought public attention to the work of the New York Zoological Society. The Society was dependent on the patronage of its members, and it needed to publicize its scientific work as widely as possible for the reason

¹³ William Beebe, "A Wilderness Laboratory," Atlantic Monthly 119 (May 1917), 628-9, reprinted in Jungle Peace (1918).

¹⁴ Beebe to Hornaday (July 10, 1920), Beebe Papers/PUL, Box 15, Folder "Hornaday."

that patrons wanted assurance that their contributions were going to good use. It is with this patronage dynamic in mind that Beebe told his director that "my colored paintings will reach high water mark this year and the best news is that a professor from Glasgow University and three men from the British Museum want to come soon. This should all be a splendid advertisement for the Park and Society."¹⁵ Certainly, illustrations of hoatzins and otters would do much to advertise the work of the DTR and the Society, but the attention of professional naturalists from other institutions legitimized the value of tropical research stations even more.

Beebe's stations quickly drew attention from the wider scientific community. Stanley Gardiner, a zoologist from the University of Cambridge, thought that the establishment of that Tropical Laboratory in British Guiana was one of the most interesting developments in zoology for a long time. "I am quite sure that what we want more than anything else, and I have spent six years in the tropics, is for students to sit down and solidly work under conditions as natural and reasonable as possible."¹⁶

Beebe would from time to time invite certain naturalists to the station and request modest contributions. In the 1920 season, four scientists visited the Kartoba station at \$1,000 each. Hornaday criticized the practice, to which Beebe responded, "[y]ou chide me for keeping a hotel and you are right in a way, but I am very careful of the few who are invited."¹⁷ Beebe noted that this additional funding was necessary to keep the station going. More than a means to secure money, Beebe encouraged visiting naturalists to

¹⁵ Ibid.

¹⁶ Stanley Gardiner to Beebe (September 23, 1921), Beebe Papers/NYZS, DTR, General Records, Box 1, Folder "Tropical Research Station - Financial Statements and Fund Raising."

¹⁷ Beebe to Hornaday, (Sept 16, 1920) Beebe Papers/PUL, Box 15, Folder "Hornaday."

contribute to the scientific work of the station. To his great satisfaction, by 1939, 143 articles appeared in Zoologica (the scientific journal of the NYZS) that sprang from research conducted at the DTR stations. Fifty-two were written by Departmental staff. Ninety-one were by authors representing thirty-two outside institutions including the American Museum, Chicago University, Harvard, the Museum of Comparative Zoology, University of Illinois, Princeton, Stanford, the U.S. National Museum, Woods Hole Oceanographic Institute, and Yale.¹⁸

Despite this widespread approval, Beebe often had to defend his research interests. William Hornaday, for instance, was disconcerted with Beebe's new penchant for researching nature's minute organisms like ants and termites. Hornaday was a game-hunter and his concerns for the zoo as well as with preserving America's wildlife only took into consideration charismatic mega-fauna. Beebe's jungle work seemed trivial. Beebe responded to Henry Fairfield Osborn with ire:

Just because we happen to stand six feet from the ground (and he is only about five') and are furnished with eyes so poor that we can discern only big objects, is no argument at all. If we are interested only in big game shooting, that is one thing, but the laws of evolution and adaptation and the general processes of life hold just as surely within the life of a small bush or on the trunk of a tree as at a water hole or among a herd of elephants.¹⁹

Hornaday's disapproval was understandable given the New York Zoological Society's devotion to the preservation and exhibition of birds and four-legged animals.

Beebe also funded the project out of his own pocket. Both he and the assistant

¹⁸ William Beebe, "Evaluation of Zoologica as judged by the Contributions of the Department of Tropical Research (nd., ca. 1939), Beebe Papers/PUL, Box 14, Folder 31.

¹⁹ Beebe to Osborn (October 3, 1920), Beebe Papers/PUL, Box 16, Folder 5.

director of the department—John Tee-Van—donated portions of their salaries to the DTR fund. Beebe also contributed his earnings from free-lance writing. When he received news that three articles were accepted by the Atlantic in 1920, he wrote that he now had “the extra thousand which I needed to tide us over these months.”²⁰ It seems that Beebe was a naturalist of boundless energy. He had to literally build research stations, manage a permanent research staff, play host to station visitors—both scientific and recreational—keep the directors of the Society happy, fend off criticisms from scientific circles, and discover innovative ways to foot the bill. He likely wrote with great pride when taking stock of the 1920 season: “I think when I sum up the results of the whole station, not in the future but this year, you will be proud of us, and I am going to make the average museum expedition, and even Andrews’ hundred thousand dollar one, look sick, and all on \$6000.”²¹

It was precisely at this time that Beebe became a nature writer of serious literary repute. He had already broken into the Atlantic Monthly with a series of articles that related his exploration to the Orient while searching for pheasants. These were of the standard adventure narrative genre. But as Beebe began to write of the jungle, he started to take on a new voice, one that stood out among naturalists. His Atlantic editor thought that

[t]here ought to be some way of publishing your essays which should call them to a brand-new audience. The difficulty has been that you are pigeonholed in the public mind with some of your fellow naturalists of the Auk variety, whereas you

²⁰ Beebe to H.F. Osborn, (October 3, 1920) Beebe Papers/PUL, Box 16, Folder 5

²¹ Beebe to Hornaday, (September 16, 1920) Beebe Papers/PUL, Box 15, Folder “Hornaday.”

are really nothing but an observer of life and manners among animals and men, who can put poetry into prose”²²

This was a decisive moment. Beebe could have gone on writing naturalistic treatises similar to his very formal Monograph of Pheasants (1918-1922), and he did continue to spend a great deal of time on systematic biology. Instead, he became a general naturalist, a non-specialist, a general observer of all life. When it came to writing, Beebe used the jungle as the background and became a naturalist, poet, and philosopher.²³

Between 1916 and 1921, Beebe wrote a series of essays that were published in Atlantic and later collected in two popular books, Jungle Peace (1918) and Edge of the Jungle (1921). With the work of the Department of Tropical Research as the key focus, these essays waxed poetically on the beautiful color and form of the creatures of tropical rain forests in Guiana. But these were more than jungle natural histories. They were subtle critiques of a war-torn civilization. Theodore Roosevelt wrote a review of Jungle Peace and noted that it

was written when the writer’s soul was sick of the carnage which has turned the soil of Northern France into a red desert of horror. To him the jungle seemed peaceful, and the undying war among its furtive dwellers but a small thing compared to the awful contest raging among the most highly civilized of nations.²⁴

The tropical jungle was thus an anodyne to Beebe’s experiences in World War I; his thoughts on the carnage of modern warfare were calmed by the careful examination and description of nature’s most wonderful creations. Even Roy Chapman Andrews thought

²² Ellery Sedgwick to Beebe, (March 27, 1918) Beebe Papers/PUL, Box 15, Folder 2

²³ See George Reuben Potter, “William Beebe: His Significance to Literature,” 203-228

²⁴ Theodore Roosevelt, Review of Jungle Peace, by William Beebe, New York Times Review of Books (October 13, 1918), 1.

that it “reached the high water mark of nature writing. The whole thing is like a beautiful poem and brings me with you on every moment of your work in the jungle.”²⁵ Beebe had tapped into an unexpectedly sentimental vein and his writings brought him national fame as a naturalist and nature writer. It was also during these years that Beebe began to develop a biocentric outlook on life.

Understanding Beebe’s Biocentrism

Raised as a child of West Orange, NJ, Beebe’s early jaunts in the world of natural history had all the trappings of a desire to flee America’s urban centers to engage a more primitive and primeval setting. He and his first wife experienced the wild on a trip to the Orinoco and Venezuelan jungles. Their published travel account, titled Our Search for Wilderness (1910) began with a typical requiem of the wild: “Was there no spot left on earth, we wondered, which could truthfully be called an untrodden wilderness? . . . jungles untamed by axe or fire, where guns had not replaced bows and arrows, where the creatures of the wilderness were tame through unfamiliarity with human beings!”²⁶ Thus, Beebe’s search for wilderness was not of the “discover new lands” genre, but rather spoke to a desire to learn of a primitive nature that had not yet fallen victim to the destructive potential of western civilization.²⁷ His thoughts on nature and civilization were typical of the “back to nature” movement that roared through the metropolitan north-east at the

²⁵ Andrews to Beebe, (January 22, 1919) Beebe Papers/PUL, Box 15, Folder 1

²⁶ William Beebe and Mary Blair Beebe, “A Naturalist in the Tropics,” Harpers 118 (March 1909), 235

²⁷ Roderick Nash, Wilderness and the American Mind (New Haven: Yale University Press, 1967), 141-160; Max Oelschlaeger, The Idea of Wilderness, (New Haven: Yale University Press, 1991), 68-132

turn of the century.²⁸ The romanticism of Beebe's early jaunts into the wilderness—after World War I—was transformed into a critique of human civilization, an attitude that was remarkably consistent through the rest of his long career.

Beebe's critique of modern civilization moved in a number of directions, the first of which was a criticism of capitalist expansion and development at the expense of nature. While he certainly partook of the same naive wanderlust as Andrews, a desire to be away from cities and civilization, Beebe was more decisive in decriing the destruction of nature at the hand of mankind. For example, in a popular account of his most successful oceanic "stations" on the Arcturus expedition, he concludes, "The earth is altering with eldritch rapidity before the onrush of increasing numbers and destructiveness of mankind."²⁹ Expressing a point of view similar to Murphy, the human destruction of nature meant the death knell of the past, a long history of evolution.³⁰ Those naturalists interested in studying evolution in the field thus had to seek out those remaining natural areas that had not been disturbed by humans. This is exactly why Beebe was so drawn to the tropical jungles of South America, and it would be his primary reason for exploring oceanic fauna that had not yet suffered the tyranny of civilized progress.

If civilization was responsible for the destruction of nature, humankind's ego was

²⁸ Peter J. Schmitt, Back to Nature: The Arcadian Myth in Urban America (Baltimore: Johns Hopkins University Press, 1969).

²⁹ William Beebe, "Seventy-Four: An Island of Water," Atlantic Monthly 137 (January 1926), 45. For an earlier and less pointed example of this attitude see idem, "Owls of the Nearctic Region," 11th Annual Report of the New York Zoological Society for 1906, (1907) 157-59.

³⁰ William Beebe, "The Evolution and Destruction of Life," Zoological Society Bulletin 21 (May 1918), 1622-24.

the agent of those changes. Beebe's Atlantic Monthly editor noted that "Will owes a single allegiance to the Creature Kingdom and looks on mankind as the least desirable species thereof"¹¹. This is true, but only from an ideological standpoint. Beebe was a quintessentially social creature, he had a deep love and respect for the friends and colleagues that surrounded him, but he was also something of a misanthrope in that he despised humans' self-confidence in controlling and knowing nature. He flippantly remarked that, to the contrary, humans may be experiencing a period of devolution. As opposed to his studies of evolution where he detected slow but invariable progress, "[w]hen we come to human beings we must admit that we find conditions which are stationary or retrogressive"¹². Predating the postwar arguments of William Vogt and Fairfield Osborn who suggested that we may be reaching the "twilight of civilization," Beebe believed that arrogance and anthropocentrism unchecked would lead to environmental catastrophe.

When one abandons human arrogance, the mind's imagination would be at free play thus causing a far more fulfilling appreciation for the natural world. Imagination was key to Beebe's natural history and we can sense it in his admiration for the fantasies of Lord Dunsany, his favorite writer. In a review of Lord Dunsany's Don Rodriguez, Beebe praises the author's extraordinary scientific skills:

Fortified by seances with a microscope and a glass of stagnant water, or a few prostrate hours in a meadow, freed from man size and pseudo-importance, when the terrors of a toad hopper become sources of uneasiness for you, then can you

¹¹ Ellery Sedgwick, "Atlantic Anniversary," (ca. 1957), Beebe Papers/PUL, Box 14, Folder 32.

¹² Ibid.

properly appreciate a pukka mipt, or a veritable bird with a difficult eye”¹³

This anti-egotistical sentiment fostered a profound respect and admiration for natural phenomena. This respect for nature goes back to Beebe’s earliest writings. For example, as curator of ornithology for the NYZS, Beebe often contributed popular bird pieces to Recreation, an important periodical of the back-to-nature movement. An article on the extraordinary craftsmanship of nesting birds begins with a note that checks human conceptions of self importance. “When one has lived in the city for a year or two and has become absorbed in business and impressed with the greatness of human affairs upon the earth, let him go to the woods, find the simplest kind of bird’s nest, take it apart, and put together the same materials again, placing it in the bush or tree.”¹⁴ Inevitably, the human-constructed nest will disappear with the first hard wind or rainfall.

Modern humans, according to Beebe, also maintained a smug attitude in their ability to manipulate the environment through technological innovations. Beebe found that nature’s contrivances served to check human self-importance. In an article that describes how some of the commonest utensils invented by humans were already naturally possessed by birds, he writes that “in walking through the aisles of the Patent Office in Washington, in our complacency we realize that we are indeed a wonderful people, yet if we examine some living creature, such as a bird, our conceit will certainly receive a well merited shock.”¹⁵ Setting aside, somewhat contradictorily, the evolution of human traits,

¹³ William Beebe, “Lord Dunsany and ‘Don Rodriguez,’” The New York Times Book Review and Magazine (October 1, 1922), 3.

¹⁴ William Beebe, “Nests, Nesting, and Nestlings,” Recreation 22 (May 1905), 339.

¹⁵ William Beebe, “Some Wonders of Birds,” New York Tribune (June 9, 1907), “Sunday Magazine,” 15.

Beebe finds that evolution has worked to create in plants and animals wonderful contrivances for manipulating the environment. Indeed, he often lectured on how modern civilization was dependent on nature. Despite the modern belief that humans are separated and independent from the natural world, Beebe often pointed to how interrelated the two really were. For instance, he described how bird life was crucial in regulating pest populations in agriculture. "Should some world-wide disaster overwhelm the entire kingdom of the birds, man himself, in all his pride of independence, would surely perish. With such amazing delicacy is the balance of Nature maintained!"¹⁶

Human arrogance and self-confidence, according to Beebe, translated into a profoundly amoral view of nature. One symptom of "our so-called civilization" was the popular sport of shooting live pigeons sprung from traps, a recreational activity that Beebe used to represent how ninety-five percent of all Americans conceive the value of bird life. "I would anticipate any post-mortem orientation on his [the bird shooter] part with a forceful wireless prayer: *Send the soul of this man back to earth into the bodies of all the old horses of future bull fights*."¹⁷ Beebe then challenges the remaining five percent to investigate the form, color, and habits of birds through careful and meticulous observation of bird life in their native habitats.

So hubris was civilization's tragic flaw, and one can appreciate and hopefully mitigate this excessive pride when observing nature. Key to the proper view of nature was

¹⁶ William Beebe, "How the American People Might Starve to Death," The Ladies' Home Journal 25 (April 1908), 10.

¹⁷ William Beebe, "The New Study of Birds," Zoological Society Bulletin 30 (September-October 1927), 145. On recreational bird hunting, see Jennifer Price Flight Maps: Adventures with Nature in Modern America (New York: Basic Books, 1999), 1-56.

a deep sense of humility. Indeed, humility washes completely through Beebe's writings, a fact that was not lost on Herman Hagedorn while introducing Beebe as the winner of the Roosevelt Medal for Science. He said that Beebe was a gentleman who had "the habit of humbly inquiring of the lesser brethren of man."³⁸ We can sense this humility in a highly acclaimed essay (reprinted eight times) that related Beebe's first exploration of a tropical jungle at night where he is almost overcome by the strangeness of the smells and the sounds. "We had become lords of creation in name alone, threading our way humbly among the fungi and toad-stools, able only to look aloft and wonder what it was like."³⁹

Use of the imagination was key to Beebe's sense of humility. Beebe's use of his imagination also helps to explain why his legacy is more literary than scientific. One of the most renowned students of nature writing has indicated that "To a greater degree than science, literature releases imagination's free play, though the play is not entirely free, since the imagination is regulated by encounters with the environment."⁴⁰ For Beebe, an encounter with the environment was about the retrieval of factual information, and herein lies the critical problem. For example, if one was to come to understand the ocean realm, "we must descend beneath the surface and become amphibious."⁴¹ To understand nature, one must shed all thoughts of human importance and imagine oneself as a participant in

³⁸ Herman Hagedorn, "Roosevelt Medal Citation," (October 27, 1953) Beebe Papers.PUL, Box 18, Folder 3.

³⁹ William Beebe, "Jungle Night," Atlantic Monthly 120 (July 1917), 70, reprinted in Jungle Peace (1918). This article was admired as an archetype of the natural historical essay and thus reprinted in various critical editions.

⁴⁰ Lawrence Buell, Environmental Imagination, 94.

⁴¹ William Beebe, "Thoughts on Diving," Harpers Monthly 66 (April 1933), 584.

the natural world. But how does the experience get translated into literature? Beebe gave some critical advice to his long term colleague John Tee-Van:

Facts become weakened the moment they are crystalized into words. The easy way, of course, is to recall a few incidents such as the day you and I were afloat offshore, when a tapir walked out in front of us and a huge wave tossed us like corks, or when we crouched, heads touching, and looked out on luminous creatures in the eternal darkness surrounding the bathysphere.⁴²

So the anecdote, a narrative of the experience, was critical for the representation of natural facts.

Beebe was dealing with the larger problem of the inadequacy of language in representing nature. While corresponding with an editor from the National Geographic Society about an upcoming bathysphere article, Beebe stated that “The only thing of which I am certain is that whatever I write for you will be very far below the actual experience. It is like going to Mars and the English vocabulary is pitifully inadequate. But I will do my best and at least no one can dispute the facts.”⁴³ This problem became particularly acute when Beebe visited underwater regions that had never been directly observed. Words simply fail to describe experience. More than a sentiment shared with editors, the failure of language was a fact that Beebe wove into his writings; he puts it on display as a problem of natural history and exploration. In the resulting 1934 National Geographic article, Beebe reports that only the five people who had gone down to 1,000 feet in the bathysphere “know how hard it is to find words to translate this world.”⁴⁴

⁴² Beebe to John Tee-Van, (August 23, 1961) Beebe Papers/NYZS, General Records, Box 1, Folder “DTR History- Beebe.”

⁴³ Beebe to Dr. La Gorce, (August 17, 1934) Beebe Papers/PUL, Box 17, Folder 4.

⁴⁴ William Beebe, “A Half Mile Down,” National Geographic Magazine 66 (December 1934), 675.

Complicating the matter was the disservice that modern science had done to nature in categorizing it with esoteric language. Science had done much to strip nature so that “the beauty and romance are in hiding behind certain select and abstruse technicalities. What universal emotion is brought into being if we talk of syngamy of gametes, or the cytogamy of zygotes?”⁴⁵ The use of abstruse scientific language was a symptom of a much more significant malady among scientific practitioners. In a statement that must have raised an eyebrow on more than one naturalist, Beebe observed that “most scientific men are dead and don’t know it. They lack romance and merely bring back their specimens without seeing the wonderful things which develop all around them in the wilderness.”⁴⁶

One strategy for ameliorating this problem was to depend on artistic representation. The Department of Tropical Research always possessed several artists responsible for illustrating Beebe’s specimens. The artistic program began with a scientific function. Reporting to Henry Fairfield Osborn on the state of the first tropical research station, Beebe noted that “[a]nother thing I am doing is to have color plates made of all the interesting and significant things I come across. Every day I realize, at least to a mind like mine, the tremendous value of visualizing facts in general.”⁴⁷ In Beebe’s mind was the need to have evidence to correlate coloration among and between species. He was optimistic that color and form would answer evolutionary questions. It is doubtful

⁴⁵ William Beebe, “The Jelly-Fish and Equal Suffrage,” Atlantic Monthly 114 (July 1914), 37.

⁴⁶ “William Beebe returns with party from explorations in British Guiana,” New York Times (July 22, 1924), 19-7.

⁴⁷ Beebe to H. F. Osborn, (August 2, 1919) Beebe Papers/PUL, Box 16, Folder 5.

whether or not the department's illustrations were put to such use. Nevertheless, these illustrations were an important visual supplement to Beebe's articles and books. When words failed, Beebe turned to his art staff.

The failure of language was almost always linked to a biocentric outlook. The human mind, according to Beebe, did not have the capacity to ever fully know nature's secrets. Human language just as certainly was not able to represent nature's wonders. Both of these facts instilled a sense of humility, a recognition of human limitations. Instead of priding ourselves in our ability to know and control nature, Beebe advocated a humility that granted respect to nature. Humans became small parts of an intricate universe.

So Beebe's philosophy of nature exhibited a profound repudiation of anthropocentrism. He preached the importance of humility and respect for nature. This was a biocentrism that prized the evolution of natural life above all. The human capacity to know and manage nature were fictions, and the human condition would only be redeemed by replacing its overblown ego with humility. Beebe's biocentrism was not a privately held belief; it washed throughout almost all of his popular literature. His writings brought him considerable attention and praise and, as noted earlier, nature writing was splendid publicity for the stations and the New York Zoological Society. Beebe's literature was one part of a wider strategy to manage and advertise his natural history. We will see below how Beebe's biocentrism played a vitally important role in legitimizing his own scientific activities. For Beebe was about to become a hero.

In 1923 Harrison Williams, a member of the Zoological Society's Board of

Managers, donated his yacht, Noma for a five week expedition to the Galapagos Islands. Beebe added several members to the staff of the DTR and proceeded to follow in Darwin's footsteps in search of clues to the mystery of evolution. Immediately upon his return, another Society trustee, industrialist Henry Whiton, offered the steam yacht Arcturus for a similar expedition. Harrison Williams then offered to finance the conversion of the Arcturus into an oceanographic research vessel. The Beebe-Williams connection was the source of some indignation back at the NYZS. Hornaday informed an explorer who was soliciting funds that

Mr. Beebe regards Mr. Williams as his discovery, which Mr. Williams decidedly is, and therefore Mr. Beebe would take great umbrage at me, or at anyone else in the Zoological Society, who would in any manner invade his preserve. Unfortunately, Mr. Beebe corrals all the money that his patrons are willing to put up.⁴⁸

Hornaday's diction here is telling. The use of words like "discovery," "preserve," and "corral" seem to indicate how inextricable were the practice and funding of natural history. Beebe had no trouble raising similar funds from others within the New York banking elite. When the expedition was announced in the papers, hundreds of letters from around the country poured into Beebe's office requesting positions on the adventure. By 1925, Beebe had organized an expedition that would almost put Andrews' Central Asia Expedition to shame, this time to the tune of over \$250,000.

⁴⁸ Letter written ca. 1926 and quoted in William Bridges, Gathering of Animals: An Unconventional History of the New York Zoological Society (New York: Harper & Row, 1974), 397.

The Arcturus Expedition

Beebe had already learned the tricks of the trade when it came to managing small tropical research stations. But he had not yet become aware of the importance of managing sensationalism, a skill that would be necessary because his jungle writings had created an audience that ensured a popular following of the Arcturus Expedition. The expedition was nothing short of a mammoth undertaking. The ship was some 2,400 tons, retrofitted for deep-ocean sampling, and the scientific staff numbered 14 with a total crew of 51. This was Beebe's first foray into marine oceanography, but his objective was very much the same as his jungle work: to describe the life histories of as many species as possible in the wilderness. The Sargasso Sea was thought to be the home of countless fishes and crustacea, and the Humboldt Current was already quite famous for its rich and abundant marine life. Beebe called these regions a "wilderness of water."⁴⁹

Throughout the six-month expedition, major metropolitan newspapers across the country followed Beebe and his staff with rapt attention. Much of this coverage was the result of the work of New York publisher and publicity man, George Palmer Putnam. Putnam was the middle-man of the expedition, which service he provided at least partially in exchange for permitting his two kids to travel along. He received Beebe's correspondences via wireless and telegram and then relayed the stories to newspapers and magazines. Just after the expedition was under way, Henry Fairfield Osborn reported to a primary patron that

The Arcturus Expedition gives full promise of making history. The breadth of

⁴⁹ William Beebe, "Weird Fish Drawn from Sargasso Sea," New York Times (March 3, 1925), 1-7.

interest is almost mystifying. It owes its existence, in the first place, to the excellent publicity which George Putnam has been largely responsible for, but of course above all to the natural curiosity aroused in all kinds of people by a scientific expedition of this nature. [T]here will be slight question that the expedition will prove to be a very unusual success and of broad meaning publicly and scientifically.⁵⁰

This publicity was important to the patrons who had fronted the money for the expedition. Mass public attention also brought in further funding from philanthropists that would be used for future research, thus publicity was part of the economy of financing natural history. While Beebe enjoyed writing articles and books for mass appeal, he detested the business of day to day publicity. Putnam wrote to Beebe while in the Galapagos, "I know that personal publicity means nothing to you. But it is a fact that no expedition of similar character has ever been given such national publicity."⁵¹

Putnam was fully aware that Beebe was interested in distributing tasteful, dignified, and non-sensational accounts that highlighted the scientific value of the expedition. Beebe was not always satisfied with Putnam's handling of these matters. In fact, there was trouble from day one. The day of the launch was well covered by newspapers and magazines that played up the dangerous nature of the expedition. The ship was crowded with friends and family saying their goodbyes, reporters taking photographs, crews preparing the ship for departure, and amidst it all Beebe attending to last minute details.

⁵⁰ Henry Fairfield Osborn to Harrison Williams, (March 30, 1925), Beebe Papers/PUL, Box 16, Folder 7

⁵¹ George Palmer Putnam to Beebe (April 17, 1925), Beebe Papers/PUL, Box 16, Folder 7. We need to take Putnam's remarks about Beebe's attitude toward publicity with a grain of salt. Beebe had always maintained the facade of being uninterested in public attention, but such attention was valuable to the maintenance of his research stations. Most of Beebe's correspondences with Putnam were via wireless. Since there is no record of Beebe's messages, I need to take some licence by examining Putnam's responses.

At one point, several reporters cornered him for a response on the danger of braving “the port of missing ships,” the Sargasso was speculated to be the resting place of countless ships mired in the weed. Beebe responded in a manner that would later be very uncharacteristic, “I hope there will be some danger, for we are all looking for thrills. But what the dangers will be, where we shall begin our investigation, or what we shall find, I don’t know.”⁵² He went on to explain how the expedition’s itinerary was dependent on the value of the findings in any one area.

Perhaps the copy writers for the Times were anticipating a dangerous voyage. After the good ship had crossed the Panama canal for Pacific waters, no word was received from the ship for eleven days. The Times’ front-page article was leadingly titled “Beebe Ship Silent 11 Days as Radio Calls to Her in Vain,” and subtitled “Some Alarm Expressed,” “Equipment Supposed to Have Been Ample to Keep Apparatus in Order,” and “51 Persons are on Board.” Robert Cushman Murphy came to the rescue and reported that the erratic weather of the Humboldt Current probably was interfering with the wire communications.⁵³ Of course, nothing had happened to the Arcturus, but the sensational story raised Beebe’s ire and he put it to Putnam for an explanation. Putnam responded in defense, “Very definitely I had nothing whatsoever to do with it. I mean, in no wise was it a ‘publicity stunt.’”⁵⁴

The bon voyage event also created another problem for Beebe. In the hustle and

⁵² “Arcturus Sails for Sargasso Sea,” New York Times (February 11, 1925), 14-2.

⁵³ “Beebe Ship Silent 11 Days,” New York Times (April 10, 1925), 1-3.

⁵⁴ George Palmer Putnam to Beebe, (April 14, 1925) Beebe Papers/PUL, Box 16, Folder 7.

bustle reporters had homed in on four female members of the crew, Isabel Cooper and Helen Tee-Van as scientific artists, Ruth Rose as historian, and Elizabeth Trotter, assistant in Fish Problems. A picture of the four women, dressed to the tooth, was later printed in the Sunday rotogravure of the Times. The paper did not make much of the picture, but to Beebe and Madison Grant (then president of the NYZS), the picture sent an impression that the Arcturus Expedition was more a pleasure cruise than a serious scientific endeavor. For the rest of the expedition, Putnam was hard pressed to prevent similar information from getting to the public. He sent word to Beebe on the news coverage of the Sargasso leg of the expedition.

Incidentally those last photographs from Schoedsack were admirable. There practically wasn't a woman in them and they were all dignified as they could be. The Times loves them and other papers are using them. I don't think that you or anyone else could have any criticism. And so far as the news is concerned the daily stories which are built up out of your brief dispatches I believe that if you have seen them you [would] have agreed with Fair[ield] and myself that they are adequate, dignified, and generally helpful. And certainly in no wise remotely hurtful."

Approvingly responding to another Sunday rotogravure spread, Putnam noted that "[i]t is all dignified and absolutely beyond criticism. It is good too from the standpoint of the feminine element, being suppressed. You are quite right there. We will watch that all very carefully."⁵⁶ Unfortunately, it is difficult to figure out the exact nature of the "feminine element." Beebe always maintained that his female staff members were selected for their competence as artists and scientists, and he was justifiably proud of their diligence

⁵⁵ George Palmer Putnam to Beebe, (April 14, 1925) Beebe Papers/PUL, Box 16, Folder 7

⁵⁶ George Palmer Putnam to Beebe, (April 17, 1925) Beebe Papers/PUL, Box 16, Folder 7

on both accounts. If they were to be represented in the national press, Beebe wanted them portrayed as professionals engaging in a serious scientific practice.

The extent to which Beebe made this an issue is unclear. Beyond doubt, however, was Putnam's almost paranoid perception of Beebe's concern. As the Arcturus neared home, Putnam sent a telling letter to Beebe that describes to what lengths the two might have gone to preserve the professional representation of the expedition:

You are tremendously nice in your attitude towards me in this whole matter and I appreciate it. I know perfectly well that often I blunder and do things which don't altogether please you. But in the long run I think you are in reasonably good hands. In the first place, I grant that I let too many girl pictures get by me in that first batch and I know you didn't like it. Anyway, henceforward the feminine element has been soft-pedaled satisfactorily. Perhaps we will smuggle say Dorothy and David and one girl ashore on the tug. If that does not prove practicable I think a stern order should go out from you, the commander, that the women are to be as little in evidence as possible at the landing. Certainly that none of them is to talk beyond the absolute necessities. The girls should say to the reporters 'Dr. Beebe will give out all the information.' And then poor Dr. Beebe, whether he wants to or not, will have to calmly take half an hour and sit down with the reporters and answer every damn question they want to ask. You may as well face the realization of that necessity. And then the young ladies can all disburse in their several directions and we will all be there to cooperate in soft pedaling them as much as can be. Not that there is anything reprehensible in it, but that from your standpoint it is wisdom.⁵⁷

It appears that Putnam and Beebe were engaged in a conspiracy to write women out of the expedition.⁵⁸ This certainly may be going on, but only to a limited extent. Beebe was more concerned with how the expedition was portrayed to the public, and he had little confidence in the public's ability to recognize women as participants in science. He had

⁵⁷ Putnam to Beebe, (May 20, 1925) Beebe Papers/PUL, Box 16, Folder 7.

⁵⁸ Naomi Oreskes analyzes the gender dynamics of a similar disembarking event of a geo-physics expedition and comes to this conclusion: "A close examination of how these public affairs are organized complicates such an interpretation. 'Objectivity or Heroism?' On the Invisibility of Women in Science," in Science in the Field, Osiris 2nd series, volume 11, (1996): 87-113.

high praise for the female staff's work. For instance, Ruth Rose had authored and co-authored several pieces that were published in magazines. But he wanted to make sure that publicity was professional and dignified, and this meant that he had to create representations that were dignified in the eyes of patrons and NYZS board members.

Putnam reported to Beebe that he had

heard some unpleasant echoes from M.G. [Madison Grant]. He seems to be very disagreeable about the trip. He seldom lets an opportunity slip by to make fun of you. He has just written me this letter: "Many thanks for the copy of the current *Cosmopolitan*. The article by Miss Cooper is well done and more dignified than much of the publicity that we have been receiving lately." I reckon he primarily means the pictures. Of course as is inevitable, the papers use chiefly the photos of the charming young women."⁵⁹

Putnam also reported word from Henry Fairfield Osborn who had nothing but praise for the publicity. Beebe had more in mind than pandering to patrons and bosses. As noted earlier, his task was to simultaneously "extract something which will satisfy my own intellectual curiosity, as well as trusting sponsors, fellow scientists, and 'stayathomers'."

By all accounts, the expedition was a dismal failure in meeting its primary objectives. Beebe had hoped to find an enormous meadow of sargassum weed serving as home to a rich community of ocean fauna. Only sporadic strands of weed were found and the myth died hard, especially to reporters who pressed Beebe upon his return, "Did you find any signs of ships that have been trapped by the seaweed?" "No, but we saw enough of the Sargasso Sea, after cutting through it three times, to make it certain that there never was any basis for that legend."⁶⁰ Beebe had the double misfortune of seeking out the

⁵⁹ Putnam to Beebe, (March 17, 1925) Beebe Papers/PUL, Box 16, Folder 7.

⁶⁰ "Beebe and Arcturus Home with Marvels," *New York Times* (July 31, 1925), 1-4, 8. At least one writer used the occasion to comment on the resilience of myths in the face of scientific examination. M. B.

Humboldt Current during an El Niño event (in contrast to Murphy, Beebe did not believe that the absence of the Humboldt was an interesting research problem) He worked quickly to justify the positive scientific findings of the expedition In a quintessentially Beebesque reflection, he noted that "so many things in life come to us obliquely, the road we plan to follow to a certain objective may be the straightest of lines, but an accident may deflect our way into a bypath that proves to be a Road of Destiny ""⁶¹

That road was constructed with the same technologies that one would find on older oceanographic expedition, like the Challenger Expedition of the 1870s ⁶² Arcturus was equipped with a deep-sea dredge that scratched and retrieved little portions of the ocean floor at some three and a half miles depth Nets were secured to a trawl that collected specimens at various depths The ship itself was outfitted with a boom-walk that extended over the port side from which depth soundings and general observations were conducted Perhaps the most startling innovation was the hinged pulpit that could lower an observer to water level off the bow The ship meandered from place to place, occasionally stopping to dredge and trawl for a fixed period Position, depth and temperature were noted at these "stations," specimens were then brought on board, separated, identified, and preserved as artists and photographers worked quickly to make representations that captured the form and the all too ephemeral color of ocean fauna

Much of the newspaper coverage came from Beebe's reports of strange and exotic

Levick, "Old Myths Defy the Light of Science," New York Times (August 30, 1925) IV, p. 11

⁶¹ William Beebe, "Ocean Tells New Tales to Beebe," New York Times (August 9, 1925), IV, p. 1

⁶² Helen Rozwadowski, Fathoming the Ocean: Discovery and Exploration of the Deep Sea 1840-1880 (Ph.D. Dissertation, University of Pennsylvania, 1996), 125-184

fish “These incredible creatures, painfully secured from their eerie, horizonless world, would be beyond the inventive power of the wildest imagination.” Nevertheless, Beebe gave it a shot. He reported finding the living fossil amphioxus, cyclothones with detachable jaws and luminescent teeth, the hatchet fish with a strangely telescoped head, the pharynx fish which has a distensible stomach, and hundreds of fish with marvelous appendages and bioluminescent organs. These were Beebe’s “grotesques, dragons, and gargoyles.” Even the briefest acquaintance with these organisms made the fairies, hobgoblins and elves of Dunsany, Barry, Blackwood, and Grimm seem like nature fakery.”⁶³

Despite the findings, he was quick to call attention to how fragmentary such an exploration must necessarily be. He asked his reader to imagine a race of beings living in the upper atmosphere that had not the physiology for terrestrial life, but with an insatiable curiosity for what existed below. On airships they would crudely lower hooks and nets and retrieve only the slimmest representation of terrestrial life.”⁶⁴ This object/subject reversal—so typical in Gary Larson cartoons—is a classic Beebe move; it is reminiscent of his many attempts to see organisms from the organisms’ point of view, which always served as a check on human self-importance. “When we find ourselves in an egocentric mood such as this,” Beebe wrote about successfully capturing a silver hatchet fish, “we

⁶³ William Beebe, The Arcturus Adventure: An account of the New York Zoological Society’s first oceanographic expedition 1st Harpers edition, (New York: Harper and Row, 1981), 340. The book was originally published by Putnam and Sons. The fantastic nature of oceanic fauna overlapped—in Beebe’s mind—with the fantasy-fictions of Lewis Carol and Lord Dunsany. Also see Sherwood Anderson, Winesburg Ohio (1918) on “grotesques.”

⁶⁴ William Beebe, “In Pursuit of an Elusive Sea,” New York Times (April 19, 1925), IV, p. 1.

have but to think what comment Sternoptyx would make on our own figure were we to drift down past him in the darkness of his deep home.”⁶⁵ The reversal also reveals Beebe’s desire to bodily enter the aquatic realm ⁶⁶

Arcturus naturalists had such an opportunity, albeit in shallow waters, with the help of a diving helmet, the use of which Beebe believed was the most important discovery of the expedition. He recalled “trembling with terror, for I had sensed the ghastly isolation” while struggling against a bad swell on the steep slope of Tagus Cove. Beebe’s explanation for writing these “personal digressions” was “to make real and vivid in the mind of the reader, the unearthliness of the depths of the sea.”⁶⁷ He compared it to interstellar space, then to the moon and Mars.⁶⁸ When Beebe pulls out of these soliloquies, he gets to the task of describing the clarity of the water, beautiful lava-sculpted undersea mounts, encounters with tiger sharks, and a host of life forms. He would bring down bags of bait and let tropical fish feed from his hand. Occasionally he made use of dynamite caps to stun specimens long enough for easy retrieval. Beebe enjoyed this more than any other activity. It was his true medium, experiencing nature’s wonders in situ.

⁶⁵ William Beebe, The Arcturus Adventure, 348.

⁶⁶ Beebe was always trying to go beyond facts in his writings. He wanted to show what it felt like to be an organism in a jungle or the ocean deep. The objective has an interesting parallel in the documentary movement of the 1930s, which attempted to not merely present the facts of life, e.g., of the plight of Dust Bowl Oklahomans, but rather to present a truly personal and emotional account. William Stott, Documentary Expression and Thirties America (New York: Oxford University Press, 1973).

⁶⁷ William Beebe, The Arcturus Adventure, p. 341-2.

⁶⁸ Beebe’s interplanetary statements allude to a genre of stellar exploration then popular in science fiction. Roslynn Haynes, From Faust to Strangelove, 163-8.

A final highlight of the expedition was the lucky opportunity to observe the eruption of two volcanoes on one of the Galapagos Islands, it also provided Beebe with another opportunity to pay homage to the backers of the expedition. Beebe's description of the chance event is saturated with the sublime. Filled with "wonder and awe" he put the incident into a cosmic context:

I watched an open artery of Mother Earth pouring into the sea—rock liquid as blood. The Galapagos was being born again. The cosmic splendor of the whole thing was overpowering. We had been brought close to the very beginning of things, and this could not be written or spoken, hardly thought indeed, but merely sensed as one stood apart in a lonely corner of the deck.⁶⁹

This is the earliest clear invocation of the sublime found in Beebe's writing. He had long invoked a biocentric scheme of nature, but it wasn't until he wrote of the Albemarle volcanoes that he would wax on cosmic beginnings, a sense of being overpowered, the failure of language, and human smallness. Beebe quickly capitalized on the chance siting by naming the twin outbreak after the expedition's primary patrons. Putnam praised Beebe for the act: "It is also delightful to me, as I know it will be to Fair[ield], that you so wisely named the volcanoes after Williams and Whiton. This reference to Williams on the front page of the Times will be tactically most helpful. No matter how big a man is this sort of thing pleases him and it is eminently justifiable."⁷⁰

In contrast to his jungle books, coverage of the expedition did not make it into many magazines. The entire affair was handled by the daily press, and less than a year after his return Beebe published a popular book length account, The Arcturus Adventure

⁶⁹ Ibid., 133-5

⁷⁰ George Palmer Putnam to Beebe, (April 17, 1925) Beebe Papers PUL, Box 16, Folder 7

Less than a running narrative of exploration, the book is essentially a collection of essays that highlight the main events of the trip. Reviews of the volume were mixed. Many gave the typical thanks to Beebe for making science palatable and enjoyable for a lay audience. Of special interest were Beebe's accounts of helmet diving, but it was not his descriptions of the coral-edged Galapagos environment that drew attention. Instead, commentators concentrated on his encounters with sharks. One reviewer noted that "[t]he under water life included sharks, which Mr. Beebe, with a courage no battlefield could surpass, trusted would not attack him."⁷¹ While such courage received approbation from one point of view, it also had the potential to bite back on account of the sensational nature of such displays. One literary critic who had nothing but praise for Beebe's jungle books leaned toward ambivalence when reading of a new species of deep-sea fish, *Diabolichthys arcturi* Beebe. The reader "begins to dread the worst—that his trusted guide has succumbed to the enemy's snare at last, and now bids for popularity by purveying sensation."⁷² Beebe overcomes the problem, in this reader's eyes, because what is fantastic and sensational is really just a habit of deliberate observation.

Others were less forgiving. "William Beebe is in a little danger of being spoiled," wrote a reviewer for The Nation. "He has learned that he is an interesting man who does exciting things, and the poison of self-consciousness threatens to make of him a showman

⁷¹ R. L. Duffus, "'Arcturus', Whither Away?" The New York Times Book Review (May 23, 1926), 1.

⁷² Henry Chester Tracy, American Naturalists (New York: E. P. Dutton & Co., 1930), 222-3. Tracy perceptively put his finger on the entire dynamic that I am arguing here. Summarizing Beebe's oceanic writings as of 1930, he notes that "without the slightest effort at sensation-mongering some quiet descriptions shape themselves into forms of arresting strangeness. . . . And that is how he avoids, as we said before, certain pitfalls. Since the truth is strange enough, he conveys it without condiments." 224-5.

exhibiting himself. Sometimes he writes like a celebrity in a dress suit condescending to a cultured audience which has paid \$5 a head to look at him”⁷³. Professional scientists were even more reserved in their praise. The trouble with Beebe, according to a tropical naturalist, was that he looked at “everything in nature as an ‘adventure,’” a trait that he thought “distasteful.” He also challenged Beebe’s tendency to exaggerate the dangers of exploration. In short, “Too much poetry and too little science, too much adventure and too little calm thinking. . . . are the most evident faults of Beebe’s writings”⁷⁴. Beebe must have taken this sort of criticism to heart. He worked the jungles of British Guiana for another four years, with the exception of a 1927 cruise to Haiti’s coral reefs. In 1929 he moved the research station to Nonsuch, Bermuda, the site where his management of sensationalism was tested at an extreme.

Abysmal Research: The Bathysphere

Beebe has been referred to as “the most popular natural historian of the twentieth century”⁷⁵. The source of this fame can partly be attributed to his work in tropical South American and to the Areturus expedition, but it was his in situ exploration of the ocean deep that brought him to the heights of fame. The bathyspheric work was actually a small part of the “Bermuda Oceanographic Expedition’s” broader research agenda to explore the oceanic life off the coast of Bermuda. Financing his previous oceanic expeditions

⁷³ Lewis S. Gannett, “Whither Mr. Beebe?” The Nation 123 (September 8, 1926), 225.

⁷⁴ Alexander Petrunkevitch, “An Explorer of Nature,” The Yale Review 16 (January 1927): 404-406.

⁷⁵ Robert Welker, Natural Man, 45. Also see Beebe’s obituary, “William Beebe, Naturalist, Dies; Bathysphere Explorer Was 84,” New York Times, (June 6, 1962), 44-1.

required massive funding from wealthy patrons, and the nature of such expeditions was always fleeting and piecemeal as oceanographic vessels briefly explored a series of research “stations” along the ships’ itinerary. In 1929 an offer from the Bermudan government made it possible for Beebe to combine his earlier strategy of forming tropical research stations with his newfound fondness for oceanic life. Sir Louis Bois, governor of Bermuda, offered the use of Nonsuch Island off the south coast of the Bermuda mainland for the establishment of an oceanographic and marine biology research facility. Here Beebe would continue to explore oceanic fauna, but the Bermuda station made it possible for an intensive (as opposed to extensive) survey of life within a prescribed area. The offer seems to have been a result of Beebe’s March 1929 lecture on under-sea life that had piqued the interest of members of the Bermudan parliament and tourists alike.

In April of 1929 the Department of Tropical Research relocated to these semi-permanent quarters and quickly turned the two existing buildings—formerly hospitals—into a formidable research lab. One building served as the living quarters and the other was retrofitted into a laboratory equipped with microscopic viewing stations, aquaria, and a preserving room. The kitchen was transformed into a photographic and staining lab. A small electrical plant and a fresh-water supply station were quickly erected. Beebe had also acquired two row-boats and the big sea going tug Gladisfen for the purpose of deep-sea trawling.

The establishment and maintenance of the station was dependent on the good will of the Bermudan government. “Never,” Beebe reported to Madison Grant, “in any country, have we had equal kindness and generosity from the government. All the fishing

laws have been abrogated, signal flags have been arranged for communication with the shore, our landing place has been cleared of boulders, etc etc”⁷⁶ Beebe consistently nurtured the station-government relationship by inviting politicians to tour the new facilities. As a consequence, he found easy access to the Bermudan parliament when the station was in need. In April 1929, Beebe convinced the parliament to pay for raising the hull of a sunken fifty foot tug and moving it to the station’s harbor in order to fend off north-east gales.⁷⁷ In the 1931 season, Bermuda governor, His Excellency Sir Astley and Lady Cubbitt visited the station three times. On one occasion Beebe let their daughter helmet-dive to four fathoms.⁷⁸

Despite the *pro bono* services of the Bermuda government, managing the oceanographic station was a costly business that required Beebe’s constant attention. Seines, deep-sea nets, steel cables, winches, and steel drums were constantly breaking down or snagging on the ocean bottom, causing Beebe to send a steady stream of equipment orders back to America. In the 1931 season, the all-important steel drum required for deep-sea trawling broke under the stress of use. A cable arrived from a New York manufacturer indicating that repairs would take six weeks. Realizing that two months of deep-sea down time was unacceptable, Beebe steamed to New York, saw to having the drum ready in ten days, and in the process convinced the president of the

⁷⁶ Beebe to Madison Grant, (April 1, 1929) Beebe Papers/PUL, Box 7, Folder 5

⁷⁷ See *ibid.*, and Beebe to Madison Grant, (June 1, 1929) Beebe Papers/PUL, Box 7, Folder 5 where Beebe reported that two parliamentary visitors “expressed themselves as being dissatisfied only if we do not go on for another year.”

⁷⁸ Beebe to Mr. Niles, (August 1931) Beebe Papers/PUL, Box 7, Folder 5

company to cut the repair bill by two-thirds.⁷⁹ The Bermuda station did receive some funding by the Bronx Zoo, but the lion's share of the financing continued to come from patrons, such as Mortimer Schiff and Harrison Williams, who donated \$30,000 in 1929. The tropical amenities of Bermuda were also put to good use as a summering spot for yacht-going wealth. In 1931 Beebe reported that he was "particularly fortunate in the number of wealthy men who came to St. Georges in their yachts especially to visit us. Every one of them were enthusiastic, and showed it either in immediate cheques or in a promise of future help."⁸⁰ A typical visitor could expect a tour of the facility by Beebe, a trip out on a tug for a day of deep-sea trawling, or even a helmet-dive in Nonsuch harbor.

By May of the first season, Beebe had organized seven departments for scientific research: photography (Robert Whitelaw), painting (Mrs. Tee-Van, replacing Miss Cooper), aquaria, trapping and fishing, technical laboratory work (notably Gloria Hollister's work on staining fish cartilage), shore fishes, and deep-sea fishes. Beebe was most proud of the activities in this last department. Similar to the Arcturus, the DTR's ocean vessel, Giladisen was outfitted for deep-sea dredging and trawling. He reported to Grant that "the average haul is as good as those on the Arcturus or on other oceanographic expeditions." More than the quantity of fish in typical hauls, Beebe thought that "the greatest interest in this work however is the continual work in one spot. After the season's work is over we will be able to reproduce as nearly as is possible, the relative kinds and numbers and relationships of the deep sea inhabitants in the open ocean.

⁷⁹ Beebe to Mr. Niles, (May 1931) Beebe Papers/PUL, Box 7, Folder 5.

⁸⁰ Beebe to Mr. Niles, (July 1931) Beebe Papers/PUL, Box 7, Folder 5.

off Nonsuch”⁸¹ Beebe was doing the same kind of research here as he had done in the jungles of British Guiana where he blocked off a distinct quadrant of jungle space and systematically described all that it contained

A steady stream of scientists and philanthropists visited the research station, and Beebe continued to write of the littoral and deep-sea fauna in both scientific and popular papers. In sum, organizing the station was a sizeable task, and that fact did not go unnoticed. A Bermuda copy writer reported that

The first impression gained by a layman visitor is surprise at the technical organization. A scientist is frequently imagined to be a somewhat absent-minded person so deficient of ordinary common-sense that he is a prey to the commercially-minded business man. Dr. Beebe is certainly indifferent to commercial or financial success, but as an organizer he can hold his own with a disciplined soldier or a captain of industry.⁸²

Ever since the Arcturus Expedition, Beebe had received many proposals for designing technologies for deep-sea exploration. But it was not until Otis Barton, an engineer, amateur naturalist, and possessor of a sizable fortune, presented a feasible design with an offer to pay for the sphere’s construction, that Beebe considered expanding his work in the ocean-deep to include in situ exploration. The “bathysphere” was cast and fitted with three 8-inch thick windows of fused quartz, the clearest glass ever produced, as Beebe incessantly told the press. A new tug was chartered and rigged to safely lower and retrieve the six-ton vessel. Beebe designed a meticulous protocol for the DTR staff and tug crew that ensured everyone’s safety. By May of 1930, the Department of Tropical

⁸¹ Beebe to Madison Grant, (May 1, 1929) Beebe Papers/PUL, Box 7, Folder 5

⁸² “The Beebe Expedition,” Royal Gazette Bermuda (June 11, 1929), see Beebe Papers/NYZS, DTR, General Records, Box 3, Folder “G. Hollister Files”

Research was ready to seamlessly integrate bathyspheric research into their wider program

A considerable amount of time went into preparations, but the dives themselves only took up a scant part of three weeks in the entire 1930 season. The sphere was lowered fifteen times over the course of seven days, four descents were test dives in which the sphere was lowered empty, Beebe and Barton were the occupants on the remaining descents but for one in which DTR scientists John Tee-Van and Gloria Hollister were lowered to 419 feet. The bathysphere was equipped with a high energy light and a Bell telephone through which Beebe would relay his observations to Hollister who took notes from the tug's deck. Four of the eleven manned dives were actually "contour dives." Instead of a deep vertical descent, the bathysphere was lowered to between 80 and 300 feet as the tug slowly moved to give Beebe and Barton a horizontal profile of Bermuda's insular shelf. The modest nature of the bathyspheric research was reported by Beebe who, accordingly, emphasized findings of his more traditional deep-sea and Bermuda shore research. Newspapers did not immediately seize upon the fantastic nature of the dives until it was announced that Beebe and Barton had reached a depth of 1,426 feet.

Some critics immediately believed they were witnessing a contest for a world record and minimized the descent by citing that miners had been working in the bowels of the earth up to 5,200 feet. "Dr. Beebe must therefore let out more cable to capture the world's depth record."¹¹ Beebe was quick to disabuse the public that he was out for a record and began what would be one of many argumentative maneuvers that portrayed the

¹¹ "Deep Down," in "Notes on a Week's Headlines," *New York Times* (June 22, 1930), III, 7-5.

dives as a serious scientific endeavor. Shortly after the first dive to 1,426 feet, Beebe reported that he had seen many fish “attesting to the scientific value of the apparatus,” and upon his return to New York he remarked that “the importance of this deep dive is not the fact that it is the furthest man has ever been under the sea but the great value to science in its study of deep-sea inhabitants.” At first, there was little response from fellow naturalists. Henry Fairfield Osborn was easy to convince and he wrote an approving letter to Science attesting to the scientific value of the bathysphere. Beebe was no doubt concerned with winning others. After reading the National Geographic Magazine account of his 1930 dives, E. J. Allen wrote a glowing letter of praise. Beebe circulated the letter among his staff with a little note written in the margin, “This scientist ranks close to Osborn and Einstein in reputation.”⁴⁴ Beebe was equally pleased with an encyclopedia article on deep-sea research written by John Nichols, the curator of recent fishes at the American Museum of Natural History. Nichols claimed that the

bathysphere provides Science with a great metal eye with which it should be possible to see deep sea fishes for the first time in their proper perspective [W]e may reasonably expect that it will initiate a notable advance in our knowledge of deep sea life by making possible better correlation of what we know of it by other means.⁴⁵

This was precisely the kind of legitimization Beebe desired from scientific circles.

Beebe was now enjoying a new status as a hero of science. A Bermuda reporter interviewed Beebe shortly after the 1930 season and wrote up an article entitled “The

⁴⁴ E. J. Allen to Beebe, (January 21, 1931) Beebe Papers/PUL, Box 15, Folder 1.

⁴⁵ Draft of encyclopedia article written by John T. Nichols. See Nichols to Beebe, (March 2, 1931) Beebe Papers/PUL, Box 15, Folder 1.

Modern Marco Polo.” Tapping into an interwar sentiment that the age of heroes was at an end, he wrote that “it is customary among the critics of our time to lament the passing of the age of robust doers of magnificent deeds and the substitution therefore of an age of effete scribblers with no heroic exploits to celebrate. Beebe is a living refutation of that theory.”⁴⁶ It is unclear what Beebe said to this reporter to make him write that “he dislikes people who lionize him,” but more certain is that Beebe was ambivalent if not hostile to his heroic status.

This Bermudan reporter was not alone in lionizing Beebe, in praising his heroic efforts. But this was a heroism of a very new kind. The nineteenth-century “hero” was a man of great physical strength and mental prowess. The Arctic explorer, for instance, had to encounter and overcome a hostile environment through a combination of resolve, intelligence, and bodily strength. Beebe was in the same camp as other interwar heroes, like August Piccard and Charles Lindbergh, whose adventures were intimately connected to technology.⁴⁷ All Beebe had to do, after all, was sit in a cramped sphere, his greatest discomfort was sitting on a monkey-wrench throughout the entirety of the first dive. A science writer for the New York Times put his finger squarely on the new dynamic when he claimed that the ascents of Piccard and the descents of Beebe match the exploits of Columbus, Magellan and Cook. Their adventures required not only “great physical courage,” but they also needed to have a “profound knowledge of physical science

⁴⁶ C. Carl Borth, “A Modern Marco Polo,” The Bermudian (November, 1931), 12.

⁴⁷ Joseph J. Corn, The Winged Gospel: America’s Romance with Aviation, 1900-1950 (New York: Oxford University Press, 1983), 3-27.

involved in what must be called artificial adaption to the environment " Beebe did not possess this knowledge. He relied on the expertise of Barton and other engineers to construct a piece of technology that could safely withstand enormous under-sea pressures. Beebe was thought to be a hero, but this was a new kind of heroism by technological fiat **

Becoming aware of some of the pitfalls and potentials of the bathysphere as an object that mixed science with dramatic spectacle, Beebe would increasingly find new ways of striking a reasonable balance. The bathysphere underwent repairs through the 1931 season and a unique offer from NBC to broadcast a dive gave him special incentive to employ the bathysphere during the 1932 season. Through the medium of the radio, Beebe was thus able to bring his research to an entirely new and widespread audience, and his management of sensationalism took on new form **

** Waldemar Kaempffert, "Into the Black Depths of the Sea," New York Times Magazine (August 28, 1932), 8. Heroism by technological fiat helps put into relief other explorer-technology hybrids like America's manned space program in the 1960s. Astronauts were clear American heroes, but their heroism was a function of the technological apparatus that made space exploration possible. This dynamic also signals us to examine more carefully the relationship between natural history and technology. Beginning in the 1940s, the technology of oceanography would make great strides in profiling the geography of the sea floor and the dynamics of the ocean. These new technologies were simply elaborations of sampling techniques that had been developing (especially in Sweden and Norway) since the end of the 19th century. The practice of war time oceanography was a refinement in describing the natural history of the ocean. Also see Maynard Miller's introduction to Bruce Price, Into the Unknown (New York: Platt & Munk, 1968), ix-xiii.

** The bathysphere was used in 1930, 1932, and 1934. Despite his comments claiming that there was scientific value in the descents, he did make a brief comment to the contrary at the end of the first season. When asked why he didn't dive in 1931, he claimed that repairs and weather conspired against further descents. This was likely a dodge, and it is possible that Beebe had intended to phase the bathysphere out of his research program. He agreed to further dives when NBC made their broadcast offer. Again, there were no dives in 1933 to which there was no explanation. But Beebe decided to use the sphere in 1934 when National Geographic offered to make an enormous outlay for the expedition. After the 1934 dives, Beebe again indicated that the dives didn't amount to much scientifically. Otis Barton then offered to pay for half of the Department's expenses if Beebe decided to use the sphere in 1935. Beebe considered the offer but then declined. This is to say that Beebe probably didn't want to have anything to do with the

1932 Season

If you had your radio tuned to an NBC syndicate on September 22, 1932 at 1:30 EDT, you would have heard the daily programming interrupted by the voice of Ford Bond who was on the deck of the scientific research vessel S S. Freedom, some seven miles south of Nonsuch, Bermuda. William Beebe was preparing to enter a steel sphere that was to be lowered in these tropical waters to a record depth of 2200 feet. "He will literally enter a new world," Bond told the audience, "from which we will bring to you his voice telling of what he sees there." Bond introduced the setting of the scene for about 20 minutes and was resolved in the authenticity of the event, this was in no way a publicity stunt. "This is a broadcast," he insisted, "of a scientific undertaking. It is not a planned event to make a radio program." One half-hour after the program's start, the bathysphere was swung over the ocean, and Bond concluded the first broadcast, "Down down into the depths two men in a hollow steel globe and while you are listening to other programs for the next hour, the Bathysphere will be going down down down down."⁹⁰ At 3:00 p.m. Bond quickly reintroduced the scene and then handed over the transmission to Beebe, 1500 feet down, who communicated with his staff on board the Freedom through a Bell telephone, and thence through the ether to British and American radios. He was well aware of precisely when the radio transmission

bathysphere scientifically, but used it for the pragmatic purpose of reaching a wider audience, thus drawing attention to his own work and the NYZS, and, moreover, Beebe was not above exchanging a spectacular event for good money that kept the DTR afloat. He no doubt thought it ironic that for the rest of his life, his public image was coupled with the bathysphere.

⁹⁰ "First Broadcast," (September, 1932) a preliminary draft of what was to be said during the broadcast, edited by William Beebe. Beebe Papers/PUL, Box 12, Folder 4.

began, but instead of acknowledging his new international audience, it was business as usual. His first words: "Four fish going by with orange lights and bluish white color persisting right in path of light. Two Eels about two feet long just swam by. Color of water is a bluish-black." For another half-hour, as the bathysphere was lowered another 700 feet to the crushing depths of 2200 feet, Beebe continued to narrate his voyage of discovery by completely ignoring the fact that he was setting a new record, never noting that his were the first human eyes to peer into the dark abyss of a quarter-mile's depth. Instead, he told his audience of the unfathomable brilliance of phosphorescent creatures that poured through the fused quartz windows.⁹¹ A half-hour into the broadcast Beebe made no note of achieving the record of 2200 feet. Bond concluded the broadcast: "As he has of course been completely absorbed in his work we have had the privilege of participating in real scientific exploration. We have seen this great scientist actually at his work, have heard his reports as they will actually later be correlated and added to the sum total of human knowledge."⁹²

This seemingly spontaneous and authentic broadcast of discovery actually masked a carefully choreographed affair. Beebe made the decision to not address his audience. He wanted to call attention not to the act of exploring a new world, but rather to the new world itself. He wanted to de-emphasize the fact that he was the first to venture into this new abyssal frontier by conveying to his audience that he was not in the business of heroic

⁹¹ "Bathysphere Dive 20," (September 22, 1932) transcript of communication between Beebe and staff, Beebe Papers/PUL, Box 12, Folder 4

⁹² "First Broadcast," 10

adventure. His interests were purely scientific. Beebe conveyed this to Bond who then drafted a preliminary transcript that was then edited by Beebe. So that all would go well during the broadcast, the combined oceanographic and radio team conducted a dress rehearsal a week before.⁷¹ These preparations helped to efface Beebe's personality, his own ego, and his self-acknowledged status as a hero, separating them from the work of science.

The broadcast was judged a great media success. An executive from NBC immediately fired off a cable saying that the "program today [was] one of the most thrilling if not most thrilling I have ever heard. Congratulations and heartiest thanks." The special programs director of NBC noted that "carrying on your work without apparent regard to radio audience proved one of the most graphic broadcasts ever presented."⁷² Less biased critics included the broadcast in lists of the most pivotal radio events of 1932, which included the Lindbergh kidnaping, Japan's General Honjo speaking directly from the battlefield in Manchuria, and Amelia Earhart's greeting to America on her arrival in London after her trans-Atlantic flight. Newspaper writers were often more impressed by the description of the deep sea than the record depth. The News Chronicle reported that

New Yorkers, sitting at home with pipe and slippers have been brought into direct touch with the marvels of sea life, half a mile below the surface, by the broadcasting of Dr. William Beebe's record descent in a bathysphere. Amid the roar of Broadway's traffic late yesterday they heard the scientist describe in cool impersonal tones his journey into terrifying depths of the ocean, where eternal darkness is studded by the myriad lights of phosphorescent fishes.

⁷¹ Journal written by William Beebe and Gloria Hollister, "Second Log of Bathysphere, 1932," p. 25. Beebe Papers/PUL, Box 12, Folder 3.

Despite the overwhelmingly positive coverage, Beebe continued to emphasize science over spectacle. To an interviewer's query about the popular dive, Beebe responded—with a hint of hyperbole—that

[f]rom above they sent down word that our feat was being broadcast by radio, but my assistant and I were so busy we didn't have time to think of the broadcast until we were told thirty minutes later that it had ended. Sealed up as it were, it seemed utterly impossible for me to think of any one else except my assistant and myself.

The interviewer concluded with a note of which Beebe would have approved: "Popular writer that he is, possessing the gift of taking scientific fact and transcribing it into fascinating literature that the layman can understand and enjoy, William Beebe is primarily a scientist."⁴⁴ This was exactly the kind of publicity that Beebe was after. What could have been interpreted as a publicity stunt was portrayed as a serious scientific endeavor.⁴⁵

Beebe also took matters into his own hands by writing up a lengthy account of the dive for the New York Times Magazine. The entire goal of the dive, he explained, was to get below the level of humanly visible light where bioluminescence could be directly observed.

I could now prove without doubt whether continued observations from a window such as this would yield valuable scientific observations, or whether the attainment of these depths must be considered in the light of merely a stunt, breaking former

⁴⁴ Cable from Philip Carlin, of NBC to Beebe, (Sept 22, 1932), cable from William Burke Miller, director special broadcasts, NBC to Beebe, (Sept 22, 1932) Beebe Papers/PUL, Box 12, Folder 5. "Half a Mile Under the Sea," News Chronicle London, (Sept. 24, 1932). "The Loudspeaker," New York American (January 2, 1933). William Duncan, "Life a Mile Down in the sea Described by Dr. William Beebe," Public Ledger Philadelphia, PA, (Jan 18, 1933).

⁴⁵ On radio in the 1930s see Alan Brinkley, Voices of Protest: Henry Long, Father Coughlin and the Great Depression (New York: Vintage Books, 1982).

records ⁹⁶

Beebe voted for the former and went on to describe the strings of siphonophores, coiled pteropods, a school of myctophids, and other organisms, all of which possessed incredible lighting organs, probably for feeding and mating functions

Beebe must have considered the whole affair a stunning success. Telegrams from the states poured into his office, congratulating him on the spectacular scientific event. Newspaper coverage was nation-wide. Despite the ever-increasing popularity, the sphere sat dormant through the 1933 season, but when the National Geographic Society offered to finance a considerable portion of the DTR's 1934 season, Beebe once again lowered the bathysphere into Bermuda's waters

1934 Season

The lessons that Beebe learned about publicity and sensationalism during his earlier expeditions were put to good use in managing the publicity for the 1934 bathysphere dives. His increased popularity made careful management absolutely essential. While still in New York late in 1933, Beebe had received word from Gilbert Grosvenor that the National Geographic Society was interested in offering \$10,000 to sponsor three or four dives. The event was to be called "The National Geographic Society William Beebe Expedition," and in return for the funds, Beebe would produce two articles with sixteen deep-sea illustrations produced by the artistic staff. Beebe set a number of conditions of

⁹⁶ William Beebe, "Descent into Perpetual Night," New York Times Magazine (October 9, 1932), 1-2, 14-15

his own. First, given the danger involved, Beebe was to be “absolutely in command and having whoever you send as photographer being under my direction.”⁹⁷ As his prior experience with public photographs bears out, and as we shall see below, Beebe was really attempting to control the kinds of pictures to be taken and distributed. The second condition was that Beebe would not be asked to dive deeper than he had in the 1932, i.e. that he not be asked to set a record. Lastly, the formal name of the venture would be “The National Geographic Society-New York Zoological Society Expedition,” thus omitting any direct reference to Beebe.

Grosvenor’s offer came just in time. The DTR was experiencing financial problems given the almost ubiquitous impact of the Depression, and Beebe was in need of extra funding to carry the staff through the 1934 summer. Beebe immediately wrote to Madison Grant simultaneously asking him for permission, and telling him what was about to occur. “This sum will be sufficient to enable me and my staff to carry on our researches for three or four months beyond the bathysphere work, and as I cannot possibly spare a penny more of my own this year, it seems a godsend at this particular time.”⁹⁸ Not everyone in New York was happy with the setup. Reid Blair, director of the Zoological Park, wrote to Grant that he hoped Beebe “will be successful but I am anxious about this stunt and its effect on the Zoological Society if any accident should occur.”⁹⁹

Beebe was becoming increasingly tired with the chore of publicity manager as the

⁹⁷ Gilbert Grosvenor to Beebe, (December 20, 1933) Beebe Papers-PUL, Box 17, Folder 4.

⁹⁸ Beebe to Madison Grant, (December 28, 1933) Beebe Papers-PUL, Box 15, Folder 15.

⁹⁹ Reid Blair to Madison Grant, (ca. January, 1934) quoted in William Bridges, Gathering of Animals (1974), 428.

successive dives received more and more public scrutiny, so he wrote to an events coordinator at the Geographic and informed him that he was having “information problems.” Grosvenor responded to Beebe by offering the services of John Long, the publicity manager for the National Geographic’s recent stratosphere project. Long would serve as a conduit and manager of information between Bermuda and the mainland. Freed from this chore, Beebe was able to devote more time to the management of his own scientific staff. More important, Beebe assigned Long the task of transmitting particular kind of information. He later wrote that “Mr. Long has been very patient with my desire to be certain that the outside reporters would send unsensational accounts.”¹⁰⁰ Long’s management was even more propitious in that the Geographic’s press releases were distributed to five hundred papers worldwide. Such an advertising network would bring massive publicity to the event, and it would be publicity more or less under Beebe’s direct control.

During the summer of 1934 Beebe and his staff worked diligently in Bermuda (the NGS dives were to take place in August) while Captain Stevens and Major Kepner were preparing to best Piccard’s stratosphere record. The latter expedition was sponsored by the National Geographic Society. An NGS employee, who spoke with Beebe while Long busied himself with the stratosphere project, suggested that Beebe radio good wishes to the duo in the interest of creating an aura of good publicity for both the balloon and the bathysphere expeditions. Beebe penciled a note on the telegram: “Heartiest good wishes to Stevens and Kepner for splendid observations on stratosphere flight and a happy

¹⁰⁰ Beebe to Dr. LaGorce (August 17, 1934) Beebe Papers/PUL, Box 17, Folder 4

landing”¹⁰¹ The balloon was equipped, with the help of Robert Millikan, with a spectrograph for detecting cosmic rays, and it is not insignificant that Beebe should explicitly wish them luck in making splendid observations. He was trying to minimize the spectacular nature of the stratosphere flight, just as he had with the bathysphere. There was good reason to do this, as the timing of the two events caused a natural association. One copy writer brought Beebe’s problem into relief:

In time the atmosphere became almost as prosaic as terra firma. Then a Swiss [Piccard] conceived the idea of going out of the atmosphere, up into the stratosphere. It was a great idea, and the race for ‘farthest up’ is now in progress with keen emulation. Dr. William Beebe remains the sole competitor for the distinction of going ‘farthest down’.¹⁰²

This was not the kind of coverage that Beebe wanted. Beebe thus wished them luck, but not in achieving a record height, rather he hoped that they may make a valuable scientific contribution. Another manager at National Geographic wired Beebe informing him that he had sent Beebe’s wishes to Stevens and Kepner who had wished Beebe luck in his undersea explorations.¹⁰³ The manager even sent along the copy of a release that Long had composed after the flight:

We consider the Stratosphere Flight a success in that these gallant gentlemen descended safely and we are further delighted to find that much of the scientific data recorded on photographic film throughout the flight was not destroyed by the impact, especially important being the results of the cosmic ray and work of the spectrograph.¹⁰⁴

¹⁰¹ Telegram from Fisher to Beebe (July 9, 1934) Beebe Papers/PUL, Box 17, Folder 4

¹⁰² “On the Way Down,” Express Easton, PA (April 19, 1934).

¹⁰³ LaGorce to Beebe, (July 25, 1934) Beebe Papers/PUL, Box 17, Folder 4

¹⁰⁴ LaGorce to Beebe, (August 3, 1934) Beebe Papers/PUL, Box 17, Folder 4

We have to imagine that Beebe approved of the release. Even before meeting Long, he had developed a deep trust in his ability to distribute unsensational and scientific publicity.¹⁰⁵

Long arrived in Bermuda early in August, and plans were made to dive sometime in the second week of the month. Marred from its transport from the Chicago Exposition, the bathysphere received a fresh coat of aqua-marine paint. The sea calmed enough for an easy descent on August 11, Beebe and Barton were lowered to a record depth of 2510 feet. Over the receiver, Beebe could hear the Ready's steam-whistle and shouts of congratulations when the sphere had passed its previous record depth. But Beebe put a halt to the dive just short of the half-mile mark, which was the expected goal. Reminiscent of Nathaniel Shaler's remarks about the value of the race for the North Pole (see Chapter 1), papers reported Beebe as saying that "the only reason he did not go on to the half-mile goal was that he had been more interested in making observations at various levels than in merely setting a record."¹⁰⁶ In the excitement of abounding life, Beebe had "completely forgotten the idea of a half-mile record."¹⁰⁷ He did not forget four days later when, with only a dozen turns worth of cable left on the winch, the sphere was lowered to the deepest mark it would ever reach, 3028 feet. Again, Beebe rationalized the record:

Whatever I thought about the relative value of intensive observation as compared

¹⁰⁵ Incidentally, one can imagine the staffers at National Geographic drooling over the possibility of a person-to-person communication from Beebe in the depths of the ocean to the balloonists in the midst of the stratosphere. Something similar actually occurred in 1965 when members of the Sea Lab crew spoke directly with astronauts of the Mercury mission who were then circling the earth.

¹⁰⁶ "Beebe Wires Amazing Finds to Geographic," Washington Herald (August 12, 1934).

¹⁰⁷ William Beebe, A Half-Mile Down, 213.

with record-breaking, I had to admit that this ultimate depth which we had attained showed a decided increase in the number of large fish—more than a dozen from three to twenty feet having been seen¹⁰⁸

Aside from one shallow dive for John Tee-Van, the bathysphere research of the 1934 season came to a quick end, and it also marked the conclusion of in situ deep-sea research at the DTR. Beebe would never again find himself bolted into the narrow confines of the bathysphere.

Long had kept the presses fed with developments up to that point. After the dives, he prepared a long release that reported some of Beebe's more spectacular observations. The release did emphasize the record depth, but Long was quick to postscript the news with a by now standard disclaimer: "While one of the objects of the expedition was to go down a half-mile, it was not solely record depth that Dr. Beebe sought. Before, between, and since the two record dives, he and his aides have made many dives to observe sea-life at various depths."¹⁰⁹ Such comments were an attempt to clearly define the objective of the dive in contrast to media coverage that often explicitly stated that the goal of the exploration was to dive to record depths.¹¹⁰ Beebe was happy with Long's work, but he ranked the entire publicity effort by the National Geographic Society as only "75%."

For example, the "great turquoise light" was simply the change in color of my electric beam, where as it was world-wide copied as some amazing animal light, and I have had letter after letter from scientific men calling me all kinds of things. For the first time the Illustrated London News was crawling with misstatements.

¹⁰⁸ Ibid., 223.

¹⁰⁹ "World Record Deep Sea Dives Made Off Bermuda," Geographic News Bulletin, (August 17, 1934) Beebe Papers/PUL, Box 17, Folder 4.

¹¹⁰ "Beebe Starts Descent to Half-Mile Sea Depth," Evening Bulletin Philadelphia, PA (August 11, 1934), 1.

because they took them from reporters' stories, instead of my being allowed to send the facts direct¹¹¹

Also, the "feminine element" from Arcturus days came back to haunt Beebe again. Throughout all of the dives, Gloria Hollister served as the diligent record keeper at the upper end of the Bell phone. The NGS photographer took a picture of Hollister at work that was distributed to newspapers and magazines. At least one publication reproduced the photograph with a caption that Beebe found offensive: "Miss Gloria Hollister acts as secretary to the Beebe expedition, and looks charmingly feminine in spite of workmanlike shorts and shirt. She talks to the explorers when they are deep, deep down and takes notes of what they find." On the copy that Beebe received, he circled the word "secretary" and penciled in the retort, "Oh yeah?"¹¹² Beebe told Long that the press had "played up the beautiful blonde secretary so that it has been extremely embarrassing to Gloria here and to Mrs. Beebe in London, and I have got to go into the scientific end to compensate. So you see why we must leave either the girls or the reporters ashore."¹¹³ Comments like this reveal a genuine concern for how the personnel of the DTR were represented in the wider press. But it also raises the question of why, if they caused such publicity problems, he had women on his staff in the first place.

¹¹¹ Beebe to Long, (October 15, 1934) Beebe Papers/PUL, Box 17, Folder 4

¹¹² I haven't located the original source. "Dr. Beebe and the Bathysphere," (ca. 1934) Beebe Papers/NYZS, DTR, Office of the Director and General Associate, Box 2, Folder "Clippings: Bathysphere and Diving." In fact, this kind of representation was an aberration. Hollister's work on the Bermuda Oceanographic Expedition, notably her perfection of a technique for making visible fish bones and cartilage without the need for dissection, was reported throughout as an important contribution of a woman in science.

¹¹³ Beebe to Long, (October 15, 1934) Beebe Papers/PUL, Box 17, Folder 4

Gloria Hollister gave her own interpretation as to why Beebe included so many women on his team. She remarked that Beebe thought that "women surpassed men in genius for detail" and the representations of deep-sea creatures required the application of microscopic detail. Hollister was thus one of five women on the first Bermuda expedition.¹¹⁴ This interpretation fits in fairly nicely with a short article on women's rights that Beebe published in 1914. The article, "The Jelly-Fish and Equal Suffrage," presented an analogy between the sexual life of jelly-fish and that of humans. Beebe concludes by saying that thoughtful specialization and respectful cooperation between the sexes was the essence of "sex-equality." Nature provides the example that does not "presuppose that one half of the world shall be set to dusting furniture while the other half goes stolidly marching to war."¹¹⁵ Hollister's statement squares with this. But there is another story, and it comes from Beebe himself. In a 1929 interview for the World Telegram, the reporter pressed Beebe to explain the presence of women on his staff. Beebe responded by saying that he was interested in what was "above their ears." More interesting was the remark that he was "after adaptable scientific students who fall in with my plans, and sometimes women offer me just those qualities."¹¹⁶ I would rather not attempt to tease apart the deep recesses of Beebe's brain, but the important point here is that Beebe was interested in maintaining a large scientific research station that necessitated a goodly

¹¹⁴ "Young Naturalist Sets New Record in Science," The World News (November 1929), Beebe Papers/NYZS, DTR, General Records, Box 3, Folder "History of DTR Hollister/Scrapbook, 1930."

¹¹⁵ William Beebe, "The Jelly-Fish and Equal Suffrage," Atlantic Monthly 114 (July 1914), 47.

¹¹⁶ "Seeks Girls with Ideas," World Telegram (May 1929), Beebe Papers/NYZS, DTR, General Records, Box 3, Folder "History of DTR Hollister/Scrapbook, 1930."

amount of managerial control. Beebe thus prized the control he had over his staff, the control over how the work of the DTR was represented in the public eye, and the control over how his science and writings were circulated in the public sphere.

For all intents and purposes, the 1934 season was another splendid success. Publicity was widespread and more or less dignified, and the National Geographic Society received considerable praise for sponsoring the expedition. Reid Blair, the director of the NY Zoological Park who was worried about Beebe's "stunt," congratulated Beebe on the dives and went on to say that he too wished that "we might benefit by the success of your spectacular dives. We have not had a single new member since June 1. I am not envious of the Geographic's success but wish we might have benefitted to some extent."¹¹⁷ In all fairness, Beebe had never failed to mention his affiliation with the New York Zoological Society. Indeed, the Society had at least a little cachet as a scientific institution that Beebe always used to increase his own scientific capital.

Legitimizing the Bathysphere and Uses of the Sublime

Beebe was constantly trying to find ways to improve the scientific value of bathyspheric dives. At one point he sat down to write a note, likely to himself, on "Bathysphere observations especially wanted." First on his list of general observations was to note the color with every animal, and he castigates himself with a side note, "not 'cheek light pale' or 'body covered with multitude of small lights.'" He wanted to observe the precise mechanisms of fish locomotion and schooling behavior. There is also a list of

¹¹⁷ Blair to Beebe, (ca 1934) quoted in William Bridges, Gathering of Animals, 428-9.

specific questions “Do Cyclothones “move in unison like miniature surface schools?” “What does *Chaulidus*’s first dorsal ray do?” “What is the source of a shrimp’s luminescence?” “Do they twist their eyes back?” He finishes on a note that by this time had become the quintessential Beebe style “Try to concentrate in off moments on the small stuff number of copepod schools etc.”¹¹⁸

Other than refining his own bathyspheric observations, Beebe made inquiries to physical scientists for advice on possible experiments so as to put the bathysphere to good use. E. O. Hulbert of the Naval Research Laboratory, for instance, responded by giving a long list of experiments that would investigate brightness, spectrum analysis, polarization, and cosmic rays. Furthermore, he suggested that Beebe contact Robert Millikan, of cosmic ray fame, for further possibilities. Beebe wanted to mirror the stratosphere flight’s use of a spectrograph, and would have done so if it weren’t for the bathysphere’s physical limitations.¹¹⁹

One way of proving the scientific value of the bathysphere, or of disproving the stunt, was to stay at the bottom of each dive for an extended period of time. Beebe did much to publicize the extended periods of observation that these dives required. More than a quick jaunt for a record, Beebe was hoping “to stay in the depths of the ocean for five or six hours at a time, photographing and studying the inhabitants.”¹²⁰ Then he came up with a new way to use the technology. Towed by a ship, the bathysphere could swing

¹¹⁸ William Beebe, “Bathysphere Observations Wanted,” (ca 1932) Beebe Papers/PUL, Box 12, Folder 4

¹¹⁹ E. O. Hulbert to Beebe, (March 31, 1934) Beebe Papers/PUL, Box 17, Folder 3

¹²⁰ “Beebe Out to Set Sea Descent Mark,” New York Times (April 15, 1934).

low over Bermuda's underwater plateau and thus Beebe could construct a highly accurate topographical map of the sea floor. Unfortunately, the winch was not able to raise and lower the sphere fast enough for the new method to be of any value. So it should be clear that Beebe was deeply concerned that the dives appear non-sensational and thoroughly scientific. But he still could not rise above one unsurmountable problem- absolutely key to the practice of the natural historian is the collection of actual specimens. For taxonomists like Beebe, the pickled specimen in hand was necessary to do the work of science. In the bathysphere, he was little more than a voyeur. Beebe even attached baited hooks to the outside of the sphere to no success. When he tried to name a new species of fish that he had identified through the bathysphere's quartz window, a host of naturalists cried foul.

Several scientists were less than enthusiastic with the bathyspheric work. They were even more ambivalent about the popular account of these dives, Half a Mile Down (1934), in which Beebe attempted to name a new species and genera from his observations through the bathysphere window. Hugh Darby found fault with Beebe's attempt to write a popular scientific account. "The weaknesses of his book are due largely to the fundamental incompatibility of their demands."¹²¹ Carl Hubbs responded similarly but took Beebe even more to task in reporting and naming seemingly impossible fish. "I am forced to suggest that what the author saw might have been a phosphorescent coelenterate whose lights were beautified by halation in passing through a misty film breathed onto the quart window by Mr. Beebe's eagerly appressed face."¹²² The value of the bathysphere as

¹²¹ Hugh Darby, review of Half a Mile Down, The Nation 139 (December 12, 1934), 687.

¹²² Carl Hubbs, "Reviews and Comments," Copeia 2 (July 16, 1935), 105.

a valid scientific technology was under fire, and even the director of the Zoological Park could not “see much prospect of his obtaining any real scientific data from such dives.” Less than a scientific text, the book should “take its place in the annals of daring exploration.”¹²³ Beebe acquiesced to the pressure. Shortly after the expedition members returned to New York in 1934, he told reporters that “the dives had no scientific value,” and that he would devote his time hereafter “to diving in places where the sea and land merged and where specimens for observation and capture were to be had.”¹²⁴

Beebe’s quest for legitimizing the bathysphere moved beyond technological tinkering and a tight control over publicity. It informed his public depictions of his own natural history, as well as descriptions of the oceanic abyss. The most clear manifestation of this influence was Beebe’s invocation of the sublime, a likely strategy for checking his reputation as a hero. In one sense, it seems almost as if Beebe’s description of an abyssal waterscape necessitated a discourse on the sublime. Scholarly attention to the aesthetic of the sublime has resulted in a litany of modifications. American sublime, electrical sublime, technological sublime, and geological sublime are just a few examples. Despite the profusion of uses, there are several themes that cut across these variants. The sublime is an emotion that is felt when one experiences a spectacle of unfathomable and ineffable awe, a view from the bottom of Mt. Shasta looking up, or on top of Mt. Shasta looking out. Immense scale is key to this emotion. Immanuel Kant referred to the failure of the

¹²³ John T. Nichols, “Life in the Bathysphere,” Saturday Review of Literature 11 (December 8, 1934), 336.

¹²⁴ “Dr. Beebe Returns from his 20th Trip,” New York Times (November 3, 1934), 17-2.

imagination to present objects to the understanding. This is a function of experiencing a spectacle that overburdens the senses. Terror, desolation, and isolation are also associated with experiencing the sublime, this is one of the keys to distinguishing the sublime from the beautiful. Experiencing the sublime is also coupled with a certain failure of language. A visitor to the 1907 electrical lighting of Niagara Falls responded that “words fail to describe the magnificence of the spectacle.” Having no reference that would compare with the view of Niagara, another visitor declared that the spectacle was “unearthly.” All these associations with the sublime serve to shrink down the human ego, sublime feelings highlight the insignificance, the minuteness of the human condition in the presence of nature’s most vast and awe inspiring spectacles.¹²⁵ It is in this way that a sublime aesthetic becomes a manifestation of a wider biocentric critique.

Feelings of the sublime are usually linked with a visual experience where a natural phenomenon overwhelms one’s imagination. But Beebe also invoked the discourse of the sublime while discussing the most elemental danger of deep-sea diving – pressure. The crucial element of the immensity of scale is provided not only by the visual, but also

¹²⁵ On mountains and the geological sublime see Marjorie Hope Nicolson, Mountain Gloom and Mountain Glory: The Development of the Aesthetics of the Infinite (Ithaca: Cornell University Press, 1959). For America’s variants on the sublime Raymond O’Brien, American Sublime: Landscape and Scenery of the Lower Hudson Valley (New York: Columbia University Press, 1981); Elizabeth McKinsey, Niagra Falls: Icon of the American Sublime (Cambridge: Cambridge University Press, 1985); and Barbara Novak, Nature and Culture: American Landscape and Painting 1825- 1875 (Oxford: Oxford University Press, 1980); Rob Wilson, American Sublime: The Genealogy of a Poetic Genre (Madison: University of Wisconsin Press, 1991). On the technological sublime David Nye, American Technological Sublime (New Baskerville: The MIT Press, 1994). Earlier, and now classic, studies of the sublime came from scholars in America Studies, Leo Marx, The Machine in the Garden: Technology and the Pastoral Ideal in America (London: Oxford University Press, 1965); Roderick Nash, Wilderness and the American Mind (New Haven: Yale University Press, 1967). And for a recent critique of the sublime and environmentalism William Cronon, “The Trouble with Wilderness, or, Getting Back to the Wrong Nature,” in William Cronon (ed.) Uncommon Ground: Toward Reinventing Nature (New York: W. W. Norton & Company, 1995), 69-90.

through the awareness of deep-water pressures. On the fourth dive of the 1930 season, Beebe was at 1400 feet when the tiniest semi-transparent jellyfish floated past the view of his quartz window. Otis Barton casually told him that every square inch of glass on the window was receiving 650 pounds of pressure. The spectacle of this fragile creature living under such great pressure dizzied Beebe. He wrote, "I had to call upon all my imagination to realize that instant, unthinkable instant death would result from the least fracture of glass or collapse of metal. There was no possible chance of being drowned, for the first few drops would have shot through flesh and bone like steel bullets."¹²⁶ The immense power of abyssal pressure was amply demonstrated during the first test dive of the 1932 season when the bathysphere, sans explorers, came up full of pressurized water. The 30-pound wingnut to the door was loosened and then shot clear across the deck as if from a cannon. "All my life," Beebe noted, "I had heard of the terrific pressure at great depths and had seen bottles and cans come up crushed, but never until now had I had first-hand visual proof of this phenomenon."¹²⁷ In almost every popular account, Beebe persistently comes back to the feelings of awe and terror that he experienced while helplessly trapped within his steel ball.

More than just the pressure of abyssal depths, Beebe also invoked the sublime while experiencing the strange colors of this new world. He was observing the bioluminescence of several fish during the 1930 season when he experienced "a

¹²⁶ William Beebe, "A Quarter Mile Down in the Open Sea," Bulletin, New York Zoological Society 33 (November-December 1930), 223.

¹²⁷ Beebe, Half Mile Down, 154.

tremendous feeling of awe at the astounding glory of glowing lights and iridescence, and never-ending marvel of a living fish" that can withstand deep-sea pressures ¹²⁸ Beebe was also moved by the brilliant blue ambient light that filtered through the window. At 600 feet on his first dive, he

brought all my logic to bear and tried to think sanely of comparative color, and I failed utterly. I think we both experienced a wholly new kind of mental reception of color impression. I felt I was dealing with something too different to be classified in usual terms ¹²⁹ As they descended, and blue gave way to black, he was awed by the "the terrible slowness of the deepening shade ¹³⁰

Searching for similes and earthly reference was quite difficult. Beebe compared the experience with an astronaut attempting to describe a new planet for the first time. When pressed for a comment on his special interest in the dives, Beebe responded that "the depths of the sea below the level of light was so bewildering and amazing that all I can say is that I shall watch for anything that comes within view with the same ignorance and excitement as a rocketeer would have for the Martian faunas ¹³¹ Beebe consistently compared the experience and his observations in the bathysphere to space exploration. He simply was nonplused with the task of describing what by all appearances was a new world. The problem was not lost on Rudyard Kipling, one of Beebe's favorite authors,

¹²⁸ William Beebe, "The Bermuda Oceanographic Expedition," Bulletin, New York Zoological Society 33 (March-April 1930), 61.

¹²⁹ William Beebe, "A Quarter Mile Down in the Open Sea," 208; William Beebe, "Down Into Davy Jones's Locker," New York Times Magazine (July 13, 1930), 1.

¹³⁰ William Beebe, "A Quarter Mile Down in the Open Sea," 215.

¹³¹ William Beebe, "Dr. Beebe Again will Invade 'Davy Jones's Locker,'" press release from National Geographic Society, (ca. June, 1934), p. 7; Beebe Papers/NYZS, DTR General 1900-1962, scrapbook of Gloria Hollister. For a cultural history of space see Howard E. McCurdy, Space and the American Imagination (Washington: Smithsonian Institution Press, 1997), 1-28.

who reported that he had “been reading that amazing Fourth Dimensional book of yours that you so kindly sent me—Half Mile Down—and I find I haven’t any scale for its measurement. It looks like the first opening up of a new world . . . like Columbus throwing fits on the discovery of the Western Tropics.”¹¹²

Beebe’s most powerful invocations of the sublime occurred on a general level when he described how he felt a quarter or a half mile below sea-level. Far from a tale of heroic conquest, Beebe continuously called his readers’ attention to his own insignificance within the ocean deep. In characterizing the first season of diving, he said that he “shall never experience such a feeling of complete isolation from the surface of the planet Earth as when, a few months ago, I dangled in a hollow pea on a swaying cobweb a quarter of a mile below the deck of a ship rolling in mid-ocean.”¹¹³ When the telephone went out on a dive at 250 feet, Beebe responded to being cut off from all communication. “We had become veritable plankton. I visualized us as hanging in mid-water. . . . The silence was oppressive and ominous, and our whispers to each other did nothing to alleviate it. The dark blue outside became cold and inimical.”¹¹⁴ The day after his very first dive, he sat down to reflect and crystallize what he observed “through inadequate eyes and interpret with a mind wholly unequal to the task. To the ever-recurring question, ‘How did it feel?’, etc., I can only quote the words of Herbert Spencer, I felt like ‘an infinitesimal atom

¹¹² Rudyard Kipling to Beebe, (December 26, 1934) Beebe Papers/PUL, Box 15, Folder 17

¹¹³ William Beebe, “A Quarter Mile Down in the Open Sea,” 201.

¹¹⁴ William Beebe, “A Quarter Mile Down in the Open Sea,” 217.

floating in illimitable space."¹³⁵ Beebe reaches the height of self-effacement when he compares himself to floating peas and infinitesimal atoms. It appears to be a strange image given that Beebe was a heroic explorer of a new world. But this latter fact was exactly what Beebe wanted to distance himself from.

In 1936 Beebe wrote a small resume that reflected on the deep sea dives. His intention was to study the nature of light, or rather the lack of light in the ocean deep. His early visits brought him to levels where a small amount of sun light created an ominous and brilliant blue. Beebe, again reflecting on and rationalizing the dives, indicated that going deeper was necessary to break into the realm of total blackness.

In 1932 and 1934 I gave a half-mile as the answer to innumerable questions, but I cared nothing for any man-made measurements of depth—my only goal was to get beyond solar light. . . . And instead of a swift descent and return and only a silly record to brag of, we were staying minutes and hours in the sphere, comfortably looking out and seeing creatures which had evolved in the blackness of a blue midnight for the past one hundred million years or so, ever since the second day of creation when the oceans were born.¹³⁶

There is no direct evidence that Beebe invoked the sublime to mitigate the sensational practice of his descents. But in this slender piece of evidence, we see how Beebe's concern that the bathyspheric dives be portrayed as a thoroughly scientific endeavor—in no way a spectacular stunt—gives way to sublime thoughts on the creation of all life. Beebe's use of the sublime seems to have a very definitive use.

¹³⁵ Beebe, Half Mile Down, 135.

¹³⁶ William Beebe, "Resume," (ca. 1936), pp. 1-4, Beebe Papers/PUL, Box 12, Folder 8.

Out, the Bathysphere, and the New York World's Fair

Beebe would later trivialize his entire oceanic program, especially in contrast to his jungle studies. He claimed that he had only intended to make one brief sea venture, “[t]hen one millionaire gave me a yacht, another millionaire gave me a yacht, and the Governor of Bermuda gave me an island. I spent ten years under water.”¹³⁷ It’s almost as if he was trying to disassociate himself from the entire experience, most importantly the record-breaking dives in the bathysphere. His involvement with the bathysphere did not end in 1934 however. New opportunities and problems emerged that once again called for Beebe’s management of sensationalism.

But this story takes on added significance when we consider alternative forms of media only hinted at above. Before Beebe’s *Arcturus Expedition*, America possessed a scant seven aquaria. Twenty new facilities were constructed between 1925 and 1950, and a remarkable twenty-seven in the following thirteen years.¹³⁸ One of the most popularly successful was Marineland, an ocean-themed aquarium—constructed in 1938 near St. Augustine, Florida. Marineland simultaneously served as a public window into the ocean, provided a research lab for scientists, and functioned as an aquatic movie set for motion picture producers.¹³⁹ Shortly after Beebe expunged the bathysphere from his research program, the ocean was becoming an increasingly important geography in motion pictures like *Marine Circus* and Disney’s *Mysteries of the Deep Sea*. These new visual spectacles

¹³⁷ “William Beebe, Naturalist, Dies, Bathysphere Explorer was 84,” *New York Times*, (June 6, 1962).

¹³⁸ Spencer Tinker and Marian Omura, *Directory of the Public Aquariums of the World* (Honolulu: University of Hawaii, 1963), 4.

¹³⁹ Gregg Mitman, *Reel Nature*, 159-165.

opened up an underwater vista that had been completely unknown to American audiences. They did the work of demystifying the oceanic realm, and, to a certain extent, they aided in the democratization of exploration. Skin and SCUBA diving would become popular recreational activities shortly after World War II, activities in which everyman became an explorer. Movies and aquaria played a role in advertising these geographies as places of beauty, and Beebe thus played a part in this wider move to democratize the practice of exploration.

When Otis Barton decided to fund the construction of the bathysphere in 1929, he had every intention of taking moving pictures for a major under-sea adventure movie.¹⁴⁰ The 1920s were a heyday for the hunting-adventure film, and Barton simply wanted to use mid-ocean depths as a new setting for this popular genre. Beebe often had to sacrifice time at the bathysphere window so that Barton could shoot film. Unfortunately, the technology for under-sea photography, much less moving film, was still in its infancy. Lighting was poor and all of the footage produced naught. Barton moved his filming operations to Panama where he was able to hire actors to perform some mildly sensational scenes in shallow waters. The Educational Films Corporation of America (specialists in educational, scenic, and scientific subjects) produced Barton's film, which came out in 1939. The movie did contain some shots of the bathysphere from the deck of the Ready, but otherwise took place on the sandy beaches of Panama.

¹⁴⁰ Barton was not alone in hoping to bring the underwater realm to the silver screen. In 1934, MGM began production of Jules Verne's 20,000 Leagues Under the Sea. It is not clear whether the idea of the picture was caused by the bathysphere publicity, but at least one newspaper writer did make the connection. Mayme Ober Peak, "Reel Life in Hollywood," The Globe Boston, Massachusetts (November 26, 1934).

The producers sent a copy to Beebe late in 1938—it was then titled “Bathysphere.” Beebe’s only response was to encourage the producers to follow through with their plan to rename the movie, Titans of the Deep, and that all shots of the DTR staff be omitted, leaving only the Panama footage¹⁴¹. When the film was released in 1939, word around town seemed to imply that Titans of the Deep was one of Beebe’s projects. He fired off a letter to Science:

I would like to correct a rather vital misconception in regard to the film now running in New York City and elsewhere in the country, called ‘Titans of the Deep.’ This is being credited to me and my associates, whereas neither I nor any member of my staff of the Department of Tropical Research, nor any one connected with the New York Zoological Society, had anything to do with it. At the very beginning are shown a few authentic shots of the Bathysphere, but all the rest of the film is the work of Mr. Otis Barton, and was taken in Panama at his own expense and with no relation to the Bathysphere. I never saw any of it until it appeared on a New York screen. Together with my staff, I would like completely to dissociate myself from this motion picture and to have it known altogether as the work of Mr. Barton. In a recent letter he tells me he has been trying to accomplish this correction, but without success¹⁴².

A movie that highlighted staged sharks preying on swimming women, Titans, according to reviewers, had very little scientific value. Beebe had every right, as Barton seems to have admitted, to disassociate himself and the staff of the DTR with the film¹⁴³. So even after

¹⁴¹ Beebe to Henry Blair, (September 26, 1938) Beebe Papers, PUL, Box 15, Folder B.

¹⁴² William Beebe, review of “Titans of the Deep,” Science (April 7, 1939), 319.

¹⁴³ Beebe never seemed to be a big fan of the many natural history films that were playing to packed movie houses throughout the 1930s, but he was in no way a critic. In fact, several members of the Arcturus expedition were deeply involved in the art. Ernest Schoedsack had just seen his film, Grass, hit the theaters when he joined the expedition as photographer in charge of still and moving pictures. It was likely Beebe’s fondness for Schoedsack’s portrayal of Persian tribal culture that earned him a spot on the trip. Ruth Rose, the technician and historian of the expedition who authored two chapters and co-authored another with Beebe in The Arcturus Adventure, later went on to write the script for King Kong. So Beebe must have had some appreciation for this new form of science entertainment, but when it came time to review Barton’s project, Beebe had few kind words to say. On Grass and King Kong, see Gregg Mitman, Reel Nature, 37-39, 55-58.

Beebe had banished the bathysphere from his research program, he continued to preserve its image and those of his research team and the New York Zoological Society, as dignified, unsensational, and, as always, thoroughly scientific. The timing of the release coincided with the New York World's Fair, a venue that presented Beebe with the opportunity to exhibit his science to America's public.

When not employed in the business of exploring Bermuda waters, the bathysphere inhabited public spaces as a testament to the spirit of exploration. Between 1934 and 1936, it stood, as if suspended by the Ready, in the American Museum of Natural History's "Hall of Oceanic Life." The bathysphere took its place underneath the gondola of August Piccard's stratospheric flight at Chicago's Century of Progress Exposition in 1933. The Chicago exhibit symbolized a new phase of exploration, long restricted to the plane of the earth's horizon, humans were now exploring the depths of the ocean and the dizzying heights of the upper atmosphere. In 1939, the bathysphere was proudly displayed at the New York World's Fair. Beebe's involvement with exhibit design demonstrates his desire to stir the imagination with natural and fantastic wonders while presenting the dignified nature of his natural history at the same time reinforcing his recurring message that humans were only a small and overly egoistical part of the natural world. He also wanted to simulate the bathysphere dives in such a way that the audience itself would become participants, not mere observers, in exploration.

The role of science and technology in fostering economic and democratic progress

was a moral at the very center of these fairs¹⁴⁴ Beebe's, and the New York Zoological Society's, contributions to the New York World's Fair loosely fit into this general scheme. An Ohio advertising firm contacted the Society and proposed building an "Underwater Theater of the Sea" from which fair visitors could observe oceanic life. "American business," the executive outlined,

already utilizing its millions to retain the best minds in scientific and industrial achievements to groom it for the New York World's Fair, can be surpassed in Showmanship at the time by only one organization: the New York Zoological Society. Within the Society's grasp lies the opportunity, to borrow a phrase from the immortal P. T. Barnum, to state "The Greatest Show on Earth."

In contrast to the many exhibits that would demonstrate how science and technology had undergirded economic progress, the exhibit would appeal to the "over-powering fascination . . . to thrills . . . mystery . . . entertainment, to the spectacular, or to anyone who seeks education in those things which interest him but which, by being so far removed from his ordinary life, remain unattainable." The special appeal lay in the sea itself: "every man loves to stand beside the sea, peering out across the vast expanses which hold adventure, mystery, romance." Moreover, the engineering feat involved, "the task of capturing from the Sea its most prized, least known inhabitants: all these things make the Project a publicity natural, the perfect answer to a publicity man's prayer."¹⁴⁵

The "Theater of the Sea" never moved beyond the planning stage, but Beebe was optimistic that the World's Fair offered him a unique opportunity to exhibit the ocean as

¹⁴⁴ Robert W. Rydell, World of Fairs: The Century-of-Progress Expositions (Chicago: University of Chicago Press, 1993), 92-114.

¹⁴⁵ "From United States Advertising Corporation," (ca. 1938) Beebe Papers/PUL, Box 12, Folder 9.

well as the practice of natural history. He drafted an exhibit in which viewers would be sitting in a large room somewhat resembling an upscaled inner chamber of the bathysphere. The audience would look through an enlarged round window in order to observe exactly what Beebe had seen on his many descents. The DTR artist staff was to use invisible paint to carefully recreate their representations of deep sea life on three alternatively scrolling transparent screens. The fish would become visible by a fluorescent light, mimicking the bioluminescent phenomena Beebe had noted. Behind the three scrolling screens would be a translucent screen on which would be projected an “animated cartoon showing animals seen from surface to 3000 feet”¹⁴⁶. The show was to begin with stock footage of the bathysphere on the deck of the Ready with staff scurrying about making preparations for the descent. Beebe would enter the sphere, the bathysphere swung overboard, and then the audience’s perspective would be moved to inside the bathysphere. More than a window into the deep sea, Beebe’s proposal gave an audience the opportunity to make a deep sea dive, to recreate Beebe’s famous dives, to participate directly in the practice and wonder of natural history.¹⁴⁷

A second proposal intended to put both the work of the DTR and the deep sea wonders of the Hudson Gorge on display. Throughout the summer months of the exposition, Beebe’s staff would conduct daily trawls and dredges in the Hudson Gorge, exactly as they had done to public acclaim in 1928.

¹⁴⁶ “Viewing Area,” (ca. 1938), Beebe Papers.PUL, Box 12, Folder 9.

¹⁴⁷ In Disney World’s EPCOT Center, a visitor to the “Land of the Seas” exhibit goes on a similar expedition that ends with visitors viewing aquarium fishes as if from a deep-sea oceanic observatory.

The collections of weird abyssal fish, many of which will be new to science, and some still alive, will be rushed back to the Exposition and placed immediately on view . . . Artists will be seen making large sized colored plates of the creatures, and microscopic photographs will show their amazing structures in detail

The intent was to exhibit the fantastic creatures “living in the least known area of exploration left on the planet”¹⁴⁸ But just as certain, Beebe wanted to exhibit the practice of natural history itself

Beebe’s final proposal was entitled “Everyman’s from the Ocean” and consisted of a simple factual exhibit that outlined the physiological connections between humans and the sea For example, he noted that salt water was an excellent temporary substitute for blood “Man’s blood is an enclosed epitome of ocean water . . . when his ancestors first crawled out of the sea” A simple diagram of the water cycle emphasized that terrestrial weather was very much a function of oceanic processes Beebe concludes the proposal with a final statement of humility, “Difficulties of penetration serve to ameliorate our conceit”¹⁴⁹

The actual exhibit was far more modest, but achieved some of the elements that Beebe had proposed The New York Zoological Society’s most sensational event was in using the current generated by an electric eel to ignite magnesium flares along the Great White Way¹⁵⁰ The eel was located at the Zoological Society Building that highlighted exhibits of the DTR The first sight was a series of dioramas that juxtaposed New York’s

¹⁴⁸ “Proposal of the New York Zoological Society to Place on Exhibition at the 1939 Exposition ‘Collections of Living and Dead Deep Sea Fish,’” (ca. 1938) Beebe Papers/PUL, Box 12, Folder 9

¹⁴⁹ “Everyman’s from the Ocean,” (ca. 1938) Beebe Papers/PUL, Box 12, Folder 9

¹⁵⁰ Rydell, World of Fairs, 111

past and present natural history. The former contained many of the creatures Beebe had retrieved from the Hudson Gorge, “animals stranger than the wildest conceptions of our Hollywood dream manufacturers.” The diorama also displayed how deep-sea fishes were caught in silk nets and how the bathysphere was lowered into the ocean depths. Close to the diorama were preserved specimens of deep-sea fauna. The bathysphere was located in the “bathyspherium,” a domed and darkened room, “much as it must have appeared a half mile down to the fishes of the deep,” models of which were illuminated by an ultra-violet light.¹⁵¹

Beebe’s work was also represented on one of the seven transparent murals in the Science and Education Building. The exhibit illustrated the “scientific method of thought” and demonstrated “the extent to which scientists go in securing reliable knowledge.”¹⁵² The transparencies answered questions like “What is Beyond?” through advances in astronomy. X-ray crystallography addressed “What is Within?”; atomic physics was employed to answer “What is Energy?” Beebe took his place on a transparency addressing “What is Beneath?” It was divided into three sections, two depicted the bathysphere suspended on a cable in mid-ocean, and the third depicted Beebe at his laboratory table with his microscope identifying the various forms of life brought up from below. Several of the transparencies did include representations of unnamed scientists, these were caricatures for the chemist, the astronomer, and so forth. Beebe was the only

¹⁵¹ John Tee-Van, “The Zoological Society’s Building at the World’s Fair in 1940,” (ca. 1940), Beebe Papers, NYZS, DTR, Office of the Director and General Associate.

¹⁵² Rydell, World of Fairs, 112.

named scientist.¹⁵¹ The Science and Education Building was the center of the entire Fair, and that Beebe was so prominently displayed in a central exhibit testifies to the extraordinarily popular appeal of both Beebe, and his bathyspheric research. There is no record of Beebe's response to the exhibit, but one has to imagine a sense of pride in having his work taken seriously as a scientific endeavor. To have his oceanic natural history hang beside depictions of astronomy, physics, and chemistry must have carried much weight in Beebe's mind. To have his transparency simultaneously represent his work in the bathysphere, as well as his work in the laboratory must have had a similar effect.

* * * * *

Beebe entered the world of publicity, entertainment, and high adventure with fear and loathing. These were activities that had a consistent potential to call his scientific status into question, but they were also the lifeblood of the Department of Tropical Research. Conductor of a vast enterprise that required careful and meticulous management, Beebe was in the business of courting and pleasing an eclectic audience that ranged from New York Zoological Society naturalists, the wider scientific community, his primary patrons, and a public audience that seemed to watch his every move. At the heart of the dynamic was the persistent problem of balancing science with sensationalism, heroism with humility, egocentrism with biocentrism, and adventure with serious study. He achieved such ends by carefully controlling his and his staff's public image, as well as

¹⁵¹ Allen Saalburg, "Details on the Seven Transparent Murals," (ca. 1938) Beebe Papers/PUL Box 12, Folder 9.

by composing nature writings that mitigated the stigma of fruitless adventures and reckless record-seeking. Here I have noted his biocentrism, his misanthropism, and his use of the sublime. These were concepts that surely arose in the field as Beebe carefully and meticulously attempted to view nature as a subject instead of an object. But they were also ways to manage his socio-professional identity.

It is difficult to label Beebe, even using Stephen Fox's categorization, as an amateur conservationist. He was very seldom active in conservation activism. Beebe articulated his relationship to conservationism in a 1948 annual meeting for the New York Zoological Society:

For a moment let us consider an unpleasant subject—the Human Race. Like Gaul we divide it into three unequal parts. First, the General Mass, say 99 and 9/10's, of selfish Humans, who are Unwise about the present, and Thoughtless about the Future of their relation to the Earth on which they exist. Mr. Osborn recently told me that the Conservationists, my Second Part, amounted to 1/2 of 1% of the Human Race. They are the Unselfish ones, tearing about, to right the Ecological wrongs of the Great General Mass. There remains a Very Thin Slice, the Pure Scientists, composed of myself and my confreres, who are as selfish as the Horrid Mass, but are Happy about it. We number about 1/100,000 of, oh, well my mathematics are getting quite out of hand, I will stick to the Thin Slice. In our work with Birds, Beasts, and Butterflies, all we ask is to be completely divorced from Humans, although we are grateful to the Conservationists for trying to keep Wild Creatures alive for a few more years, so we can study them.¹⁵⁴

Surely Beebe is being overly modest here. But he introduces an important historical question: How do we gauge the work of non-activist nature writers as contributors to environmental history?

Beebe's writings delivered an at times ambiguous critique of modern civilization

¹⁵⁴ Notes to speech at the 1944 New York Zoological Society Annual Dinner, (ca. 1944) Beebe Papers/PUL, Box 14, Folder "Writings: Miscellaneous and Bibliographical."

As opposed to many of the participants in the back-to-nature movement, Beebe did not go to the wilderness for retreat, he went there as a student of nature. He despised cities and development for destroying these natural places. Behind this development was a human self-confidence, Beebe called it “misplaced self-importance,” in the ability to control and manage nature for utilitarian ends. This attitude fostered a biocentrism in Beebe’s writings that did more than offer a non-utilitarian view of nature. He invested in nature an inherent value that was in no way contingent on humans. Viewing nature, for Beebe and his readers, had an inherent aesthetic pleasure. Nowhere is this more evident than in the oceanic frontier. A reviewer of one of Beebe’s Bermuda books noted that for most Americans, fish are simply the potential ingredients for a “nourishing bouillabaisse,” but in Beebe’s hands, these routine observations are “the elements of tremendous dramas, high adventures.”¹⁵⁵

These adventures were not solely the province of men of science, they were activities that could be enjoyed by all. Time and again, Beebe would give a recipe for this kind of appreciation:

Get a helmet and make all the shallows of the world your own. Start an exploration which has no superior in jungle or mountain. . . provide yourself with tales of sights and adventure which no listener will believe. . . until then he too has gone and seen, and in turn has become an active member of the “Society of Wonderers under-sea.”¹⁵⁶

Beebe introduced to the American public this new world, one that he had visited himself.

¹⁵⁵ William Soskin, “Reading and Writing,” review of Nonsuch: Land of Water, New York Evening News (August 23, 1932), 25.

¹⁵⁶ William Beebe, Beneath Tropical Seas (New York: Blue Ribbon Books, 1928), 3-6. Also see *idem*, Half Mile Down, 3-19.

an ocean full of spectacular wonders that inspired feelings of awe and wonder, a world that Americans would flock to shortly after the war with mask and snorkel. As yet, the thought of polluting or destroying these natural wonders was far from anyone's mind, even Beebe's. When all is said and done, Beebe made the ocean something worth protecting. The next three chapters discuss some of the work by oceanic naturalists after World War II, a period in which the ocean became an all-important geography in ensuring American security, economic-growth, and recreation. Beebe's fingerprints will be found in all three chapters.

Chapter 5

Federal Science and the Exploration of the Pacific/Ocean: Preparation and Preservation of a New Last Frontier

The Pacific Era may be defined as a contemporary epoch in which the scientific and political interest of the world has been focused as never before on the Pacific Ocean area as a result of numerous phenomena which are World War II; the dropping of the atomic bombs on Hiroshima, Nagasaki, and Bikini atoll; the American occupation of Japan and the concomitant revolution in Japanese life.¹

Like a great flood tide, the ocean rushed into the bays and coves of postwar American culture. It became the setting for popular war literature, such as James Jones's From Here to Eternity (1951), Herman Wouk's Caine Mutiny (1941), Nicholas Monsarrat's Cruel Sea (1951) and James Michener's twin epics Tales of the South Sea (1947) and Return to Paradise (1951). The ocean was both nemesis and seat of spiritual renewal in Odyssean man-in-the-raft narratives like Robert Trumbull's The Raft (1942), Thor Heyerdahl's Kon Tiki (1950) and Ernest Hemingway's The Old Man in the Sea (1951). Reflective perspectives of the ocean, like Anne Lindbergh's Gift from the Sea (1955), pointed to the nurturing power of the sea. Science of the sea, too, was represented by Rachel Carson's The Sea Around Us (1951), Eugenie Clark's Lady with a Spear (1953) and Jacques Cousteau's The Silent World (1953). Many of these works made it onto the silver screen as dramas and documentaries. They were joined by movies of wartime heroics like The Fighting Sea-Bees (1944), starring John Wayne, and the resurrection of the 1930s effort to film Jules Verne's 20,000 Leagues Under the Sea.

¹ Gregg M. Sinclair, Forward to The Pacific Era, William Wyatt Davenport ed., (Honolulu: The University of Hawaii Press, 1948), xi.

(1954) Public marine aquaria sprung up around the country in unprecedented numbers. Skin and SCUBA diving became popular recreational activities. Hawaii enjoyed a booming tourist economy. Pacific cuisine could be sampled in one of Trader Vic's campy franchises. RCA issued a new recording of Debussy's La Mer in 1951 with new liner notes written by Rachel Carson. Fashion designers began marketing hats with ocean themes and Pacific-style lava-lava wraps. And in the early 1960s, the Hawaiian tunes of Don Ho became a national phenomenon. In the words of fishery biologist E. R. Coker, "a more widespread 'sea-consciousness' must prevail in the future."²

Postwar sea-consciousness defies simple synthesis. The ocean could either be the setting for human drama, a protagonist that challenged human resolve, a place of seclusion and recreation, a nurturer of life and spirituality, a resource for economic development or a buffer against Communist imperialism.³ What is certain is World War II's role in precipitating this newfound awareness of the ocean. While battles on the European front were mostly terrestrial, America's activity in the Pacific theater can largely be characterized as ocean warfare.⁴ Hundreds of thousands of soldiers suddenly became familiar with the Pacific ocean and islands as American troops "island hopped" west from Pearl Harbor and north from Australia pushing the Japanese military force closer and closer to its homeland. The American public back home heard of the military exploits

² E. R. Coker, This Great and Wide Sea (Chapel Hill: The University of North Carolina Press, 1947), x.

³ Linda Lear, Rachel Carson: Witness for Nature (New York: Henry Holt and Co., 1997), 204-5; Gregg Mitman, Reel Nature: America's Romance with Wildlife on Film (Cambridge: Harvard University Press, 1999), 164-5.

⁴ Robert Sherrod, On to Westward: War in the Central Pacific (New York: Duell, Sloan and Pearce, 1945), 3-14.

through the pictures and words of war correspondents. As a consequence of this wartime exposure, Americans' conception of the oceans had undergone drastic change. According to Coker

[i]f we had thought of them as separating barriers, we now see them as connecting links between all the continents and islands. . . . [N]o longer should a civilian have the temerity to measure the protective value of the seas against that of hills and valleys, mentally, however, he notes that, not only for ships, as navy men have always known, but also for armies and munitions, for planes and rockets, the seas are not now 'set as a bound that they may not pass over' ⁴

Shortly after Japan's surrender, the United States was mandated the Micronesian islands as a Trust Territory. With a new anxiety concerning the possible threat of a homeland invasion, America militarized the Trust Territory to create a buffer against Communist expansion. In short, the ocean, and specifically the Pacific Ocean, became a new and important frontier geography needed to maintain American security.

After the signing of the peace agreements in 1945, Admiral Nimitz addressed a joint session of Congress concerning military achievements in the Pacific theater. "The introduction of atomic power," Nimitz said, "has given new importance to sea power. Our defense frontiers are no longer our own coast lines. . . . Today our frontiers are the entire world."⁵ The frontier metaphor used here is significant. Many attempts throughout the early-twentieth century were made to explore alternative frontiers in Alaska, the Philippines, Guam, Hawaii, and Puerto Rico. With Nimitz's statement we see the creation

⁴ Ibid., 4.

⁵ Quoted in Richard Hewlett and Francis Duncan, Nuclear Navy 1946-1962 (Chicago: University of Chicago Press, 1974), 76. For more frontier rhetoric, see W. A. Shurchiff, Bombs at Bikini: The Official Report of Operation Crossroads (New York: W. H. Wise & Co., 1947), 57.

of a new frontier—that of the ocean, and specifically Micronesia. Central to the colonization of this new territory would be the postwar collaboration between the military and oceanography.

These new geographies were the sites of intensive scientific activity by oceanographers (ocean) and natural historians (Trust Territory). The following two chapters delve into a small cross-section of America's sea-consciousness through an examination of oceanic natural histories by Rachel Carson and Eugene Clark, whose histories intersected with wartime and postwar oceanic exploration. This chapter provides some of the background by relating the efforts of oceanographers and naturalists who explored the ocean and the Pacific, mostly under the auspices of the American military. In this chapter, I deviate from the biographical methodology employed in most of the dissertation and therefore only briefly discuss some of the actual work of naturalists and oceanographers in the field. The primary focus here is on the bureaucratic maneuvers of naturalists on the mainland who mounted an exploratory campaign, through the patronage of the federal government, on the ocean and Micronesia. This chapter functions the same way as Chapter 1 that introduced Andrews, Murphy, and Beebe by focusing on the metropolitan places that served to bring naturalists and patrons together. World War II ushered in a new phase in the patronage of natural history. Where Explorers Club naturalists were bankrolled by wealthy business leaders, the naturalists here entered the field with the support of federal funding, and ushered in a new phase of exploration that may be termed "big natural history."

We begin with a look at the explosion of oceanography during and after the war.

The well-known story of science/military collaboration on the construction of atomic weapons was paralleled by the military's patronage of oceanography. Of particular importance was the work of oceanographers in monitoring a series of atomic and thermonuclear tests in the new Trust Territory. The next section examines the work of the Pacific Science Board (PSB), a coordinated organization of American scientists interested in exploring territories closed off to science since Japan's occupation of the western Pacific. Funded primarily by the Office of Naval Research, PSB scientists were, for the most part, naturalists interested in studying and preserving Pacific island ecology. The effort received military-funding because of the government's substantial interest in Micronesia as a Trust Territory, a new American possession in the charge of the United States Navy. The final section briefly examines a few of the abortive attempts by naturalists who called for the conservation and preservation of fragile Pacific islands.

Chandra Mukerji has recently tackled the difficult problem of explaining the peculiar relationship between science and state after World War II. In order to preserve the mutualist relationship after wartime collaboration, the government doled out just enough money to obligate scientists to come to the aid of state interests in times of need (war, national emergencies, policy consultation). Mukerji suggests that the government created an "elite reserve labor force" and had only a limited interest in the specific research projects funded by postwar tax dollars.⁷ Her primary case evidence is the huge increase in government-funded oceanography, and this is problematic. Her focus on the funding

⁷ Chandra Mukerji, A Fragile Power: Scientists and the State (Princeton: Princeton University Press, 1989).

strategies of federal science trivializes the role of oceanography in the postwar period. America's postwar sea-consciousness stemmed from the realization that the ocean would serve as a territory for preserving American security. In a sense, the ocean and the Pacific region became new commercial and military frontiers. The funding of oceanography and the natural historical investigation of the Pacific were key to the work of frontier exploration. Just as early-national politicians sent geographical expeditions to explore America's western frontier, so too did the military send out oceanographers and natural historians to explore the oceanic frontier. Referring to Polynesia, in a remark equally applicable to Micronesia, a New York reporter noted that "the South Seas are Uncle Sam's baby. Power over an area implies responsibility for it, and responsibility makes understanding highly advisable."⁸ Such was the intention and function of postwar government-funded oceanography and natural history.

Micronesia was, however, an ambiguous frontier. American management of the territory revolved around three foci: establishing a permanent military presence, creating a natural laboratory for atomic experiments, and bettering the welfare of native inhabitants. Needless to say, these goals did not always complement each other. American science was called on to assist the government on all three accounts. Postwar Micronesia has eluded attention by most American historians, environmental historians and historians of science. A social, cultural and environmental history of the Trust Territory will certainly reveal the roles of science, diplomacy, and conservation in America's policy towards

⁸ J. C. Furnas, Anatomy of Paradise: Hawaii and the Islands of the South Seas (New York: William Sloane Associates, Inc., 1947), 4.

Micronesia as well as the region's function as a crucible for changing the way Americans' thought about the relationship between humans and nature. The focus of this chapter, however, is to simply highlight the role of oceanography and natural history in managing the Micronesian frontier.

Militarizing the Ocean

There was some interaction between the state and oceanography prior to World War II. For instance, when the problem of detecting submarines originated during World War I, the Naval Consulting Board, headed by Thomas Edison, formed a Committee on Submarine Detection by Sound. In 1916 the National Research Council (NRC) was established for the purpose of advising the government on scientific matters and it quickly set up its own committee for submarine detection research. These organizations established what would become a recurring relationship between marine scientists and the Navy that centered on the development of acoustical equipment to monitor sounds under the surface of the ocean.¹⁹ The NRC soon constructed a laboratory composed of university physicists at the U.S. Naval Experiment Station in New London, Connecticut—the site for the earliest development of sonar technology.¹⁰

The relationship continued during the interwar period. In 1936 the Navy had worked with Yale oceanographer Henry Bigelow and Columbus Iselin of Woods Hole

¹⁹ Susan Schlee, The Edge of an Unfamiliar World: A History of Oceanography (New York: E. P. Dutton & Co., 1973), 244-6; Thomas Hughes, American Genesis: A Century of Invention and Technological Enthusiasm (New York: Penguin Books, 1989), 118-126; Helen Raitt and Beatrice Moulton, Scripps Institution of Oceanography: First Fifty Years (San Diego: The Ward Ritchie Press, 1967), 137-51.

¹⁰ Chandra Mukerji, Fragile Power, 40.

Oceanographic Institute (WHOI) to investigate some problems with echo-sounding devices¹¹ Iselin found that temperature variations refracted echo sounds thus vitiating the technology's usefulness. Since sonar effectiveness worsened as the sun heated the surface layer of water, this anomaly was called the "afternoon effect."¹² As a result, new technologies were invented to more easily detect temperature variations, most important was the bathythermograph: a device that created a continuous temperature profile as it was lowered into the ocean.

The impact of World War II on both the scale and technological innovation of ocean science was decisive. For instance, the sleepy town of Woods Hole, through funding by the National Defense Research Committee, was transformed into a massive scientific research station. In 1942 WHOI's staff mushroomed from 60 to over 300 persons. Its annual budget leaped from \$135,000 to almost \$1 million.¹³ The need to battle Japanese and German submarine fleets pushed acoustic research to the fore. As improvements were made on the bathythermograph, Woods Hole scientists equipped Navy ships and submarines with the device in order to produce temperature profiles of the ocean depths. These readings were continuously analyzed by oceanographers. Not only

¹¹ Commissioned by the National Academy of Science, Bigelow produced a text in 1931 that gave an overview of oceanography and outlined some of the economic and military functions of oceanographic knowledge. Oceanography: Its Scope, Problems, and Economic Importance (Boston: Houghton Mifflin Co., 1931). The key motivation of the text was that America was falling behind in oceanographic research. The national governments of Norway, Sweden, France, Germany, and the United Kingdom had all invested heavily in establishing oceanographic research stations. Bigelow's text fell on deaf ears and it would take the incentive of a world war to begin a real federally-funded push to investigate the oceans.

¹² Susan Schlee, The Edge of an Unfamiliar World, 85-87.

¹³ Ibid., 282; also see Roger Revelle, "The Oceanographic and How it Grew," in Oceanography and the Past, Mary Sears and Daniel Merriman, eds. (New York: Springer-Verlag, 1980), 10-24.

did these ships take temperature readings, but they also aimed echo sounders on the ocean floor to chart both depth and sea-floor composition. This research thus represented the first extensive exploration of the submarine ocean. Ocean currents, temperatures, and sea-floor topography were charted on maps -this is the quintessential work of the frontier explorer¹⁴

The war also had an influence on west coast research stations. Before 1941 Scripps Institution of Oceanography in La Jolla, California was a small and isolated laboratory with limited funding. In 1941 Scripps and the United States military turned to the problem of submarine detection. The National Defense Research Committee set up a project on the west coast at the Navy Radio and Sound Laboratory on Point Loma. The Navy chartered Scripps's only research vessel, the E. W. Scripps and enlisted Harald Sverdrup, Martin Johnson, Richard Fleming, Eugene LaFond, Walter Munk, Francis Shepard, and Roger Revelle as participants in researching the submarine environment¹⁵

Of particular interest was the nature of the "scattering layer," a seemingly transoceanic subsurface layer that scattered sound waves. Scripps scientists found that the layer had a diurnal movement indicating that it was a biological phenomenon. Scripps scientists also studied sound reflectivity. Different sub-surfaces have unique sound

¹⁴ The project of mapping ocean contours and temperatures was not new. For example, in 1854 Matthew Fontaine Maury had produced an impressive map of the Atlantic basin. Helen Rozwadowski, Fathoming the Ocean: Discovery and Exploration of the Deep Sea 1840-1880 (Ph. D. dissertation, University of Pennsylvania, 1996), 68-118. Oceanographic vessels continued this project, even Robert Cushman Murphy and William Beebe had made modest contributions. Extensive mapping, however, was a result of hundreds of ships equipped with echo sounding devices crossing the sea and collecting data that was sent back to Woods Hole for analysis. See Susan Schlee, Edge of an Unfamiliar World, 296-7.

¹⁵ Elizabeth Noble Shor, Scripps Institution of Oceanography: Probing the Oceans 1936-1976 (San Diego Tofua Press, 1978), 79-83; Helen Raitt, Scripps Institution of Oceanography, 137-151.

signatures that indicate mud, coral, bedrock, or solid steel. Topographical charts of the ocean would thus describe the nature of the sea-floor--crucial information when the Navy wished to moor "influence" mines to the ocean floor (the influence mine was released when a ship broke a magnetic field).¹⁶ Wave action was also studied by Harald Sverdrup and Walter Munk who advised the Navy on the feasibility of amphibious landings. Munk for instance, had come up with a way to predict size of shore breakers as a function of wind velocity, fetch, and duration. In the fall of 1943 Scripps Institute of Oceanography collaborated with Woods Hole Oceanographic Institution and the engineering department at Berkeley in a program intended to forecast sea conditions from aerial photography. Biologists also researched the sounds emitted from ocean fauna, some of such sounds being thought to be German jamming devices. It was in this context that biologists would come to realize that the sea was far from a silent environment. Indeed, they found that the ocean was a chorus of organismic sounds. Scripps biologist Martin Johnson studied the noisiest of ocean creatures, the snapping shrimp.¹⁷ Johnson's work on snapping shrimps was actively used by the Navy to recognize passive sonar anomalies.

In short, the U. S. Navy mobilized American oceanography in order to get answers to very specific military questions. Information was needed on echo-sounding technologies, ocean temperature gradients, ocean currents, wave dynamics, weather prediction, sea-floor topography, sea-bed structure, and both the fouling and sound

¹⁶ Willard Bascom, The Crest of the Wave: Adventures in Oceanography (New York: Harper & Row Publishers, 1988), 59-64.

¹⁷ Martin Johnson, "Sound as a tool in marine ecology, from data on biological noises and the deep scattering layer," Journal of Marine Research 7 (1948): 443-458.

producing activities of oceanic fauna ¹⁸ To answer these questions, military patronage had transformed small scale oceanographic labs into monster research facilities heavily dependent on federal support. The oceanography/military collaboration during World War II was a manifestation of "big science" ¹⁹ The end of the war thus presented the important problem of redefining the relationship between oceanography and the military. Oceanographers were released from military service, but the Navy continued to fund research projects on a contract basis.

The Navy emerged from World War II in a precarious position. It seemed as if the slowly growing nuclear arsenal would make a separate air force the main instrument of America's military. Submarines still remained a potent conventional weapon and assured some future for the Navy, but the success of submarines depended on the superiority of American ocean science, thus leading to Naval funding ²⁰ The Office of Naval Research (ONR) was thus established in 1946 as the administrative arm of the Navy for funding basic science, and especially oceanic science. ONR was quickly followed by the Atomic Energy Commission's patronage of oceanography. Perhaps the most conspicuous collaboration between oceanography and the military was during the Micronesian atomic bomb experiments from 1946 to 1955.

¹⁸ The strange irony to the massive funding of oceanography during the war is that most of the work conducted can be characterized as either geography, geophysics, or even natural history. The funding led to technological advances that helped oceanography detect ocean phenomena (temperature disparities, sea-floor contours and composition, density profiles).

¹⁹ James H. Capshew and Karen Rader, "Big Science: Price to the Present," Science After 1940, Arnold Thackray ed. Osiris 2nd series, volume 7 (1992): 3-25.

²⁰ Harvey Sapolsky, Science and the Navy: The History of the Office of Naval Research (Princeton: Princeton University Press, 1990), 45.

The first project took place on Bikini Atoll in the northern Marshalls. Operation Crossroads was a military project intended to test the effects of atomic bombs on naval vessels, as well as to determine the environmental impact of the explosion on Bikini Atoll in Micronesia. Before the Marshall Islands tests could be conducted, the problem of local Micronesian inhabitants had to be resolved. Starting in 1946 and continuing through the 1960s, the United States government relocated six island communities. Crossroad's historian W. A. Shureliff justified the Bikini relocation in his official report:

The order to evacuate the natives came from the Navy Military Government Officer in February, when choice of Bikini as the test site became final. The Bikinians, convinced that the Tests would be a contribution to world peace, indicated their willingness to evacuate. Nine of the eleven alaps (family heads) named Rongerik Atoll, 128 miles to the East, as their first choice for resettlement. Although much effort was spent to establish the Bikinians comfortably on Rongerik, some dissatisfaction and nostalgia have been apparent.²¹

Cultures with deep historical connections to particular landscapes were removed from prospective test sites. The results of such actions were disastrous to indigenous peoples who had evolved complex social and economic structures heavily dependent on ownership of land and resources.²² In effect, the Micronesian relocations were attempts to depopulate a new experimental landscape, to cleanse a frontier of human factors in order to establish American hegemony over a newly colonized territory. With natives thus erased from at least part of Micronesia, American scientists could transform the region

²¹ W. A. Shureliff, Bombs at Bikini, 93. For some first hand specifics on the problem, which seemed to be an insufficient supply of coconut trees, see David Bradley, No Place to Hide (Boston: Little, Brown and Company, 1948), 157-63.

²² Robert Kiste, The Bikinians: A Study in Forced Migration (Menlo Park, CA: Cummings Publishing Company, 1974).

into a massive laboratory.²³

Crossroads was a massive research project. Mobilizing a Joint Task Force of over 42,000 persons, it originated as an attempt to resolve the problem of the remainder of the Japanese fleet. On top of this was the question of the effect of nuclear warfare on naval vessels. Right after the war, some naval officials worried that an air force's monopoly over nuclear bomb delivery might render naval operations obsolete. Crossroads was thus an attempt by the Navy to figure out its own status within the nuclear age.

The aim of the one thousand biologists, geologists, oceanographers, and technicians that comprised the Task Force was "to carry out an integrated investigation of all aspects of the natural environment within and around the atoll: the currents and other properties of the ocean and lagoon waters, the surface geology, the identity, distribution, and abundance of living creatures, and the equilibrium relationships among all these."²⁴ According to Roger Revelle, director of SIO, there were three immediate problems associated with the Bikini tests: "to measure the waves that were created by both the air drop bomb and the underwater bomb . . . , to follow the radioactivity, both inside and outside the atoll, the diffusion of that radioactivity . . . , [to measure] the effect on the organisms and the atoll itself, on the coral reef itself, of these explosions." According to Mukerji, Bikini was the "earliest government attempt at establishing an elite reserve of scientists," i.e., the government hired the ocean scientists not because they needed basic

²³ Jonathan Weisgall, Operation Crossroads: The Atomic Tests at Bikini Atoll (Annapolis: Naval Institute Press, 1994).

²⁴ Roger Revelle, U.S. Geological Survey Professional Paper 260 (1954), in

oceanographic information but rather to train their own scientists on the effects of nuclear blasts.²⁵

A substantial body of oceanographic knowledge emerged from the monitoring of nuclear tests. Walter Munk used the aerial photographs taken before the Bikini test to describe ocean reef morphology and its function in regulating Pacific waves.²⁶ In the spring of 1947 Revelle directed a resurvey of Bikini Atoll for the Joint Operation Crossroads Committee of the Atomic Energy Commission. This was intended primarily to determine delayed and long-term effects of the underwater nuclear explosion. As a separate project at that time, several deep holes were drilled on Bikini Island under the direction of the U.S. Geological Survey to determine the geologic history of a coral atoll. The 1947 expedition was followed by a third in 1949 to make a seismic refraction survey of Bikini. Bikini continued to serve as a kind of laboratory throughout the 1950s for both Scripps and military scientists. It is unclear how either the Navy or the AEC used this information, but the scholarship nevertheless contributed to naturalists' knowledge of Pacific atoll life. William Taylor, for instance, catalogued all the plants in the northern Marshall islands.²⁷ As we shall see later, a general knowledge of atoll geology and life was of great concern to Naval administrators of Pacific islands.

Revelle left his military job with the Bureau of Ships in 1948 and returned to

²⁵ Mukerji, A Fragile Power, 48-9.

²⁶ Walter Munk and Marson Sargent, "Adjustment of Bikini Atoll to Ocean Waves," Transactions, American Geophysical Union, 29 (December 1948): 855-860.

²⁷ William Randolph Taylor, Plants of Bikini and other Northern Marshall Islands (Ann Arbor: University of Michigan Press, 1950).

Scripps. Even though he was no longer working for the Navy, he would continue to collaborate with them on most oceanographic expeditions. He proposed another Pacific expedition with the Navy Electronics Laboratory and its Navy-operated ship, PCE(R)-857. Scripps' Horizon and the Navy's 857 went to Hawaii, then discovered the mid-pacific mountains on the way to Bikini where they conducted seismic-refraction profiles. On the way home, the Horizon set off periodical four-pound Sofar bombs for the Navy's air-sea rescue system. The seismic-refraction tests showed that atolls were indeed coral rings about volcanic islands long since eroded. The MIDPAC collaboration with the NEL was the first of a long history of joint civilian science and military science expeditions.

In 1951 the AEC called on the SIO to research the effects of the first thermo-nuclear explosion (the Mike shot of Operation Ivy). Their job here was similar to that of Operation Crossroads, though in this case Scripps scientists operated aboard their own research vessels, the Spencer Baird and the Horizon. The objective of the first leg of the Capricorn Expedition was to observe the wave dynamics resulting from the blast. The Task Force was concerned that the blast might initiate a tsunami, the disastrous consequences of which must have been remembered from the 1946 wave caused by a landslide in the Aleutian Islands. The Horizon was to monitor the wave dynamics some distance from Eniwetok, and if the wave was too high the Scripps scientists would relay the information to the Task Force which would then issue a tsunami warning to all points around the Pacific.²⁸

Several Scripps scientists who had participated in Operation Crossroads were also

²⁸ Willard Bascom, The Crest of the Wave, 134.

on that trip. Because of some poor advice from the project's meteorologists, the Horizon was directed straight into the fallout. The participation of Scripps in this work brought a formal commendation to the institution and also one to Bascom from the Chief of Naval Research, Rear Admiral C. M. Bolster, for "outstanding performance" in a "Herculean project." After monitoring the Mike shot, the Capricorn Expedition did a systematic sounding of the Pacific's deepest underwater trench, the Tonga Trench.²⁹

Oceanologists like Willard Bascom continued to research nuclear tests in the Pacific. The 1954 Bikini atoll series after Operation Ivy was code-named Castle. Bascom and his colleague Chris Isaac were again called on to measure ocean shock waves produced by the explosion. The AEC had constructed a makeshift city on the Marshall atoll Enyu which functioned as the living quarters for a wide range of scientists (very much a continuation of overnight cities such as Los Alamos and Hanford). Bascom expressed a perhaps typical attitude of scientists associated with these tests: "The fun of participating in these massive experiments in physics and oceanography was now shadowed by the thought that our toys really were weapons that could be used against cities, or as threats to hold nations hostage."³⁰ Bascom's account of his experiences with the AEC reveal the giddy-headed playfulness that may have been typical of Pacific research; this attitude obviously contrasted with the massive destructive potential of America's new toys. One of the more horrific consequences of the Bravo shot was the accidental irradiation of both Enyu and the entire crew of the Japanese fishing vessel,

²⁹ Robert Fisher, "On the Sounding of Trenches," Deep-Sea Research 2 (1954): 48-58.

³⁰ Willard Bascom, The Crest of the Wave, 158.

Lucky Dragon

In 1954 Scripps scientists organized the Cusp Expedition in which the Spencer F. Baird, Horizon, Paolina-T and the wallowing T-441 participated in another classified project, Operation Wigwam, an underwater test of a nuclear-fission device. As had been the case with Operation Crossroads, environmental studies were necessary beforehand. Scripps scientists helped make the selection of a "a biological desert, some distance from any commercial fishing areas, where transport of contaminated water is away from fishing grounds." Alfred B. Foeke of the Marine Physical Laboratory, was scientific director of Operation Wigwam, Gifford C. Ewing was deputy director, Paul L. Horner was in charge of the physical oceanography studies, and Milner B. Schaefer was in charge of the biological program. Aerial surveys were carried out in the spring of 1954, and after the test in mid-May of 1955 additional field and laboratory tests were made to monitor the effects. Various minute organisms, fish eggs and larvae, tunas and mid-water fishes were gathered by net, trawl, and long line to determine the uptake of fission products and their concentration in and within the creatures."¹¹

How do we explain the interaction between state and ocean science in this Micronesian laboratory?¹² It is easy enough to suggest that scientists served as consultants on the effects of nuclear weapons on ocean, islands, and people. But we need to take stock of the place itself. Micronesia became a key strategic outpost with a significant military presence. It was literally a new frontier, though of strategic rather than economic importance. When the Navy contracted scientists to participate in nuclear tests, it was

¹¹ Elizabeth Noble Shor, Scripps Institution of Oceanography, 221.

interested in both the monitoring of the test as well as receiving basic information on Micronesia—weather patterns, wave dynamics, coral reef formation, biological distribution. The flaw in Mukerji's logic is that she believes that the government was not necessarily interested in pure atoll or ocean research, but rather merely employed oceanographers to measure the effects of nuclear warfare. Her argument, in the case of postwar oceanography, does not hold if we view the work of oceanographers as frontier exploration. There is no better example of this kind of exploratory initiative than the Pacific Science Board.

The Pacific Science Board

Micronesia is composed of three cluster regions—the Mariana, the Caroline, and the Marshall Islands—that cover an area of ocean equal to that of the continental United States. In the territorial settlement that followed World War I, Japan was awarded Micronesia, previously a colonial holding of Germany. As Japan's eyes increasingly sought ways to expand its empire into China and south-eastern Asia, this territory became a pivotal strategic area for preserving and extending its power over the seas. Through some forceful diplomacy at the end of World War II, America convinced the United Nations to grant Micronesia to the United States as a Trust Territory.¹² Administration

¹² In 1950 Secretary of State Dean Acheson drew America's defenses in Asia as a line extending from the Aleutian Islands to Japan, Okinawa, and the Philippines. This was the ultimate line of containment. Micronesia served as the Naval support structure for land and air bases in these territories. Arthur Power Dudden, *The American Pacific: From the Old China Trade to the Present* (New York: Oxford University Press, 1992), 192, 213. On foreign policy directly after the war see John Lewis Gaddis, *Strategies of Containment: A Critical Appraisal of Postwar American National Security Policy* (New York: Oxford University Press 1982), 54-88.

was handed over to the U.S. Navy, which had already built a significant infrastructure of bases and airstrips throughout the region.

The colonization of Micronesia by Americans was a peculiar process. Admiral Nimitz was fast transforming Micronesia into the Navy's western Pacific outpost, thus ensuring its fate as a military zone. But these islands and atolls were populated by over 50,000 native islanders. After the war, trust territories were ultimately the responsibility of the United Nations, which then passed along the intricacies of implementation to a certain country. The stated goals of a trust guarantor were "the furtherance of peace, promotion of social, economic, political, and educational advancement of Trust peoples toward the ultimate goal of self-government, encouragement of respect for human rights, and ensuring equal treatment in social, economic, and commercial matters to all members of the United Nations." The United States convinced the U.N. to set up the Micronesian Trust as a "strategic area," a special category of the Trust agreement that enabled the United States to justify specific policies as a matter of international security. Under this provision, the United States was able to fortify its military presence and create huge restricted military zones, like the northern Marshalls that were cordoned off for atomic testing.¹¹

The United States' treatment of Micronesia is notable for its island contrasts. Several of the atolls of the Marshalls were cleared of native inhabitants to make room for

¹¹ George A. Coddington, Jr., "The United States Trusteeship in the Pacific," *Current History* 29 (December 1955), 358-63, and Acting High Commissioner of the Trust Territory in 1955 Delmas H. Nucker's report to the United Nations Trusteeship Council (June 14, 1955) published in "World Documents: Report on Pacific Trust Territory," *Current History* 29 (December 1955), 371-77.

what would be a massive laboratory test, a policy that was hotly contested by members of the U. N. Trusteeship Council. But this was only a small part of a massive territory, and the administration of the entire region originally fell to the Navy. A Deputy High Commissioner was appointed to oversee the entire operation, and an infrastructure of administrators was installed on all islands with sizeable populations. These administrators were given the task of seeing to natives' health, as well as economic, social, and political stability—a job that required, inevitably, a broad base of natural history and anthropological know-how. There was precious little scientific knowledge of the environment and people of Micronesia. American naturalists were thus called in force to remedy this lacuna, an initiative that ranks among one of the largest government-funded natural history exploratory efforts in the nation's history. The Pacific Science Board took almost full charge for organizing the exploration of this frontier region.

As with most new territories, the Pacific Trust provided an opportunity for the expansion of a national resource base. Walton Hamilton, a Yale professor of law, called attention to the "problem of frontiers" in 1944. Hamilton described how the postwar environment would foster an American dependency on foreign natural resources and suggested that the U. S. Commercial Company could easily serve as a state instrument for the exploration and prospecting of new resources.¹⁴ Even before Japan's surrender, victory in the Pacific seemed imminent and the Commander of the Pacific Fleet, with eyes on Micronesia, dispatched some twenty naturalists and social scientists to explore and

¹⁴ Walton Hamilton, "The Control of Strategic Materials," The American Economic Review 34 (June 1944), 261-279.

catalog the region's natural resources. Under the aegis of the U. S. Commercial Company, they examined plant, animal, and mineral resources and their "relation to the native life or economy, or to the economy of the United States."¹⁵ Josiah Bridge and William Mark surveyed mineral resources. William Bascom and Leonard Mason examined the trading networks of indigenous islander economies. Raymond Fosberg and Edward Hosaka detailed botanical resources. H. G. MacMillan and Oliver Rogers reported on agricultural resources and soil quality. Henry Townes conducted an entomological inspection tour of Micronesia. Douglas Oliver was one of several anthropologists who were asked to report on Micronesian culture.¹⁶

Their reports almost unanimously warned that the Trust Territory held little promise for American capital.¹⁷ Micronesian islands had inhabitants that lived in an extended subsistence economy. Natural resources were necessary for native islanders. Island flora and fauna were precariously delicate and any efforts at mining, clearing, or planting would certainly disrupt the natural economy of human and non-human life. U. S. C. C. naturalists went a step further than not recommending the exploitation of Micronesia's meager resources, they also called for a systematic regime of conservation and preservation. For instance, soil was quickly eroding from island interiors, and any

¹⁵ Raymond Fosberg, "Botanical Report of Micronesia," report for the U. S. Commercial Company Economic Survey of Micronesia, volume 13, part 1 (1946), 6.

¹⁶ "Conservation in Micronesia: A Report on Two Conferences held under the Auspices of the Pacific Science Board in Honolulu and Washington, D. C., in April and May 1948," (Washington D. C.: National Research Council, 1948), 65-70.

¹⁷ "Summary of Findings and Recommendations," report of the U. S. Commercial Company Economic Survey of Micronesia, vol. 1 (1946), 124-7.

hope of maintaining native agriculture required a soil conservation program. Timber resources were scarce and slow growing and would be benefitted by forest management. Raymond Fosberg also recommended the cordoning off of natural areas for scientific reserves and watersheds. Endemic species would be quickly eradicated if not cared for through habitat preservation.

The U. S. Commercial Company immediately ceased sending naturalists into the field when it was realized that the American economy would in no way benefit from exploiting Micronesia's limited resources. Ferdinand Lane, an American nature writer, expressed the consensus in no uncertain terms. "That [America] will ever selfishly exploit that maritime empire is unthinkable, but it should give her a decisive influence in advancing international justice."¹⁸ Thus Micronesia's postwar fate was not to serve as commercial frontier, but rather as a military frontier. As General MacArthur fashioned Japan and the Philippines into strongholds against the Communist threat in China and Korea, Admiral Nimitz readied Micronesia and Polynesia as militarized regions for asserting American naval supremacy over the Pacific.

Administration of the Trust Territory demanded a rigorous understanding of the Micronesian environment. Military personnel would be living on the islands and a basic knowledge of hydrology, weather patterns, insects, plants, and animals was necessary to establish and maintain a military infrastructure. America was also charged with the troublesome task of fostering the self-governance of island populations that had become accustomed to both American directives and commercial products. The U. S. Navy was

¹⁸ Ferdinand Lane, *The Mysterious Sea* (Garden City, NY: Doubleday & Co., 1947), 351.

to administer the territory in such a way as to assist Micronesian peoples in the establishment of independent and self-sufficient democracies. Perhaps feeling a little out of their league, military leaders turned to American scientists for guidance.

The military need for scientific information was fortuitously sated by American naturalists who were anxious to explore the Micronesian environment. Throughout the interwar years, western naturalists were not permitted to explore these carefully safeguarded islands and atolls. Japan's surrender lifted the "iron curtain" and thus permitted naturalists to enter those regions that had previously been explored only by Japanese and German scientists, and much of their work had been lost in the war. The setting was perfect for a mutual relationship between American scientists and the military.

On April 4, 1946 a small group of government and academic naturalists met with Vice Admiral Richard Conolly to discuss the formation of a new committee of the National Research Council (NRC) that would centralize and orchestrate the scientific exploration of the Pacific. Among the scientists were Harold Coolidge, trustee of the Coolidge Foundation (a "trust for the benefit of mankind"), George Murdock, anthropologist at Yale University, Robert Cushman Murphy, and representatives from the Department of Agriculture, the U. S. Geological Survey and the National Museum. Presiding over the meeting was NRC chairman Ross Harrison who unequivocally highlighted the importance of Micronesian natural history in colonizing the western Pacific. George Murdock agreed and noted the sensitivity of Naval administration during the war in consulting anthropological experts while preparing the region for military government. In the future, he continued, the services of civilian scientists in advising on

health concerns and population problems, "would be a quid pro quo for various types of assistance, transportation, and so on."³⁹ Both Murphy and Coolidge noted the paucity of information on Micronesian plant and animal life and the need to foster a conservationist ethic toward this region. After general comments from most of the scientists, Admiral Conolly agreed that the Navy had much to gain by encouraging the formation of the new organization—the Pacific Science Board. "There is a large ocean area out there that Admiral Nimitz has had a proprietary interest for a considerable period. . . . In the years to come it will be a matter of moment to the security of the country and the defense of that region [to have] all the scientific knowledge that can be gathered about it."⁴⁰ Coolidge, a man with indefatigable bureaucratic energy, volunteered to organize and finance a national meeting for all interested in fostering science in the Pacific.

The Pacific Science Conference⁴¹ convened in June 1946, and was a massive affair bringing together scientists, military strategists, and government officials from the state and interior departments to plan a coordinated exploration of the Pacific. The core scientific members were grouped into six divisions. Nineteen scientists joined the Division

³⁹ Minutes of the "Meeting on Research in the Pacific Area," (April 4, 1946), PSB Papers, Executive Board—Pacific Science Conference—General, (1946), 11.

⁴⁰ Ibid., 7. Also see Nimitz to Harrison (April 11, 1946), PSB Papers, Executive Board—Pacific Science Conference—General, 1946.

⁴¹ The conference should not be confused with the Pacific Science Congress, which was a gathering of members of the Pacific Science Association. Chartered in 1920, the PSA was an international group of scientists that operated out of the perimeter and interior of the Pacific rim. The Pacific Science Congress met in New Zealand in 1947. Robert Cushman Murphy, the keynote speaker, went as representative of the Pacific Science Board. See Philip F. Rehbock, "Organizing Pacific Science: Local and International Origins of the Pacific Science Association," in Roy MacLeod and Philip Rehbock (eds.), Nature in its Greatest Extent: Western Science in the Pacific (Honolulu: University of Hawai'i Press, 1988), 195-222, and for the 7th annual Pacific Science Congress in New Zealand, see Chapter 3.

of Anthropological Sciences, ten in the Division of Earth Sciences, seven in Oceanography and Meteorology, twelve in the Plant Sciences, eight in Public Health and Medicine, and twenty-seven in Zoological Sciences. The Department of State sent twelve liaison members, ten came from the War Department, eleven from the Army Air Forces, twelve from the Navy. The Departments of the Interior, Agriculture and Commerce sent twenty representatives. The nexus of the operation, the National Research Council, sent nine participants. The objectives of the conference were laid out by Douglas Oliver, an anthropologist previously under the employ of the U. S. Commercial Company, in the opening session. They were to form an effective organization of American scientists interested in the Pacific and develop a mechanism for assisting government agencies in the management of America's Pacific possessions.⁴² It was thus to serve the "pure" objective of encouraging basic scientific research, and the "practical" function of advising the military on administering the territory.

Key representatives from all the non-scientific agencies were allotted time to lay out their interests in the Pacific Science Board. All expressed a great need for urgent response, none more than the military. Admirals Richard Conolly and H. G. Bowen noted that the Navy required earth scientists to investigate atoll formation, harbor and coastal silting, and the earth's magnetic field. Meteorologists were needed for accurate weather forecasting, botanists and marine ecologists for investigating the distribution of phosphorescent waters, and zoologists for information on sound-producing animals and

⁴² "Proceedings of the Pacific Science Conference of the National Research Council," Bulletin of the National Research Council 114 (Washington, D. C.: National Research Council, 1946), 5-8.

fouling organisms. In short, the Navy was interested in information “bearing upon the planning and conduct of naval operations.” The second military interest was in receiving information “pertaining to the peoples governed which will assist in the improvement of their health, economy, and well-being, as well as in the establishment of self-governing communities.”⁴³ This was the price that the United States paid for occupying Micronesia and blowing up a number of atolls. In exchange for the work of American naturalists, the Navy would provide transportation and use of military facilities.⁴⁴

The context for the Navy’s paternal attitude toward caring for native peoples was the Pacific’s long tradition of being conceived as a natural paradise in the minds of western culture. In a sense, this was a place beyond time, one that represented the perfect symbiotic relationship between humans and nature.⁴⁵ While it was known by all that the Pacific had long been subject to the tyranny of warfare, western trade, and religious fanaticism, it was not enough to justify America’s intrusion in this “natural paradise,” especially given that the instrument of the occupation would include atom bombs and massive ships of death. America’s presence would be inevitable, but the work of the

⁴³ Ibid., 10-1.

⁴⁴ No word was uttered about who was going to fund expeditions, a responsibility that eventually fell to the Office of Naval Research. For a more detailed statement of the military interests involved see the memo “Problems submitted by various naval activities for consideration at the meeting of the National Research Council on a research program in the Pacific,” PSB Papers, Executive Board. Pacific Science Conference General, 1946.

⁴⁵ For critiques of the view, see Andrew Ross, The Chicago Gangster Theory of Life: Nature’s Debt to Society (New York: Verso, 1994), 21-98; Rod Edmond, Representing the South Pacific: Colonial Discourse from Cook to Gauguin (New York: Cambridge University Press, 1997), 265-8. For a statement on the changing role of colonialism, see Thomas Adam, Modern Colonialism: Institutions and Policies (Garden City, NY: Doubleday & Company, Inc., 1955), 4. For a first-hand account of the Pacific in wartime see Martin Birnbaum, “Vanishing Eden,” Natural History 49 (March 1942), 161-71.

Pacific Science Board might function to ameliorate the transition. The sentiment was expressed by Eric Beecroft, Assistant to the Secretary of the Interior:

Unfortunately for the indigenous peoples, some of their gravest problems are those arising from the intrusion of outsiders. Many Pacific islanders have had their privacy rather rudely disturbed lately, and it has occurred many times in the past. The most recent impact of cultures, added to those which preceded, must represent an exciting challenge to the anthropologist and social scientist.

The challenge, of course, was to cater to the needs of these "'dependent' peoples under the tutelage of trained administrators."⁴⁶

Many of the scientists expressed concern over what America's presence in the Pacific meant for the ecological stability of Pacific islands. The war itself, through warfare and the work of the Army's construction battalion, had caused massive ecological changes to environments on which natives depended for existence. America's continued occupation of the Pacific would also mean the creation of a larger military infrastructure that could potentially damage natural areas. A knowledge of Pacific island and atoll ecology was thus necessary to repair wartime damage and prevent future deterioration. "Great changes have come," declared Alexander Wetmore, Secretary of the Smithsonian Institution, "in the Pacific during the period of the war, and there will be increasing change from primitive conditions in the future." It was therefore crucial to determine the forms of animals and plants "as some will be reduced greatly in abundance or even will become extinct."⁴⁷ Resources, Wetmore added, that are not solely the interest of naturalists but of native populations that exist on them.

⁴⁶ "Proceedings of the Pacific Science Conference," 20.

⁴⁷ *Ibid.*, 26.

After the opening remarks, the scientific divisions moved to separate quarters to discuss the most important scientific problems of the postwar Pacific. Each division made recommendations for research that would assist in military affairs, aid the Navy in the administration of Micronesian peoples, and catalog and preserve endemic plants and animals. Participants reconvened and compiled a list of general recommendations for establishing field stations and fellowships for naturalists, developing the bureaucratic machinery for the Pacific Science Board, encouraging collaborative relationships with international scientists, and promoting a strict regime of conservation, such as the establishment of reserves, national parks, and nature monuments. They also called for the need to carefully monitor the introduction of species that could potentially wreak havoc on island communities.

The final implementation session presented an opportunity for the only non-American scientist, Peter Buck, to say a few words. Buck was a Maori anthropologist of international fame and then working at the Bishop Museum in Honolulu, which would become an important office for the Pacific Science Board. He had nothing but words of praise for America's occupation of the Pacific.

Governments now are looking not merely for the exploitation of the commercial prospects of countries or islands that they acquire, but they believe that they have a responsibility towards the native peoples. In all our discussions of the various things that have come up, the idea in the background has been that the welfare of the native peoples of those islands must be safeguarded or improved.⁴⁴

Ironically, the conference was being held at the same time as the United States military was relocating the entire population of inhabitants on Bikini. It would create massive

⁴⁴ Ibid.

holes in these atolls and shower them with radiation. Beyond the northern Marshalls, new airfields, naval facilities, and military depots would mushroom throughout the Pacific. America's attitude toward the Pacific was ironic, and not a little bit tragic.

Implementation of Pacific Science Board recommendations was almost entirely reliant on the needs of military administrators. One of the Navy's most pressing needs was the matter of pest control. Species that had been recently introduced in islands as a result of both Japanese and American militarization had found an auspicious environment for rapid population growth. Nimitz went directly to the PSB for assistance which instituted a program for the "Insect Control of Micronesia (ICM), later called the Invertebrate Consultants Committee for the Pacific (ICCP). From 1947 to 1954 the PSB sent twenty-seven field workers to the Trust Territory, Guam and American Samoa. PSB naturalists did not offer any advice on chemical quick-fixes, but rather worked towards a system of biological controls. This included a transfer of certain parasites from Fiji to Guam, sending an entomologist to Zanzibar to collect *Scolia* wasps as a control for the Rhinoceros Beetle in the Palaus, and the dispatch of an entomologist and a conchologist to Africa to search for biological control measures for the Giant African Snail."⁴⁹

Just as important as the pest problem, the Navy prioritized anthropological research in Micronesia. Directed by the chair of the Pacific Science Board, Yale anthropologist George Murdock, and funded by the Office for Naval Research, the

⁴⁹ First Interim Report of the Pacific Science Board, composed by Harold Coolidge (October 1, 1947), PSB Papers. Executive Board. PSB Reports: Interim, 1947. Charles Elton used the research of several PSB field workers for his classic Ecology of Invasions by Animals and Plants (New York: John Wiley & Sons, Inc., 1958). Rachel Carson also followed these results carefully.

Coordinated Investigation of Micronesian Anthropology (CIMA) remained active between 1947 and 1949 and sent forty-two anthropologists—in coordinated teams of between two and six scientists—to Saipan, Palau, Yap, Ulithi, Ifaluk, Truk, Ponape, and Mokil. Most investigators were cultural anthropologists whose approaches were both historically specific, such as understanding the origins of systems of sailing directions and time measurement based on astronomical observations, and scientifically general, such as understanding the social structure of Yap islanders that caused not overpopulation—a problem in other parts of the Pacific—but dangerously low population growth. While in the field, anthropologists made on-the-spot recommendations and then made further recommendations in final reports that were distributed to island administrators.⁵⁰ Ward Goodenough's study of landownership among the people of Truk was especially appreciated. One overseer remarked that

[s]ince disputes over landownership are perhaps the most serious source of friction among the natives of the Trust Territory, it is evident that American judicial authorities must feel a great debt of gratitude towards any investigators capable of unraveling what is a highly intricate system.⁵¹

The Navy was so impressed by the work of CIMA scientists that they assigned permanent anthropology advisors to six district administrators in Micronesia.

CIMA concluded its operations in 1949 and was replaced by the wider scope of the "Scientific Investigation of Micronesia" (SIM). Organized by Harold Coolidge, SIM

⁵⁰ Philip Drucker to Harold Coolidge (February 11, 1949), PSB Papers, Executive Board. SIM. General 1949.

⁵¹ W. A. Lessa, "The CIMA Program," a paper delivered to the PSB symposium, "Recent Research Programs of the Pacific Science Board at the 1953 A. A. A. S. conference." PSB Papers, Executive Board. PSB General, 1953, 8. Also see "10 Years of Pacific Science Board Field Programs," published by NAS/NRC (1957), PSB Papers. Other Reports.

sent out a bevy of naturalists to work on individual projects. The first battery of field investigators numbered two anthropologists, three botanists, and five zoologists who worked individually on the islands of Tap, Truck, Ponape, and Palau. Other than ICCP investigators, SIM naturalists were the first Board scientists that were not solely anthropologists.⁵² The reason for the inclusion of botany and zoology was decidedly practical. For instance, Eugenie Clark, an ichthyologist from the American Museum of Natural History, was asked to catalog poisonous reef fishes that had been tormenting American troops wading in the surf. Clark was also asked to discover the native names for organisms listed and learn as much as possible from local knowledge. Before leaving New York, Clark and the rest of the SIM scientists received a memo from the Deputy High Commissioner of the Trust Territory outlining all the privileges and courtesies of the military's substantial Pacific facilities. Trust administrators would point scientists to native guides, interpreters, and expert skin divers who would be useful to individual scientific projects. Such hospitality, however, came at the cost of a few responsibilities.

The Deputy High Commissioner, either directly or through his Civil Administrators, will advise SIM participants on such matters as are considered to affect national defense and the general national interests and which therefore are not to be discussed or published. SIM participants are also expected to recognize the governmental authority and responsibility of Civil Administrators over all persons within those officer's respective jurisdictions. The SIM participants are expected to advise the Civil Administrator in whose district they are working of their plans, particularly when a lengthy or hazardous trip is to be undertaken, or they expect to be out of communication for some time. Failure to do so would indicate a lack of responsibility toward the SIM project and toward the

⁵² Harold Coolidge to Admiral Louis Denfeld (April 26, 1949), PSB Papers: Executive Board: SIM: General, 1949.

cooperative relationship of this project and the Navy”³³

The practice of natural history in Micronesia thus entailed a complicated matrix of governmental, military, and native interactions

During the 1949 field season, eleven PSB scientists worked independently on their own scientific projects. This completely changed in 1950 with the formation of the Coral Atoll Program (CAP), an initiative spurred by a request of the National Research Council to investigate the pressing needs of peoples on lowland atolls who faced rising populations and pitifully low resources in the late 1940s. Harold Coolidge organized CAP as an intensive “ecological” examination of specific atolls. Arno was selected as the first research site, and a group of sixteen specialists coming from marine ecology, botany, zoology, geology, and anthropology were sent to work together to investigate complete atoll ecology. Robert Hiatt summed up the ecological approach by noting that

[e]ssentially, since ecology is merely a point of view from which almost any subject matter may be considered, and since an understanding of the total environment is the ultimate objective of ecological research, this approach meshes perfectly with the situation at hand. Our concern is specifically with the interrelationships of living things and their environments. We must learn what organisms inhabit atolls, what effects the environments have upon them, how they in turn affect the environment, and what effects they have upon each other. Then, interposed is man in a rather unique situation, and he exerts the strongest and most general influence of all.³⁴

These were unique teams of interdisciplinary scientists united by the common goal of bettering native welfare through an understanding of the complete ecology of Pacific atoll

³³ Rear Admiral L. S. Fiske to SIM participants, (May 23, 1949) PSB Papers. Executive Board. SIM Bulletins and Instructions, 1949.

³⁴ Robert W. Hiatt, “The Pacific Science Board’s Coral Atoll Program,” (ca. 1953) PSB Papers. Executive Board. PSB General, 1953, p. 3.

environments

It was in the context of the Coral Atoll Program that Western intrusion in the Pacific became part of a wider ecological critique. Life on Pacific atolls, more than on highland volcanic islands, was a delicately balanced relationship between environment and humans. "Western European civilization," noted CAP director Robert Hiatt, "has inexorably invaded these autarchic communities . . . in an irreversible shattering of age-old equilibria."⁴⁴ It was therefore the goal of CAP teams to discover a new equilibrium that took into account the history of Pacific colonization, America's being the latest. Equilibrium would be achieved by determining the carrying capacities of various atoll types: small and dry (Onotoa), large atoll within a Polynesian cultural area (Raroia), an atoll with good vegetation (Ifalik), and a small, wet and heavily populated atoll (Mokil). Only atolls that had not been greatly affected by the war were slated for investigation. The goal was to develop base line data that would be used in analyzing the situations of atoll populations in crisis. Investigators examined all interactions that bore on the native uses of marine products. These examinations would lead to establishing an atoll's carrying capacity, upon which the Trust administration could recommend population control and efficient utilization of atoll resources.⁴⁵ The Pacific Science Board sent out one team per

⁴⁴ Ibid., 11.

⁴⁵ Robert Hiatt, "The Carrying Capacity of an Atoll: An Abstract of the Marine Zoological Aspects," (ca. 1950) PSB Papers, Executive Board: PSB-SIM: Coral Atoll Project: Arno, 1950. See project goal reports by Raymond Fosberg and H. G. Macmillan in PSB Papers, Executive Board: PSB-SIM: Coral Atoll Project: General, 1950. In 1951, conferences were held in Honolulu and Washington, D.C. to give further direction to CAP investigators. The CAP's concern with population problems was indicative of a wider response to population problems worldwide most clearly articulated by William Vogt in Road to Survival (1948).

year between 1950 through 1955, a total of forty scientists were engaged in CAP projects on five coral atolls

The team sent to Raroia in the Tuamotu Archipelago had even received some attention in the popular press. Raroia became an atoll familiar to many Americans through their reading of Thor Heyerdahl's best seller, Kon-Tiki (1950). The text told the story of a group of six Norwegian scientist-adventurers who had sailed from South America to test an anthropological theory. Heyerdahl thought that some Pacific islands had been populated by Peruvian peoples sailing on balsa rafts. Anthropologists generally dismissed Heyerdahl's theory on account of the absence of sailing technologies in South American cultures. The Kon-Tiki expedition was thus an experiment—a reenactment of a historical event. The adventure ended in Raroia. Norman Newell, geologist at the American Museum of Natural History and leader of the CAP expedition, had even contacted Bengt Danielsson, a companion of Heyerdahl's, and asked him to serve as chief anthropologist for the Raroia expedition.⁷⁷ Newsweek began an article on the trip by noting how “[c]ynics, among them some 3,440,000 American servicemen, drone along that the beauties of the South Sea Islands are gone forever. They blame the corrupting white man, war, and the general evanescence of things idyllic.”⁷⁸ Newell, Danielson and the other scientists, the article goes on, disagree with this consensus and are doing all they can to preserve that primitive charm associated with the Pacific through an application of

⁷⁷ Norman Newell to Danielsson (March 4, 1952), PSB Papers, Executive Board. PSB. SIM Coral Atoll Project. Raroia Participants. Danielsson, B., 1952.

⁷⁸ “Illusion Reclaimed,” Newsweek (November 3, 1952). Also see the other articles in PSB Papers, Executive Board. PSB. SIM. Coral Atoll Project. Press Releases, 1952.

ecological principles

The ecological orientation of the Coral Atoll Project adds another layer to the story of the explosion of ecological thinking after World War II. Donald Worster has suggested that the "age of ecology" that dawned in the shadow of World War II was precipitated by professional ecologists who mobilized to tackle environmental concerns over atomic energy. Joel Hagen has expanded on this by showing how ecosystem ecologists like Eugene and Frank Odum actually drew from the new tools, techniques, and research opportunities of atomic energy.⁵⁹ The ecological program of the CAP should complicate this even further. The approach emerged out of a desire to administer and care for Pacific island peoples and environments in which the dominant problem seemed to be the intrusion of western culture itself. In a sense, ecology became a corrective to the debilitating influence of Americans, and the American military, on Pacific holdings.

Preserving the Postwar Pacific

Many of the scientists engaged in organizing and participating in Pacific fieldwork highlighted conservation as an important project in their recommendations to Trust administrators. The need for conservation became timely due to the ecological changes that resulted from World War II. Destructive plants, animals, bacteria, and chemicals were introduced, topsoil was bulldozed off coral atolls and discarded in the ocean, ground-water reached dangerously low levels, coconut, mango, and other fruit trees as

⁵⁹ Donald Worster, Nature's Economy: A History of Ecological Ideas (Cambridge: Cambridge University Press, 1985), 339, and Joel Hagen, An Entangled Bank: The Origins of Ecosystem Ecology (New Brunswick: Rutgers University Press, 1992), 100-1.

well as many game birds had been killed. Native islanders had certainly suffered as a result of these changes. Conservation strategies in Micronesia were intended to remedy these problems. But those with a stake in conservation had very different objectives in mind. Would America preserve and protect natural island environments without thought to native populations, or was America's priority the rehabilitation of the native peoples themselves?

Much of the momentum for postwar conservation in the Pacific was directed by Harold Coolidge. Coolidge's highest degree was a B.S. from Harvard, but he had accompanied many naturalists on big-game expeditions throughout the 1920s and 1930s. His interests steadily moved towards conservation and he was an especially ardent advocate of international conservation. In the 1930s he served as secretary for the American Committee for International Wild Life Protection, an organization that included some of the biggest names in conservation politics, Madison Grant and Kermit Roosevelt of the New York Zoological Society, Thomas Barbour of the Museum of Comparative Zoology, Joseph Grinnell of the American Society of Mammalogists and Childs Frick of the American Museum of Natural History. The committee intended to address wildlife problems in Africa, Canada, and the Arctic "that can only be handled by international cooperation, in a large measure guided by the Anglo-Saxon races who have shown their ability to cope with wild life problems at home on a considerable scale."⁶⁰ In the hands of Coolidge and the American Committee, conserving world resources was a matter of

⁶⁰ John C. Phillips and Harold J. Coolidge, Jr., The First Five Years (Cambridge, Massachusetts: The American Committee for International Wild Life Protection, 1934), 3.

controlling the resources of indigenous populations”⁶¹

As American troops streamed onto westbound ships during the war, Coolidge and American Museum of Natural History scientist Childs Frick thought to publish a handbook for military personnel “believing that literature regarding the animal life of the Pacific islands would encourage its conservation”⁶² Largely an effort by New York naturalists, Robert Cushman Murphy did most of the writing and William Beebe wrote the preface The Pacific World (1944) provided those soldiers who cared to read it with factual information about the history, geology, fauna, flora, and human populations of many of the islands throughout the Pacific theater. The only conservationist-sounding directive was in Beebe’s introduction

I have already mentioned the terrible decimation of island tribes, in some cases almost to the point of extermination. There is nothing you can do about this, but there is something very important that concerns every soldier as a responsible American. There are many birds, lizards and other creatures inhabiting the smaller Pacific islands that are not to be found anywhere else in the world. A soldier could very likely land on one of the littler atolls and, with a gun, kill every individual bird of a certain species.⁶³

Beebe reveals an attitude here not uncommon with international conservationists like

Coolidge and members of the American Committee for International Wildlife Protection.⁶⁴

⁶¹ Coolidge was something of the ringleader for postwar nature protection, the overwhelming emphasis of which was to preserve the heritage of non-human nature. See, for instance, Harold Coolidge, “A World Approach to Nature Protection,” Renewable Natural Resources, Section VI (1949), 714-20.

⁶² Fairfield Osborn, Forward to The Pacific World: Its vast distances, its lands and the life upon them, and its peoples (New York: W. W. Norton & Co., 1944), 6.

⁶³ William Beebe, “The Pacific is Before You,” in Pacific World, 16.

⁶⁴ The postwar environment was rife with similar plans for international conservation. See John McCormick, Reclaiming Paradise: The Global Environmental Movement (Bloomington: Indiana University Press, 1989), 25-46.

His was more a concern with the fate of lizards than natives

Shortly after the war, Colonel Archie Roosevelt hatched an idea to create a Pacific War Memorial. Less a monument than a research institute, the Memorial would be a New York based foundation that secured funding for the establishment of field stations throughout the Pacific. Fairfield Osborn and John Tee-Van of the New York Zoological Society, Childs Frick and Robert Cushman Murphy of the American Museum of Natural History, and Harold Coolidge championed the effort and brought the possibility to the attention of Admiral Nimitz. The motivation for such a Memorial was to put science into the service of preserving Pacific islands. "The devastation of war," Murphy announced in an organizational meeting of the Pacific Science Board,

necessary in part and probably not entirely necessary, make rapid steps urgent. We know that although the richest field for investigation is on the larger islands there are very interesting problems and great danger on many of the smaller islands which are characterized by endemism of many sorts and are on the point of vanishing.⁶⁵

It was thus the intention of this group of urban naturalists to orchestrate scientific research in such a way as to highlight the fragility of Pacific islands and call for their preservation. Protection for Memorial trustees meant nature protection through the establishment of parks and reserves, restricted districts only to be used for aesthetic retreat or scientific investigation. The plan would effectively remove land from territorial peoples.⁶⁶ By 1947

⁶⁵ "Summary of Findings and Recommendations," report of the U. S. Commercial Company Economic Survey of Micronesia, vol. 1 (1946), 124-7.

⁶⁶ On America's history of Indian removal see Mark Spence, Dispossessing the Wilderness: Indian Removal and the Making of the National Parks (New York: Oxford University Press, 1999), Ted Catton, Inhabited Wilderness: Indians, Eskimos, and National Parks in Alaska (Albuquerque: University of New Mexico Press, 1997), Robert Keller and Michael Turek, American Indians and National Parks (Tucson: University of Arizona Press, 1998), and for the problems encountered when exporting American

the Pacific Memorial Trust Foundation had raised \$35,000 to finance a national campaign to raise further funds both for its administrative headquarters in Honolulu and for a field station and fellowship program.⁶⁷ The Memorial Foundation did establish one research facility in Koror that was used as a way station for SIM investigators like Eugenie Clark, but momentum flagged, for reasons explained below, and the initiative fell to the Pacific Science Board. An unsigned memo was circulated to trustees and advisors of the Memorial in 1950 entitled "Has the Pacific War Memorial a Future?" "Sooner or later," the author frustratingly insisted,

a group of interested citizens will have to take the initiative in seeing that national parks, monuments or wilderness reserves are established throughout the Pacific, not only on areas under United States jurisdiction but on areas under other governments as well, and the Pacific War Memorial would seem to be the logical organization to do the job.⁶⁸

The author of the memo hoped that the thin structure of interested scientists would remain a group ready for action when the timing was right.

The overlapping membership between the Pacific War Memorial and the Pacific Science Board, notably Coolidge and Murphy, meant that the latter would incorporate the nature protection agenda of the Memorial. At the 1946 Pacific Science Conference, the conservation recommendations sound very similar to Memorial objectives. For example they sought the protection and preservation of "areas, objects, and living species of flora

conservation strategies see Jane Carruther, The Kruger National Park: a social and political history (Pietermaritzburgh: University of Natal Press, 1995).

⁶⁷ First Interim Report of the Pacific Science Board, composed by Harold Coolidge, (October 1, 1947) PSB Papers: Executive Board: PSB Reports: Interim, 1947, p. 3.

⁶⁸ "Has the Pacific War Memorial a Future?" (January 19, 1950) Murphy Papers, Folder "Has the Pacific War Memorial a Future?", 1. Coolidge was very likely the author.

and fauna having scientific, historic, or aesthetic significance, through appropriate conservation legislation, including the establishment of national parks, nature monuments, and reserves ⁷⁰ Conservation matters at the level of the PSB very much reflected the Memorial initiative

Once again, Harold Coolidge organized two PSB conferences in 1948 on the subject of conservation in Micronesia. These collections of scientists, government workers, and military personnel expressed a range of responses to America's obligation to conserve island environments. Biologists spoke with a united voice. "Islands are of particular interest to conservation-minded people," explained a Hawaii naturalist, "because their biotas are so delicately balanced, so easily disturbed, and so susceptible to extermination ⁷¹" It was therefore the obligation of American scientists to preserve and protect these fragile environments for scientific examination and "posterity." Raymond Fosberg echoed these concerns by drawing a timely analogy to world politics that emphasized the urgent need for immediate action. The forces which tend to destroy natural resources, natural beauty, and natural phenomena, he said, "are much like those of Communism in that they can lose battle after battle . . . but if they win just once, the forces for conservation of democracy are finished. Natural wealth once destroyed is gone ⁷²" Speaking on the flagging populations of endemic bird life, Ernst Mayr pointed out that

⁷⁰ "Proceedings of the Pacific Science Conference," 42

⁷¹ Elwood C. Zimmerman, "Island Faunas in General: Their Special Interest and Vulnerability," in Conservation in Micronesia: a report on two conferences held under the auspices of the Pacific Science Board in Honolulu, T. H., and Washington, D. C., in April and May 1948, 17. PSB Papers, Executive Board. PSB. Conferences on Conservation in Micronesia, 1948

⁷² Raymond Fosberg, "Island Floras," in Conservation in Micronesia, 21

catering to problems with native population growth was connected to a system of nature protection. If population pressures persist, he noted, any and all areas cordoned off as reserves would be quickly overrun. Naval Lieutenant Commander Paul Hathaway gave conference participants assurance that their recommendations would be given due consideration by Trust administrators, but their interest in conservation was solely guided by the welfare of native peoples and the health of military personnel. Hathaway was probably more interested in hearing the papers on soil erosion and fresh water conservation.

Both conferences composed a list of recommendations that were combined by Coolidge and sent to the Deputy High Commissioner of the Trust Territory. The specific recommendations entailed a host of nature protection aims: setting aside regions that would protect endemic species, migrating water fowl, forested areas, and sites of archeological interest. Conference participants also thought it wise to include a list of recommendations on native participation, the first of which stated that conservation in Micronesia "be for the purpose of fostering the cultural and natural resources of the area for the benefit of its inhabitants."⁷² Efforts would be made to encourage natives to use natural resources more efficiently. Coconut and breadfruit planting would be systematized for maximum yields. Education, too, would be key to success. Natives would not submit to conservationist aims, according to conference participants, unless the training of teachers include "indoctrination in conservation." Native Micronesians, in the

⁷² "Part IV: Summary of the Combined Recommendations of the Two Conferences," in Conservation in Micronesia, 62-4.

recommendations of the PSB, were to be treated as wards of America. It was the duty of American scientists and administrators to care for a region devastated by war and on the brink of ecological collapse. Upon approval by the National Research Council, the PSB formed a new subcommittee called the Conservation Committee for Micronesia.

Not all agreed with the paternal sounding recommendations. Laura Thompson, a conference participant from the Institute of Ethnic Affairs, published a response to the conservation objectives of the Pacific Science Board in Scientific Monthly. If the Trust government was to institute a system of reserves and parks, as per the PSB's recommendations, "we may be denying [native peoples] vital resources from forest uplands, streams, fisheries, or garden lands on which the subtle balance of their economy has long depended."³ She further criticized the notion that natives did not have conservation strategies of their own. Resource allocation, she pointed out, was woven into their everyday cultural practices and western scientists should not be overly anxious to issue directives from New York and Washington D.C. to people who had existed on these islands for centuries. The crux of the matter was that the Micronesian conservation problem could not be addressed with ad hoc accommodations. Addressing conservation issues needed to begin with the assumption that Pacific islands were organic wholes in which animals, plants, and humans were intimately interconnected.

Thompson's article hit Coolidge like a bombshell. It called into question the very existence of the Conservation Committee of the Pacific Science Board--an agency designed to apply American science to conservation problems in the Trust Territory. It

³ Laura Thompson, "The Basic Conservation Problem," Scientific Monthly 68 (February 1949), 129-131.

was especially effective in questioning the efforts of do-gooder scientists from the north-eastern United States who were attempting to create an American system of natural parks and reserves in an environment that clearly resisted the migration of American conservation policy. Coolidge circulated the article to members of the Conservation Committee and solicited their comments. A few quibbles aside, they were in substantial agreement with Thompson's critique.⁷⁴

The PSB's Conservation Committee met in 1950 with reformulated goals. The priorities of the Committee had shifted noticeably to promoting measures for the efficient conservation of natural resources. For soil conservation, they advised against the importation of massive deep plowing and heavy tillage equipment. Limited island ground water should not be overtaxed with wells. Administrators should take measures to manage public forests efficiently. They should also control fire conditions, grazing, and the island pests. Committee members continued to call for the construction of parks and reserves, but they reworked the proposal so as not to exclude their use by native populations. In the words of the Conservation Committee's Trust representative Ernest Holt, "[n]either an attitude of laissez faire nor one of complete prohibition will suffice."⁷⁵ Though the Committee, largely through Coolidge's urging, did call for the complete preservation of one stand of high forest near Koror in the Palaus, close to the Pacific War Memorial's field station.

⁷⁴ See letters in PSB Papers. Executive Board. PSB. Committee on Conservation in Micronesia. General, 1949.

⁷⁵ Ernest G. Holt, "A Statement of Conservation Principles for Micronesia," (September 29, 1950) PSB Papers. Executive Board. PSB. Committee on Conservation in Micronesia. General, 1950.

Holt's job as conservation consultant to the Trust government was completely ineffective. Hampered with a lack of power, his ecologically minded recommendations fell on the deaf ears of administrators who had much more pressing needs. Holt resigned in 1951 and the position was never filled. Few of the Committee's general recommendations ever met a receptive audience, mostly because the Department of the Interior assumed management of the Trust in 1951, thus making the PSB's connection to the military more or less useless. The Committee met again in 1954 and they made a few recommendations, asking once again for the Palaus preserve.⁷⁶ But the minutes to the meeting display none of the conviction and enthusiasm of the 1948 conference. The wider program of the Pacific Science Board continued through the early 1950s, but did so without the assistance of a moribund committee on conservation that had tried too ardently to impose an ethic of American conservation on peoples who had an ethic of their own.

* * * * *

At the start of the twentieth century, Americans began to conceive of the Pacific and the ocean as a place, a place of economic, strategic, and recreational value. Bristling with frontier optimism, Hubert Howe Bancroft wrote in 1913 that

[t]he wealth of the Pacific, for the most part lightly held by inferior peoples, invites the presence of the strong and dominant. The great ocean has waited long for fit occupancy and ownership. This was well that the best results might ensue. Many centuries must elapse before a crude culture planted in aboriginal regions can attain to a front rank, wherefore a transplanted civilization of a higher order were better

⁷⁶ "Minutes of Informal Meeting of the Washington Panel of the Conservation Committee for Micronesia-Pacific Science Board," (April 7, 1954) PSB Papers: Governing Board, PSB, Committees: Conservation for Micronesia, 1954.

here, and it should be drawn from the purest sources”

Bancroft’s imperialistic vision was never realized in quite the way he had hoped, though America had made sufficient investment in the Pacific to worry Japan. American stay-at-homers through this period learned about the Pacific more from Hollywood films than anywhere else. This changed in the 1940s when the Pacific became known as a geography of war. The attention to the Pacific, and the ocean in general, would continue into the postwar years through the proliferation of oceanic and Polynesian popular culture.

The Pacific became many things to many different persons. The U. S. military desired to know of the Pacific and the oceanic frontier in order to secure American borders against Communist expansion. They also wanted to learn about an area that would become a nuclear testing ground, an event not without political implications. In exchange for these militaristic uses of land and water, the United States government was given the task of seeing to the welfare of native Micronesians. They therefore needed to know of the Pacific peoples, their islands, and the natural systems that maintained human life. American naturalists were therefore enlisted through federal patronage to make the Pacific known for militaristic and humanitarian purposes. Sometimes at odds with this initiative were the naturalists’ call for the preservation of Pacific islands through the establishment of parks and reserves. Indeed, frontiers are flexible creations.

This chapter has focused on the federal government’s desire to know of the Pacific and the ocean. But the government’s investigation of these territories was part of a

” Hubert Howe Bancroft, The New Pacific (New York: The Bancroft Company, 1913), vii. Also see Foster Rhea Dulles, America in the Pacific: A Century of Expansion (Boston: Houghton Mifflin Company, 1938) for an extended Manifest Destiny argument that legitimized American imperialism.

growing awareness in American culture that the ocean played a large role in the lives of ordinary Americans. The following chapters focus on two naturalists who made the ocean more palpable, more present, to the American public. We shall see how their natural histories intersected with the work of Pacific Science Board in significant ways. Looming over all were the images of mushroom clouds over Pacific atolls, the ultimate symbol of the human ability to destroy life, to destroy nature. Just as the PSB functioned as a check to the ever-growing machine in the prelapsarian garden of Micronesia, so too did the work of Rachel Carson and Eugenie Clark offer portraits of the ocean that humbled American readers in an age of nuclear anxiety.

Chapter 6

Nature Writing Meets Science Writing: Rachel Carson's The Sea Around Us and the Merging of Literary Traditions

As a contribution to the recent period of centennial and millennial nostalgia, Time Magazine issued a list of the hundred “most influential people of the century.” The late March 1999 issue focused on “scientists and thinkers.” On the cover, Sigmund Freud diligently takes notes on a dour Albert Einstein. At Einstein’s elbow is a portrait of Jonas Salk, and over Freud’s shoulder a hanging picture of John Maynard Keynes. A bookcase is behind the therapy couch, and upon its top shelf, a bust of Rachel Carson. The eminent nature writer Peter Matthiessen wrote the article that justified Carson’s representation on the cover. “Before there was an environmental movement, there was one brave woman and her very brave book.”¹ Matthiessen was referring, of course, to Silent Spring (1962), Carson’s famous critique of indiscriminate pesticide use that played an important role in highlighting the core issues that were about to be played out in the modern environmental movement. The epochal nature of this book has swamped out Carson’s popular work as an oceanic naturalist, the crowning achievement of which was The Sea Around Us (1951). The power of this elegant book brought Carson to hitherto unknown heights of popularity, and contemporaries and historians alike justifiably view the text as a stepping-stone to

¹ Peter Matthiessen, “Environmentalist: Rachel Carson,” Time Magazine (March 29, 1999), 187. Not incidentally, Matthiessen’s article is followed by a much shorter treatment on Jacques-Yves Cousteau, 190.

Silent Spring Aside from one biographical treatment, Carson's ocean studies have received scant attention by historians

The Sea Around Us was a part of the rising "ocean consciousness" that permeated much of postwar American culture Its chief contribution lay in transmitting an "oceanocentric" depiction of the Earth in which humans were insignificant participants in a drama dominated by the role of the ocean Carson inspired in her readers a sense of awe and humility in the face of an all-pervasive and omnipotent ocean At the same time, The Sea Around Us was a scientific text that reported on both old and new findings of naturalists and modern oceanographers She related oceanographic findings that dated back to the mid-nineteenth century, as well as the most modern research of ocean scientists who had stepped up their investigations during and after World War II In short, The Sea Around Us was a merger of nature writing and science writing two very different genres of literature Nature writing has nature as its subject while science writing reports on the scientific investigation of nature, an all important but easily forgotten distinction This chapter charts the development and merger of these traditions in Carson's life from 1936 till 1952

The Sea Around Us has received some scholarly attention The noncontroversial consensus holds that the text was a portrayal of "the sea in words nontechnical readers would understand," an effective and elegant combination of science and literature ² It is

² Mary A. McCay, Rachel Carson (New York: Twayne Publishers, 1993), 41, Carol B. Gartner, Rachel Carson (New York: Frederick Ungar Publishing, 1983), 47-68, Paul Brooks, The House of Life: Rachel Carson at Work (Boston: Houghton Mifflin Company, 1972), 109-20, Vera Norwood, Made From this Earth (Chapel Hill: University of North Carolina Press, 1993), 147, Linda Lear's biography of Carson examines her oeuvre as a hinge that brought together science and literature; there is not a more comprehensive treatment Rachel Carson: Witness for Nature (New York: Henry Holt and Company,

only a half-truth that Carson “translated” scientific findings with a lyrical sense of poetry. In fact, she relied heavily on older sources, many of which had a literary charm of their own. Even some of her most recent resources were pleasing to the ear. Many of her sources already had such a tone, and Carson’s use of numerous long quotations is just one indication. In a sense, the project was part literary and part editorial, she took copious notes and organized them into a treatise that painted a comprehensive treatment of the ocean.

While Carson was not a wide-ranging explorer, The Sea Around Us was part of a lineage of oceanic natural histories including the work of Andrews, Murphy, Beebe, Eugenie Clark, Thor Heyerdahl, and Jacques Cousteau. But there is a kind of exploration with Carson as well, and this leads us to her practice as an amateur naturalist and government biologist. In the latter case, we see Carson engaged in a number of activities that included field work with scientists and commercial fishers. If Carson had ever had the ambition of doing field work aboard the Albatross III (the Fish and Wildlife Service’s primary research vessel), that hope was dashed when she took up quarters inside the beltway as an editor for the Fish and Wildlife Service (FWS).¹ Carson’s truest explorations were of the kind that were the stock in trade of all amateur naturalists: the nonsystematic walk along beaches and tidal pools. According to Samuel Hays, such personal exploration was enjoying a period of growth due to rising standards of living and

1997).

¹ Women were not well represented on research expeditions of the Fish and Wildlife Service, see Lear, Rachel Carson, 97.

levels of education that followed the war.⁴ Exploring nature need not be the province of the rich, elite, and the professional, it was a move to democratize the nature of exploration. Carson was a leader in this move as she urged her audience to view nature anew with a “sense of wonder.” While much of her writing stemmed from natural historical literature, it was also filled with this participatory exploration reminiscent of turn-of-the-century nature study.

Historians have viewed The Sea Around Us as an important precursor to Silent Spring because of the former’s treatment of ocean ecology as well as its appealing mixture of science and literature. By the 1960s, the era of the “nature lover” had lost much of its authority on the political level.⁵ The authority on environmental reform (on the legislative and judicial side) had to be scientific, often marshaling information from the chemical, physical, and ecological sciences. In the heated controversy after the publication of Silent Spring, critics often claimed that Carson had little scientific understanding. This line of

⁴ Samuel P. Hays, Beauty, Health, and Permanence: Environmental Politics in the United States, 1955-1985 (Cambridge: Cambridge University Press, 1993), 13-39. It is worth mentioning that during the 1950s the exclusive membership of the Explorers Club (previously, there was the New York group and a charter in Washington D.C.) opened its doors to the wider public as charters sprang up all across the country.

⁵ For a contemporary view on the important distinction between the nature lover and the naturalist, see Marston Bates, The Nature of Natural History (London: Chapman & Hall, 1951), 273-5, 281-2. Also see Samuel Hays, Beauty, Health, and Permanence, 329-362 and David Pepper, The Roots of Modern Environmentalism (London: Croom Helm, 1984). We are still in need of a comprehensive treatment of science in environmentalism that carefully distinguishes the roles of naturalists, ecologists, and experimental scientists. My general impression is that different environmental concerns involved different forms of expertise. Issues like air and water pollution, radiation fallout, and lead poisoning often fell to those scientists who used scientific equipment to quantify particulate matter or toxicity levels. Wildlife management, population pressures, and resource utilization became the province of ecologists. A naturalist that could not call him or herself an “ecologist” carried very little weight in environmental debates. This is all to say that The Sea Around Us marked Carson as both a nature-loving naturalist and a competent reader of science. Without the latter, Carson would have had more difficulty convincing the audience of Silent Spring.

attack might have proved successful if Carson had not previously been established as a scientific authority some twelve years before with The Sea Around Us

A strange paradox lay at the heart of Carson's first contact with the oceanic realm. While her oeuvre can be characterized as either natural history, science writing, or a combination of the two, she had early on inhabited institutional spaces that emphasized lab-science. Born and raised in a suburb of Pittsburgh, her first glimpse of the ocean was at the Marine Biological Laboratory (MBL) in Woods Hole in 1929, a site that had been and continued to be a home to modern experimental biology.⁶ Carson's summer project seemed to fit the bill fairly well: her lab time was spent comparing the terminal nerves of various reptiles—hardly experimental, but clearly a morphological project that required attentive lab work. When not dissecting reptiles, Carson spent her time walking along the shore examining tide pools. Carson's undergraduate biology teacher, Mary Scott Skinker, was also at the MBL in 1929 and often accompanied her on these excursions. Skinker later recalled that there was a mystical quality about these walks: "Rachel would wander off by herself, silently watching the ocean, utterly captivated by the sounds, smells, and rhythm of the ocean as well as by the variety of the marine life all around her."⁷ Carson also spent much time in MBL's considerable library. Here she began culling facts about

⁶ Keith R. Benson, "From Museum Research to Laboratory Research: The Transformation of Natural History into Academic Biology," 49-86, and "Summer Resort and Scientific Discipline: Woods Hole and the Structure of American Biology, 1882-1925," 121-50 in Ronald Ramger, Keith Benson, and Jane Maienschein (eds.) The American Development of Biology (New Brunswick: Rutgers University Press, 1991).

⁷ Lear, Rachel Carson, 61. This is difficult to verify though we may wish to take it at face-value. Unfortunately, Carson was not a journal writer, though she was a note taker. Her notes from these early years are comprised of species lists and general observations.

the ocean that formed the foundation for The Sea Around Us. In short, despite the laboratory focus of MBL life, Carson found time to do the two activities that would dominate her life: general observation of nature and research of scientific literature.

The paradox deepens when we consider that shortly after graduating from Hunter College, Carson enrolled at Johns Hopkins University, another hotbed of laboratory work, especially for genetics.⁸ Rheinart Cowles, then head of Johns Hopkins' new Chesapeake Biological Laboratory, urged Carson to examine the urinary system of fish for her masters thesis. After a detailed analysis of the morphology of catfish embryos, Carson produced a thesis that, in retrospect, has a particularly un-Carsonesque sound, "The Development of the Pronephros During the Embryonic and Early Larval Life of the Catfish." It is difficult to reconcile Carson's later writings with her lab-dominated experiences at Johns Hopkins. She was certainly not anti-experimental; she simply thought that experimentalism was but one of many ways of knowing nature. She would later say that her

real preoccupation is not with 'pure' or abstract science. . . . I am the sort who wants above all to get out and enjoy the beauty and wonder of the natural world, and who resorts only secondarily to the laboratory and library for explanations."⁹

Whatever her thoughts on lab-science when she finished her degree in 1932, her career in academic biology came to a quick end, mostly because of her taxing family responsibilities, responsibilities that were exacerbated by the depression. Carson heeded the advice of Skinker and in 1935 took the civil employee exam to secure work in the U.S. Bureau of

⁸ Garland Allen, "Old Wine in New Bottles: From Eugemics to Population Control in the Work of Raymond Pearl," in Keith Benson, Jane Maienschein, and Ronald Rainger (eds.) The Expansion of American Biology (New Brunswick: Rutgers University Press, 1991), 231-261.

⁹ Paul Brooks, The House of Life, 125.

Fisheries (the Bureau merged with the Biological Survey to become the Fish and Wildlife Service in 1945)

The Natural History Tradition

Elmer Higgins, then director of the Bureau, hired Carson as a feature writer of scientific subjects and gave her the task of writing short radio scripts. By 1936 she was writing short introductions for Bureau brochures. One piece of writing signaled a crucial divide in Carson's career. In contrast to her science writing for the Bureau and the Baltimore Sun (discussed below), "World of Waters" was Carson's first oceanic natural history. Higgins told Carson that the article was not appropriate for a Bureau publication and suggested that she submit it to Atlantic Monthly, as noted in a previous chapter, the journal of record in natural history writing.¹⁰

Carson submitted a revised manuscript to Edward Weeks, editor and successor to Ellery Sedgwick, the Atlantic owner and editor who was so fond of Beebe's natural history writing. What Sedgwick saw in Beebe, Weeks had found in Carson. The Beebe-Carson connection does not end there, for the published essay, retitled "Undersea," contained some quintessential Beebe moves. The second paragraph told her readers that "to sense this world of waters known to the creatures of the sea we must shed our human perceptions of length and breadth and time and place, and enter vicariously into a universe

¹⁰ Linda Lear, too, suggests that this was a critical text in the evolution of Carson's writing. Rachel Carson, 82. But where Lear seems to view "World of Waters" as an outgrowth of her work for the Bureau, I view Higgins' rejection of the manuscript as the point where Carson simultaneously began producing two different kinds of writing: natural history and science writing.

of all pervading water.” Carson asks us to envision a traveler who begins on a sandy shore and moves slowly to the ocean abyss, observing life along the way. Beebe had asked his readers to do similarly in his descriptions of undersea life.¹¹ Carson describes plankton as “boundless pastures.” Drifting endlessly, midway between the sea and the air above and the depths of the abyss below, these strange creatures and the marine inflorescence that sustain them are called ‘plankton’ – the wanderers.” Again, she might have had a copy of Beebe’s Arcturus Adventure in front of her at the time.¹² Finally, without directly invoking Beebe, Carson portrays the ocean abyss with all of his signal cues on abysmal cold, blackness, and geologic time: “In these silent deeps a glacial cold prevails, a bleak iciness which never varies, summer or winter, years melting into centuries, and centuries of geologic time. There, too, darkness reigns – the blackness of primeval night in which the ocean came into being.”¹³ Carson would not meet Beebe until 1938, but given the relationship between them that would flourish in the 1940s, and Carson’s later statements that she had read Beebe’s work, e.g. Half Mile Down four times, I think it is safe to assume that Carson’s earliest oceanic natural history was deeply

¹¹ Rachel Carson, “Undersea,” quoted in Linda Lear (ed.) Lost Woods: The Discovered Writing of Rachel Carson (Boston: Beacon Press, 1998), 4. Cf. William Beebe, Beneath Tropical Seas (New York: Blue Ribbon Books, 1932), 3-6, and idem, Half Mile Down (New York: Harcourt, Brace and Co., 1934), 3-19.

¹² Rachel Carson, “Undersea,” 6. Cf. William Beebe, Arcturus Adventure: An account of the New York Zoological Society’s first oceanographic expedition, First Harpers edition, (New York: Harper and Row, 1981), 194-219. Not to put too fine a point on it, Carson notes that the “sea performs a vital alchemy that utilizes the sterile chemical elements dissolved in the water.” Beebe notes that “By some strange, secret alchemy [shellfish] draw from the transparent water the hardest and most durable of walls.” My emphasis. There are some important differences between the two as well. Notably, Carson consistently referred to the ocean as mother of life, Beebe as “Father of Life.”

¹³ Carson, “Undersea,” 8.

influenced by Beebe's writings

"Undersea" was not, however, merely culled from Beebe's literature. The article evinces Carson's personal exploration of the sea. Her descriptions of the rhythmic tide's effect on shore life certainly came from personal observation of tide pools and sandy beaches. References to spine-studded urchins likely came from her experiences at Woods Hole. The descriptions of clams, lobsters, haddock, cods, flounders, and halibut stem from her work with the Bureau of Fisheries, for Carson noted that "from these and shallower waters man, the predator, exacts a yearly tribute of nearly thirty billion pounds of fish."¹⁴ She does not end, however, on such a utilitarian note. The final message was decidedly cyclical, even ecological. She brings all the elements of the essay together to describe the "cosmic background" in which the "seas continue their mighty and incomprehensible work."¹⁵ The sea draws in chemical elements from land and air, with the sun's energy, these substances are consumed by planktonic animals that in turn are fed upon by shoals of fish that die and are redissolved into simple elements to start the entire process anew.

"Undersea" caught the eyes of Quincy Howe, editor at Simon and Schuster, and Hendrik van Loon. Carson's connection with van Loon helps us situate her writing within a "middlebrow" culture that came to fruition in the 1920s. Throughout the 1920s and 1930s, van Loon had written a number of popular books on the history of western civilization and geography. These were texts that had fully embraced an "outline" form

¹⁴ Ibid.

¹⁵ Ibid., 11.

that owed much of its popularity to H.G. Wells's Outline of History and became a key genre in what Joan Shelley Rubin has identified as "middlebrow culture." In van Loon's own words, this genre of literature "carried this necessary information to this new public and in such a form and shape that it could understand this new knowledge and enjoy it."¹⁶ Van Loon became one of Carson's early mentors in the publishing world and time and again gave her advice on how to write for a popular audience. With van Loon's and Howe's encouragement, Carson began outlining an intimate "portrait of the sea" that became Under the Sea-Wind (1941).

In her correspondences with van Loon, Carson made clear how the book would need to hold closely to the primary dictum of nature writing – the inseparability of content and form. In order to convey an ecological understanding of nature's interconnectedness, the book had to take the form of a narrative:

The fish and other sea creatures must be the central characters and their world must be portrayed as it looks and feels to them - and the narrator must not come into the story. . . . It seems to me that the principal thing the book must accomplish is the creation of undersea atmosphere, and this [a narrative style] seems the best and generally most agreeable way to accomplish that end.¹⁷

We see here a biocentric sentiment, a desire to tell a story through fish eyes to minimize human egocentrism. This form of nature writing is evident in those writers that Carson admired the most.

Carson's most important early literary influence was the nature writing of Richard

¹⁶ Rubin, The Making of Middlebrow Culture (Chapel Hill: University of North Carolina Press, 1992), 217.

¹⁷ Rachel Carson to Hendrick van Loon, (February 5, 1938) Carson Papers, Box 3, Folder 57.

Jeffries, who she referred to as a “literary grandfather.” Jeffries was an essayist of the English landscape throughout the latter half of the nineteenth century. His later writings reveal not only a deep sympathy for the natural world, but also a statement on the insignificance of humans.¹⁸ Carson was an admirer of Jeffries’ biocentrism and singled out his essay, “Hours of Spring” as particularly important. Here Jeffries relates an instance of waking up in the morning and becoming “aware that the buds are opening on schedule and the birds arriving and he wonders how these things can be happening without him who had always so carefully observed them.”¹⁹ Carson eventually appropriated a line from Jeffries’ “Summer Pageant” for the title of her first book.

Henry Tomlinson, a contemporary of Carson’s, was an English essayist and book writer of a broad range of subjects including travel, history, criticism of progress, antiwar rhetoric, and fiction. Not the standard nature writer, Tomlinson often turned to nature in an attempt to discover an underlying truth that was somehow out of human beings’ grasp. He even compared his literature to the transcendental writings of Henry David Thoreau.²⁰ When Carson caught wind of Sputnik’s successful orbital flight, her thoughts turned to Tomlinson who “suggests over and over: there must be a Truth that has eluded man’s understanding. If only he could grasp it and its intimations are everywhere about—surely all this could be avoided!” It seems to me that what Tomlinson—and I—and others have to

¹⁸ Samuel J. Looker, introduction to collection of essays edited by same, Jeffries’ England: Nature Essays by Richard Jeffries (New York: Harper and Brothers Publishers, 1938), xi-xvii.

¹⁹ Rachel Carson to Dorothy Freeman (March 14, 1961), quoted in Martha Freeman (ed.), Always, Rachel: The Letters of Rachel Carson and Dorothy Freeman, 1952-1964 (Boston: Beacon Press, 1995), 360. Lear, Rachel Carson, 103-4.

²⁰ Fred D. Crawford, H.M. Tomlinson (Boston: Twayne Publishers, 1981), 30.

say should have been said a generation ago. Is it too late?"²¹ If humans could conceive of themselves as but a small part of nature, there would be no need for war, violence, and international posturing.

Carson was also fond of Henry Beston, editor of The Living Age and chronicler of Maine's landscape. Just like Tomlinson, Beston attempted to find a mysterious force within nature—especially the craggy shorelines of Maine—that seemed to emanate from the ecological unity of life. For instance, he expressed a very deep sense of humility and reverence in The Outermost House (1924), one of Carson's favorite natural histories. "We need another and wiser and perhaps a more mystical concept of animals," he wrote. "We patronize them for their incompleteness, for their tragic fate of having taken form so far below ourselves. And therein we err, and greatly err. For the animal shall not be measured by man."²² While still in the process of writing Under the Sea-Wind, Carson made a pilgrimage to the site where Beston had built the Cape Cod house that became the setting for Outermost House.

Perhaps the most important influence on Carson's earliest natural history was the English naturalist Henry Williamson, who had written several narratives from the animal's point of view. Williamson achieved such an effect by anthropomorphizing animals to make them the central characters of a narrative that could be easily read and understood.

²¹ Carson to Freeman (November 7, 1957), quoted in Freeman, Always, Rachel, 233.

²² Henry Beston, "The Outermost House" in Elizabeth Coatsworth (ed.), Especially Maine: The Natural World of Henry Beston from Cape Cod to the St. Lawrence (Brattleboro, VT: The Stephen Greene Press, 1970), 18.

by a popular audience.²³ The narrative flow of Under the Sea-Wind is accomplished with precisely the same maneuver. The life-histories of migrating shore birds are fleshed out through the story of Blackfoot and Silverbar, those of mackerel through the eyes of Scomber, and the adventurous migrations of eels from inland pond to Sargasso Sea through Anguilla the eel.

If Carson drew from Williamson, Betson, Tomlinson, and Jeffries for her narrative approach, she came to know the actual life-histories of these organisms through her work with the Bureau of Fisheries, as well as her own personal exploration. For instance, in July 1938 Carson visited the Fisheries Station in Beaufort, North Carolina. When not examining the fishery facility, Carson spent her time examining Beaufort's marsh pools, ponds, and shoreline. She paid special attention to the flow and ebb of the local tides and its effect on seashore life. The notes of her observations became the basis for the first chapter of Under the Sea-Wind. She told Edward Weeks at Atlantic Monthly that "'Flood Tide' describes the events that take place during the rising of the night tide on a small island on the North Carolina coast. The island actually exists as I have described it and some of the happenings I record took place before my eyes."²⁴

Of course, the latter two sections of the book—largely underwater descriptions—could hardly have stemmed from personal observation but were rather taken from life-histories pieced together by marine biologists. The Bureau of Fisheries had long

²³ On Williamson's influence on Carson see Lear, Rachel Carson, 90-1.

²⁴ Carson to Weeks (June 24, 1939) Lear-Carson Collection, Box 4, Folder "Origins of Under the Sea-Wind."

been charged with the task of informing America's fishing fleet of scientific knowledge that would lead to the efficient conservation of natural resources. Government biologists thus investigated the feeding, mating, and migration habits of commercial fishes in order to prevent excessive depletion. Other than the study of fishes, government biologists were also students of the sea—examining currents, tides, upwellings, and temperature disparities. The adventures of Scomber the mackerel drew heavily from her contact with government biologists, especially those working in Chesapeake Bay.

Carson's readings of natural history and her work as a government naturalist saturate the entire text, but it is nowhere more evident than in her narration of a fishing boat's attempt to capture a school of mackerel with a seine-purse net. Carson deftly describes the schooling habits of mackerel and then moves on to a dramatic narrative in which the mackerels escape the fishermen's grasp by sounding through the slowly closing hole at the bottom of the encircling net. Before the escape, Carson delves into the mind of one of the fishermen:

One of the fishermen in the seine boat had been only two years at sea. Not long enough to forget, if he ever would, the wonder, the unslakable curiosity he had brought to his job—curiosity about what lay under the surface. . . . It seemed to him incongruous that a creature that had made a go of life in the sea, that had run the gauntlet of all the relentless enemies that he knew roved through that dimness his eyes could not penetrate, should at last come to death on the deck of a mackerel seiner, slimy with fish and gurry and slippery with scales. But after all, he was a fisherman and seldom had time to think such thoughts.²⁴

If Carson did not intend to write an autobiographical vignette, then she at least put some of her thoughts into this fisherman's mind. These are Carson's incongruous thoughts as

²⁴ Rachel Carson, *Under the Sea-Wind: A Naturalist's Picture of Ocean Life* new ed. (New York: Oxford University Press, 1952), 200.

she tried to reconcile her own position within the conservationist machinery of resource utilization and the wonder, fascination, and respect that she had for oceanic life. They are also the sentiments that Carson found in her reading of Betson, Tomlinson, and Jeffries.

While Under the Sea-Wind was not a commercial success, the book did receive some critical acclaim by reviewers. An unsigned New York Times reviewer noted that humans rarely take the time to examine the ocean, “he knows little even of the sea-wind’s birds, much less of the ocean’s creatures. It takes a naturalist [like Carson] to look at what is there.” William Beebe thought that Carson was at her best when describing complete life histories: “There, her attention is concentrated upon a single individual organism, about which environment, experiences and enemies, are made to revolve, and on which they focus.” George Miksch Sutton, an ornithologist at the University of Oklahoma, noted that the author of Under the Sea-Wind may be an expert ichthyologist, “but she is primarily a lover of the sea” writing “from a wholly new viewpoint, the viewpoint of a creature that experiences daily the ‘eternal rhythms of the seas.’”²⁶ Henry Beston’s review praised Carson for showing how “the sun ‘is always more than a gigantic mass of ions, it is a splendor and a mystery, a force and a divinity, it is life and the symbol of life.’”²⁷ These reviews highlight how Under the Sea-Wind was being read as a natural history of oceanic life. This was not a book about oceanography, or marine science, or fishery biology. While Carson may have been using her FWS knowledge of eel and

²⁶ “A Dramatic Picture of Ocean Life,” New York Times (November 23, 1941), 10; George Miksch Sutton, “Along the Moonlit Tidal Flats,” Books (December 14, 1941), 5; William Beebe, review of Under the Sea-Wind, Saturday Review of Literature (December 27, 1941), 5.

²⁷ See Carson to Freeman (February 13, 1954), quoted in Freeman, Always, Rachel, 23.

mackerel migrations and predator/prey interactions, the focus was not the science, but nature itself.

The failure of Under the Sea-Wind to capture popular acclaim has been explained by historians as an unfortunate consequence of timing. “Poised for the popular reception that she had every right to expect after such glowing evaluations,” writes Carson’s most recent biographer, “Carson’s hopes were dashed by world events [the bombing of Pearl Harbor], which ultimately deprived her of commercial success.”²⁸ While there may be some credence to this interpretation, it smacks of a teleological assumption that all of Carson’s work would inevitably meet with popular praise. It also does not explain the fact that Carson was unable to place any of the book material in popular magazines: even Atlantic Monthly turned down a manuscript. Under the Sea-Wind was, after all, a work of literary natural history, a genre that held uncertain promise in the publishing world, especially for newcomers like Carson.²⁹ Carson’s eventual fame was the result of a book of a different genre, one that combined nature writing with science writing.

²⁸ Linda Lear, Rachel Carson, 104.

²⁹ Sutton’s point that Carson was a lover of the sea highlights the problem, at least for a few in the scientific community. British naturalist Marston Bates wrote that the “[n]ature lover” for the scientist has thus come to mean a sort of pervert. “Nature loving twists the normal, the objective, the healthily reproductive, and what is more, carries with it scientific ostracism: (The danger isn’t in loving nature, but in admitting it.)” The Nature of Natural History, 281-2. It is easy to see how someone of Bates’ ilk might not enjoy Under the Sea-Wind. Though, in the end, the failure of a book is hard to explain. It can be argued that the mechanics of the publishing industry had more to do with a book’s success than anything else. For instance, all of Carson’s books after Under the Sea-Wind were serialized in the New Yorker.

Science Writing

After finishing her M.A., Carson wanted to continue on to her Ph.D. at Johns Hopkins and then go on to a career as a biology teacher. Economic necessity caused her to leave the University and begin work for the Bureau of Fisheries. It was for the same reason that she became a feature writer of fishery biology and conservation for the Baltimore Sun and more sporadically national magazines. These experiences were absolutely crucial in the development of Carson as a writer, for the trade of science journalism was much different from that of nature writers.

The U.S. Bureau of Fisheries was commissioned in 1872 as an agency to explore American waters for harvestable fish populations. Key to this work was the Bureau's research ship Albatross, which roamed the waters that surrounded American territories. For instance, when Roy Chapman Andrews steamed to the Orient in 1910, the Albatross' scientific staff was exploring waters for commercial fishes near the Philippines, which had been recently acquired in the Spanish-American War. The early-twentieth century witnessed a boom in fisheries that quickly depleted coastal populations of commercial fishes, and the Bureau of Fisheries turned to the problem of conserving oceanic resources so that America's fishery fleet could continue to enjoy a sustainable resource. The Bureau either hired or contracted zoologists who went into the field to observe the life-histories of fish populations as well as the operations of fisheries. Bureau scientists wrote up reports on their research that would be distributed to fishermen and government representatives charged with writing legislation that ensured the sustainability of fish

resources⁴⁰

Carson was not one of these fish biologists. She was the editor at the Division of Scientific Inquiry and helped other biologists prepare and publish their reports. One of her earliest contacts was assistant Bureau chief Robert Nesbit, who was working on Chesapeake fishes. Carson helped by analyzing statistical data and writing up reports and brochures for the public. She also had the opportunity to consult with experts in fish biology and visited many of the Bureau's field stations.⁴¹ We know precious little about this period of Carson's life, but we can say with some degree of certainty that she was learning how to write about science for the public. Carson steadily climbed the bureaucratic ladder and in 1949 became the Chief Editor of all Fish and Wildlife Service publications. She and her staff arranged tables, edited text, illustrated and organized reports and brochures that were sent to the Government Printing Office.

Carson's own writing for the Fish and Wildlife Service was very limited, but when Albert Day replaced Ira Gabrielson as director of FWS in 1946, Carson thought it an auspicious time to propose a series on the national wildlife refuge system, eventually titled "Conservation in Action." Representative of the series was an issue devoted to the general topic of "Guarding Our Wildlife Resources." Carson spent about two years visiting national refuges and compiling facts on the history of America's dwindling wildlife populations. Through brief encapsulations of the historical problems with

⁴⁰ It is a small tragedy that we do not have a good history of the typical Bureau biologist. Until we do, see Kurkpatrick Dorsey's treatment of David Starr Jordan in The Dawn of Conservation Diplomacy: U.S.-Canadian Wildlife Protection Treaties in the Progressive Era (Seattle: University of Washington Press, 1998).

⁴¹ Lear, Rachel Carson, 82-3.

migratory birds, waterfowl, game mammals and fishes, Carson came to the general statement that we need to preserve "our wildlife in a modern world, in which the advance of civilization is too often a destructive one"¹² But "Guarding Our Wildlife Resources" is really about the work of government biologists who had identified and attempted to remedy the problem. She addressed the work of bird banders, fish trackers, habitat specialists, and mammal ecologists who were working hard to strike a balance between preserving endangered species and ensuring economic progress, mostly through the establishment of wildlife refuges.¹³ The publication was liberally illustrated with pictures of animals in their natural settings, but many are the pictures of government biologists in the field—planting round-stem bulrushes, capturing and weighing waterfowl, banding migratory birds, planting salt licks for elk populations in Jackson Hole, transporting deer and sheep onto ranges with plentiful vegetation for browsing, and sorting through marine specimens scooped out of a marine harbor. In short, this was a piece of science writing. It chronicled the work of Fish and Wildlife Service biologists engaged in a battle to guard wildlife resources. While elegantly written, this publication can hardly be called a specimen of nature writing. It was an exemplary piece of science writing that demonstrates Carson's ten years of interaction with FWS biologists. While her government position provided Carson with limited opportunities for composing original

¹² Rachel Carson, "Guarding Our Wildlife Resources," 2.

¹³ Some historians find it convenient to categorize Carson's writings into utilitarian and non-utilitarian groups. Generally speaking, the former group represents her government writing, while the latter her non-government literature, like "Undersea" and Under the Sea-Wind. Gartner, Rachel Carson, 114-15. I believe that the fault lines are much easier to identify when we divide her work into writing about nature (natural history) and science (science writing).

pieces, her extra-professional articles in newspapers and magazines provided another venue for developing her skills as a science writer

There was no dearth of newspaper and magazine articles discussing scientific subjects throughout the late-nineteenth and early-twentieth century. It was not until after the first world war, however, that scientific journalism became a distinctive field with its own set of codes and standards. This new journalism took shape when it became increasingly obvious that scientists were playing a large role in creating military technology and fostering economic development. An early manifestation of scientists' desire to explain the findings of science was the creation of the Science Service in 1921. With financial support of newspaper magnate Edwin W. Scripps and prominent zoologist William Ritter, the Science Service became an arm of several scientific societies and began distributing articles to over 100 newspapers in the 1920s. One of its earliest and most prominent writers was the chemist Edwin E. Slosson, but before long, the Service had secured the services of twelve writers, many of whom did not have scientific degrees. Treatments of science increased steadily throughout the twentieth century. By the mid-1930s, however, only a scant proportion of those articles were written by scientific professionals who reported on their own work. Through the 1940s and 1950s science-journalists with little or no training in professional science became the main conduit through which the American public learned of science.¹⁴

¹⁴ Dorothy Nelkin, Selling Science: How the Press Covers Science and Technology (New York: W.H. Freeman and Co., 1987), 86-91; Ronald C. Tobey, The American Ideology of National Science, 1919-1930 (Pittsburgh: University of Pittsburgh Press, 1971), 62-95; Marcel C. LaFollette, Making Science Our Own: Public Images of Science 1910-1955 (Chicago: University of Chicago Press, 1990), 45-65.

Carson was a journalist with a scientific background, but she was not a credentialed scientist with an active research program. Her editorial duties at the Bureau put her in an ideal position to write articles in newspapers. Beginning in 1936 Carson began a correspondence with Mark Watson, editor at the Baltimore Sun, that resulted in a series of newspaper pieces on conservation, mostly of Chesapeake fishes. Similar to her later "Conservation in Action," Carson was publicizing the ways in which government scientists were helping fishermen to mine local waters. Her first article, "Science Keeps Watch Over the Sea," demarcated science as the solution to both fishery problems and the wider problem of a mechanistic world gone awry.

Does this mechanistic trend of civilization threaten the great natural resources of the sea even as it has reduced or destroyed much of the more familiar wild life of the continent? Perhaps because the fisheries belong to a strange element of which we know comparatively little, they are often regarded as being exempt from the forces that have rolled other living species into the abyss of extinction. The fertility of the sea, the mother of life, is pictured as inexhaustible.

Fishery biology, born of the present generation, has made marked progress toward its goal of removing the uncertainties that have beclouded the field of production in the fisheries throughout their history, and is providing a basis for the scientific management of the industry. From scientific deduction to practical application is a difficult step. It must be taken with the aid of the industry and with the cooperation of fishermen often set in the ways of forefathers to whom the comings and goings of fishes were acts of Providence, uncontrollable and unpredictable. The fishery biologist is interested in seeing the industry placed on a basis of sound and intelligent management comparable to the principles of animal husbandry practiced by every progressive rancher. It insures against hasty and unnecessary legislative shackles by the level of production compatible with the preservation of the species.¹⁵

The only glimpse of nature in this article was a challenge to the myth of the ocean's inexhaustible resources, a point that Murphy and others had been making for twenty years.

¹⁵ Rachel Carson, "Science Keeps Watch Over the Sea," draft of "Numbering Fish," for Baltimore Sun (ca. 1936) Carson Papers, Box 98, Folder 1784.

Though Watson made some significant editorial changes, by and large, the article remained a booster for government biology. Like so much science writing in the twentieth century, this was a statement on how science benefitted society through efficient scientific management, a mark of Progressive conservation.

One year later, Carson submitted an article entitled "Sentiment Plays No Part in Save-the-Shad Movement: Federal Men Called on to Try to Solve Biological Mystery."⁴⁶ Thirty-five years earlier, the participants in the nature-faker controversy lambasted natural histories that embraced "sentimentalism" at the cost of scientific accuracy.⁴⁷ "Sentimental" remained a pejorative throughout the early-twentieth century and Carson was thus careful to describe how the effort to preserve shad broods from fishermen was not an emotional crusade but rather a rational and scientific move to conserve a crucial resource. Throughout the 1940s Carson continued to write on similar marine subjects including whaling, terrapin and trout farming, and oyster harvesting. Each article informed a public audience of the scientific measures taken to conserve marine resources and thus helped to dispel the myth of the sea's inexhaustible resources. Carson also wrote newspaper copy on terrestrial conservation issues, but the message remained very much the same.

Some of these pieces of science writing do contain writing of the natural history genre characteristic of "Undersea." Tellingly, an article on migrating eels that Carson had written for the Baltimore Sun was a condensed version of the eel saga that became a third

⁴⁶ Rachel Carson "Sentiment Plays No Part in the Save-the-Shad Movement," in The Providence Sunday Journal, (February 28, 1937) Carson Papers, Box 98, Folder 1791.

⁴⁷ Ralph Lutz, The Nature Fakers: Wildlife, Science and Sentiment (Golden, CO: Fulcrum Publishing, 1990), 172-3.

of Under the Sea-Wind ¹⁸ In this lengthy Sunday edition article, Carson addressed the mysterious migration of eels from mid-ocean to inland rivers and lakes, but instead of the eels-eye view of Under the Sea-Wind, we get something of a report on what scientists have observed in the eel's life history. In the end, the article was a report of scientific findings on the natural history of the eel. Holding true to form, Carson concludes the article with a statement on the economic importance of eel fisheries in the Chesapeake Bay.

Carson was ever attempting to publish articles in magazines that sought to further combine natural history with science writing. For instance, reports of wartime aeronautic heroics presented an opportunity to write a piece on the extraordinary flying abilities of the chimney swift. The larger draft of the Coronet publication presented an account of the swift's mastery of the air. But for spending the night in the shelter of chimneys and hollowed trees, Carson reported that swifts spend their life feeding, drinking, and mating on the wing. The piece then reports the pains that naturalists have gone through to observe these elusive creatures. For instance, George Sutton spent many nights anchored to the top of a chimney and observed wing movements as swifts dropped into the shelter. Carson then reported the work of swift banders who have "now provided the solution of a major mystery of bird migration." Another article that contained this mixture of natural history and science writing told of the bat's use of echo-location. Given the development of radar and sonar technologies during the war, Carson entitled the article "The Bat Knew

¹⁸ Rachel Carson, "Chesapeake Eels Seek the Sargasso Sea" Baltimore Sunday Sun (October 9, 1938), republished in Lear (ed.) Lost Woods, 19-23.

it First”³⁹ In short, Carson was beginning to etch out a new kind of article that combined natural history writing and science writing. At the same time, they contained a sense of awe, respect and wonder—so characteristic of Under the Sea-Wind—and reports of scientific research as were found in many of her newspaper articles and Fish and Wildlife Service publications.

Carson became increasingly dissatisfied with her FWS job throughout the 1940s. Apparently, editorial work was tedious and Carson wanted to concentrate on her own writing, or at least hold a job that would allow her to write on subjects in natural history. She was unhappy with the conservation work of government biology and the type of literature she was producing for government biology. Carson asked William Beebe for a writing job at the New York Zoological Society shortly after the end of the war. “Frankly,” she wrote, “I don’t want my own thinking in regard to ‘living natural history’ to become set in the molds which hard necessity sometimes impresses upon Government conservationists.”⁴⁰ In this telling remark, it appears that Carson wanted to leave the world of ocean resources behind in order to write natural histories with a deeper respect for nature. Beebe took the request seriously and talked the matter over with Henry Fairfield Osborn, though no job materialized. At the same time, Carson contacted the editor of Reader’s Digest requesting a science writing job. She also sent out feelers to the

³⁹ Rachel Carson, “Ace of Nature’s Aviators,” in Lear (ed.), Lost Woods, 24-29; idem., “Sky Dwellers,” Coronet (November 1945); idem., “The Bat Knew it First” Collier’s (November 18, 1944).

⁴⁰ Rachel Carson to William Beebe (October 26, 1945) Carson Papers, Box 4, Folder 67

Audubon Society⁴¹ None of these inquiries bore fruit and she resigned herself to stay on as editor at the Fish and Wildlife Service while writing on her own in spare moments In early 1948 Carson conceived of a new project, another book length natural history of the sea, though this was to be a peculiar picture of the ocean that was part natural history and part science writing

Natural History Meets Science Writing

Carson's decision to write another book about the ocean was spurred, she told Beebe, by her "belief that we will become even more dependent upon the ocean as we destroy the land"⁴² The book was tentatively titled "Return to the Sea" and was to include as much postwar oceanographic material as possible Two general treatments of the ocean had then recently been published Carson told Beebe that she wanted her treatment to lie "somewhere between the books by R. E. Coker and Ferdinand Lane rather nearer the latter, yet I hope to give it a somewhat deeper significance, while still writing for the nontechnical reader"⁴³ The remark is very revealing Ferdinand Lane was fast becoming a generalist nature writer with popular books on trees, insects, rivers, and mountains His Mysterious Sea (1947) was a well-written natural history of the ocean

⁴¹ Rachel Carson to DeWitt, editor of Readers Digest (May 31, 1945) Carson Papers, Box 98, Folder 1787

⁴² Rachel Carson to William Beebe (September 6, 1948) Carson Papers, Box 4, Folder 67

⁴³ Ibid

that had much in common with Carson's text ⁴⁴ Peppered with quotes from Shakespeare, Milton, Matthew Arnold, and Coleridge, Lane provided a lucid and comprehensive -perhaps too comprehensive -account of the ocean's geologic, dynamic, and biological history that even the staunchest Carson fan would consider lyrical. R. E. Coker was a respected and long-lived biologist at the Bureau of Fisheries who had been a close correspondent with Robert Cushman Murphy regarding Peru's guano industry. This Great and Wide Sea (1947) was a comprehensive introduction to marine science with sections on the history of oceanography, chemistry and physics of the sea, and life in the sea. In short, the text was a general introduction to oceanography. Carson wanted to strike a balance between Lane's and Coker's accounts - a combination of natural history and science writing.

During the 1940s Carson began corresponding with nature writers of some literary repute. For instance, she time and again joined Louis Halle Jr. bird watching along the C&O Canal towpath with the rest of the local Audubon chapter. Carson thought that Halle's popular Spring in Washington (1947) was the quintessential nature guide to Washington D.C.'s environs, a recipe for curing the stifling bureaucracy of capital life ⁴⁵. Another important literary contact was Edwin Teale, a name familiar to readers of Nature Magazine and other natural history journals. In late winter of 1949 Teale and his wife

⁴⁴ Lane begins his text with a chapter on the ocean's origins. The first chapter starts, "The origin of the oceans is obscure." Carson begins her first chapter on the origins of the ocean, "Beginnings are apt to be shadowy." Perhaps a trivial coincidence, but I think it can be reasonably argued that Carson used Lane as something of a model when outlining The Sea Around Us.

⁴⁵ Carson may have been especially attracted to Halle given that his Spring in Washington was a missive on the life of a government bureaucrat and the solace that he found observing the district's wildlife. See Spring in Washington (New York: William Sloane Associates Inc., 1947), 3-6.

started a 17,000 mile journey in South Florida and headed north with the spring. Attempting to chronicle the flow of spring as it moved northward, Teale's North with the Spring (1951) was a truly innovative piece of nature writing. The journey was something of a balm for the terror of the war. "And while we waited," Teale explained, "the world changed and our lives changed with it. The spring trip was something we looked forward to during the terrible years of World War II."⁴⁶ Carson had the opportunity to lunch with both Teale and Halle, ostensibly to talk about developing a literary style. The advice they imparted to Carson is unknown, but we may gather from their work that they advised Carson to write of the ocean in a way that might have an ameliorative effect on a populace emerging from the throes of war.⁴⁷

William Beebe was another of Carson's frequent correspondents in the years she was engaged in writing The Sea Around Us. In the preface of the text, Carson admitted that her "absorption in the mystery and meaning of the sea have been stimulated and the writing of this book aided by the friendship and encouragement of William Beebe."⁴⁸ Beebe had high admiration for Carson's nature writing. She had received the honor of having a portion of Under the Sea-Wind included in Beebe's anthology of natural history writers including such notables as Aristotle, William Bartram, Thoreau, Darwin, Wallace,

⁴⁶ Edwin Way Teale, North With the Spring: A Naturalist's Record of a 17,000-Mile Journey with the North-American Spring (New York: Dodd, Meade & Co., 1951), 2.

⁴⁷ Lear, Rachel Carson, 141.

⁴⁸ Carson, The Sea Around Us, vi.

and Muir ⁴⁹ In 1949 Beebe wrote a recommendation on Carson's behalf for the Eugene Saxton Memorial Fellowship, which she won in 1950 Apparently, Beebe also made a few personal calls to members of the selection committee He even credited himself for seeing to it that Carson was awarded the Burroughs Award for nature writing in 1951 ⁵⁰ It is difficult to trace exactly how Carson's writing was influenced by Beebe's but she did respond to Half Mile Down with "a mixture of awe, envy, and gratitude that one of the two men who ever visited these depths was so exceptionally gifted with the ability to share those experiences with those of us less privileged" ⁵¹ Beebe's oceanic natural histories highlighted the inconsequential nature of humans when compared to the oceanic realm, a relationship that necessitated awe, respect, and humility

The nature writing of Beebe, Halle, and Teale, as well as those of the biocentric writers mentioned earlier, informed the general theme of The Sea Around Us Through a narrative of the ocean's history, Carson portrays humans as a species that emerged from an ocean to which it will return Carson highlighted the fact that the Earth was an ocean planet Over vast periods of geologic time, the ocean had the power to weather down continents, and also the power to create life Granted, humans have had the power to destroy through war and create through science, but human efforts pale in comparison to

⁴⁹ William Beebe (ed.), The Book of Naturalists: An Anthology of the Best Natural History (New York: Alfred A. Knopf, Inc., 1944).

⁵⁰ Carson to Beebe (August 26, 1949) and Beebe to Carson (December 11, 1951) Carson Papers, Box 4, Folder 67

⁵¹ Carson to Beebe (April 5, 1949) Carson Papers, Box 4, Folder 67

the transforming agencies of an omnipotent ocean⁵²

This oceanocentric theme infused the entire text, but it was the organizing principle of the first chapter. Carson began the book with a history of the ocean's development. It is rather surprising that she favored the theory of the moon having spun out of the Pacific basin (the moon from Pacific hypothesis was not widely held at this time), but Carson used the point to highlight the connection between the ocean and cosmic history.⁵³ The first rains, Carson wrote, signaled the beginning of the dissolution of the continents:

It is an endless, inexorable process that has never stopped: the dissolving of the rocks, the leaching out of their contained minerals, the carrying of the rock fragments and dissolved minerals to the ocean. And over the eons of time, the sea has grown even more bitter with the salt of the continents.

The destruction of the continents performed a vital function, for it was from those leached elements that the first life would develop. The sea "produced the result that neither the alchemists with their crucibles nor modern scientists in their laboratories have been able to achieve."⁵⁴

Life slowly crept onto the shores of the continents and thus began the slow

⁵² The point was stated by Tomlinson shortly after the first World War. He wrote that the sea "is the creation of Omnipotence, which is not of human kind and understandable, and so springs of its behaviour are hidden. The sea does not assume its royal blue to please you. Its brute and dark desolation is not raised to overwhelm you, you disappear then because you happen to be there. It carries the lucky foolish to fortune, and drags the calculating wise to the strewn bones." Sea and the Jungle (New York: E. P. Dutton & Co., 1920), 28-9. On a moral level, it might be said that the The Sea Around Us was a post World War II analog to Tomlinson's text.

⁵³ Carson's information here comes largely from J. W. Gregory, "Geological History of the Pacific Ocean," Proceedings of the Geological Society of London 86 (1930).

⁵⁴ Rachel Carson, The Sea Around Us, 7.

evolution of terrestrial life, the development of humans being a very small and recent part of a much larger evolutionary history. The earliest oceanic exploration symbolized the return of humans to the sea.

And yet he has returned to his mother sea only on her own terms. He cannot control or change the ocean as, in his brief tenancy of earth, he has subdued and plundered the continents. In the artificial world of his cities and towns, he often forgets the true nature of his planet and the long vistas of its history, in which the existence of the race of men has occupied a mere moment of time. [When on a long ocean voyage] he feels the loneliness of his earth in space. And then, as never on land, he knows the truth that his world is a water world, a planet dominated by its covering mantle of ocean, in which the continents are but transient intrusions of land above the surface of the all-encircling sea.⁵⁵

Most reviewers took the moral exactly as Carson had intended. An Omaha writer reported that "Rachel Carson, in the Sea Around Us, places terrifying emphasis on man's helplessness against this enormous mass of water."⁵⁶ Others, like this Oklahoma reviewer, neglected the ocean altogether and honed in on the text's philosophical implications: "From one point of view, the penalty of such books as Hoyle's The Nature of the Universe and Carson's Sea Around Us is their impression of man with his own insignificance."⁵⁷ The moral was sometimes interpreted as an anodyne for atomic science. Commenting on Carson's book along with other oceanic natural histories by James Dugan and Jacques Cousteau, a New Haven reporter thought that "the recent rash of books on the sea are a result of the fact that man has found that there are fields of activity in which he never

⁵⁵ Ibid., 15.

⁵⁶ Unsigned review, World Herald, Omaha, Nebraska (September 2, 1951). See also Carson papers, Box 9, Folder 163.

⁵⁷ "Great Seas Are Our Life," Daily Oklahoman, Oklahoma City, OK (September 16, 1951) Carson Papers, Box 9, Folder 163.

will emerge as the conqueror. Science has led him to the brink of disaster, and nature offers him a new vehicle for his irrepressible energies."⁴⁸ The moral could also be employed to reframe cold war anxieties. What impressed Bruce Barton the most was

the age of the world in contrast with man's brief span. . . . It seems to me that we Americans, in our thinking and planning, particularly regarding our so-called 'foreign policy,' tend too much to ignore the one fundamental that should never be ignored, time. . . . It can and will, with our help, eventually upset Communism. Provided that in our hurry for world salvation, we do not commit national suicide by draining our own land of its resources, and the veins of our sons of their blood."⁴⁹

Yet another reviewer thought that The Sea Around Us, along with Maurice Herzog's Annapurna and Hemingway's Old Man in the Sea, offered an enticing retreat from the complexities of civilization. "They offer us also vicarious courage, indomitable perseverance in the face of disheartening odds."⁵⁰ These reviewers found solace in the The Sea Around Us. Whether they were concerned with nuclear-bomb science, the cold war, or the complexities of civilization, they all were attracted to the notion that the sea was somehow bigger than they were, completely out of their control. The ocean put human affairs into wider perspective.

More than a piece of nature writing that helped to resituate Americans' relationship to the natural world, The Sea Around Us was an extraordinary piece of science writing. The process of writing the book involved many trips to libraries and

⁴⁸ "Man's Attempt to Subdue the Sea," Independent, New Haven, CT (August 11, 1956)

⁴⁹ Bruce Barton, "Bruce Barton Says," Miami Herald (September 9, 1951) Carson Papers, Box 9, Folder 163

⁵⁰ Donald Adams "Speaking of Books," New York Times Review of Books (March 2, 1953) Carson Papers, Box 9, Folder 163

meticulous textual research, the paper trail of which is preserved in several binders and note-card-filled boxes at the Beinecke Library. Carson's research was, needless to say, comprehensive. She began with a general outline that divided the project into three sections: a narrative of the history of the ocean's surface, its depths, the general morphology of its bottom and basin, a description of the ocean dynamics of waves, winds and currents, and a section on how the sea impacts the lives of humans by controlling weather and providing natural resources.

Carson then drew from a wide range of scientific treatments of the sea. Most of the sources were natural histories of ocean geography, life, and dynamics published since the middle of the nineteenth century, but Carson also kept abreast of recent oceanographic developments, especially echo-location research on the sea's bottom and the scattering layer. A surprising amount of Carson's information came from non-scientific accounts found in newspapers and pilot guides which Carson used to present exciting and dramatic descriptions of ocean islands and waves. Beyond textual research, Carson also interviewed and corresponded with naturalists and oceanographers. For example, she wrote to Thor Heyerdahl requesting a description of the surface life that he viewed from the raft of the Kon-Tiki.⁶¹ William Beebe insisted that the project would be greatly enhanced if Carson did some helmet diving for a first-hand look at the sea.⁶² She

⁶¹ Carson was aware of Heyerdahl's Pacific voyage on the Kon-Tiki and wrote to him requesting information on some of his observations. She told him that "[t]his is the sort of fresh, personal experience that I am trying to get into the book wherever possible, when based on reliable observations such as yours would be." Carson to Heyerdahl (January 9, 1950) Carson Papers, Box 4, Folder 70. Carson printed a portion of Heyerdahl's response in a long quote.

⁶² Beebe attempted to make the arrangements for a visit to Bermuda, though the trip never materialized. Instead, Carson contacted F. G. Walton-Smith, director of the Miami Marine Laboratory. Echoing

discussed Pacific islands and the dynamics of waves and currents with Robert Cushman Murphy. Murphy also suggested that she contact Mary Sears and Maurice Ewing at the Woods Hole Oceanographic Institute. They were just two of the prominent wartime oceanographers that she interviewed. Henry Bigelow, a former director of Woods Hole Oceanographic Institute, Daniel Merriman of the Bingham Oceanographic Laboratory, and Harvard meteorologist Charles Brooks. The Sea Around Us was the product of the work of scientists and naturalists that had investigated the oceans, as well as Carson's own culling of historical facts. Her task was to organize and edit this material to create a publication that would introduce the sea to the reading public.

This work was thus an extension of her experience as an editor at the Fish and Wildlife Service where her task was to help publish the work of government biologists in a readable fashion fit for public consumption. Two observations emerge from an examination of Carson's textual research. First, while she drew from oceanographic research conducted in the 1940s, much of her information came from sources of oceanography and oceanic natural history written before World War I. Second, with an ever vigilant eye for elegant writing, Carson took special note of the metaphors, phraseology, and style of both modern and historical sources alike. Commentators on The Sea Around Us constantly call attention to the text's lyricism and poetry. However, this observation overlooks how Carson drew from early writings of natural history. Carol

Beebe's advice, she told Smith that "direct observation of the appearance and behavior of the coral reef fauna would give me a truer perspective on the whole subject." Carson to Walton-Smith (June 2, 1949) Carson Papers, Box 4, Folder 75. A big surf, strong current and high turbidity made her brief underwater adventure slightly disagreeable, though memorable. Carson to Beebe, (August 26, 1949) Carson Papers, Box 4, Folder 67.

Gartner has recently said that Carson's "literary skill is most evident in her ability to present complex scientific information with both clarity and grace." The claim seems innocent enough, though what Gartner means by "complex" is open to question.⁶³ For instance, few of Carson's notes speak to the many physical and chemical equations that were becoming increasingly prevalent in oceanographic research.⁶⁴ Carson once told her close friend Dorothy Freeman that "straight scientific exposition is not my 'contribution' to the world. It is, I agree, what you call lyricism. But if that lyricism has an unusual quality it is, I think because it springs from scientific fact and so rings true."⁶⁵ Since Carson was not a scientist, in the active researcher sense of the word, she came to "scientific facts" through scientific literature, much of which was written by natural historians so fond of lyrical representations. I in no way want to minimize Carson's deft writing style, but the point here is to highlight Carson as an editor and science writer of a natural historical tradition that had already possessed a style of its own. I will discuss just a few examples.

The chapter entitled "Birth of an Island," for which Carson won the George Westinghouse Science Writing Award, is one of the true gems of The Sea Around Us. It

⁶³ Carol B. Gartner, "When Science Writing Becomes Literary Art," in Craig Waddell (ed.) And No Birds Sing: Rhetorical Analyses of Rachel Carson's Silent Spring (Carbondale: Southern Illinois University Press, 2000), 105. Moreover, the claim implies a separation between literary presentation and science, despite having quoted Carson's line that there is "no separate literature of science" just a page earlier.

⁶⁴ Carson even noted to Henry Bigelow, while researching the book, that "mathematicians do not help me much." Carson to Bigelow (March 4, 1950) Carson papers, Box 4, Folder 68. Cf. the discussion of Murphy and modern oceanography in chapter 3.

⁶⁵ Carson to Freeman, (November 5, 1957) quoted in Freeman, Always, Rachel, 232.

was the first chapter that she systematically researched and drafted, and her agent, Marie Rodell, sent the chapter as a sample to two book publishers. At one point, Carson considered removing the material from the book to write a separate article given the “timely” nature of the subject—that is, the preservation of fragile island ecosystems. In a manner similar to Murphy’s environmental histories, the narrative moves from a discussion of underwater geological formations, to the process of wave denudation, then to colonization by organisms. This seamlessly leads to a treatment of the extraordinary species that evolve on ocean islands—species that have achieved a delicate balance within isolated environments. The chapter concludes with thoughts on the recent American colonization of the Pacific and a call to preserve these fragile islands.

The volcanic origins of sea islands is a paradoxical phenomenon, according to Carson, “in the ways of earth and sea that a process seemingly so destructive, so catastrophic in nature, can result in an act of creation.”⁶⁶ Carson makes no direct reference to William Beebe’s description of the birth of a Galapagos volcano or his geologic interpretation of Bermuda, but the two certainly shared a cosmic wonder for such spectacles. Carson also draws from Beebe for his thoughts on the colonization of islands. By carefully examining organisms transported by air, water, birds and seaweed, Beebe speculated on what kinds of animals and plants would soon inhabit an island if it had sprung up immediately in the middle of the ocean. Carson, too, creates a similar

⁶⁶ Carson, The Sea Around Us, 83

hypothetical portrait⁶⁷ She turns to Darwin in the Galapagos for evidence on the strange plants and animals that evolve on islands She even quotes from his autobiography, "Both in space and time, we seem to be brought somewhat near to that great fact—that mystery of mysteries—the first appearance of new beings on earth"⁶⁸ Carson also drew from Ernst Mayr, Robert Cushman Murphy, and David Lack for their work on peculiar oceanic life Her treatment of island conservation was directly a result of conversations with Robert Cushman Murphy (on New Zealand), Harold Coolidge (on the work of the Pacific Science Board), and Raymond Fosberg (on tropical botany)

Perhaps the most influential sources on Carson's treatment of the importance of island conservation were reports written by naturalists who had explored the new Pacific Trust Territory For example, Raymond Fosberg's report on botanical resources recommended a strict regime of conservation Carson was especially intrigued with his treatment of introduced species, notably the African snail, the coconut beetle, a banana root borer, and a large scale, all of which were causing havoc on indigenous floral communities Carson noted Fosberg's suggestions to introduce biological organisms as controls to these introduced species A reading of Henry Townes' entomological investigation of Micronesia furthered the point that introducing species to fragile island communities would be detrimental⁶⁹ Carson also read a report prepared by the U S

⁶⁷ Cf. William Beebe, The Arcturion Adventure (New York: Harper and Row, 1926), 317-38; Carson, The Sea Around Us, 89-92

⁶⁸ Carson, The Sea Around Us, 92

⁶⁹ Raymond Fosberg, Botanical report of Micronesia (Honolulu: U.S. Commercial Company, 1946); Henry Townes, Economic Survey of Micronesia, vol. 12 (Washington, D.C.: Library of Congress Photoduplication Service, 1948)

Geological Survey on Trust Territory mineral deposits that concluded that there was “no inducement to American capital.” The report also noted that indigenous tribes depended on local agriculture, and any attempt of large-scale mining would surely disrupt the natives’ subsistence economies. This research on Pacific flora and fauna caused Carson to echo the recommendations of the Pacific Science Board. In her spiral notebook, she wrote that “fauna and flora conditions will never be nearer prehistoric conditions than now [America needs] to preserve peculiar fauna and flora of Micronesia for future scientific study, use, and enjoyment.”⁷⁰

Carson’s research on Pacific island life became the most overt conservationist message in The Sea Around Us. She summarized the problem with a sentiment that would become the ecological centerpiece of Silent Spring: “Most of man’s habitual tampering with nature’s balance by introducing exotic species has been done in ignorance of the fatal change of events that would follow.” Oceania, she remarked, has experienced a long history of introduced species—rats, goats, snails, insects—that have detrimentally and irredeemably devastated fragile island ecosystems. She concludes the chapter by advocating the adoption of the principal motivation behind the Pacific War Memorial: “In a reasonable world men would have treated these islands as precious possessions, as natural museums filled with beautiful and curious works of creation.”⁷¹ In the end, “Birth

⁷⁰ See Carson’s notes on Pacific research in her spiral notebook, Carson Papers, Box 4, Folder 78.

⁷¹ Carson, The Sea Around Us, 95-6. Carson’s primary contact on the Pacific War Memorial was Robert Cushman Murphy. The line on “natural museums” first appeared in a letter to Murphy as a question that Carson wanted confirmed. This is very typical of much of her research. Many notebooks are filled with questions that arose in Carson’s mind and she would then either interview scientists or send letters for information. Carson to Murphy, (October 23, 1948 and September 22, 1948), Carson Papers, Box 4, Folder 73.

of an Island” is a remarkable mixture of natural history and science writing. Carson deftly weaves together the evolution of ocean islands and life and at the same time chronicles the work of naturalists engaged in Pacific exploration.

Carson’s treatment of the meteorological function of the ocean outlines how continental weather conditions are determined by the role of the ocean as “global thermostat.” The point is forcefully argued through a paraphrase of British meteorologist Charles Brooks’ work on the North Atlantic. Brooks likened the North Atlantic to “a great bath, with a hot tap and two cold taps,” the mixture of which determines the surface temperature of the Atlantic that then determines European weather patterns. Carson also borrowed a line from Brooks that described the ocean as “a savings bank for solar energy, receiving deposits in seasons of excessive insolation and paying them back in seasons of want.”⁷² In short, Carson uses Brooks’ bath and banking analogies to do the work of explaining the argument. After general statements of this sort, Carson moves on to flesh out the argument with details culled from Brooks and other sources, notably the 1920s work of Robert Cushman Murphy on the Humboldt Current and the El Niño phenomenon.

The heart of the global thermostat chapter is a discussion of Swedish oceanographer Otto Pettersson’s work on the ocean as a controlling factor in the history of the earth’s climate. In contrast to her typical brief descriptions of scientists, Carson went into great detail outlining Pettersson’s life and work, which culminated in his 1912

⁷² Carson, *The Sea Around Us*, 171-2, see Charles E. P. Brooks *Climate Through the Ages: a study of the climatic factors and their variations* (London: E. Benn LTD, 1926), 73-5, idem, “The Role of Oceans in the Weather of Europe,” *Quarterly Journal of the Royal Meteorological Society* 56 (1930), 131-48. For Carson’s notes, see sections on “climate” in green 3-ring binder, Carson Papers, Box 4, Folder 80.

manifesto, Climatic Variations in Historic and Pre-Historic Time Carson wrote that “to review the Pettersson theory is to review also a pageant of human history, of men and nations in the control of elemental forces whose nature they never understood and whose very existence they never recognized.” This atypical exposition of Pettersson’s life makes perfect sense given Carson’s desire to create a portrait of the ocean that explained its connection to terrestrial affairs.

Pettersson, Carson tells us, spent his life trying to explain severe variations in North Atlantic and Baltic weather that often had catastrophic impacts on agriculture and the local herring industry. By poring through scientific, historic, literary, and folkloric texts, he pieced together a long history of cyclic weather variations and compared this with astronomical tables that largely told the story of North Atlantic tidal fluctuations. The overlap between the two phenomena explained the connection between tidal and climate variations.⁷¹ Carson spares eight pages of text to Nordic history, both of civilization and of climate. She discusses the sagas of Erik the Red and the benevolent climate that made such adventures possible. She introduces the reader to Eskimo folklore and Icelandic literature. Then Carson sends us back into the fourth century B.C. and writes of the Scandinavian poetry and folklore that contain further evidence of climatic variation. Carson then brings us back to Pettersson’s tidal explanation of these historic changes. But in reality, we never left Pettersson. Carson’s elegant environmental history

⁷¹ Unfortunately, Pettersson has received scant historical attention. See Robert Marc Friedman, Appropriating the Weather: Vilhelm Bjerknes and the Construction of a Modern Meteorology (Ithaca: Cornell University Press, 1989), 37-47. Friedman has written the definitive text on Scandinavian meteorology and a similar treatment of oceanography seems a worthwhile project.

is Pettersson's. The elegance, poetry, and literature are the work of Pettersson, an oceanographer of the naturalist tradition whose style of exposition was unimpeachable. Carson's job was to take careful notes and condense Pettersson's argument and evidence.

So Carson's blend of nature writing and science writing drew from modern oceanographic research and older natural histories of the ocean, many of which were elegantly written narratives and descriptions. The approach was deliberate. As wartime oceanographers probed the depths of the ocean with the most technologically savvy equipment, Carson was drawn to a more historical epistemology that emphasized direct and personal observation of the ocean. She concluded The Sea Around Us with a brief look at the modern Sailing Directions and Coast Pilots issued to all navigators. "[I]n these writings of the sea there is a pleasing blend of modernity and antiquity, with unmistakable touches by which we may trace their lineage back to the sailing directions of the [Norwegian] sagas." These Pilots directed navigators to carefully examine populations of sea fowl for clues on locating specific harbors and islands. They also suggested that mariners traveling through new waters seek out local knowledge. "In phrases like these," Carson wrote, "we get the feel of the unknown and the mysterious that never quite separates itself from the sea."⁷⁴ The moral demonstrates her deep sense of humility: humans will never completely divest the ocean of its secrets. But Carson also highlighted the Pilots because they were examples of good literature. At one point she calls one of the guides "Conradian." A New Republic reviewer admired Carson's "appreciation of the writing of others; she makes use of many quotations, especially from

⁷⁴ Rachel Carson, The Sea Around Us, 215-6.

the Pilot Books of the U' S Hydrographic Office It is good to find someone valuing properly the literary merits of these publications ”⁷⁵

Edwin Teale thought that The Sea Around Us marked a new genre of writing that he called “science-literature,” a work that simultaneously reported on the findings of science without sacrificing an intimate portrait of nature. Reviewers unanimously remarked that the text was an elegant combination of poetry and scientific fact. Graham Netting, assistant director at Carnegie Museum, also thought that The Sea Around Us broke new ground. What “passes as science writing today,” he wrote, “is cold, thin gruel. What we obviously need is a new category of science classics, reserved zealously for those books that satisfy the twin criteria of imaginative research and literary craftsmanship.”⁷⁶ More common were responses that praised Carson’s lyrical voice. Articles resembling an LA Times review entitled, “Prose Sings Fascinating Sea Story,” were commonplace in literary sections of newspapers and magazines around the country. One reviewer in the Atlantic was especially perceptive of what Carson had strategically achieved:

I cannot vouch for the validity of Miss Carson’s findings— or, rather, her synthesis of her and other oceanographers’ findings— and possibly neither can the New Yorker. For, the story goes, when the editor of the New Yorker was congratulated on running the profile of the multifaced ocean, he replied that he had asked a staff man to check Miss Carson’s facts in the fact bin. And who had gotten the dope together in the fact bin but Miss Carson herself! The facts, though, sound right. And Miss Carson is scrupulously discerning between what is accepted as fact and what is proffered as hypothesis [emphasis is mine]⁷⁷

⁷⁵ J. S. Colman, Review of The Sea Around Us by Rachel Carson, New Republic 125 (August 20, 1951), 20.

⁷⁶ Graham Netting, “The Naturalist’s Bookshelf,” Carnegie Magazine 25 (November 1951), 320.

⁷⁷ Harvey Breit, Review of The Sea Around Us by Rachel Carson, Atlantic 188 (August 1951), 84.

Carson's achievement was a merger of two careers and two literary traditions, one as a natural historian and the other as a science writer. When they came together in The Sea Around Us, Carson found a receptive audience. The importance of this new genre should not be underestimated given that Silent Spring was poured into the mold of The Sea Around Us.⁷⁸ While many of the positive reviews of Silent Spring praised Carson's literary effectiveness and scientific accuracy, a number of commentators made a direct link to The Sea Around Us. "A few years ago," wrote an Oregon reviewer, "Rachel Carson drew on her experience and knowledge as a biologist and her talents as a writer to win millions of readers through her magnificent The Sea Around Us. Now she has brought these qualities to bear in a ringing indictment of what she believes to be man's abuse of his place in nature."⁷⁹

The Missing Chapter

Given the trajectory of Carson's career as an environmentalist, The Sea Around Us seems to be something of an aberration. Carson's ocean was indomitable, unconquerable, mysterious. In many ways Carson was continuing Beebe's project of portraying an oceanic sublime that rebuffs all efforts by humans to conquer, control, or destroy it. Aside

⁷⁸ Carol B. Gartner, "When Science Writing Becomes Literary Art." It is not uncommon for scholars to group Carson's sea books in one category belonging to nature writing; Silent Spring stands out as a book on environmentalism. The grouping that I am trying to advocate here is to observe books like Under the Sea Wind and Edge of the Sea as pure nature writing, and The Sea Around Us and Silent Spring as a new genre that combines nature writing with science writing. Rebecca Raglan, "Rachel Carson and Her Legacy," Barbara Gates and Anne Shteir (eds.) Natural Eloquence: Women Reinscribe Science (Madison: University of Wisconsin Press, 1997), 196-214.

⁷⁹ Malcolm Bauer, "Rachel Carson Sprays Sprayers; Man Held Forging Evil Chain," in the Portland Oregonian, (September 30, 1962) Carson Papers, Box 63, Folder 1120.

from the important topic of preserving Pacific islands, Carson never entertained the possibility of humans altering the state of the ocean. Of course, there is a humble biocentrism here that is characteristic of nature writing in general, but there is little of the environmentalism that would emerge from Carson's pen some eleven years later. On the other hand, Carson may have expressed something of an environmental ethic of the ocean not in what she put into The Sea Around Us, but rather what she left out.

It is odd that Carson, long a devoted employee of the Fish and Wildlife Service, chose to exclude any treatment of ocean fisheries. The problem is even more intriguing given the efforts of marine biologists to harvest plankton for world population problems that became such a hot topic after the war. In 1948 William Vogt and Fairfield Osborn published widely read books that raised the specter of environmental decay and its implications for human existence. Among the many topics covered, especially in the case of Vogt, was the alarming exponential growth of human populations and the inability of the earth to sustain its human residents. In Vogt's words, "[b]y excessive breeding and abuse of the land mankind has backed itself into an ecological trap. By a lopsided use of applied science it has been living on promissory notes. Now, all over the world, the notes are falling due."⁴⁰ Many scientists mobilized to rectify the situation, others turned to the ocean in a vain search for another promissory note.

As early as 1926, William Beebe had suggested that the human race may turn to

⁴⁰ William Vogt, Road to Survival (New York: William Sloane Associates, Inc., 1948), 285; Fairfield Osborn, Our Plundered Planet (New York: Grosset & Dunlap, 1948). On Osborn see Andrew Jamison and Ron Eyerma, Seeds of the Sixties (Berkeley: University of California Press, 1994), 64-82, and Gregg Mitman, "When Nature is the Zoo," Osiris 2nd series, Science in the Field 11 (1996): 121-33.

plankton, "this larder of the ocean," as a food source ^{*1} But the possibility did not receive any serious attention until after the war when scientists saw in the sea a new frontier of free natural resources Maurice Nelles, a research manager of the Allan Hancock Foundation, organized an expedition aboard the scientific ship Velero IV for the purpose of exploring the possibilities of harvesting ocean plankton Two Carnegie Institution of Washington botanists began an effort in 1949 to harvest fresh and salt water algae A team of Berkeley marine biologists was also looking into marine farming Yale professor Werner Bergmann was researching the possibility of desalinizing massive quantities of ocean water to turn deserts into productive land ^{*2} These optimistic projects were doused late in the late 1940s when they proved technologically infeasible Daniel Merriman, who Carson interviewed on the subject, and Gordon Riley predicted that ocean fishing could be increased five-fold with more efficient use of fishery technologies "But to harvest any considerable fraction of the plankton of the world," Riley reported, "seems as fantastic as the old dream of extracting gold from sea water By and large we must leave the plankton to the fishes" ^{*3} There were dissenters to Riley and Merriman's claims Columbus Iselin, another of Carson's interviewees, remained sanguine about the potentials of plankton harvesting

^{*1} William Beebe, The Arcturus Adventure, 201

^{*2} See notecard "The Allan Hancock Foundation," in Carson Papers, Box 4, Folder 79, William Laurence, "Sea Soon May Yield Great Food Stores," New York Times (June 21, 1948), 1, "Alga May Avert Famine," Science News Letter (January 1, 1949), Waldemar Kaempffert, "Future Generations From the Sea," New York Times (October 23, 1949) Sec. IV, p. 9.6

^{*3} Gordon A. Riley, "Food from the Sea," Scientific American 181 (October 1949), 16-9, Daniel Merriman, "Food Shortages and the Sea," Yale Review 39 (March 1950), 430-44

Carson was fully aware of these hopes and drafted a chapter, excerpted for publication, entitled "The Ocean and a Hungry World." Referring to the criticisms of Vogt and Osborn, Carson begins the chapter by outlining the current failings of agriculture to sustain the world's growing population and provides an elegant segue: "But from the plundered land we turn to the sea with many questions." She briefly describes the two schools of thought and comes down squarely on the pessimistic side of the issue: "Annual fish catches could be doubled, but only at great expense. And while the earth's plankton amounted to an unfathomable biomass, no reasonable technology was available to retrieve this resource for human use. Scientists and conservationists, in Carson's estimation, should concentrate their efforts on increasing fish yields."⁸⁴

But Carson removed the chapter. Moreover, there is no discussion of the issue whatsoever in the text. It is difficult to imagine the reason for the elimination of such a timely discussion. Mary McCay has suggested that Carson realized that the chapter sounded more like the writing of an agent of the FWS than a "curious scientist or reverent witness."⁸⁵ The chapter, she continues, lacks lyricism and is utilitarian in nature. If this was a hard and fast criterion for inclusion, then it is odd that Carson did not remove the chapter on the mineral content of the ocean, both utilitarian and, in my estimation, decidedly non-"lyrical." The excision is troubling because Carson wrote the book to show the connections between humans and the ocean, a relationship that was becoming acute

⁸⁴ Rachel Carson, "The Ocean and a Hungry World," draft of unpublished chapter. Carson Papers, Box 7, Folder 134.

⁸⁵ Mary McCay, Rachel Carson, 50-1.

Carson thought that the entire project was important because “the life that invaded the lands has already so despoiled them it is being driven back more and more to its dependence on the sea”⁸⁶ “The Ocean and a Hungry World” fits precisely under this rubric. Carson may have sensed a flagging enthusiasm for plankton processing as the difficulties of the project became apparent. Given Carson’s critique on the destruction of land, it is possible that she did not want to entertain the possibility of humans turning to the ocean as a panacea. She was also aware of the key ecological role played by plankton, and as she would later expand in Silent Spring, when humans tinkered with the lower levels of the food pyramid, the consequences were often unpredictable, and sometimes devastating. But these are just speculations. Aside from islands, Carson’s ocean remained inviolable.

Carson would change her opinion on the resiliency of the ocean some ten years later in a new preface to the second edition of The Sea Around Us (1961). In the intervening years, the Atomic Energy Commission had made a common practice of disposing nuclear waste in deep-sea basins. Carson recalled her former attitude regarding the inability of humans to damage the ocean and provided a corrective. “[T]his belief, unfortunately, has proved to be naive. In unlocking the secrets of the atom, modern man has found himself confronted with a frightening problem: what to do with the most dangerous materials that have ever existed in all the earth’s history, the by-products of

⁸⁶ From Carson’s application to the Eugene F. Saxton Foundation (May 1, 1949); quoted in Lear, Rachel Carson, 163.

atomic fission ⁸⁷ Given that she wrote this new preface while frantically engaged in her Silent Spring project, it is not surprising that Carson warned her readers that irradiated plankton, even at low levels, would have magnifying effects in organisms higher up the food chain, organisms that were the fodder for the human race ⁸⁸

Even though concern over the pollution of the oceans was still ten years away, Carson's oceanic natural history did signify the development of a new relationship between nature, citizens, and the public—a relationship that would eventually become a characteristic component of modern environmentalism. The blinding success of The Sea Around Us led Carson to believe that she was witnessing a newfound appreciation of the natural world in the general populace. "I am convinced," she declared in her reception speech for the Burroughs Medal, "that we have been far too ready to assume that these people are indifferent to the world we know to be full of wonder. If they are indifferent, it is only because they have not been properly introduced to it—and perhaps that is in some measure our own fault." Nature writers are thus called to preform an important civic function. "It seems reasonable to believe . . . that the more clearly we can focus our attention on the wonders and realities of the universe about us the less taste we shall have for the destruction of our race ⁸⁹ Such was the new responsibility of environmentally-minded nature writers like Carson, a political use of nature writing reminiscent of Beebe's

⁸⁷ Rachel Carson, "Preface to the Second Edition of The Sea Around Us," republished in Lear (ed.) Lost Woods, 106-7

⁸⁸ Ralph H. Lutts, "Chemical Fallout: Silent Spring, Radioactive Fallout, and the Environmental Movement," in And No Birds Sing, 33-37

⁸⁹ Rachel Carson, "Design for Nature Writing" speech at reception of Burroughs Award (April 1952), printed in Lear (ed.) Lost Woods, 94-5

What could be said for nature writing could also be said for nature itself. At the reception honoring Carson as the recipient of the National Book Award she gave her thoughts on the relationship between citizen and scientist:

We live in a scientific age, yet by a strange paradox we behave as though knowledge of science is the prerogative of a small number of men, isolated and priestlike in their laboratories. This is not true. It cannot be true. The materials of science are the materials of life itself. Science is the what, the how, and the why of everything in our experience. It is part of the reality of living.⁹⁰

Carson brought this message to her final book-length treatment of the ocean, Edge of the Sea (1955), which she described as “a seashore guide to the Atlantic coast done from what I think is a fresh point of view—much less a handbook for identification than something to give a glimpse of how life is lived among the wave-swept rocks and wet sand.”⁹¹ In the preface of the book she issued a directive for people to go out and examine seashore phenomena on their own: “Understanding comes only when, standing on a beach, we can sense the long rhythms of earth and sea that sculptured its land forms and produced the rock and sand of which it is composed.”⁹² The seeds of a grassroots environment movement were, in part, sown by naturalists like Carson and Beebe who helped the American public realize their own potential as explorers and stewards of nature.

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⁹⁰ National Book Award Acceptance Speech for The Sea Around Us, delivered January 29, 1951, Rachel Carson Collection, Box 101, Folder 1883.

⁹¹ Carson to Beebe, (November 3, 1950 and April 26, 1951) Carson Papers, Box 4, Folder 67. Beebe replied by suggesting that Carson take a comparative approach beginning in Labrador and moving south to Key West. Whether she had this approach—which describes the structure of Edge of the Sea—in mind before contacting Beebe is uncertain.

⁹² Rachel Carson, Edge of the Sea (New York: Houghton Mifflin, 1955), 7.

The Sea Around Us stands out as one of the most popular postwar treatments of the ocean. Carson echoed Murphy's message that human affairs were intricately tied to the ocean. She further elaborated Beebe's oceanic sublime by highlighting the insignificance of humans in the realm of nature. And she absorbed the biocentrism of a host of nature writers to convey a sense of awe, power, and mystery in the face of an almighty ocean. The ocean became valuable not as a resource but as a symbolic geography of humility. Such was the tradition of nature writers. The power of the text was bolstered by the scientific findings that Carson used to support her message. The postwar ocean was an environment fertile with potential meanings. Eugenie Clark embraced Carson's depiction of the sea as mother-to-all and put it to work in her domestication of the ocean.

Chapter 7

Eugenie Clark and Postwar Ichthyology: the Lady with the Spear and the Shark Lady, but Always a Lady

*Pretty, mother of four, author of the best selling Lady with a Spear, Dr. Clark at 39 doesn't fit the usual image of a scientist. An internationally famed authority on fishes, and sharks in particular, she doesn't fit the usual image of a housewife either.*¹

In 1953, Coronet ran a pictorial essay entitled "Career Women" that began with a short retrospective "A woman gave us radium, another helped unravel the secret of the atom. The hand that once rocked the cradle now blueprints sweeping skyscrapers or guides the scalpel in delicate surgery. Women everywhere have struck out on the paths to achievement." Included in the essay were engineer Beatrice A. Hicks, Pulitzer Prize winning journalist Marguerite Higgins, radio manager Bernice Judis, industrial designer Maria Bergson, and academician and social advocate Mildred McAfee Horton. Two female scientists were also included on the list: Rachel Carson, author of the widely acclaimed Sea Around Us (1951), who had "fallen hopelessly in love with the ocean as a child, and had been dedicated ever since to unfolding its mysteries," and ichthyologist Eugenie Clark. The short paragraph on Clark told of her recent expedition to the Red Sea "there, in the shark-infested sea, a young woman was calmly spear-fishing. Dr. Clark has dodged sharks all over the world [and has] done much to broaden the frontiers of knowledge."²

¹ "Scientist with a Fishing Spear," St. Petersburg Times (October 17, 1961), 1.

² "Career Women," Coronet 33 (April 1953), 115-28.

Two years later Holiday Magazine ran profiles on eleven “women in the world today.” World-wide in scope, the series attempted to “understand the triumphs, problems and defeats of a sex which has been often misunderstood, often terribly oppressed.” The profile of Clark flips back and forth between her “dangerous” work as an underwater naturalist and her ability to raise a happy family at the same time. “Who could guess,” the article begins, “Eugenie Clark’s story on first meeting her? She is small, pretty and unassuming. She has lovely hands, darkly sleek hair and a low, gentle voice. And yet Eugenie Clark would baffle a television panel trained in spotting rare occupations.” The article then details some of her scientific work. She has spent most of her time underwater goggling and spearing fish among “the shimmering beauties and dangers of salt-water reefs and seas.” She has encountered “dangerous sharks, barracuda and moray eels in the depths.” She has traveled to remote areas of the world, lived in “tribal huts on tiny Pacific islands and has eaten raw squid and raw shark.” The Holiday author then attempts to balance this image of the heroic and adventurous naturalist by highlighting the domestic side of Clark. “It would be a mistake to think of Eugenie Clark either as a cold, totally scientific person or as one obsessed by one subject. Her marriage to Ilias Konstanitu is a happy, extremely close one and they have many pastimes, pleasures and friends in common.” The two take enormous pride in their children, the article continues, but it has been a difficult year for the family because Ilias has been away from home for the greater part of every week. There is hope, for the family plans to relocate in Placida, Florida where “the whole family will be together, here the children will be able to grow up near the sea and later, in the sea with their mother. It is another happy ending for Eugenie

Clark”³

Six years later, at the height of her fame as a world explorer, intrepid skin-diver, and scholar of sharks, the San Francisco Chronicle ran a short biography and interview of Clark that coincided with a visit to the bay area. The piece was entitled “‘Skin Dive,’ Mother-to-Be Told,” and reported that “[t]here is only one phase of her skin diving that bothers Dr. Clark. She said she has been told by psychiatrists that this is a wholly masculine expression with erotic overtones,” to which Clark responded “But I really don’t care. If so, this is the only masculine thing about me.”⁴

These three depictions of Clark highlight two important dynamics. First, they call attention to the somewhat incongruous mixture of women and natural history. Clark was the subject of interviews and popular articles because she was engaged in the “dangerous” practice of exploration, a thoroughly masculine field of work. Second, they attempt to come to grips with the working woman by emphasizing her domestic side. She could, at the same time, hold down a job and raise a happy family. These two dynamics are not unrelated. Clark doubly transgressed the social norms of her time by not only working, but also working in a traditionally male dominated field. I will argue that Clark fashioned her image as a scientist and a popular explorer (in both her research and her popular writings) in such a way as to legitimize her place inside a masculine world of natural history exploration. To accomplish this, she drew from a postwar culture of domesticity

³ Roger Angell, “World of Women: USA: Lady with a Spear,” Holiday 17 (January 1955), 48-51.

⁴ Carolyn Anspacher, “Skin Dive, Mother-To-Be Told,” San Francisco Chronicle (February 13, 1961), 36.

that simultaneously made her status as a career woman and an explorer more acceptable. In Clark's capable hands, the ocean became an extension of the home, a safe place filled with innocuous and beautiful organisms. Recent research in the history of science has pointed to the "domestication" of nature in postwar America.⁵ The purpose of this chapter is to describe how Clark was part of this wider culture of popular natural history, but more to the point, the goal is to explain how the domestication of the ocean functioned for Clark as a way of negotiating her own peculiar status as a career woman and a female explorer.

The chapter begins by looking at Clark's earliest experiences as a naturalist within a loving and nurturing family. We also see here the movement of aquaria fish from domestic pets to research organisms for her dissertation project. Her introduction to the worlds of nature and science was given force by her family upbringing. More important, the story of this domestic setting was put on display by Clark in her popular book Lady with a Spear (1953), the text that introduced her to the world of public natural history. I then discuss Clark's work overseas with the Pacific Science Board and, again, the popular presentation of this adventure in Lady with a Spear. The text powerfully represents America's new Trust Territory as a thoroughly domestic and pacified space. The most striking feature of her Pacific research was her skin diving, an activity that was quickly becoming a very popular recreational activity. The chapter then moves on to Clark's field

⁵ Gregg Mitman, Reel Nature: America's Romance with Wildlife on Film (Cambridge, Mass: Harvard University Press, 1999), 109-179. Also see Vera Norwood, Made From This Earth: American Women and Nature (Chapel Hill: University of North Carolina Press, 1993), 143-171; and Gill Hudson, "Unfathering the Thinkable: Gender, Science and Pacifism in the 1930s," Science and Sensibility: Gender and Scientific Enquiry, 1780-1945 (Cambridge, Mass: Basil Blackwell, 1991), 264-286.

station work at the Cape Haze Laboratory in Sarasota, Florida. Here I pay particular attention to Clark's research on the hermaphroditic nature of the grouper and her attempts to modify the behavior of lemon and nurse sharks, activities that were then being followed by the popular press as Clark's public persona continued to gather momentum. The chapter concludes with a general treatment of Clark's double status as a naturalist and mother.

The relationships between gender and natural history (writ large) in late-capitalist, postwar America are powerfully articulated in Donna Haraway's treatment of the history of primatology. She explains the narratological codings of National Geographic's Jane Goodall as infused with a story not about decay, but rather "the failure of communication, the malfunction of stressed systems." The role of the communicative and mediating woman in alleviating the resultant anxiety is simply put: "Woman is closer to nature than Man and so mediates more readily." That modality of gender is required to heal man's expulsion from the garden after the bomb and in the ultimately threatening world that followed.¹⁰ Haraway thus provides a functional critique of gender in natural history. Her narrative strategies are usually doing the business of "healing" some psychological anxiety: industrial capitalism or exploding bombs, for instance. Both Eugenie Clark's research program and the representations of that program fit into Haraway's explanation; in many ways, Clark was an early analog to Goodall in that the former's status as a female scientist provided a unique perspective into the natural world that hinged on a domestic

¹⁰ Donna Haraway, Primate Visions: Gender, Race, and Nature in the World of Modern Science (New York: Routledge, 1989), 135, 149-50.

ideology

These histories are also illustrative of a culture of natural history in transition. Despite the many examples of women practitioners in the science of natural history, early-twentieth century exploration was often considered a thoroughly male activity. The Explorers Club did not list a woman's name on its membership roster until 1955. Indeed, a group of women travelers, geographers and explorers, rebuffed by the Explorers Club, responded by founding the Society of Women Geographers in 1925.⁷ One time president of the Explorers Club, Roy Chapman Andrews noted that he did "not see just where women fit into exploration. . . . I do not suppose that any man appreciates the feminine touch in most things more than I do. But on an expedition, how can a woman be anything but a liability? There are few women who are able to do technical or scientific work better than a man."⁸ In her autobiography, Grace Barstow Murphy discussed the antisocial, and sometimes misanthropic, behavior that results when men make a profession out of natural history. She went on, "I say 'men' intentionally, for women only rarely make a profession of natural history. A woman's life is human life, which with her must come first."⁹ The most obvious exception to her analysis of women in natural history was American Museum of Natural History anthropologist Margaret Mead, a close colleague of her husband. Grace Murphy fit the exception into the logic of her analysis by noting that

⁷ Margaret Rossiter, *Women Scientists in America: Struggles and Strategies to 1940* (Baltimore: Johns Hopkins University Press, 1982), 303; on gender and natural history, see p. 73.

⁸ Roy Chapman Andrews, "Explorers and Their Work," *Saturday Evening Post* 204 (August 22, 1931), 7.

Mead “is an ethnologist, which means keen interest in people”⁹ Of course, there was no dearth of women explorers in the early part of the twentieth century, but these naturalists had to consistently fight against the pervasive stereotype that the work of exploration could only be practiced by the “stronger” sex¹⁰ The gendered conception of exploration provided obstacles and opportunities that Clark negotiated within a postwar culture of domesticity

More than dealing with a gendered tradition of natural history, Clark also had to deal with the problems faced by women within the broader structure of science Margaret Rossiter has shown that despite the temporary move of women into academic positions during the war, the postwar period proved to be a “major step backward” in bringing more women into the scientific workplace In 1949, for example, the Employment Opportunities Section of the Women’s Bureau reported that women comprised less than 8% of the zoological positions between 1946 and 1947 Rossiter explains that part of this prejudice against women stemmed from a concern that female scientists were neglecting their domestic responsibilities¹¹

The social changes of the American workplace during and after the wars are absolutely crucial for understanding Clark’s natural history The story of women taking

⁹ Grace E. Barstow Murphy, There’s Always Adventure: The Story of a Naturalist’s Wife (New York: Harper and Brothers, 1943), 49

¹⁰ See Marcia Myers Bonta, Women in the Field: America’s Pioneering Women Naturalists (College Station: Texas A&M University Press, 1991), and Vera Norwood, Made From This Earth

¹¹ Margaret Rossiter, Women Scientists in America Before Affirmative Action, 1940-1972 (Baltimore: Johns Hopkins University Press 1995), 41-7 Also see Vivian Gornick, Women in Science: Portraits from a World in Transition (New York: Simon and Schuster, 1983), 120

over their husbands' positions along assembly lines during the war is well chronicled. If only for a short time, American women were encouraged, if not expected, to contribute to the war effort by exchanging apron for riveting gun. This seemingly dramatic social change is just as interesting for its themes of continuity. During the war, women were expected to express and elaborate their femininity even in the most male-dominated occupations.¹² They were to prepare the hearth for their husbands' triumphant return. When GIs returned home, American men resumed their old positions, and many women (by no means all) returned to the household. Single women were encouraged to marry. Married women were to be fruitful and multiply. A new culture of domesticity swept through white middle class America, one that prized the virtues of reproduction, sexuality tamed within the contained space of the home, and the practice of raising healthy children, all activities located within the security of new federally subsidized suburban homes. The cultural matrix was thus prepared for the baby boom.¹³

Themes of sexuality, fertility, gender, and behavior all were at the center of Clark's ichthyological research program. She turned to ocean fishes in order to justify her seldom articulated brand of feminism that melded the postwar "career woman" and the

¹² Elaine Tyler May, "Rosie the Riveter Gets Married," in The War in American Culture: Society and Consciousness During World War II (Chicago: University of Chicago Press, 1996), 128-143.

¹³ Elaine Tyler May, Homeward Bound: American Families in the Cold War Era (New York: Harper Collins, 1988), Susan M. Hartmann, The Home Front and Beyond: American Women in the 1940s (Boston: Twayne Publishers, 1982), William Chafe, The Paradox of Change: American Women in the 20th Century (New York: Oxford University Press, 1991), Karen Anderson, Wartime Women: Sex Roles, Family Relations and the Status of Women during World War II (Westport, Connecticut: Greenwood Press, 1981), William M. Tuttle Jr., "Daddy's Gone to War": The Second World War in the Lives of America's Children (New York: Oxford University Press, 1993), Winifred D. Wandersee, Woman's Work and Family Values, 1920-1940 (Cambridge, Mass.: Harvard University Press, 1981).

homemaker. Clark also employed the trope of postwar domesticity in her popular accounts of her scientific research. In effect, her popular writings domesticated the ocean realm by way of extending the security of the postwar home to include the ocean. Clark used this language in order to make her work and writings more acceptable to a public that clearly viewed her as engaging in an activity better left to men. This ambiguity took on particular force in the hands of popular writers who profiled Clark's work. They attempted to strike a delicate balance between Clark as an intrepid explorer and a homemaker. In these popular writings, and also in her own work, Clark became something of a hermaphrodite: a scientist who combined masculine and feminine roles.¹⁴

Aquaria Culture: From Pet to Research Organism

Clark's biographical account of her early interest in ichthyology tells of a seamless transition from childhood upbringing to naturalist. Her passion for swimming was encouraged by her mother and extended family who taught Clark how to swim in the salty breakers of Long Island. Her affection for fish began with a childhood trip to the old aquarium at Battery Park, after which Clark filled her mother's apartment with aquaria.

¹⁴ Naomi Oreskes presents an interesting argument which treats the discourse of heroism in the twentieth-century. She looks at the strange contradiction between the proclamation of bold adventure and heroism made by the male members of an oceanographic research team, and the mathematical, objective, and dispassionate science of the female scientists aboard the same vessel. Oreskes invokes the dispassionate and objective work of these female calculators to challenge some of the prevailing feminist scholarship on women's "other" ways of conducting science. My analysis of Clark challenges Oreskes in several ways. I point out that she has put too much stock in a unified conception of science. 20th century natural history, and female naturalists have a different set of problems than 20th century science and female scientists. I believe that the best policy is not to let our examples speak too much, and at the same time, to create histories that are imminently local. "Objectivity or Heroism? On the Invisibility of Women in Science," in *Science in the Field*, *Osiris* 2nd series, volume 11, (1996), 87-113.

containing fish, reptiles, and amphibians. Her work as a naturalist thus did not begin, as in so many other tales of naturalists, in the fields and wooded lots of her neighborhood. She was a child of New York City, and instead of going to the mountain—perhaps the nature trails of near by Ramapo State Park—Clark brought the mountain to her little two room apartment. She observed the feeding and mating behavior of her household pets. She watched “the mating of guppies, swordtails, and platyfish, which bear their young alive, and we saw them giving birth. It was fun to read and discuss all the aspects of these various modes of reproduction. It made it easier on those mother-daughter talks, too.”¹⁵ Clark was thus introduced to the mating of fishes at home with mother at her side. This experience with common aquaria fish and mating behavior extended into her training as a professional naturalist.

After taking an undergraduate degree in zoology at Hunter College, Clark began taking courses at NYU. At the same time, World War II was well under way and in her words, “industries were booming with war work and there was a shortage of men.” Wanting to simultaneously contribute to the war effort and secure funding for her graduate education, Clark turned to the want ads and found a job as a chemist at a plastic research lab in Newark. When not in a chemical industry lab, Clark was studying under the American Museum of Natural History’s Curator of the Department of Fishes, Charles Breder, who sponsored Clark’s masters research—a purely systematic and anatomical

¹⁵ Eugenie Clark, Lady with a Spear (New York: Harper & Brothers, 1953), 11. Using such an autobiographical account is always problematic for discovering the nature of how a naturalist gets turned onto such activities. The important point is that Clark is creating a narrative that describes the move from home to nature. It is on this level of rhetoric, language, and narrative that we see the usefulness of the source. As of this date, Clark is still alive and well, and to a certain extent, working at the Mote Lab at Sarasota, FL. She promises to turn over her papers to the Mote Library soon.

examination of the order *plectognathu*, with special emphasis on their puffing mechanisms¹⁶

After completing her masters, she began taking courses at Scripps Institution of Oceanography where she had her first opportunity to helmet dive with Scripps' ichthyologist, Carl Hubbs. In 1947 Clark applied and received a position with the Fish and Wildlife Service to study the fisheries in the Philippine Islands. According to Clark, when word got out that she was the only female scientist in the program, combined with the fact that her mother was Japanese, the FBI revoked her passport and sent her back to the states after a short stay in Hawaii. Perhaps with this incident in mind, she decided to continue her graduate studies at NYU. A Ph.D., according to Clark, was not completely necessary to pursue a career in zoology but a helpful credential for a field of work where women had to deal with numerous other disadvantages. "Women scientists have to buck some difficulties when it comes to field work but I had one decided advantage. A man in my position often has a family to support and is not free to travel. I was independent and free to go anywhere and do anything I liked, and there was only my own neck to risk."¹⁷

For her dissertation research, Clark examined the reproductive behavior—primarily the evolutionary mechanism of sexual isolation—of platys and swordtails, the same kind of

¹⁶ C.M. Breder, Jr., and Eugene Clark, "A Contribution to the Visceral Anatomy, Development, and Relationships of the Plectognathi," Bulletin of the American Museum of Natural History 88, article 5 (New York: 1947), 287-320. Both Breder and Clark split their time on systematic and behavioral research. This small monograph is purely systematic. I will, however, be focusing on Clark's work on the behavior of fishes.

¹⁷ Eugene Clark, Lady with a Spear, 41-2.

fishes that were in her first home aquarium¹⁸ Dr. Gordon, then the head of the Department of Animal Behavior at the AMNH, had produced platy-swordtail hybrids that—while popular among aquaria enthusiasts—were born with a lethal black cancer. The two species often live in close proximity to one another in shallow streams, but they seldom mated. So Clark set out to discover the mechanism that controlled such sexual isolation. The first part of the project entailed examining the precise nature of copulation under controlled conditions. This called for close observation—nose to the cold glass of aquaria in the museum greenhouse—and recording of interspecies copulation. Her friends jested, “What are you compiling there, the Kinsey report on fishes?”¹⁹ In order to find the key moment of copulation, Clark used a micropipette to remove a sample from the ovaries for evidence of male sperm. She then used this technique in reverse to artificially inseminate female fishes using combinations of sperm from both platys and swordtails. Such artificial insemination techniques were new and the success of the procedure was questionable.²⁰ In Clark’s words, “I waited around like an expectant father.” When one of her females produced twelve babies, she “felt like handing out cigars.”²¹ Perhaps we should not make too much out of such flippant remarks. On the other hand, it is not incidental that Clark portrayed her manipulation of reproduction in such masculine terms

¹⁸ Ibid., 42. By the time Clark arrived there, AMNH’s Department of Experimental Biology had been the site for experiments on the physiology and psychology of reproduction in the lower vertebrates. See Gregg Mitman, *Reel Nature*, 61-6.

¹⁹ Eugene Clark, *Lady with a Spear*, 46.

²⁰ Eugene Clark, “A Method for Artificial Insemination in Viviparous Fishes,” *Science* 112 (December 15, 1950), 722-3.

²¹ Eugene Clark, *Lady with a Spear*, 48.

Her exploration into the behavior of aquaria fish continued along these experimental lines. She tested the interocular transfer of visual information by placing tantalum foil caps over one eye of a goby fish. The fish was then trained to swim to one of two stimulus objects presented simultaneously, and slowly learned that the higher of the two objects was a positive stimulus, a piece of conch, fish, or crab meat. When the eyecap was reversed, the goby had remembered the location of the positive stimulus. The results were statistically ambiguous, but most of the gobies remembered correctly, thus demonstrating interocular transfer.²² This experiment in behavior modification would later be elaborated with her work on lemon sharks.

One final example of her dissertation research on aquaria fish highlights the extraordinarily invasive techniques Clark sometimes employed to examine their sexual behavior. She sought to discover the function of the pelvic fins of guppies, swordtails, and platyfish in copulation. Of fourteen mature males, four were used as controls, the right pelvic fin was cut off three males, the left pelvic fin was cut off three other males, and the four remaining males had both pelvic fins cut off. The males were then paired off and then the couple was observed. She found that the "males lacking both pelvic fins had considerable mechanical difficulty in effecting the 'hold' on the female that is necessary for a copulation." From these data she arrived at three possible functions of pelvic fins during copulation.²³

²² R. W. Sperry and Eugene Clark, "Interocular Transfer of Visual Discrimination Habits in a Telost Fish," Physiological Zoology 22 (October 1949), 372-8.

²³ Eugene Clark, and Robert Kamrin, "The Role of the Pelvic Fins in the Copulatory Act of Certain Poeciliid Fishes," American Museum Novitates 1509 (New York: American Museum of Natural History, May 7, 1951), 1-13. It should be added that Clark's popular treatment of her early research, which covers

Clark's experimental research at the American Museum of Natural History is important for two reasons. First, we see how household pets became research organisms. Her introduction into the world of natural history was thus an extension of her own childhood pastime. Second, at precisely the same time that Clark went to work to fill wartime shortages of male employees, she was also manipulating the reproductive processes of aquaria fish, a procedure that she portrayed in strikingly masculine terms. Her experimental program thus paralleled an important social shift in the American workforce. At the same time, her research focused on factors—reproduction and behavior modification—that women were to foster during the war. In a way, Clark was functioning as both a man and woman at the same time.

Domesticating the underwater world

The experimental nature of her dissertation research meant that Clark spent precious little time conducting active field research. By the time she had earned her degree, she had spent some time diving with Carl Hubbs in La Jolla, she had spent a week composing a key of Hawaiian *Plectognath* fishes, she stayed at Woods Hole during the summer on several occasions, and she visited the AMNH Lerner Lab in Bimini. All were short excursions and never resulted in any sustained research or papers. This changed in 1948 when Harold Coolidge, Executive Secretary of the National Research Council's

most of her experiments, leaves this one out. Also, the pelvic fin question was partially sponsored by the National Research Council's Committee for Research in Problems of Sex, founded in 1922 in conjunction with the Bureau of Social Hygiene to consider fundamental sex problems in the fields of morphology, physiology, and psychology. Alfred Kinsey's work was sponsored by this committee. So Clark's offhand comment regarding the "Kinsey report on fishes" is not just purely rhetorical.

Pacific Science Board, visited the Museum to inform the staff of fellowship opportunities for conducting research in the newly formed U.S. Trust Territory in the western Pacific. Drawing from her expertise with *Pteroglyphus* (the famous poisonous blowfish of sashimi fame is a member of this order) Clark submitted an application that proposed a survey of the poisonous shore fishes in the Pacific. Robert Cushman Murphy, a colleague in the American Museum, sat on the Board that considered these applications, and may have had some role in seeing to the acceptance of Clark's project.

It will be remembered that Clark participated in the PSB project, Scientific Investigations of Micronesia, a coordinated exploration of Micronesian anthropology, botany, zoology and ecology. The U.S. Navy's responsibility to administer civilian life in Micronesia necessitated a knowledge of island life in order to fit the practical need of conserving scarce natural resources for native use. Chapter five showed how government-sponsored research in Micronesia worked to simultaneously transform Micronesia into a militarized buffer region and make this kind of colonialism as benign as possible. Here is the all-important context for Clark's work in the Pacific. Undoubtedly, she was to compile a list of poisonous fishes, practical information for the American military. But what is more amazing was the way this peculiar style of gentle colonialism dovetailed with Clark's own domestication of the Pacific. In the decade before her visit, these islands had been the site of carnage, death, and destruction, while Clark's Pacific is pacified, friendly, and homey. Clark's expedition to the Pacific, just as Thor Heyerdahl's primitive reenactment on a balsa raft, resurrected a happy domestic and purely natural territory, then in care of the United States Navy.

Clark's visit to Micronesia provided her with the first substantial opportunity to practice natural history underwater through the art and sport of spearfishing. This primitive technique for taking fishes was not something Clark brought to the Pacific; instead, she learned how to dive with the help of native fishermen. Mid-way through her journey, Clark was working on the reefs off the island of Koror in the Palau Islands where she used the newly founded Pacific War Memorial Station as a headquarters for the rest of her stay in the Pacific. The managers of the station introduced Clark to Siakong, a native Paulan under the employ of the Pacific War Memorial as a general handyman. When he was not repairing fences and painting buildings, Clark noted in Lady with a Spear, he was testing his mettle as "the best spearfisherman in the Palau Islands or maybe in the whole world." It is hard to overstate Clark's admiration for Siakong. She described him as the epitome of masculinity, possessing the strength of some three native Palauans. Though a raggedly-dressed fellow on land, "[w]hen he took these off to go into the water he was suddenly metamorphosed from a bum into a Greek God."²⁴ Of all the technologies that Clark used to secure specimens—poison, traps, nets, dynamite—she found spearfishing the most effective tool for capturing reef fishes. Diving underwater allowed her and Siakong to identify desired fishes and then chase them into reef crevices for an easy catch.²⁵

²⁴ This cult of Palau fishermen continues even today. See Carl Safina, Song for the Blue Ocean: Encounters Along the World's Coasts and Beneath the Seas (New York: Henry Holt and Co., 1997), 340.

²⁵ Eugene Clark, "Reef Fish Studies in the South Pacific," Scientific Investigations in Micronesia #1 (Washington D.C.: National Research Council, 1949), PSB Papers, "SIM Report #1," 6. The previous biographical account comes from this report and Lady with a Spear.

Interlude: America goes Underwater

The fact that Clark was spear fishing was noted by a number of reviewers of Lady with a Spear as rather extraordinary. Their wonder stemmed from Clark's participation in the predominantly male activity of diving, and specifically of spearfishing. This is particularly interesting given that underwater recreation's popularity mushroomed shortly after the war. Again, explanations for why so many Americans took to the water defies simple explanation. One commentator suggested that it was the popular treatment of the United States Underwater Demolition Team, whose primary purpose was to dive down to shore and harbor bottoms to place and remove submarine detection nets.²⁶ Shortly after the war, teams of underwater soldiers were given the task of salvaging as much sunken equipment as possible. In these cases, the practice of underwater diving was a thoroughly militaristic, masculine, and athletic affair. These divers did not enjoy the luxury of SCUBA, but rather donned bulky and enormously heavy diving suits. One diver for the Navy's postwar salvage team noted that divers were "supposed to be the best physical specimens alive. They've all been some kind of tradesman before—like carpenters, welders, riggers or else athletes."²⁷ He also said that every dive is a battle with nature. New commercial diving schools were established to train men yearning for an encounter

²⁶ "Undersea Armor," Newsweek 27 (January 21, 1946), 60. John Tassen, "Tourists in the Underwater World," New York Times Magazine (June 27, 1954), 18.

²⁷ Thomas Griffin, "Out of this World," Collier's (February 2, 1946), 24. Perhaps the most interesting factor that distinguished helmet diving from skin and SCUBA diving was that the ability to swim could be a liability to underwater operations. Leslie Lieber, "The World's Most Dangerous Classroom," Science Digest 20 (December 1946), 84-7.

with dangerous nature ²⁸ These were not glamorous jobs, they promised no recreational experience whatsoever. Work was always hazardous and required great strength.

The strange irony of postwar underwater recreation is that its initial surge had nothing whatsoever to do with technological innovation, for when coastal residents of California and Florida began entering the waters en masse in the early 1950s, they often did so with only a mask, snorkel, and fins. The technology for skin diving became easily accessible in the 1930s, but it was not until the 1950s that the activity began to become a sport. By 1954 California contained over a hundred skin-diving clubs and boasted over 100,000 recreational divers, Florida possessed close to 40,000 regular skin-divers ²⁹ In 1953 alone, over \$40 million worth of underwater swimming equipment was sold by such outfitters as Abercrombie and Fitch ³⁰ The allure of underwater recreation was dominated by spear fishing, an athletic activity that tested the mettle of manly courage.

Readers of David Bradley's wildly popular account of Operation Crossroads, No Place to Hide (1948) were introduced to spear fishing as Bradley sought specimens for evidence of radiation contamination off a Bikini reef ³¹ Perhaps more influential was Hans Haas' popular account of his dangers and adventures of spearfishing off California waters

²⁸ In 1947 the Sparling School in Wilmington, CA became the first commercial diving school. Most students were veterans of the war, all were men. "Diving School," Life 25 (July 12, 1948), 45. "Underwater Campus," American Magazine 147 (February 1949), 97.

²⁹ George Kent, "Man's Newest and Loveliest Adventure," Reader's Digest 64 (March 1954), 109-12.

³⁰ John Tasson, "Tourists in the Underwater World," 27.

³¹ David Bradley, No Place to Hide (Boston: Little, Brown and Company, 1948), 128-30. On No Place to Hide see Paul Boyer, By the Bomb's Early Light: American Thought and Culture at the Dawn of the Atomic Age (Chapel Hill: University of North Carolina Press, 1994), 82-92.

In Diving to Adventure: The Daredevil Story of Hunters Under the Sea (1951), Haas told of his many dangerous encounters with moray eels, octopuses, and sharks of all varieties. Spearfishing thus held promise as an adventurous activity.¹² A Collier's account of "The Rover Boys under the Sea," a skin-diving club for military personnel on Wake Island, told of a story of an

indignant skin diver [who] punched [a] startled shark and speared it. When a hammerhead shark bit another skin diver's catch in two off Hikueru Atoll in the South Pacific, he hit the shark with his spear gun, kicked it, punched it on the nose and kneed it. But when he tried to grab the shark by its jaw, he lost the tip of his thumb.¹³

Two national organizations were established to encourage skin diving and promote yearly spearfishing competitions. As of 1953, the International Underwater Spearfishing Association held no events for women, as "they have not taken to the rugged sport in such numbers as men."¹⁴ In short, the underwater world became a playground for male hunters on the prowl. Clark's underwater adventures were thus a transgression into a predominantly male sphere.

But there was also a non-spearfishing contingent among skin-divers that gathered considerable momentum in the summer of 1953. By 1954, skin-divers could be grouped

¹² Clark thought that Haas had taken some liberty in emphasizing undersea danger. "Although spearfishing and underwater photography can be thoroughly exciting and enjoyable and perhaps more scientifically fruitful without repeatedly risking one's life as Mr. Haas has done, there is no doubt that such risks have brought his adventure story into the realm of the spectacular." Review of Diving to Adventure, by Hans Haas, Natural History 61 (January 1952), 4. The word "spectacular" here means a brush with death, an adventure of the sort disdained by Roy Chapman Andrews and other in the 1920s and 1930s. Clark's adventure, as we will see below, was warm, charming, and personal.

¹³ Richard Hubler, "Between the Devilfish and the Deep Blue Sea," Collier's 131 (January 24, 1953), 40.

¹⁴ *Ibid.*, 41.

into two general categories: those that entered the sea to hunt, and those that donned mask and snorkel simply to observe underwater life. In the latter case, skin diving became another frenetic effort to escape the daily grind, the here and now. One diver noted in Beebesque terms that "[t]his sport is an adventurous escape from everything earthly and known: like a visit to the moon."¹⁵ In striking contrast to the battle-against-nature scenario, conveyed by Navy frogmen and implicit in the sea hunt, skin-divers often felt as if underwater recreation served to unite humans with nature. One diver noted on his first reef dive that "[t]his is the domain of the fish and I feel like an invader but at the same time part of it."¹⁶ We see here an important transition. The ocean depths were becoming a place of relaxed recreation; the ocean offered something other than sport and adventure. Skin diving reunited humans with nature; it was tranquil, calming, beautiful, even domestic. The innovation in SCUBA was the primary reason for this transition.

SCUBA respirators were the products of wartime research, though none were actively used by Americans until after the war. They were sometimes contrasted to some of the other odious inventions of war research:

Out of the wealth of atom bombs, flame throwers, booby traps, and other World War II inventions, have come some devices that promise to survive and become indispensable in peace. . . . Like DDT and the jeep, these breathing machines will be of service to anyone who learns how to use them.¹⁷

When non-military divers began using SCUBA in the late 1940s, they were more likely to

¹⁵ George Kent, "Man's Newest and Loveliest Adventure," 110.

¹⁶ John Tassen, "Tourists in the Underwater World," 18.

¹⁷ Harry Shershow, "Fun Under Water," Popular Science Monthly 148 (April 1946), 114.

be making a living than recreating. The sponge and abalone industries changed overnight as SCUBA made diving for these shallow water inhabitants much more expedient. Popular treatment of such divers, however, continued to highlight these activities as thoroughly dangerous affairs.¹⁸

Use of SCUBA for recreational purposes began in France where the Cousteau's respirator caught on very quickly. Mountaineers were among the first to see the potential of the new technology for transforming the underwater realm into a geography of sport. In 1946 Henri Broussard established the Sub-Marine Alpine Club in Cannes on the French Riviera. Members of the club emphasized hunting for reef fishes and setting records, but others might go down just to take a look around. An American traveler who visited Broussard quickly realized the therapeutic value of diving. "Perhaps these undersea caves would make perfect A-Bomb shelters, as well as retreats for asthma sufferers."¹⁹ Despite the hyperbolic tone, SCUBA helped to transform the sea into a safe place, an anodyne to atomic warfare.

No one was more important in transforming the ocean from a place of danger to a geographical destination of recreationists than Jacques Cousteau. In his first popular book on the development of SCUBA diving, The Silent World (1953), Cousteau narrates the transition from the world of skin-diving, requiring great strength and daring, to the ocean home of the SCUBA diver where scientists, hunters, and recreationists can partake in

¹⁸ See Victor Boesen, "Adventures of a Shark Diver," Saturday Evening Post 224 (July 14, 1951), 18.

¹⁹ Pierre de Latil and Mary Thayer Muller, "Wonderland of Deep Sea Hunters," Coronet 32 (September 1952), 42.

underwater exploration with relative ease and comfort. The technological innovation signaled a kind of evolutionary development in the creation of a “manfish” a human organism, outfitted with breathing apparatus, that would no longer invade the ocean, but rather became a part of it. Instead of a hostile environment, Cousteau portrays the ocean as a geography of delight and wonder.⁴⁰ He would shortly debut as a popular film-maker with a movie of same title in which viewers were treated to a double spectacle. First, due to innovations in strobe technology, The Silent World contained some of the first truly satisfactory images of undersea life that were taken with ease by underwater photographers. But just as important as the shots of reefs, fish, and corals was the coverage of the divers themselves gliding through reef crevices, spearing fish, and performing underwater acrobatics.

SCUBA also transformed the work of Hans Haas. His early book on skin-diving was a tale of bold adventures: danger lurked everywhere. In contrast, his popular film Under the Red Sea (1953), which made use of SCUBA, was almost comic in its depiction of somersaulting divers. In 1954, the American Museum’s educational television program “Adventure” dedicated a show to the living ocean. Half the show was a viewing of Under the Red Sea, during which Clark provided a running monologue. Clark’s gentle and becalming voice identifies species of corals and fish, and at the same time chuckles at the antics of the two divers playing in the weightless environment. SCUBA helped to make

⁴⁰ In contrast to Clark’s review of Haas’s Diving to Adventure, she had much higher praise for The Silent World. She especially appreciated that “unusual encounters with sharks, octopi, and other dreaded marine animals are discussed without exaggerating their dangers.” Review of The Silent World, in Natural History 62 (April 1953), 149.

the undersea world a gentle place full of stimulating colors, delicate movements, friendly organisms, and playful fun

The point that the undersea world was a place of safety, calm, and family fun was powerfully made by Arthur C. Clarke who claimed, in typical Clarke fashion, that by "1964 or, at the latest, 1974, you will vacation in submarine hotels -and enjoy hydrojet tours of the fairyland beneath the waves." In a 1954 issue of Holiday, Clarke predicted that coral reefs would soon become the site of new underwater resort hotels. Guests will breakfast next to windows opening up undersea vistas during meals, and then -with SCUBA- take tours of reef life under the supervision of guides trained in underwater exploration. In the rare event that the little touring expedition should meet a dangerous shark, each group would be escorted by two playful dolphins as a deterrent measure. Arthur Clarke's underwater resort simply reinforced a kind of ocean popularized by Cousteau and Haas -easy going, beautiful, becalming, safe, and friendly. But the underwater realm remained a thoroughly gendered environment. While there were many exceptions, male SCUBA enthusiasts by far outnumbered women.⁴¹ The point is nowhere more clear than in the popular treatments of Cousteau's Calypso team, generally a group of fourteen muscular and trim men venturing into the ocean abyss while Cousteau's wife, Simone, remained topside to tend to more domestic duties.⁴²

⁴¹ The idea that diving is not for women, especially not for mothers, has proved surprisingly resilient. Sylvia Earle, a student of Clark's, gives a splendid narrative of some of the prejudices she worked against in her career as a diving naturalist. Sea Change: A Message of the Oceans (New York: Fawcett Columbine, 1995), 63-83.

⁴² James Dugan and Ruth Dugan, "She Lives with Adventure," McCall's 83 (January 1956), 40-1. Note in the title of this piece that Simone lives "with" adventure, not a life "of" adventure.

But when Clark entered Micronesian waters in the summer of 1949, even when her book was published in 1953, SCUBA was just beginning to work its magic in transforming the undersea world into a docile environment. She was a spear-toting skin-diving enthusiast, and when she dove into the ocean, she was entering an environment full of oceanic life and male spear-fishermen. In the American consciousness, the ocean was still a geography of danger and mystery. But Clark's first undersea experiences were not those of dangerous encounters; they were notable for beautiful and romantic encounters with a sublime seascape. Siakong, her native diving instructor, was represented as both a heroic hunter and a natural sea-dwelling creature that swam effortlessly among coral formations. He politely chided Clark's petty fears of innocuous sharks and barracudas. Spearfishing, Clark noted, "is the most pleasant method for the collector who enjoys swimming and observing fish in their natural habitat."⁴¹ "Enjoyment" was the key characteristic of Clark's underwater explorations in Micronesia. She told a story of watching the amusing spectacle of Siakong playfully "bucking" a slowly moving sea turtle. The playful banter between the two underwater collaborators was always cheerful, pleasant, and even romantic. Though engaged in a scientific task, Clark's ocean was entirely recreational, not of the man-against-nature variety, but more like a relaxing vacation.

When Clark returned to the United States she wrote up her notes on the poisonous fish of the Pacific—including native terminology—and submitted the report to the PSB. In 1950, Clark traveled to Egypt on a Fulbright to work at the Marine Biological Station at Ghardaqa in the Red Sea. Clark portrayed the underwater world of the Red Sea just as

⁴¹ Eugenie Clark, "Field Trip to the South Seas," *Natural History* 60 (1951), 10.

the waters of Micronesia as a thoroughly tamed environment. She enjoins her readers to “dive off the end of the pier into the clear blue open sea, adjust your face mask, and in a few strokes find yourself in an infinite aquarium scintillating with strange and beautiful marine animals that peer at you from sanctuaries in a large coral garden.”⁴⁴ The glass plate of her face mask provided a view into nature that was as safe and secure as a visitor to a public aquarium. It is worth noting that Clark met her second husband in Egypt and this became a critical part of the popular narrative of Lady with a Spear; the two fell in love while Clark taught her betrothed how to spearfish. The love story serves as an appropriate ending to this postwar travel narrative of a female naturalist. Her love for science, nature, adventure, and heroism seem all that much more acceptable when balanced with the story of her nuptial bliss.

Clark’s Red Sea expedition also marks her first experience with moving into the sphere of public culture.⁴⁵ While in Egypt she was asked to deliver a radio program on the reef fishes of the Red Sea. She began to articulate a message that was latent in her Pacific travel narrative, but would become the central thrust of her future research on sharks. Responding to the question as to whether or not she was afraid to dive around sharks and poisonous fishes, she remarked that once one becomes familiar with an environment, it is no more dangerous to explore the wilderness than it is to cross a busy city street. “It is one of the jobs of the marine biologist,” Clark told her audience, “to make the

⁴⁴ Eugene Clark, “A Scientific Journey to the Red Sea, Part I,” Natural History 61 (1952), 346.

⁴⁵ She was also the subject of several popular profiles that discussed her work in the Pacific and the Red Sea. “Red Sea Swimmer,” Time 58 (November 19, 1951), 68; “Fish Lady,” New Yorker 28 (March 8, 1952), 24-5.

environment of the sea more familiar and hence safer, through studying and understanding the animals which live in it”⁴⁶ Dispelling the myth of a dangerous underwater world, making the marine environment a safe place for human beings, was becoming a key plank in Clark’s platform of a popular marine biologist

Lady with a Spear was published shortly after her return to the states, and it met with much critical acclaim. It was a Book-of-the-Month Club selection and Clifton Fadiman wrote a short review that favorably compared Clark’s work with The Old Man and the Sea, The Sea Around Us, and The Silent World. He especially appreciated Clark’s light and personal narration of her expeditions and claimed that her book was “really an account of a love affair with fish” encountered in a “magic fairyland or fairysea”⁴⁷ Gilbert Klingel thought that the book was “anything but a superficial adventure story.” It provided “a series of sprightly pictures of the Pacific island spear-fishermen and Red Sea natives, and the result is a pleasantly readable volume marked by a warm and youthful enthusiasm”⁴⁸ Lewis Gannet noted that it was slightly odd for such a lovely and unassuming woman to be visiting far away areas engaged in such a risky field of exploration

[I]f all this sounds a bit exotic, let me assure you that, on the evidence of her book, Eugenie is what most of us like to think of as a typical American girl—matter-of-fact, down-to-earth, gregarious, athletic, fun-loving, and unashamedly curious about things which would certainly have made both her American and her

⁴⁶ Reprinted as “Wonders of the Deep, by Eugenie Clark,” Carro Calling #847 pt. 2 (June 9, 1951), 12-3

⁴⁷ Clifton Fadiman, “A Courageous Young Scientist Explores the Undersea Universe in Lady with a Spear,” Book-of-the-Month Club News (June 1953), 2-3

⁴⁸ Gilbert Klingel, “Underwater Boswell,” review of Lady with a Spear, New York Times Book Review (July 19, 1953), 3

Japanese-Scotch grandmothers blush”⁴⁹

A reviewer for The Nation suggested that “[i]t is all related very simply and directly by a young lady who manages to seem typically American in everything except her career”⁵⁰

While these reviews do show that readers were fascinated by Clark’s depiction of an underwater “fairysea,” they are more interesting for their attempts to make sense out of the author, a female naturalist engaged in a career somewhat at odds with her gender. Despite her participation in the exotic and male-dominated world of spear-fishermen, Clark remained a typical American girl.

Anne and William Vanderbilt were so impressed with the text that they donated a small coastal plot of their 36,000-acre cattle ranch for the establishment of a marine biological laboratory on the west coast of Florida. Clark threw herself into the lab and quickly made it a premier site for marine biology research. Indeed, Clark became the same type of naturalist as William Beebe. Both were widely popular figures in charge of establishing research laboratories and field stations that were important sites for the scientific work of others. Instead of chronicling this long story, I want to briefly highlight a few of Clark’s research projects that push this analysis of gender, sex, and domesticity a bit further. For Clark was then an internationally renowned naturalist, and the subject of wide popular attention. It was in this context that she made her greatest contribution in domesticating the ocean realm.

⁴⁹ Lewis Gannet, “This Wonderful and Fishy World,” review of Lady with a Spear, in New York Herald Tribune Book Review (July 19, 1953), 1.

⁵⁰ “Girl Under Water,” review of Lady with a Spear, in The Nation 177 (September 5, 1953), 197.

Hermaphroditic Groupers and Gentle Sharks: Ichthyology at Cape Haze Lab

Among the purely natural historical research that Clark continued to do at the new marine biological laboratory was an investigation of the functional hermaphroditism of a small grouper prevalent in coastal communities of western Florida. The sexual anatomy and behavior of *Serranus subligarius* was still something of a mystery in the mid 1950s and Clark was somewhat confused by the presence of large colonies of these organisms, all of which had large bellies and thus appeared to be comprised solely of females. In a popular account of her discovery she recalled wondering “Where were the males?” After inspecting the reef many times, I learned to identify every fish I could find. There was no possible mate, even in the disguise of a different sex coloration or form. No mate! No source of sperm for the hundreds of unfertilized ovulated eggs inside each of the thousands of *Serranus* living in that reef”⁴¹ Clark brought the organism into the lab to conduct anatomical studies and learned that in fact, *Serranus* was a functioning hermaphrodite, possessing the sexual organs of both males and females. She wrote that “each adult individual can function as a male, a female, or both sexes simultaneously, depending on the situation”⁴²

After this anatomical discovery, Clark proceeded to observe the grouper’s mating behavior in both the lab and in nature (the *in situ* observation marked Clark’s first use of

⁴¹ Eugene Clark, Lady and the Sharks (Sarasota, FL: Mote Marine Laboratory, 1969), 35

⁴² Eugene Clark, “Mating of Groupers,” Natural History 74 (June 1965), 22-5, *idem*, “Functional Hermaphroditism and Self-fertilization in a Serranid Fish,” Science 129 (January 23, 1959), 215-6

SCUBA)⁵³ As with most other cases of hermaphroditism, self-fertilization is a rarity and only useful in emergencies. Cross fertilization is the general rule. Upon courtship, the grouper with the larger belly usually assumes the role of a female while the other—manifesting an unusual temporary sexual dimorphism—produces banded vertical markings across its body. “The fish that chases is, as would be expected, in the male role.” After a mating, the sex roles may be reversed. Typical of her lab experiments was to place two unbanded organisms into an aquarium. After a “frustrating attempt at courtship, the fish begin to lunge and peck at each other. . . . usually the larger manages to force the other into a corner until it appears to ‘give up’” and then becomes a banded male.⁵⁴ Mating then ensues. High speed photography right after a mating revealed a further ambiguity. The unbanded female becomes banded for just a moment right after copulation. “At first this confused the otherwise clear-cut courtship relationship between an unbanded female phase and a banded male phase, until I realized that the banding on the leading fish is the reverse, or negative, of that of the male-phase fish.”⁵⁵ Clark considered her work on the mating behavior of hermaphroditic groupers to be one of her

⁵³ There is no good treatment of how SCUBA changed the practice of oceanography and, especially, marine biology in the early 1950s. The technology was hailed as a device with which “man becomes part of the medium. . . . Subject to the same forces, he partakes of the feelings of the other underwater animals as he is swayed by passing waves and drifts along, weightless, with ocean currents.” Willard Bascom and Roger Revelle, “Free-Diving: A new Exploratory Tool,” *American Scientist* 41 (October 1953), 624. SCUBA was thus an important technology in the evolution—largely started by Beebe—of scientists’ *in situ* exploration of the ocean.

⁵⁴ Eugenie Clark, “Mating of Groupers,” 23.

⁵⁵ Eugenie Clark, *Lady and the Sharks*, 71.

most significant contributions to ichthyology”⁵⁶ But at the same time she was conducting this research, another organism began to dominate the work of Cape Haze ichthyologists

Clark was introduced to the possibilities of incorporating sharks into her research program by way of John Heller of the New England Institute of Medical Research. Heller was interested in shark liver as an anti-carcinogen and called Clark for specimens, it was this inquiry that put Cape Haze Lab into the “shark-hunting business”⁵⁷ Other than researching the medical possibilities of sharks’ visceral anatomy, Clark and visiting scientists also researched the function of the shark’s abdominal pores, gestation periods, size of brood, and they also experimented with shark-detering substances, a practical aim given that so many recreational SCUBA divers were entering America’s coastal waters in the 1950s. After having sacrificed thousands of sharks to exploring shark anatomy, she wrote that “the most interesting part of our work with sharks was studying the live animal, working with one individual day after day for long periods of time, and getting to know its personality”⁵⁸

Always keen to ask and answer behavioral questions, Clark designed a research project that interrogated sharks’ ability to learn simple tasks. On Heller’s suggestion, Clark authorized the construction of a shark pen to maintain live specimens. In 1958 Dr Lester Aronson, an expert in animal psychology, visited the lab and queried whether or not

⁵⁶ Clark would later research the protogynous hermaphroditism of the tilefish and monogamy within the sea moth. Eugene Clark et al., “Social Behavior of Caribbean Tilefish,” Underwater Naturalist 18 (1989), 20-3; Daphna Herold and Eugene Clark, “Monogamy, spawning and skin-shedding of the sea moth, *Eurypegasus draconis*,” Environmental Biology of Fishes 37 (1993), 219-36

⁵⁷ Eugene Clark, Lady and the Sharks, 11

⁵⁸ *Ibid.*, 90-1

behavioral experiments had been conducted. He lectured Clark on the primitive nature of sharks: they possessed poorly developed brains and visual apparatus and were generally considered rather stupid. Clark later reconstructed the conversation: "'Besides,' [Aronson] said, 'they're difficult to keep as experimental animals, and no one has tried putting them into a Skinner box!'" Overhearing the exchange, one of the teenage lab assistants replied, "'Our sharks are smart, and boy, can they see us coming with the food!'" Tommy said, defending his pets."⁵⁹ Aronson then made a few suggestions as to some simple behavior experiments.

Two lemon sharks and three nurse sharks became the organisms for a fairly straight forward behavioral experiment. Clark placed a white plywood target baited with a piece of mullet in the shark pen. The target was rigged with a bell that would ring when pushed with sufficient force. Over six weeks of training, the sharks were conditioned to associate both the target and the bell with food. After the sixth week, an empty target was placed in the water and the sharks were rewarded with food after hitting the target. After one week the sharks were conditioned to hit the target causing the dinner bell to ring for which they received their meal.⁶⁰ In Clark's estimation, sharks were not as dull-witted as most ichthyologists had assumed. The domestic overtones of conditioning the top predator of the sea to answer a dinner bell are all too obvious. And the point wasn't lost on one reporter who wondered how to account for a shark that would "waggle its way

⁵⁹ Eugene Clark, Lady and the Sharks, 95.

⁶⁰ Eugene Clark, "Instrumental Conditioning of Lemon Sharks," Science 130 (July 24, 1959), 217-18.

into the shallows of the Cape Haze pen and beach itself to take food like a puppy”⁶¹

Some of the popular treatments of the shark conditioning experiments drew special attention to Clark’s feminine characteristics

Three times a week a pretty, dark-haired, dark-eyed young woman walks briskly on a dock at Placida, Florida carrying a bucket of fish in one hand and a notebook in the other. She’s going to feed her captive sharks, but first the supposedly dull-witted beasts have to prove that they have learned how to order a meal. The young woman, dressed in sport shirt and Bermuda shorts and looking something like a college student, is proving that sharks, one of the least understood of the world’s beasts, can be trained to perform a sequence of acts.⁶²

By 1959, dolphins were well on their way to becoming international stars. Marineland was only a several hour drive away from Cape Haze. Clark seemed to be teaching similar tricks to ferocious sharks with vastly inferior nervous systems. The task was all the more amazing given that a pretty, young woman, who looked like a college student, was the trainer.

One variant on the experiment proved to have tragic results. Assuming that sharks were color blind, Clark painted the target yellow. One of the lemon sharks approached the target and was so disturbed by the change that it did a back-flip out of the water, and then refused to eat until it died three months later. Clark movingly recalled that she “felt terrible about his death. For more than a year, he had been a part of our daily activities.

We towed the remains of this once beautiful creature some miles out into the Gulf and watched it sink.”⁶³ This particular lemon shark was much more than an experimental

⁶¹ Coles Phinzy, “Lovely Lady with a Very Fishy Reputation,” Sports Illustrated 23 (October 4, 1965), 50.

⁶² William M. Stephens, “The Lady and the Sharks,” Saturday Evening Post 232 (July 4, 1959), 52-3.

⁶³ Eugene Clark, Lady and the Sharks, 106.

organism for Clark and her staff. It was a beloved member of the family whose death was accompanied with due ceremony.

These early behavioral experiments became the foundation of her ever recurring message that sharks do not necessarily deserve a reputation of creatures to be dreaded and feared. In a recent interview she indicated that her greatest contribution, both purely scientific and popular, was to help "dispel some of the myths about sharks that are so unfair to sharks."⁶⁴ Her primary objection was to the stereotype that all sharks were ferocious predators and posed imminent danger to human swimmers. Recreational researchers and the U.S. Navy continued to call on Clark to test and endorse various shark repellents. She pointed out that the desire for a repellent is more a psychological than a real comfort. "Your chances of being bitten by a shark," she wrote, "are much less than your chances of being in a crash when you drive your car."⁶⁵ Perhaps no publication communicated this message better than a National Geographic article relating Clark's work on the "sleeping" sharks in the underwater caverns off the coast of the Yucatan Peninsula. Telling of an incident of coming face to face with one of these cavern dwelling organisms, she wondered "Why was this requiem shark, a member of the family that includes many of the principal man-eaters, on such good behavior? Why was it so unaggressive, so lethargic?" While the question was never answered, this portrayal of the

⁶⁴ Eugene K. Balon, "The life and work of Eugene Clark, devoted to diving and science," Environmental Biology of Fishes 41 (1994), 124.

⁶⁵ Eugene Clark, Lady and the Sharks, 109. Also see Joan Archart-Treichel, "Demystifying the Shark: Some things 'Jaws' didn't tell you," Science News 110 (September 4, 1976), 155-57, for Clark's most definitive statement see the 50 page spread in Eugene Clark, "Sharks: Magnificent and Misunderstood," National Geographic 160 (August 1981), 138-87.

docile requiem shark reinforced Clark's message that the trite conception of the predatory fish is horribly exaggerated ""

Another way of domesticating the shark was to portray the organism as child, pet, or victual. Many pregnant sharks were caught at the Lab, and not infrequently, Clark found herself dissecting these organisms to find embryos at various stages of development. One reporter published a picture of such an event and described how "Doctor Clark and her assistant perform a Caesarean operation on a dying brown shark which was injured when it was caught. Its litter consisted of nine young sharks, all of which were born slightly premature and failed to survive, despite Doctor Clark's efforts "" Clark described her own work as a midwife in somewhat different terms. On one of the early days of Cape Haze shark research, the staff had caught six female dusky sharks, two of which were pregnant. They removed the embryos and one of Clark's daughters "cradled one that was still alive, holding the 'placental' cord closed so it wouldn't lose any more blood, rocking it gently and humming to it as if she had a doll. That night I didn't let the baby-sitter or the children know that the tasty, boneless fish I fried for supper was filet of unborn dusky shark "" Of course, eating shark fetuses seems to be as far from matronly as one can get. On the other hand, she did cook dinner.

Eating shark meat, for Clark, was a feat of strength. Her affection for toothsome

⁶⁶ Eugene Clark, "Into the Lairs of 'Sleeping' Sharks," National Geographic 147 (April 1975), 570-84.

⁶⁷ William M. Stephens, "The Lady and The Sharks," Saturday Evening Post 232 (July 4, 1959), 33. The author must have titled this article to make a euphonous connection to Lady with a Spear. When Clark published her popular history of Cape Haze Lab in 1969, she likely used Stephens' title.

⁶⁸ Eugene Clark, The Lady and the Sharks (Sarasota, FL: Mote Marine Laboratory Publications, 1969), 19.

shark meat was repeatedly cited. The New York World Telegram reported Clark as saying that "[t]he best way to get rid of these 'underwater menaces' is to eat them." Yesterday she had cooked 18 variations of sharks and found them all as good as popular fish.⁶⁹ There is no doubt that Clark is here drawing from an experience with two indigenous Micronesians: father and son, while fishing off the coast of Guam. The trio paused for lunch and the father began munching on a live squid. Sensitive to the probability that an American woman would be upset by such a display, the father, always a jokester, extended the half-eaten squid to Clark. The son then chastised his father as Clark reached for the squid and began her own lunch to the pleased dismay of both father and son. This little event was a kind of rite of passage that forged the bonds between Clark and her Micronesian guides. She later wrote that "from then on we were friends."⁷⁰ It would not be too much to suggest that Clark was attempting to achieve a similar effect when praising shark meat as a main course for dinner.

Living the Double Life: Mother and Scientist

Thus far I have concentrated on Clark's research and popular writings about that research. Themes of sexuality, gender, hermaphroditism, and behavior modification all seem to fit into the context of the cold-war cult of domesticity. I now want to turn the focus to Clark's own thoughts about human motherhood and the virtues of the ocean in creating healthy and happy families. Living next to the shore was the ideal environment

⁶⁹ "Put Bite on Sharks, Food Experts Urge," New York World Telegram (August 25, 1961).

⁷⁰ As reported in Clark, Lady with a Spear, 94-6.

for balancing her professional duties with her domestic duties. The point was in no way lost to a host of interviewers who constantly attempted to reconcile the themes of her “double life” as a working mother.

Child birth fit seamlessly into the economy of Clark’s life as a marine biologist at Cape Haze Lab. Drawing an entertaining analogy with her scientific preoccupations, she remarked that “in the midst of some of our shark-conditioning experiments, I took time off to have Nikolas Masatomo Konstantinu and even up the sex ratio in my family.” But pregnancy did not interrupt her diving activities. Despite the concern of her male obstetrician, Clark continued to dive and swim almost up to the time of birth. She was even sure that “swimming activity throughout each pregnancy was a factor contributing to the extraordinary short and easy labor and birth of all four of my children.”⁷¹ The practice of skin or SCUBA diving was entirely compatible with the virtues of child bearing. Clark preached that diving had a therapeutic value for pregnant mothers under stress. She even suggested that when pregnant women feel “uncomfortable, just strap on an aqualung and go down to 16 feet. Then sit on the bottom for about an hour.” Clark was also quick to highlight, in this same newspaper article, that SCUBA diving was crucial for her discovery of the hermaphroditic groupers.⁷²

The virtues of raising a family in an oceanic environment were important to the health of the family unit, as well as in maintaining her career objectives. “Living and working beside and in the water somehow seemed to make childbearing and raising four

⁷¹ Eugene Clark, Lady and the Sharks, 121-2.

⁷² Jack Viets, “Skin Diving for Mothers-To-Be,” San Francisco Examiner (February 10, 1961), 12.

small children easy to integrate with my job”⁷³ One of the primary reasons for achieving such a balance was that Clark shared the pleasure and burden of raising children with her extended family. “Hera and Aya enjoyed all the extras of having doting grandparents around, and I knew I could go on with work at the Lab, even with a third child on the way, since my mother was always available and pleased to help with baby-sitting”⁷⁴ Just as certain, raising a family at Cape Haze provided a unique learning environment for her children. Clark wrote that the same anatomical discoveries that had been a daily part of Cape Haze research could be replicated while preparing dinner. The practice of cutting a fish open in the lab was not altogether different from cleaning and gutting a fish for dinner. And this simple domestic duty, according to Clark, was a perfect opportunity for enriching the minds of her children. “Children’s first anatomy lessons should be in the kitchen while their mother cleans a fish or chicken. Packaged supermarket foods reduce this possibility, but fathers will probably never give up sport fishing and bringing home their catch”⁷⁵ More than teaching her own children the wonders of the sea, Clark began lecturing to small groups of visiting children, then to whole classes, and she eventually initiated a summer program where students could live and learn about the sea for an extended period of time.

Authors of popular articles were impressed with Clark’s ability to reconcile work with family. An article profiling Clark in a 1960 issue of The Doctor’s Wife entitled “At

⁷³ Eugene Clark, Lady and the Sharks, 123.

⁷⁴ Eugene Clark, Lady with a Spear, 43.

⁷⁵ *Ibid.*, 43-4.

Home in the Ocean” shows how the simultaneous jobs of mother and underwater naturalist share the common trope of postwar domestication. The article begins with a quote from Clark: “‘You’ve got to treat them with respect,’ says Eugenie Clark, wife of orthopedic surgeon Ilias Konstantinu and mother of four. Eugenie, one of the world’s leading ichthyologists, is not referring to her family but to man-eating sharks.” The author goes on to describe the typical day of Clark’s shark research program. First off, she checks on the “‘guest’ sharks who occupy a fenced-off area in Gasparilla Sound.” Then she dives in the open water searching for new members for the “shark club.” She then entices them to take a hook baited with “super market” meat. The article gives a few words on Clark’s thoughts on the exaggerated nature of sharks’ viciousness, and after the standard biography—culled from Lady with a Spear—the article concludes with a depiction of the Konstantinu family in which the ocean, again, becomes a place for familial bliss.

As each child came along, it was given an early dunking: all of them had a prenatal orientation since Eugenie, who believes swimming is good exercise for expectant mothers, kept up her sea diving until the last few weeks of each pregnancy. The fascination of the world beneath the sea is indeed infectious: and from this mermaid mother, the whole Konstantinu family has caught the joys of being amphibious.⁷⁶

Another writer portrayed a similar picture: “Pretty, mother of four, author of the best selling Lady with a Spear, Dr. Clark at 39 doesn’t fit the usual image of a scientist. An internationally famed authority on fishes, and sharks in particular, she doesn’t fit the usual

⁷⁶ Shirley Goodstone, “At Home in the Ocean,” The Doctor’s Wife (March/April, 1961), 25-7. The caption to the family portrait printed in this article reads “A Konstantinu family portrait: *Doctor Ilias, Tak, Iris, Hera, Nicholas and Eugenie*.” This magazine seems to be appropriately named.

image of a housewife either”⁷⁷ It was because she could pull off both jobs at once that Clark seemed to be such an enigmatic and captivating figure

An article in Sports Illustrated explicitly noted Clark’s “double life” as an ordinary housewife and as director of the Cape Haze Laboratory

Dr. Eugenie sometimes finishes work with only a few strands of her dark hair askew. At other times she ends up smelling like a tubful of fish guts, but even on the grisly days, when evening comes, she washes the blood and Formalin away, tucks her fishiest thoughts well back in her mind and becomes the mother of four and the attractive companion of Dr. Ilias Konstantinu, an orthopedic surgeon who loves motorcars and mountains and is most tolerant of his wife’s affection for the odd kingdom of the sea.⁷⁸

Clark’s husband did not tolerate this affection forever. After seventeen years of marriage the two separated. Clark moved to Buffalo and married an existentialist philosopher, bringing the children with her. After a time the children left to live with their father in Florida. These events elicited no comment from the press.

* * * * *

Clark rarely discussed feminist issues publicly, but we can view some of her thoughts in a 1979 interview for Ms. Magazine. Pressed to talk about her four marriages and divorces, Clark responded tellingly. “It seems as though women keep growing. Eventually they can have little or nothing in common with the men they chose long ago.” The reporter also interviewed one of Clark’s friends who “often asked Genie, ‘How come you’re so strong?’ ‘It’s the women who make decisions,’ she says. ‘Women are strong,

⁷⁷ “Scientist with a Fishing Spear,” St. Petersburg Times (October 17, 1961)

⁷⁸ Coles Phimzy, “Lovely Lady with a Very Fishy Reputation,” 47

women are the doers, that's the way it is ""⁷⁹ Of course, these are the sentiments of a woman well after the counter culture of the 1960s and the backlash of the 1970s. But I'd suggest that Clark's feminism emerged much earlier as she broke from expectations about women and work, and women and science, as she edged her way into the male-dominated world of natural history. But her status as a heroic explorer of strange lands and as a naturalist undertaking the "dangerous" activity of diving was mediated, as a female scientist, by themes of domesticity: gender, sexuality, mating, conditioning. Only by embracing a culture of domesticity could she fight against the feminine mystique. A full-blown woman's rights movement emerged in the 1960s that attempted to address discrimination in the workplace by, in part, fighting against the cult of domesticity that saturated American culture in the years following the war.⁸⁰ In contrast, Clark's peculiar form of feminism embraced a domestic ideology at the same time as it fought against prejudices against women in the workplace and women in science.⁸¹

A few things can be stated very clearly. First, Clark's work had the effect of domesticating the ocean. Whether it be her portrayal of the Pacific Ocean as a docile, friendly, and well-behaved playground, or her attempts to modify the behavior of sharks to answer a dinner bell, or her sermon on the therapeutic value of the sea for mothers-to-be, Clark created an oceanic realm that was an extension of the postwar domestic household.

⁷⁹ Madeleine Lundberg, "Eugenie Clark: Shark Tamer," Ms. Magazine 8 (August, 1979), 15.

⁸⁰ William Chafe, The Paradox of Change, 194-213.

⁸¹ A similar argument is made by Louise Newman's analysis of Margaret Mead which demonstrated that Mead's feminism was not a decisive break, but rather a startling continuation of Victorian ideas about race and gender. "Coming of Age, but not in Samoa: Reflections on Margaret Mead's legacy for Western Liberal Feminism," American Quarterly 48 (June 1996): 233-70.

Second, the popular coverage of Clark's work consistently balanced Clark-the-adventurer with Clark-the-mother. At this level, we can see the work of a domestic ideology making sense of a woman who had moved into a traditionally masculine field of work. Related to this, we might say that Clark drew from a culture of domesticity in order to legitimize her status as a naturalist who was doing the heroic and adventurous work of a male dominated science.⁸² Her move into masculine territory was balanced by her status as mother and wife. Less certain is the manner in which a domestic ideology informed her work as a scientist. Why did American Museum naturalists assign Clark the job of exploring the sexual behavior of guppies? Why the interest in modifying shark's behavior? Is it significant that a naturalist who combined both masculine and feminine traits in an uneasy balance, vigorously explored the hermaphroditic grouper? One answer to these questions is that Clark legitimized her postwar feminism by citing similar examples from the oceanic realm. As she moved into a postwar climate that discriminated against women in the workplace, as she fought for legitimacy in a power-structure of science that discouraged female participation, and as she explored the perpetually "dangerous" seas that had previously been the work only of men of great daring, Clark drew from a culture of domesticity to ameliorate these transgressions. It is in this light that we understand how Clark's domestication of the ocean functioned to legitimize her status as a women explorer of the underwater realm.

⁸² In a 1994 interview, Clark said that "it amused me that when I did do some of the things (e.g. diving in caves with 'sleeping' sharks) considered 'macho male accomplishments' that I was given more credit than males for doing the same thing they did. It helped to balance some of the prejudices against females." Eugene K. Balon, "The life and work of Eugene Clark: devoted to diving and science," 122.

Concluding Remarks and Speculations on a Theory of Frontier Replacement

The objective of this dissertation has been to discuss and analyze the work and popular representations of oceanic naturalists during a period of history in which the ocean began to play an important role in American affairs. Oceanic naturalists were partly responsible for making the ocean known and knowable for a nation of landlubbers. They bearded ships under the power of wind and steam to engage in the task of exploring little known regions and researching the lives of little known oceanic inhabitants: whales, sea-birds, deep-sea fish, sharks, and groupers. They created portraits of oceanic environments and brought them back to American publishing houses.

Andrews' was an ocean of adventure and commercial resources. Just as the symbolic "closing of the frontier" threatened to end a century of cheap and abundant natural resources, and also put an end to those virile frontier activities so important in proving one's manhood, Andrews turned to the ocean as a new frontier of commercial and hunting interest. Murphy's historical view of nature created a heterogeneous ocean of walls and hedges to which various organisms were inflexibly adapted. He provided the first biogeography of the sea and showed how islands and continents, too, had evolved delicately balanced relationships with oceanic conditions: fragile relationships that quickly fell victim to the sweep of western colonialism. He, just as Andrews, viewed the ocean as full of commercial products, but Murphy's resource utilization was balanced with a true appreciation, a value for marine organisms' historical specificity and temporal evolution. Beebe's was an ocean of majestic beauty, wonder, awe, and unfathomable power. When

he reported his observations from the bathysphere window, he was doing the work of Lewis and Clark and Columbus, the work of bringing back a region unknown to human eyes. His voyages of exploration, like Murphy's were also trips into the past. Reporting on the birth of Galapagos volcanoes, the history of the Hudson Gorge, and the prehistoric creatures of the ocean deep, Beebe's ocean accreted a value derived from slow evolutionary processes. The message was emphasized by Rachel Carson whose natural histories of the ocean made the evolution of terrestrial organisms - humans among them - a small part of a planetary history in which the role of the ocean was paramount. In a postwar environment in which the ocean held great promise as a geography of economic value and national security, Carson's natural histories reinforced the important message that we live on an ocean planet. It was at precisely the same time that the ocean was invaded by millions of new organisms with artificial eyes, fins, and spearguns. Eugenie Clark's ocean was a logical outgrowth - and an early manifesto - in the postwar explosion of underwater recreation. Her ocean was full of gentle beauty and safe organisms - a geography of recreation.

I have shown how these various oceans emerged from the matrix of natural history. In each case, a specific kind of ocean took on meaning and form as a function of the natural history being practiced. Andrews' work aboard steam-powered whaling vessels gave rise to a desire to modernize the practice of natural history. His failure to maintain a scientific program aimed at investigating whales demonstrates the limitations of such a move on an epistemological level, though on a practical level he integrated business and organizational methods to modernize the practice of exploration by mounting

interdisciplinary scientific campaigns on vast regions of the Gobi. It might be argued that there can never be a “new” or a “modern” natural history, for what gives the term a distinctive meaning is its historical nature.

In sharp contrast, Murphy’s expedition aboard the Daisy moved in the opposite direction; his natural history was much more in line with a “classical” tradition in which the value of temporal evolution and historical specificity were paramount. His biogeographies of the oceans and environmental histories of islands, his desire to conserve natural resources and preserve fragile ecological systems, were all logical outgrowths of his historical vision, the historical practice of the natural historian. Murphy was thus the quintessential “museum naturalist.”

William Beebe’s natural history was an outgrowth of his management of the New York Zoological Society’s Department of Tropical Research, the maintenance of which required wide public attention. To sustain the Department as a site of serious scientific research, Beebe became a public personality and his bathysphere dives, one might argue, functioned as a mechanism to court public attention. Doing so, however, seriously called into question the scientific value of his research, and the work of the Department in general. Beebe’s biocentrism and his articulation of a sublime ocean served as a check to his status as a heroic explorer.

Carson’s ocean was a function of a natural history that stemmed from two traditions: a literary genre that prized representations of nature, and a scientific journalism whose focus was science. Carson’s love for experiencing nature first hand framed her nature writing. Her nature writing was also influenced by the nature literature of Beebe,

Jeffries, Teale, and others who had created representations of nature that were humble and biocentric. Carson's science writing was an obvious and logical extension of her work as an editor for the Fish and Wildlife Service, a practice of natural history that involved visiting research stations and fisheries, and interviewing scientists and fishermen. The Sea Around Us was a powerful merger of these two traditions that was given particular force by a postwar increase in oceanographic research and a growing realization that the world would need to turn to the sea for natural resources and national security.

Eugenie Clark's domestication of the ocean took place within a decisive shift in the practice of natural history as marine biologists began to bodily enter waters to conduct scientific research. Her story, however, is complicated by the problem of negotiating popular gender conceptions in the postwar period. Clark was battling the same forces as the popular press's refusal to accept Beebe's female scientific staff as real scientists. The work of exploration, the work of diving and spearfishing, "work" in general, were not thought to be the activities of women. Clark worked against these cultural perceptions by drawing from a culture of domesticity to create an ocean populated by beautiful and benign organisms. Her work along these lines was a kind of preparatory activity for an ocean that was fast becoming a geography of recreation.

I have also presented two organizational histories that give further context to the practice of natural history. The Explorer's Club was a metropolitan space to which explorers returned in the off-season. Andrews, Murphy, and Beebe were all prominent members and could be seen giving papers at smokers and annual dinners. The Club functioned to control the meaning and practice of explorers, to help explorers define

themselves as men and as naturalists. The work of maintaining exploration as a serious scientific endeavor, and the job of securing patrons, was done around the Club's long table and within the Club's popular publications. The legitimizing work of Andrews and Beebe was thus a kind of dialogue between their field work as naturalists and the metropolitan business of disseminating that work. The Club is also a fitting window into the patronage of natural historical investigation at the turn-of-the-century which was often elite and aristocratic. Natural historians like Andrews, Murphy, and Beebe received funding from wealthy patrons. In exchange, they were to bring back representations of far-away regions to Club "stayathomers."

The federal government, too, has sponsored the natural historical exploration of frontier regions like the West, the Philippines, Hawaii, and Alaska. After World War II, however, government support of natural history entered a new phase that might be termed "big natural history." This is nowhere more evident than in the Office of Naval Research's support for oceanography, and the Pacific Science Board's organized campaign to investigate the natural history of Micronesia, America's new possession that resulted from World War II. The western Pacific, and the entire ocean, became an important frontier for ensuring national security; oceanographers and naturalists were thus called into service to do the basic work of frontier exploration. This was an ambivalent colonization, however. America was allowed to maintain military sites in Micronesia only as it maintained the health and security of native oceanic peoples. At the same time, naturalists attempted to rebuild and preserve natural oceanic environments that had fallen victim to wartime catastrophe and postwar occupation, and their failure to impose a western style of

conservation emphasized the fact that indigenous peoples had developed ‘conservation’ strategies of their own that hinged on their knowledge of oceanic environments. Rachel Carson observed these efforts from Washington, D.C. in the late 1940s and integrated them into The Sea Around Us. Eugenie Clark was a field-researcher in this initiative and brought back to America a new practice of exploration-diving- that she integrated into her research program at Cape Haze.

* * * * *

It is somewhat surprising to find that the relationships between natural historians and the ocean were, and continue to be, so very terrestrial. The figures discussed in this dissertation had many land-based analogs. Ocean dwelling cetaceans in the hands of Roy Chapman Andrews were to be economically managed as per the foresting policies of Gifford Pinchot. More than a geography for efficient utilization of natural resources, Andrews also thought the ocean was a kind of playground, or a hunting-ground, not entirely dissimilar from the activities of the Boone and Crockett Club. The historical vision of Robert Cushman Murphy had analogs in the Yosemite-tromping John Muir and even the biogeographies of Darwin and Wallace. Just as Cook and Peary were treading ground on McKinley and in the Arctic that had never felt the transient touch of human feet, so too did William Beebe become a bold explorer and witness to spectacles of the deep sea, and just as Clarence King mounted Shasta to express the sentiment of the sublime, so too did Beebe invoke the same emotion to represent the terrible, awe-inspiring, and other-worldly geography of mid-ocean depths. The ambivalent annexation of oceanic territories in Micronesia seems a bit like a seaward manifest destiny, and just as

the accumulation of western lands provided an environment for a peculiar mix of military force, commercial prospectors, and government exploration, so too did Micronesia become a territory of geographical promise. As continuously pointed out by ecocritics and scholars of nature writing, Rachel Carson's predecessor was none other than Aldo Leopold, but if we briefly turn our gaze away from Silent Spring, we see that what Leopold accomplished in his articulation of a land ethic, Carson did in fostering an ocean consciousness in The Sea Around Us. And just as naturalists had made the grandest and most foreboding of western landscapes into tame spaces of tranquility and recluse through the national park movement, so too did Eugenie Clark portray a friendly ocean of trainable organisms and family fun.

This dissertation ends just shy of some major changes in the human relationship with the ocean. Rachel Carson was absolutely right: postwar America, indeed much of the world, turned to the seas to relieve the pressures of terrestrial existence. Ocean fishing directly after the war summed to a modest 20 million tons worldwide, but by the 1960s this figure had trebled to 60 million tons and we are now closing in on the century mark.¹ New fishing technologies have caused massive destruction through the taking of non-targeted organisms, those same netting and trawling operations have caused massive destruction to sea-floor beds. The immensity of the ocean legitimized its treatment as a dumping ground with an infinite capacity for diluting nuclear and other hazardous wastes.

¹ Sylvia Earle, Sea Change: A Message of the Oceans (New York: Fawcett Columbine, 1995), 185. On postwar fishing, see Arthur McEvoy, Fisherman's Problem: Ecology and Law in the California Fisheries, 1850-1980 (New York: Cambridge University Press, 1990), 187-206, and Paul Fye, Arthur Maxwell, Kenneth Emery, and Bostwick Ketchum, "Ocean Science and Marine Resources," in Edmund Gullian (ed), Uses of the Seas (Englewood Cliffs, NJ: Prentice-Hall, 1968), 17-68.

Recreation on fragile islands in the Pacific and coral reefs world wide have overtaxed systems that had seldom witnessed flippers and spearguns. If you went on a guided SCUBA tour of Florida's coral reefs in the 1950s, you would be urged to not touch certain corals that might give you a nasty rash. Guides today demand that you not touch corals because the simple brush of a flipper can wipe clean years' worth of work by coral polyps.² Finally, the Torrey Canyon oil spill of 1967 would prove to be a relatively benign incident when compared to the Exxon Valdez debacle.

Natural historians have been fairly vocal in calling attention to these destructive practices. Carson's new preface to The Sea Around Us (1961), warning of the problems presented to ocean ecology by nuclear waste disposal, signaled a message that would be further articulated by Wesley Marx's diatribe against ocean pollution and over-fishing. The title of his book, The Frail Ocean (1967), expressed an almost entirely novel way of looking at the ocean. While Jacques-Cousteau's earlier representations of the sea partook of much of the same wondrous glory of Beebe, Carson, and Clark, his later work highlighted the blight of the ocean caused by human exploitation of marine resources. Cousteau began his public career as an explorer, but by the 1970s he was noted for his environmentalism. Thor Heyerdahl underwent a similar swing. Kon-Tiki portrayed a vision of the ocean as a purely natural and pristine geography, a place of seclusion and regeneration. When he participated in a similar archeological reenactment in 1970 aboard

² The destruction of coral reefs has a complicated history that resists the always expedient explanation of simply placing the blame on humans as violators of natural environments. For a fascinating history of the Crown of Thorns starfish, see Jan Sapp, What is Natural? Coral Reef Crisis (New York: Oxford University Press, 1999).

the Ra II, he bemoaned the startling quantities of petroleum flotsam that were a daily spectacle as he traveled across a stormy Atlantic. He too became an environmental activist. Eugenie Clark played a local role in fighting against dredging, overfishing and pollution issues close to her home in Sarasota, Florida. Clark's localized conservationist message passed to her student, Silvia Earle, who has gained international status as a whistle-blower and ardent conservationist (and a deep-sea explorer of some repute). Earle's plea for an ocean-ethic, Sea Change (1995) has been recently echoed in Carl Safina's Song for the Blue Ocean (1998), and Colin Woodard's Ocean's End (2000).³

Now, just as my explorers followed in the footsteps of terrestrial naturalists, so too have these environmental activists portrayed the problem of ocean decay by drawing analogies from the environmental problems of landlubbers. For instance, Wesley Marx began his critique with the following description:

Recently I roamed through a dying forest. The blades of bulldozers and the teeth of power saws killed this particular forest. No towns or farms or log runs emerged to give meaning to its vanishing, for it lay deep within the sea. Huge seaweed plants called giant kelp once formed a lush foliage that sheltered life as profuse and vital as that of any land forest. Today the forest is no more.⁴

Environmental regulations have followed suit. Scientific-minded conservationists with the Fish and Wildlife Service have worked with international agencies to regulate sustainable catches and maximum yields. Charismatic critters—dolphins, whales, green sea-turtles, down to the ridiculous situation of saving a single whale—are the ocean-dwelling analogs

³ Chief Justice William O. Douglas, an ardent defender of environment in the 1960s, cast the problem of ocean pollution and overfishing as an international issue. "Environmental Problems of the Oceans: The Need for International Controls," Environmental Law 2 (Spring 1971): 149-166.

⁴ Wesley Marx, The Frail Ocean (New York: Ballantine Books, 1967), 1.

to the rhinoceros, the big-horned sheep, and the buffalo. And just as Americans have created small “islands” of natural forests and grasslands cordoned off from commercial development, so too has the National Marine Sanctuary initiative spearheaded by Earle attempted to create minute vestiges of pristine seascapes along America’s coasts.

Perhaps one of the greatest ironic coincidences in the history of the frontier dialectic is that just as America began over-exploiting the oceans in the 1950s and 1960s, we turned to yet another final frontier—space. And just as the ocean exploration described in this dissertation had a terrestrial characteristic, so too did space exploration take on a kind of oceanic feel. The initial Mercury cosmonauts were bold and adventurous explorers, the natural analog to Beebe and Andrews. The colonization of space, Moon, and Mars, was hoped for with an enthusiastic ambition similar to that of oceanographers who attempted to colonize the ocean floor in the 1960s. The sea-space analogy has had particular cachet in popular culture. Gene Roddenberry’s Star Trek is rife with nautical imagery. The Enterprise itself is a thoroughly nautical vessel. The plot of the movie Star Trek II was modeled on Moby Dick. A pseudo-environmental Star Trek IV confirmed the long held new-age suspicion that humpback whales are actually interstellar explorers, in the end, the moral warned us of earthly demise lest we take care of them. Next Generation’s Jean Luc Picard was personally baptized by Roddenberry after deep-sea hero August Piccard (previously the stratosphere explorer in Chapter 4). In actuality, space has not yielded the colonial and economic dividends of frontier exploration, and we do not talk about over-exploiting stellar resources. Though there are now efforts being made by commercial satellite companies to create devices that will clean up the orbiting flotsam

caused by decaying artificial moons. And the recent 30th anniversary of the lunar landing gave rise to some wild speculation of space-tourism that sounded like Arthur C. Clarke's underwater resort mentioned in Chapter 7.

Frederick Jackson Turner suggested that there was a frontier process that characterized America's movement westward in the nineteenth century. From the Shenandoah Valley to the old north-west, across the plains, over the Rockies and thence the Sierra Nevada, these were geographies that yielded to a similar repertoire of expectations and realizations. Such grand theorizing is completely out of fashion, but I do believe that there is promise in at least thinking about frontier processes—rhetorical and practical—that extended beyond the west to the earth's oceans and then to space. Such an examination will likely reveal some stunning continuities in how Americans have dealt, and continue to deal, with new geographies.

* * * * *

The naturalists discussed in this dissertation were part of the wider process of making the ocean known as a real geographical place. In the nineteenth-century, the popular imaginary conceived of the ocean as a geographical boundary, a region to be crossed to get to another land. This geographical mindset showed signs of changing with the popular reception of Melville's oceanic stories, an interest in coastal marine biology, the growth of recreation on America's seashores and, to a limited extent, the popular attention of the Challenger Expedition. But Americans generally had their gaze pointed toward the interior of the continent.

Even as I write here in the middle of Oklahoma, as my eye moves along a

seemingly endless horizon of grasses and scrub-oak, I am keenly aware that the continent on which I stand is but an island on an ocean planet. I can appreciate an El Niño event that causes weather patterns to change worldwide. I know of the important role the ocean plays as a thermostat in the balancing of global thermodynamics. I have seen the tropical reef fish that populate the waters of Southern Florida. I might even share a can of tuna fish with my cat this afternoon. At the same time, I am aware that the ocean shares in the capitalist fate of world-wide change. In years to come, global warming will lead to higher sea levels that will drown portions of Oceania and even threaten my beloved South Florida. I have made a modest contribution in fighting the establishment of off-shore drilling rigs that increasingly populate the Gulf of Mexico. The tropical fish I have seen underwater are but a sad vestige of a former day when pressures from coastal population did not weigh as heavily as they do now. There is little solace in my can of dolphin-safe tuna, or knowing that Willy now swims in colder waters.

I came to my understanding of the ocean through a television set that fed me the work of Jacques Cousteau on National Geographic specials. I've watched along as undersea naturalists went about the work of studying blue whales. I sat with my father watching tired reruns of Seawolf and Voyage to the Bottom of the Sea. I've seen sharks constantly portrayed as the top predators of the ocean from Jaws to the ever popular programs on Shark Attack. As I got older, I entered the coastal waters of South Florida to take in some of that environment that I had only seen on TV and the silver screen. The ocean is a wilderness, in my mind, full of wonder and glory and power. It is an environment that calls for conservation, protection, and stewardship.

My childhood diet of mass-media oceanic representations was a continuation of the work done by the naturalists discussed in this dissertation. They were the explorers who made the oceanic frontier known as a place. Now, it is not logically necessary that they did the work that enabled the world's postwar turn to the oceans by way of massive fishing operations, deep-sea drilling, toxic disposal, and military maneuvers. While naturalists are not completely innocent of promoting such wanton waste, these are largely the matters of capitalist contingency. But we do have to wonder why the exploitation of the sea so quickly spurred at least some environmental concern and action in the 1960s and 1970s. Here, I do believe, my oceanic explorers did play some role. They turned the ocean into a natural wilderness. When economic forces created a move to exploit oceanic resources, to make the ocean an extension of the North American continent ripe for development, the work of oceanic naturalists enabled the conceptualization of such activities as destructive. In short, their transformation of the ocean into a wilderness place was a necessary precondition for the environmental activism that decried the over-exploitation, pollution, and destruction of an oceanic environment.

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