

THESIS

**THE ART AND SCIENCE OF NATURAL DISCOVERY:
ISRAEL COOK RUSSELL AND THE EMERGENCE OF MODERN
ENVIRONMENTAL EXPLORATION**

Submitted by

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ABSTRACT OF THESIS

THE ART AND SCIENCE OF NATURAL DISCOVERY: ISRAELCOOK RUSSELL AND THE EMERGENCE OF MODERN ENVIRONMENTAL EXPLORATION

Israel Cook Russell was an aesthetically conscious scientist who helped bridge the gap between the late nineteenth-century's scientific explorers, who looked at how nature could best benefit man, and the late twentieth-century's environmental explorers, who looked at how humans could best benefit nature. My thesis argues that Russell's artistic prose and the sympathetic imagery of nature that his prose invoked was essential to the emergence of modern environmental explorers. Furthermore, my thesis argues that modern environmental awareness did not spontaneously emerge in the 1960s. An environmentally conscious sensibility among scientists and naturalists stretches back centuries and was never fully suppressed by the power and influence of economic, commercial, industrial, and political interests. As Israel Russell's generation of scientists, who conducted much of their research directly in nature, gave way to a new era of professional scientists, who conducted most of their research in academic and government laboratories, the reverential relationship between science and nature became less common. Most early twentieth-century scientists may have been more focused on exploring lines of research that were financially supported by imperialist corporations, but scientist's imaginations and awed reactions to nature always remained. Mid to late twentieth-century scientists had similar feelings, but they were more disposed to getting out into the field and experiencing nature firsthand. To help put the ecosystems into context, they looked to the past for inspiration and, eventually, they used science as the

means to achieving a new environmental ethic rather than as an instrument of human domination. In this sense, modern environmental explorers are the descendants of scientists like Israel Russell who, although not nature writers or activists per se, influenced how contemporary scientists (and ultimately the wider public) viewed nature.

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INTRODUCTION

CHANGING VISIONS OF SCIENCE AND NATURE

It is in man's heart that the life of nature's spectacle exists; to see it, one must feel it.
-Jean Jacques Rousseau, French Philosopher, *Emile* (1762)

In science one tries to tell people, in such a way as to be understood by everyone, something that no one ever knew before. But in poetry, it's the exact opposite.
-Paul Dirac, British Theoretical Physicist (1902-1984)

After much anticipation and physical hardship, the adventurers were about to see results. Since early spring 1890 when a recently established scientific association known as the National Geographic Society commissioned this modest expedition, Israel Cook Russell (1852-1906) and his men had been using every available resource to achieve their objectives. Their exhausting journey through the Alaskan wilderness had finally revealed the expedition's ultimate goal. As Russell gazed up through the parting mist, the mountain that they had come to summit finally loomed over them. "The first object to claim attention was the huge pyramid forming the summit of Mount Saint Elias, which stood out clear and sharp against the northwestern sky. Although thirty-six miles distant, it dominated all other peaks in view and rose far above the rugged crests of nearer ranges, many of which would have been counted magnificent in a less rugged land. This was the

first view of the great peak obtained by any of our party.”¹ Israel Russell recorded these observations of a distant peak while he was at the pinnacle of his profession as a scientific explorer. Russell explored the world as a scientist under the auspices of the federal government and the National Geographic Society. However, what was most interesting about his observations was that he merged an environmentally-aware style of prose with scientific observations meant for a mostly professional audience. In doing so, he revealed himself to be a person searching for a new method of communication that could help repair the emerging conflict between professional science, aesthetic preservation, and utilitarian conservation. Russell found that he could develop a keener appreciation of science and nature through outdoor adventure and with compatible intellects in more formal, urban settings.

Scientific societies were not new concepts for the educated men of the nineteenth century. Since Sir Francis Bacon (1561-1626) first wrote about his version of a scientific utopia in *The New Atlantis* (1627), scientific societies became the most logical locations for likeminded men of learning to gather, promote, and advance new understandings about nature.² In addition to being prestigious centers of scientific knowledge, organizations like Britain’s Royal Society (1660) and France’s *Académie des Sciences* (1666) were also centers of political power in the emerging struggle between the various European empires for global domination and profits. This authority allowed the societies to have a great deal of influence over the imperialistic course of scientific discovery and exploration. Due to the patronage and lobbying efforts of these societies, which had a

¹ Israel C. Russell, “An Expedition to Mount St. Elias, Alaska.” *National Geographic Magazine* 3 (1891): 92.

² Francis Bacon, *New Atlantis and The Great Instauration*, Revised Edition, ed., Jerry Weinberger (Wheeling, IL: Harlan Davidson, 1989), 71.

considerable amount of direct influence within their respective regimes, governments decided to send scientists and naturalists—with a litany of detailed instructions and expectations—on many of the imperialist expeditions they sponsored.³ These men returned with vast amounts of information that increased scientific knowledge and aided the spread of European empires.⁴ They also returned with spectacular accounts of the world beyond the shores of Europe that fueled a growing appetite for descriptions of strange and exotic lands. Their accounts, coupled with their scientific discoveries, stimulated the imaginations of people from all walks of life, which ultimately attracted new recruits to the sciences. All of this new knowledge gradually led to an increasing specialization of the sciences and the creation of new scientific societies to legitimize increasingly distinct disciplines.⁵ However, Europe was not the only location where new scientists and new scientific societies emerged.

Once the scramble for the new world was complete and the American Revolution had run its course, a young government realized that it had much to learn about its own land. Over time, the United States acquired much more territory through negotiations with other nations, annexations, and wars of conquest. The borders of the continental United States were complete with the Louisiana Purchase in 1803, the annexations of Texas in 1845 and Oregon in 1846, the Treaty of Guadalupe Hidalgo in 1848, and the Gadsden Purchase in 1853.⁶ In response to a growing curiosity about its new acquisitions,

³ Harry Liebershon, *The Travelers' World: Europe to the Pacific* (Cambridge: Harvard University Press, 2006), 1-2, 77-138.

⁴ Richard Drayton, *Nature's Government: Science, Imperial Britain, and the 'Improvement' of the World* (New Haven: Yale University Press, 2000), 85-106. Also see Richard H. Grove, *Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism 1600-1860* (Cambridge: Cambridge University Press, 1995).

⁵ Drayton, *Nature's Government*, 176-177.

⁶ Richard White, *It's Your Misfortune and None of My Own: A New History of the American West* (Norman: University of Oklahoma Press, 1991), 73-84.

the U.S. government sent military explorers to discover exactly what resources, possibilities, and barricades the land presented.⁷ These government sponsored expeditions were charged with mapping the American West and uncovering its natural resources for the benefit of the government, entrepreneurs, and adventurous citizens. The government primarily sent these early military explorers into the West in order to solidify U.S. government control over the region and identify locations for future settlement, but economics underscored every decision. Private entrepreneurs and industrialists benefited from these explorations, helping to incorporate the West into larger industrial and commercial systems. But before such economic benefits could be realized, adventurous men were needed to investigate the unknown lands to the west.

With great expectations, and a limited but working knowledge of many sciences, these early military explorers moved across a land that was full of wonder.⁸ As motivated and well-meaning as men like Meriwether Lewis, William Clark, Zebulon Pike, and John C. Frémont were, they were soldiers first, and they often lacked the specialized training needed to properly identify, describe, and classify the resources scattered about the western landscape. This is where the academically trained scientists stepped in. Professional scientists lent credibility to early military expeditions as knowledgeable

⁷ William H. Goetzmann, *Army Exploration in the American West* (New Haven: Yale University Press, 1959), 4-6.

⁸ See some of these additional works for a more complete historiography: William deBuys, ed. *Seeing Things Whole: The Essential John Wesley Powell* (Washington and London: Island Press, 2001); William H. Goetzmann, *Exploration and Empire: The Explorer and the Scientist in the Winning of the American West*. (Austin: Texas State Historical Association, 1993); John Muir. *The Eight Wilderness Discovery Book*. (Seattle and London: The Mountaineers and Diadem Books, 2004); Stephen J. Pyne, *Dutton's Point: An Intellectual History of the Grand Canyon* (Grand Canyon: Grand Canyon Natural History Association, 1982); James P. Ronda, *Revealing America: Image and Imagination in the Exploration of North America* (Lexington: D.C. Heath and Company, 1996); Aaron Sachs, *The Humboldt Current: Nineteenth-Century Exploration and the Roots of American Environmentalism* (New York: Viking, 2006); and Michael L. Smith, *Pacific Visions: California Scientists and the Environment 1850-1900* (New Haven: Yale University Press, 1987).

experts, and they soon began leading their own expeditions. Military resources were scarce following the Civil War and the limited numbers of military forces in the West were needed to displace Indians and protect encroaching settlers. By the latter half of the nineteenth century, a new type of scientific explorer was emerging from the universities and government sponsored surveys of the American West, an explorer first and foremost a scientist. These men appeared on the heels of some of the most celebrated American military explorers who had rediscovered massive canyons, mountain ranges, and river systems which would provide rich resources for a growing nation. They were as curious about the world as their predecessors, and they wanted to share their knowledge. They learned the techniques of field work from their scientific predecessors, from their experiences and the writings of contemporaries like John Muir and John Burroughs, they learned how to express themselves using the language of nature appreciation.

The post Civil War era was also a time of massive social, political, and economic change. On top of the failures of Reconstruction, market capitalism and the government on all levels seemed to be failing the citizens of the United States. The increasing size, money, power, and unscrupulous activities of urban-industrial corporations coupled with a seemingly endless supply of immigrant labor shaped a climate of polarization between the rich and the poor.⁹ Political corruption and patronage, from local to federal levels, fed the public's distrust of the corporate and political worlds that it felt helpless to change. Fraud, waste, and abuse were normal activities that were generally not hidden from the public's gaze.¹⁰ However, this atmosphere of mendacity did not last forever. In the last

⁹ Samuel P. Hays, *Conservation and the Gospel of Efficiency: The Progressive Conservation Movement, 1890-1920* (Pittsburgh: University of Pittsburgh Press, 1999), 122-127.

¹⁰ James Miller and John Thompson, *National Geographic Almanac of American History* (Washington D.C., National Geographic Society, 2006), 190, 208.

years of the century, progressive men and women began actively to seek ways to reform corporate and political greed, waste, and abuse. These reformers argued that waste and inefficiency had permeated all levels of corporate and political bureaucracy. The solution to a happier, healthier country was expertise. Progressives promoted academically trained professionals who could expertly organize, manage, and efficiently control bureaucracies as being central to the successful recovery of national pride, prosperity, and progress.¹¹ These professionals were supposed to identify the most scientifically efficient way to fix a problem and create happiness and success out of bitterness and failure for the common people of the country. This cult of professionalism played an important social and political role in the emergent American empire of the late nineteenth century, and this ideology was highly popular among Israel Russell and his fellow scientists.

New societies and specialized journals fed the scientific explorers' professional curiosity about the world and diffused the knowledge they had gained during their journeys. One of these societies decided to sponsor an expedition to Alaska in 1890. This relatively minor event marked the beginning of a new era in exploration and professional science that set a precedent for a new type of scientist to emerge during the twentieth century. These twentieth-century scientists were less oriented to imperial and commercial objects and more concerned with the condition our planet's possible fate of becoming irreparably damaged by the accumulated influence of human progress. Essentially, the scientific explorer of the late nineteenth century anticipated a new, more

¹¹ Steven J. Diner, *A Very Different Age: Americans of the Progressive Era* (New York: Hill and Wang, 1998), 29-31.

ecologically attuned sensibility to emerge within the various scientific fields during the twentieth century.¹²

Spring, summer, and early fall were the seasons for exploring the American West during the late nineteenth century. Late fall and winter offered the scientific explorer time for consolidating field notes and for thinking, writing, and meeting in Washington, D.C., to find out what colleagues had accomplished. In order to formalize and legitimize these professional connections, several scientists gathered at the gentlemanly Cosmos Club on a winter evening in 1888 to discuss the possibility of creating a new organization. These men ended up creating a scientific society so that a coordinated body of scientific explorers could discuss and diffuse their unique knowledge. This particular professional organization became known as the National Geographic Society, and its goal of increasing and diffusing geographic knowledge of “the world and all that is in it” eventually influenced an entire generation of citizens in the United States and abroad.¹³ Seated among this original group of thirty three founding members was a somewhat quiet and aloof man. Israel Russell was small in stature and without a magnetic personality, but he did possess the desire, capability, intelligence, and academic training to conduct field work with little regard for his personal comfort and safety. Because of his talents, the National Geographic Society selected him as the leader of its first expedition.

Rather than being passive recipients of scientific knowledge, the National Geographic Society’s members, Russell included, zealously pursued it in the field. In the

¹² For additional context on the connection between scientists and nature writing see Thomas J. Lyon, *This Incomparable Land: A Guide to American Nature Writing* (Minneapolis: Milkweed Editions, 2001), 20-26; and Donald Worster, *Nature’s Economy: A History of Ecological Ideas*, 2nd Edition (Cambridge: Cambridge University Press, 2006).

¹³ Alexander Graham Bell to Gilbert H. Grosvenor, 5 March 1900, Washington, D.C., Manuscript Division, Library of Congress, Folder 19, Box 6, Part II.

spring of 1890, Russell's expedition unknowingly opened an entirely new path of discovery in America, shifting it from its earlier focus on identification and exploitation to one that concentrated on environmental conservation, preservation, and awareness. This was, of course, a process that took decades and was mostly out of the public's consciousness until the 1960s, but Russell's work anticipated that of his mid twentieth-century successors. He was a professionally trained scientist who observed landscapes that were scientifically and economically significant, but he also uncovered diverse ecosystems that were significant in their own respects as well as aesthetically pleasing. America's development of, and disregard for, its resources would not go unchecked forever, and men like Russell exemplified the research, writing, and emotional expression that would be characteristic of the twentieth-century's environmentally conscious explorers. Environmental explorers like Jacques-Yves Cousteau, Carl Sagan, Robert Ballard, and Edmund Hillary, for example, captured the popular imagination of the world through their expeditions and research. At the same time, they resisted reductionism and instrumentalism during an era that witnessed the increasing authority of universal scientific understandings and progress. They became famous for their accomplishments in the natural world, but they then used that fame to promote the scientific understanding of diverse, interconnected ecosystems rather than the imperial and commercial exploitation of them. I define these twentieth-century descendants of Israel Russell's vision of science and his sense of wonderment about the natural world as environmental explorers. The story that follows is about one man who saw something more than rocks, minerals, and resources on his expeditions; it is about how direct experience in nature changed the sensibility of an upper-class professional scientist living during the Gilded

Age. Because of explorers like Russell and developing societies like National Geographic, the twentieth century slowly became a century of environmental exploration, awareness, and appreciation rather than just unchecked exploitation.

Israel Russell started and ended his professional life as a scientist and scholar, but he was much more than that. He was a field researcher, photographer, naturalist, and explorer for the United States Geological Survey. He traveled the world and made insightful observations about the physical and natural environments he encountered. He published well over one hundred articles for popular periodicals and scientific journals and several scientific monographs for general educational purposes. His works on the volcanoes, lakes, rivers, and glaciers of North America were standard texts on the subjects for many years. Russell also was a member of multiple scholarly and popular societies and at the time of his death he was the president of the Geological Society of America. Mountains, fjords, glaciers, islands, and extinct lakes have been named after him. New York University and the University of Wisconsin presented him with honorary Doctor of Laws degrees.¹⁴ Russell's life was not an accident, but a carefully considered voyage that led him toward professional and personal fulfillment.

Russell was a highly educated man who was able to participate in America's imperial process through the government-sponsored application of his training, intellect, and artistry. As William H. Goetzmann would see it, Israel Russell participated in the final stage of the government sponsored rediscovery of the West. This stage focused on the West as a "natural laboratory" where the scientific specialists added knowledge to the

¹⁴Alfred C. Lane, "Israel Cook Russell (1852-1906)" Reprinted from the *Proceedings of the American Academy of Arts and Sciences* 53, no. 10, (September 1918), United States National Museum, Department of Geology Biographical File, Smithsonian Archives, Folder 13, Box 16, Folder 13, Record Unit 7230, p. 855-858; and Grove Karl Gilbert, "Israel Cook Russell: 1852-1906." *Journal of Geology* 14, no. 8 (1906): 663-667.

“programmed” system of national progress.¹⁵ In addition to this historical framework, Michael L. Smith would consider Russell a key contributor in the reformation of “scientists’ social objectives—fostering an environmentally literate public to shape resource development.”¹⁶ However, Smith argued that these scientists did not feel that it was their “professional responsibility” to work for social and political ends. According to Aaron Sachs, Russell probably belonged in the ranks of the late-nineteenth-century “Humboldtians” who traveled the world and observed the “unity of diversity”: examining objects from the smallest fossils to distant planets and finding in them an order and stability that they believed lay at the heart of ecological relationships. Sachs argued that it was the specialization and professionalization of science—with which Russell was intimately involved—that caused the decline in the Humboldtian’s influence.¹⁷ Additionally, Donald Worster placed men like Israel Russell among the nineteenth-century geographers “who drew the map for the freshly christened science of ecology.”¹⁸ Russell’s significance can be found within these arguments. He was a professional scientist who participated in “Humboldtian” expeditions, observed the “natural laboratory,” and wrote vividly about the landscapes that he encountered.

Russell worked directly in the shadow of some of the most famous and influential military and scientific explorers of the American West. He was acquainted with Grove Karl Gilbert, John Wesley Powell, and C.E. Dutton through his employment with the U.S. Geological Survey and through his status as one of the founding members of the

¹⁵ William H. Geertzmann, *Exploration and Empire: The Explorer and the Scientist in the Winning of the American West* (Austin: Texas State Historical Association, 1993), 180, 303.

¹⁶ Michael L. Smith, *Pacific Visions: California Scientists and the Environment 1850-1900* (New Haven: Yale University Press, 1987). 7.

¹⁷ Aaron Sachs, *The Humboldt Current: Nineteenth-Century Exploration and the Roots of American Environmentalism* (New York: Viking, 2006). 12-13, 18-19, 333-337.

¹⁸ Donald Worster, *Nature’s Economy*, 193.

National Geographic Society.¹⁹ Russell was also acquainted with some of the leading environmental writers of the late nineteenth century. He had contact with the preservationist John Muir through their mutual association with the American Alpine Club, and with the conservationist Gifford Pinchot through the National Geographic Society.²⁰ These men, each a significant actor in the evolution of western American exploration and the emergence of a national environmental consciousness, influenced Russell in one way or another. Israel Russell helped bridge the gap between the late nineteenth-century's scientific explorers, who looked at how nature could best benefit man, and the late twentieth-century's environmental explorers, who looked at how man could best benefit and appreciate nature.

The historian Stephen Pyne has argued that in the western landscape, geologists like Russell became the rising stars of the scientific world.²¹ American geology became more professionalized and well-respected as geologists systematically developed methods and theories concerning the age of the earth. Eastern intellectuals also recognized these landscapes for the beauty and wildness they possessed. The United States was still in its adolescence during the nineteenth century and maintained an inferiority complex in comparison to European culture. Democracy and freedom in a primitive land was no match—in many intellectuals' minds—for culture and art in the Old World. However, as western exploration revealed, America's natural resources and awe-inspiring landscapes easily could be compared to the greatest works of art and architecture Europe had to

¹⁹ Gardiner G. Hubbard, "Members of the Society" *National Geographic Magazine* 1, no. 1 (1888): 94-98.

²⁰ "Officials," American Alpine Club, <http://www.americanalpineclub.org/pages/page/85>: Accessed 15 Nov 2006.

²¹ Stephen J. Pyne, *Grove Karl Gilbert: A Great Engine of Research* (Austin: University of Texas Press, 1980), 4.

offer.²² Professional scientists and explorers were sent into these western landscapes to observe and report on what they found with an eye for the future growth and wealth of the nation. At the same time, nature writers ensured that the masses were aware of nature's sublime beauty and the necessity to care for and preserve it.²³ While, as Char Miller has argued, conservationists like Gifford Pinchot were acutely aware of the natural splendor, they choose to focus on utilitarian resource renewal and "wise" management rather than aesthetic preservation.²⁴ Wallace Stegner argued that scientists like John Wesley Powell, Grove Karl Gilbert, and C.E. Dutton recognized the beauty of the landscape, but also searched for ways nature could be responsibly utilized for the nation's benefit rather than for personal, capitalist gains.²⁵ The atmosphere in which Russell lived and worked was full of uncertainty and change. It was a period that witnessed the ascension of professional scientists along with an emerging awareness among intellectuals and the public concerning modern urban-industrial society's impact on the natural world. In this environment, men like Russell were faced with a dilemma: what was more important, the nation's economic needs or nature's long term protection?

Israel Russell most likely would not have identified himself as an environmentalist, but he would have called himself a scientist first—with writer, poet, and woodsman somewhere in the mix—and he probably would have included "naturalist" as a close second in his own self-definition and identity. For Russell, geography, with its sub-discipline of geology, in addition to being a "science of the

²² Stephen J. Pyne, *Dutton's Point: An Intellectual History of the Grand Canyon* (Grand Canyon: Grand Canyon Natural History Association, 1982), 13.

²³ William H. Geotzmann and Kay Sloan, *Looking Far North: The Harriman Expedition to Alaska 1899* (New York: The Viking Press, 1982), 4.

²⁴ Char Miller, *Gifford Pinchot and the Making of Modern Environmentalism* (Washington, D.C. : Island Press, 2001), 6-7.

²⁵ Wallace Stegner, *Beyond the Hundredth Meridian: John Wesley Powell and the Second Opening of the West* (Boston: Houghton Mifflin, 1954), viii-ix.

cosmos,” would help bring all the sciences within the “range of human comprehension” and help man understand how the earth, the land, the seas, the atmosphere, the plants and animals, fit into the cosmic picture. But to Russell, the study of geography was more than the material; it was, as well, an aesthetic and ecological experience. “The ‘life history’ of every feature of the earth’s surface,” he wrote, “and the ‘life-work’ of every process by which those features have been fashioned, together with changes still in progress, as well as glimpses into the future, are to be numbered among the fascinating problems geography has to present. To the study of the earth’s surface may well be added the light, color and motions which give that surface its beauty and variety. I would have the geographer feel that the thoughts of a poet greater than Milton, who ‘with no middle flight intends to soar,’ are interwoven with the bare statement that the study of earth includes its form, dimensions, motions and relation to the sun.”²⁶ Thus, by Russell’s own definition, a geographer’s world of expertise required a significant amount of ecological knowledge and an aesthetic sensibility that was firmly in the naturalist’s cosmic tradition.

The tradition of amateur naturalists had an impressive history which climaxed with the momentous evolutionary theories of Charles Darwin. Since the publication of *On the Origin of Species* in 1859, however, the authority of academically trained scientists began to supersede the naturalist tradition in the eyes of professionals, intellectuals, and the general American public.²⁷ Scientists became omniscient experts while naturalists became curious amateurs. Expertise could find the best way to produce

²⁶ Israel C. Russell, “Cooperation Among American Geographical Societies,” *Science* 21, New Series, no. 526, (Jan. 27, 1905), 122-123.

²⁷ For additional information on Darwin’s significance as a naturalist see Charles Darwin, *The Darwin Compendium: Voyage of the Beagle, Origin of the Species, Descent of Man and Selection in Relation to Sex, Expression of Emotions in Humans and Animals, Autobiography*, with an introduction by Brian Regal (New York: Barnes and Noble, 2005).

knowledge, efficiency, and profits during a time (the late nineteenth century) that witnessed an increasing rate of corruption, waste, and inefficiency within government and corporate bureaucracies. Yet the naturalist tradition was never fully disregarded by Israel Russell. He was a naturalist in the tradition of Alexander Von Humboldt and Henry David Thoreau, a celebrator of the complicated magnificence of nature. Additionally, a general feeling of disenchantment spread throughout the world that allowed scientists like Russell to search for spiritual fulfillment in natural environments rather than in traditional religious settings. Russell also was an academically trained, scientist-explorer who investigated how the environment could best be used to benefit man. Somewhere between his professional search for scientific utility and his artful descriptions of nature, Russell emerged as a precursor to the twentieth-century's environmental explorers whose purpose was to explore, promote, and protect the environment rather than explore, identify, and economically exploit it. He was a professional scientist who understood the beauty and balance of nature, from the smallest to the most massive scale. Russell also challenged his contemporary imperial paradigm of man's dominance over nature through the expression of a written language that was attempting, on some personal, possibly unconscious level, to deal with the conflict between science and nature. With this in mind, after reading portions of his professional and popular writings, a more nuanced man appeared who truly appreciated nature for its own sake, foreshadowing a style of naturalistic prose and environmental exploration that emerged in the twentieth century.

With the twentieth century arrival of "Big Science," which "values innovation over contemplation, potential profits over ethics, environmental control over preservation and protection, corporate conformity over individual creativity," it seemed that nature

lost out in favor of commercial progress and the dollar.²⁸ Scientific authority appeared to have found new status as it split into to increasingly esoteric and sheltered specialties. Research universities, industrial laboratories, and federal bureaucracies replaced the scientific explorers and their close experiences with nature. However, this depiction is deceiving. Environmental awareness did not spontaneously emerge in the 1960s. There were multiple lines of precedents, often muted or obscure, that ultimately led to Rachel Carson's warnings. Most early twentieth-century scientists may have been more focused on exploring instrumental theories in the laboratory, but their imaginations and awed reactions to nature remained.²⁹ Mid to late twentieth-century scientists had similar feelings, but they were more disposed to getting out into the field and experiencing nature firsthand. To help put the ecosystems into context, they looked to the past for inspiration and, eventually, they "proffer[ed] science not as the ultimate instrument of human domination of nature but as the means to achieving a new environmental ethic."³⁰ In this sense, modern environmental explorers are the descendants of scientists like Israel Russell who, although not nature writers or activists per se, influenced how contemporary scientists (and ultimately the wider public) viewed nature. Additionally, Russell and modern environmental explorers shared a love for adventure that they demonstrated by vigorously hiking, paddling, swimming, and climbing through the planet's various landscapes. Let us now climb with Israel Russell.

²⁸ Michael A. Bryson, *Visions of the Land: Science, Literature, and the American Environment from the Era of Exploration to the Age of Ecology* (Charlottesville and London: University Press of Virginia, 2002), 159.

²⁹ Mark Fiege, "The Atomic Scientists, the Sense of Wonder, and the Bomb," *Environmental History* 12 (July 2007), 580.

³⁰ Bryson, *Visions of the Land*, 136.

CHAPTER 1

THE CLIMB BEGINS

We are surrounded by a rich and fertile mystery.

- Henry David Thoreau, American Writer, *Wild Fruits* (1862)

All my life through, the new sights of nature made me rejoice like a child.

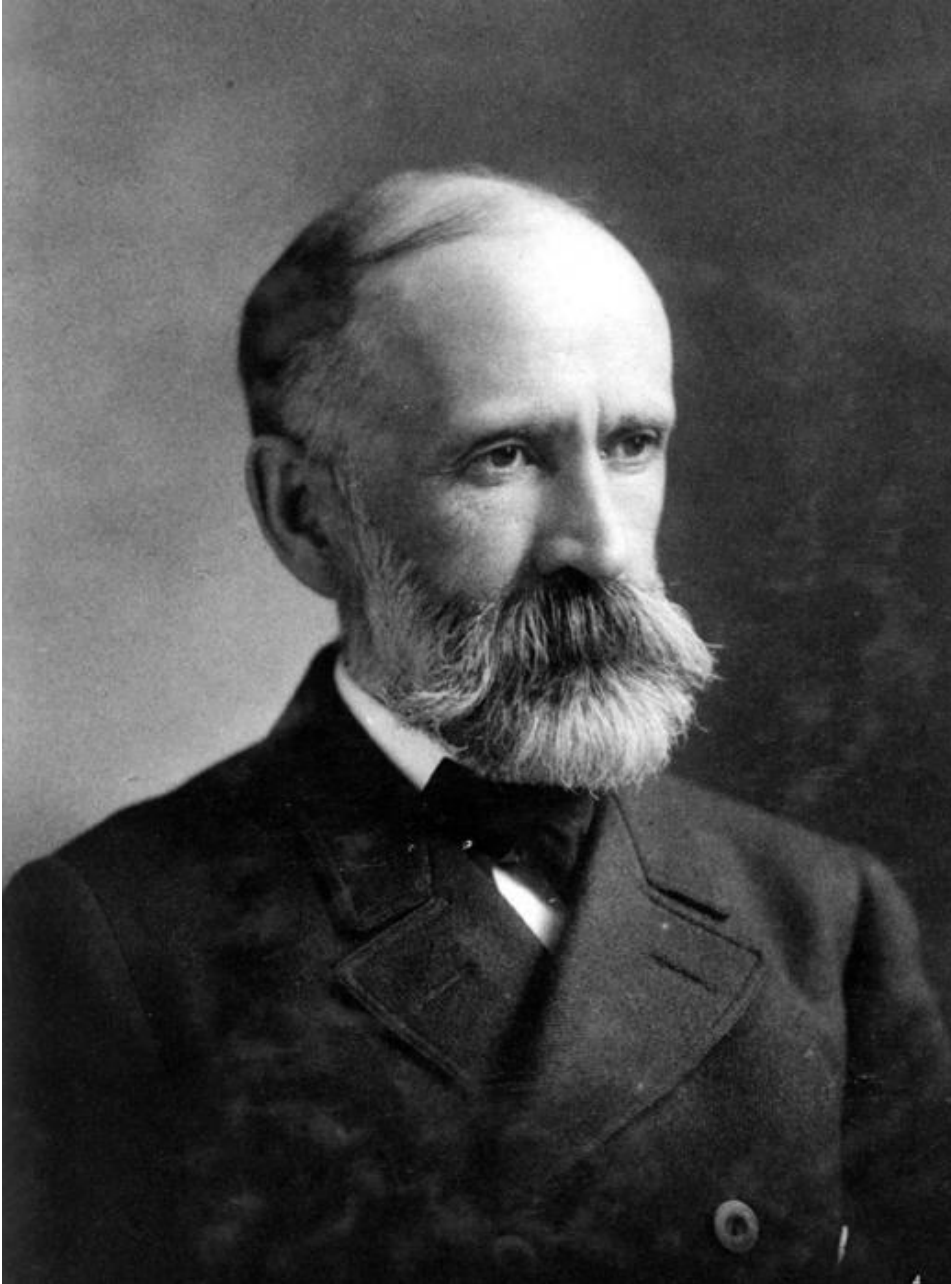
-Marie Curie, Polish/French Physicist and Chemist (1867-1934)

Israel Cook Russell was born in Garrattsville, New York on December 10, 1852, “son of Barnabas Russell and Louisa Sherman Cook Russell.”³¹ His early education was primarily in private schools starting with Rural High School in Clinton, New York where he studied until his late childhood. At age twelve, his family moved to Plainfield, New Jersey, where he attended the Hasbrook Institute in Jersey City, New Jersey, followed by undergraduate studies at the University of the City of New York (later renamed New York University) where he received his Bachelor of Science and Civil Engineering degrees in 1872. He subsequently undertook his graduate studies at the Columbia School of Mines, where he received his Master of Science degree and began his intensive life’s work as a geologist.³² He spent his youth in a rural upstate New York

³¹ Lane, “Isreal Cook Russell,” 855.

³² Gilbert, “Israel Cook Russell,” 663.

Figure 1.1: Israel Cook Russell, late in life; first geologist to explore Alaska for the USGS. 1900.



Courtesy of the U.S. Geological Survey.

community surrounded by the natural expanses of the Adirondack and Catskill Mountains and, during his juvenile years, he was introduced to the urban-industrial communities in and around New York City. Russell was able to see the impacts of human progress on the natural order from an early age in these rural and urban-industrial

settings, influencing him through a lifetime of exploration. Additionally, his post-graduate work and worldwide travels provided him with a vast amount of natural experiences that helped him develop a deeper artistic vision of the landscapes he visited. These initial experiences not only awakened Russell's sense of wonderment concerning nature, but they provided him with a vast amount of material that assisted him in developing a language that combined vivid naturalistic prose with professional scientific inquiry.

Israel Russell did not leave much personal correspondence for later generations of historians and researchers to study.³³ Therefore his life must be pieced together through his published writings and several brief biographies that some of his contemporaries wrote about him following his death. Colleagues remarked that he was quiet by nature, which was considered a personality trait characteristic of his New England lineage.³⁴ In addition to his somewhat reserved, but genial personality, Russell's physical attributes were of a "small and slender" nature which belied the physical stamina and strength he actually possessed.³⁵ Russell's warm personality and diminutive physical appearance were not characteristic combinations for success in a personality-driven and physically-demanding endeavor such as exploration. Yet Russell combined his genial nature and unassuming physical prowess with a professional work ethic and artistic spirit to break free from the traditional mold of the western surveyor. Some of Russell's peers ranked him "with Gilbert and Powell as one of the great geologists [from] the early years of the"

³³ Russell has left a vast amount of published materials, but I have not been able to uncover any significant personal correspondence or memoirs. I have not exhausted the list of possible locations, but I have conducted relatively extensive searches for information at the Library of Congress, the Smithsonian, and the National Geographic Archives. Additionally, I have been in contact with his great-granddaughter, Susan Flynn, in hopes of finding the information I need to fill in the gaps.

³⁴ Lane, "Israel Cook Russell," 856.

³⁵ *Ibid.*, 856-858.

western surveys.³⁶ Moreover, Russell possessed a literary talent and a “keen appreciation [for] the beauties of nature, which he saw not only with the eye of a savant but with that of an artist.”³⁷ His artistic nature was also illustrated through his skill as a photographer.

Prior to the arrival of photography, “geology and landscape painting [had been] closely allied pursuits. Both disciplines, it was pointed out, were rooted in a careful observation of the natural world, and both were dedicated to illuminating the diversity and order” found in the land.³⁸ Artists like Frederic Church and Thomas Moran merged art and science in a highly imaginative and purposeful manner. They depicted geology and geography faithfully, but they also used light and color to instill meaning in the landscapes and to inspire pride in the growing nation. With the development and increasing use of cameras during the nineteenth century, photographers like A.J. Russell and Timothy O’Sullivan began participating in the imperial program of expansion. “Landscape photographs were used to create dramatic, often idealized visions of the vast, remote drylands, canyons, and majestic mountains of Western territories.”³⁹ Photography increasingly became a “tool of scientific exploration” and Russell became an adept student of the craft. He lugged plates, chemicals, and camera parts across the West so that he could tell a more complete story about the landscapes he encountered, because “photographs seemed to make this imagined place more real.”⁴⁰ He also had a message to convey. In the tradition of Timothy O’Sullivan, many of Russell’s photographs combined “scientific explanation with aesthetic experimentation” and he contrasted “harsh

³⁶ Ibid., 856.

³⁷ Ibid.

³⁸ Rebecca Bedell, *The Anatomy of Nature: Geology and American Landscape Painting, 1825-1875* (Princeton and Oxford: Princeton University Press, 2001), ix.

³⁹ May Castleberry, comp., *Perpetual Mirage: Photographic Narratives of the Desert West*, Foreword by David A. Ross (New York: Harry N. Abrams, 1996), 7.

⁴⁰ Martha A. Sandweiss, *Print the Legend: Photography and the American West* (New Haven and London: Yale University Press, 2002), 3.

landscapes [with] humanity's smallness" to demonstrate his respect for the vast power of nature.⁴¹ As one of Russell's contemporaries pointed out, he "had a knack of knowing whether a photograph would really show and bring out the scientific point...[but] he also took pains to get something which would make his records not only of scientific but also of artistic value."⁴² Photography was an important tool for Russell, but it was primarily his personal attributes, intelligence, and education that prepared him for a life of science and exploration.

In 1874, young Israel Russell accompanied a United States government sponsored expedition to New Zealand in order to conduct observations on the transit of Venus.⁴³ Since the expedition did not include any billets for a geologist, Russell obtained a position on the expedition as an assistant photographer, "qualifying himself therefore by a hurried course of study."⁴⁴ He performed his duties as an assistant photographer under the direction of an astronomer named Dr. Peters who led the Queenstown, New Zealand party.⁴⁵ The Queenstown party formed one of eight parties sent out to make observations of Venus; three in the Northern Hemisphere and five in the Southern Hemisphere. The expedition's purpose was to observe "one of the rarest and most interesting phenomena in astronomy, a transit of Venus across the disk of the sun."⁴⁶ These observations were recorded with specially prepared cameras which, when developed, would allow astronomers to determine the distance from the Earth to the Sun, one of the great problems of astronomy. The results from these observations of the transit of Venus could

⁴¹ Sachs, *The Humboldt Current*, 336.

⁴² Lane, "Israel Cook Russell," 856.

⁴³ Steven J. Dick, *Sky and Ocean: The U.S. Naval Observatory 1830-2000* (Cambridge: Cambridge University Press, 2003), 255.

⁴⁴ Gilbert, "Israel Cook Russell," 663

⁴⁵ Dick, *Sky and Ocean*, 255.

⁴⁶ *Ibid.*, 239.

reduce the ambiguity concerning the distance between the Earth and the Sun by several million miles.⁴⁷ Additionally, with these new figures astronomers could recalculate the size of the solar system and posit the size of the visible universe. The 1874 expedition's scientific goals ultimately failed to provide the necessary data due to a lack of proper photographic technology at the time. However Israel Russell's observations of the natural history of New Zealand were successful, providing "the basis of his first publications."⁴⁸

Upon Russell's return to the U.S. he took up employment as an "assistant professor of geology at the School of Mines," Columbia College.⁴⁹ In addition to teaching and research, Russell used this time to write and publish articles about New Zealand's natural history. These early articles were essential to Russell's literary development and allowed him the opportunity to refine his style by balancing scientific observations with naturalist prose. In January 1877, Israel Russell published "The Giant Birds of New Zealand" in *The American Naturalist*.⁵⁰ He compiled a short history of birds in New Zealand and emphasized that the lack of mammals and reptiles allowed birds to dominate the islands. His description of Kiwi birds and their likelihood of extinction "by their new enemies, the dogs, cats, and rats that have accompanied the white man" demonstrated his concern for the fragile state of the island ecosystem along with the complicity of humans and, as Alfred Crosby would describe it, their "portmanteau biota."⁵¹ He also described the extinct Moa bird and made comparisons with the dodo of Mauritius. These were insightful points about the natural history of

⁴⁷ Ibid., 240.

⁴⁸ Gilbert, "Israel Cook Russell," 663

⁴⁹ Ibid., 664.

⁵⁰ Israel C. Russell, "The Giant Birds of New Zealand" *The American Naturalist* Vol. 11, No. 1 (Jan., 1877), pp 11-21.

⁵¹ Ibid., 18; and Alfred W. Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900-1900*, (Cambridge: Cambridge University Press, 1986), 89-90.

island ecosystems, but his descriptions regarding his search for the bones of a Moa revealed his emerging talent for narrative:

Immediately [behind] Queenstown rises a hill, as it is called in that land of snowy mountains, over two thousand feet high; separated from Mount Ben Lomond by a deep narrow valley, the sides of which are very steep, in some places forming beetling cliffs that are inaccessible even to the wild goats. It was on the side of this narrow valley, eighteen hundred feet from the base of the hill, that the Moa Cave, as we named it, was found. Soon after arriving at Queenstown we heard of the existence of a cave on that portion of the hill and, procuring a guide, we visited it. This cave extended into the side of the hill for a distance of fifty or seventy-five feet, but we found little in it of interest, except a few feathers, which we believe on good authority to be those of the extinct moa, indicating that this cave was very likely inhabited at one time by that bird. Proceeding up the hill to search for other caves, we soon came to a long crevice in the rock, from two to three feet wide, the sides of which were overgrown with ferns; upon parting these and looking down, I could see the bottom of the cave, which descended obliquely, and there to my great delight I saw a large bone projecting from the dirt, some twenty feet below. I lost no time in descending the crevice and securing the prize, which I found to be a huge metatarsal bone of *Dinornis robustus*, measuring 17.5 inches in length, and 6.8 inches in circumference at the smallest portion of the shaft; on further search its companion was found, also a large portion of the tibia and some of the vertebra of the same individual. Although [a] careful search was made we were unable to find the remaining bones of the skeleton, and were at a loss to know what had become of them.⁵²

Russell's account of his spelunking was not as steeped in the vivid imagery that he would demonstrate in his later writings such as the *Quarternary History of the Mono Valley, California*, but his ability to tell a story that combined science, nature, and personal discovery began to emerge.

In February 1879, Russell followed up his history of birds with "A Sketch of New Zealand with Pen and Pencil."⁵³ Whether he or someone else actually drew the sketches is unclear. What is clear is that the accompanying text offers the earliest glimpse of a

⁵² Russell, "The Giant Birds of New Zealand," 15.

⁵³ Israel C. Russell, "A Sketch of New Zealand with Pen and Pencil," *The American Naturalist* 13, No. 2 (Feb., 1879), 65-77.

Figure 1.2: Moas of New Zealand. Plate XXXVIII. 1916.



From an unidentified source, courtesy of the U.S. Geological Survey.

literary style which used vivid natural imagery. “A Sketch of New Zealand with Pen and Pencil” also foreshadowed some of his later works which focused on the physical geography of North America. Russell swept through the island chain vibrantly describing its various landscapes and human inhabitants. “Of all the islands which, like great emeralds, stud the southern seas, none have greater natural attractions than New Zealand...[which] possesses some of the wildest and grandest scenery in the world.”⁵⁴ He seemed to enjoy comparing New Zealand’s natural features with the rest of the world and he always seemed to conclude with New Zealand’s superiority, for the most part. The “Lake District” was “one of the most remarkable places in New Zealand, and equal in interest to the geysers of Iceland, or the wonderful region of the Yellowstone.”⁵⁵ The

⁵⁴ Ibid., 65-66.

⁵⁵ Ibid., 69.

Figure 1.3: Lake Wakatipu as photographed from Queenstown, New Zealand.



Photo taken 24 April 2006. Courtesy of the Wikimedia Commons.

nations of continental Europe were also no match for New Zealand's beauty. "In the grandeur of its scenery [Lake Wakatipu] is unsurpassed by the most celebrated lakes of Switzerland or Scandinavia. Lake Wanaka, to the northward of Lake Wakatipu, is pronounced by all the travelers who have visited it, to be 'the most beautiful lake in all the world.'"⁵⁶ Russell's writing style began to take on a romantic feel which was probably influenced by the popularity of nature writers like Thoreau and Emerson. Educated men emulated popular literary styles; Russell's distinctiveness was that he was an academically trained scientist, not a poet or nature writer. Russell was intensely affected by the natural landscapes in which he found himself. His training in the scientific method of the late nineteenth century was folded in with a naturalist tradition and literary

⁵⁶ Ibid., 70.

style that looked beyond the empirical data and theories. New Zealand possessed the grand landscapes that enabled Russell to develop his appreciation for the natural world along with a literary style that would incorporate nature and science.

In addition to his articles on New Zealand's natural history, Russell also used his time to write about topics closer to home. In August 1879, he wrote an article for *The American Naturalist* praising the artifacts and collections that were to be found in "The Geological Museum of the School of Mines, Columbia College." More of a popular endorsement of his university's museum than a vivid narrative, Russell continued to refine his writing and descriptive style. Russell gave the reader a guided tour "through the geological ages" and let the reader understand that "we will pass slowly down the long row of cases, and in doing so, review hastily the life-history of the earth."⁵⁷ He further enticed his audience through the use of explanatory descriptions of the various rocks, fossils, and material artifacts. "Among the first objects to attract the attention are the great sword-shaped spines which are the type-specimens of the genus *Macheracanthus*; these highly-polished spines, some of which are twenty inches in length, are samples of the weapons worn by the old Devonian sharks. These ancient fish-spines illustrate the economy that is shown in so many of nature's works, in gaining great strength with the use of the smallest possible amount of material."⁵⁸ His continual emphasis of slow change at the "imperfect glimpse" through succeeding ages was informed by the recent—recent in Russell's time—theories put forth by Charles Darwin. As Russell concluded, "every one interested in the great question of our time—evolution—should make himself familiar with the collection of fossils arranged geologically [so that they may see how]

⁵⁷ Israel C. Russell, "The Geological Museum of the School of Mines, Columbia College," *The American Naturalist* 13, No. 8 (Aug., 1879), 504.

⁵⁸ *Ibid.*, 506.

the man of science bases his theories and conclusions.”⁵⁹ Tying in the museum’s collections with the scientific method and Darwin’s theory of evolution would have ensured the interest of amateur scientists and naturalists alike. At the same time, the museum was a depository of artifacts for professionals to study and compare. In the late nineteenth century, science and scientists were becoming more specialized and trying to break free from the amateur traditions of the past, and Russell found himself wedged within this dichotomy of professionals and amateurs. However, Russell did not seem completely comfortable in either world and found himself with interests in each arena. This would become a central paradox of Russell’s career as he struggled to define himself as a naturalist, scientist, explorer, and teacher.

In the tradition of Linnaeus, Russell also pondered some of the smaller, more graceful aspects of the natural world. In an article titled “Botany” published in the October 1879 edition of *The American Naturalist*, Russell recorded his observations concerning the Wisteria and fertilization.⁶⁰ “In front of my study windows grows a beautiful American Wisteria; the great purple racemes hanging in the open window fill the room with their delicate perfume. During the day the blossoms are usually visited by two or three brilliant little humming-birds, and by many flies and bees, all attracted by the color, fragrance and nectar of the flowers. I have been interested in noticing the manner in which the insects, particularly the large humble bees, aided in securing the cross-fertilization of the blossoms.”⁶¹ Russell follows this passage with a brief description about the interactions between bee and flower and his observations concerning the cross-fertilization process. His subjects concerned the very essence of nature and his prose

⁵⁹ Ibid., 513.

⁶⁰ Israel C. Russell, “Botany,” *The American Naturalist* 13, No. 10 (Oct., 1879), 647-651.

⁶¹ Ibid., 648-649.

attempted to reveal his feelings about the simple beauty that was to be found in his own backyard. Russell would come back to these Humboldtian themes throughout his literary career as he observed the profound connections nature presented to the intent observer.

The Transit of Venus expedition provided Russell with the initial experience to make first hand observations regarding the natural splendor and physical history of unfamiliar terrain. Russell's experiences in New Zealand also allowed him to gain photographic, astronomical, and naturalist skills, all of which would assist him in his later explorations of the West. Additionally, he obtained artifacts of material culture which can be seen in the Smithsonian ethnological collections today.⁶² Russell's near future would not be focused on academic pursuits in an office or classroom, though he would eventually be a full professor at the University of Michigan. Russell's immediate future lay in the "unexplored" reaches of the American West. Another success which Russell carried away from this expedition was the positive impression he made on his peers, supervisors, and United States government officials. Through these initial contacts and relationships, Russell was able to secure future employment with the government and begin his own path of exploration and discovery. During his time of reflection and writing about his experiences in New Zealand, Russell began to seek new avenues which would combine his scientific training with his artistic affection for nature. He found the combination he was looking for in the American West.

⁶² Ian W. Keyes, "New Zealand Artifacts from the United States 'Transit of Venus Expedition' 1874-1875," *Smithsonian Contributions to Anthropology* 2, No. 2 (1967), III-27.

CHAPTER 2

THE GREAT WESTERN LABORATORY

We have an unknown distance yet to run, an unknown river to explore. What falls there are, we know not; what rocks beset the channel, we know not; what walls ride over the river, we know not. Ah, well! We may conjecture many things.

-John Wesley Powell, American Soldier, Scientist, and Explorer (1834-1902)

The mountains are calling and I must go.

-John Muir, American Environmentalist (1838-1914)

In 1878 Israel Russell left Columbia College and joined the Wheeler Survey as an assistant geologist.⁶³ He spent the remainder of his life wandering throughout the West, exploring various landscapes, and writing vividly about the environments he experienced. His decision to join the Survey was serendipitous, for it not only provided him with employment and professional experience, but also with the opportunities to work with many of the most renowned scientists of his day and experience landscapes that inspired some of his most spectacular and inspiring prose. These years in the great western laboratory were the most influential on Russell's scientific and environmental outlook and provided him with the credentials and reputation needed to rise to the pinnacle of his profession later in life. After the Civil War and until the establishment of the United

⁶³ Gilbert, "Israel Cook Russell," 664.

States Geological Survey in 1879, a great deal of uncoordinated exploration of the West took place. In addition to the military and political dimensions of exploration, the West's reputation as "the best natural laboratory in the world" attracted leading scientists from the East.⁶⁴ During this time, there were four major western surveys—each designated by the name of their chief explorer—under the direction of various agencies of the federal government. Clarence King led the United States Geographical Survey of the Fortieth Parallel. John Wesley Powell supervised the Geographical and Geological Survey of the Rocky Mountain Region. Ferdinand V. Hayden directed the United States Geological Survey of the Territories. Finally, there was Lieutenant George M. Wheeler, who commanded the United States Surveys West of the 100th Meridian.⁶⁵ Duplication and confrontation were common themes between these surveys. Wheeler's controversial survey saw the loss of top scientists like Grove Karl Gilbert and Archibald Marvine to the Lieutenant's rivals.⁶⁶ However, professional, willing, and adventurous scientists still found work on Wheeler's survey.

All of the surveys had been controversial in one form or another, mostly because of competing interests within the bureaucracies that supported them and the overlapping missions and boundaries of the different surveys, but Israel Russell would not have been too concerned because he had finally returned to the field. Another benefit of Russell's employment with the Wheeler Survey was that he received his first real experience as a field geologist under veteran western scientific explorers.⁶⁷ He started his western investigations in New Mexico which possessed awe-inspiring vistas, from towering

⁶⁴ William H. Goetzmann, *New Lands, New Men: America and the Second Great Age of Discovery* (New York: Viking Penguin, 1986), 400.

⁶⁵ *Ibid.*, 401-411.

⁶⁶ *Ibid.*, 408.

⁶⁷ Gilbert, "Israel Cook Russell," 664.

mountains to arid deserts. The controversies surrounding Wheeler did eventually affect Russell and all four of the western surveys. Most scientists in the West at this time worked directly for a federal government that was becoming more centralized and bureaucratized. Richard White has argued that “while the federal government shaped the West, however, the West itself served as the kindergarten of the American state.”⁶⁸ New centrally controlled government agencies like the Bureau of Indian Affairs and the General Land Office (later renamed the Bureau of Land Management) were formed and then staffed by professional bureaucrats rather than political appointees. The West lacked the strong local and state political machines that were entrenched in the East, so there was no real opposition to prevent the government from increasing its control and influence over the course of Western development. “In some basic ways the federal government created itself in the West;” and so did the scientists.⁶⁹ They were a part of the government machine that was sweeping through the West and they were central players in the expansion of federal control over the western landscape. On March 3, 1879, President Rutherford B. Hayes officially created the United States Geological Survey which would combine all the surveys efforts under one federal organization.⁷⁰ Lieutenant Wheeler and his survey were finished, but Israel Russell had only begun. One century later, Samuel Houghton noted that by the close of the nineteenth century, there were “three giants to write scientific history: Clarence King, Grove Karl Gilbert and Israel Cook Russell.”⁷¹

⁶⁸ White, *It's Your Misfortune and None of My Own*, 58.

⁶⁹ *Ibid.*, 59.

⁷⁰ Stegner, *Beyond the Hundredth Meridian*, 240.

⁷¹ Samuel G. Houghton, *A Trace of Desert Waters: The Great Basin Story* (Glendale: The Arthur H. Clark Company, 1976), 118.

In 1880, after a year of European travel,⁷² Israel Russell was hired by the newly formed United States Geological Survey.⁷³ Russell continued his Western explorations and, more importantly, began his association with Grove Karl Gilbert. Russell worked under Gilbert as an assistant geologist while they studied the Great Basin.⁷⁴ The Division of the Great Basin was one of the new divisions of reconnaissance and survey established by the United States Geological Survey and its new director, Clarence King. Russell's tutelage under Gilbert began their lifelong friendship and professional admiration. The Great Basin has been called "the heart of the great American West" for good reason.⁷⁵ Its 165,000 square miles lay in the middle of a Western setting that is "sequestered from surrounding areas by prominent mountain ranges on east and west [and within] lies a landscape of desert basins and mountains."⁷⁶ Russell and the other members of the Great Basin division would have had to prepare for a place that "simultaneously stimulates the imagination and cautions us to comprehend the dangers" of an unforgiving desert.⁷⁷ However, the rewards far outweighed the costs. The Great Basin offered a glimpse of a complex geology in a landscape that was a "storehouse of geologic history."⁷⁸ In this harsh environment rivers disappear, lakes are so alkaline as to be unable to support life, vegetation is sparse, rainfall is rare, and "surviving here depends on how well one knows the environment."⁷⁹ Russell learned a great deal from his experiences within this arid

⁷² Not much is known about his European travels. It can be safely assumed that he did get to observe the Alps and other locations associated with well known geological phenomena.

⁷³ Gilbert, "Israel Cook Russell," 664.

⁷⁴ Stephen Pyne, *Grove Karl Gilbert: A Great Engine of Research* (Austin: University of Texas Press: 1980), 112.

⁷⁵ Richard V. Francaviglia, *Mapping and Imagination in the Great Basin: A Cartographic History* (Reno and Nevada: University of Nevada Press, 2005), xv.

⁷⁶ *Ibid.*, 4.

⁷⁷ *Ibid.*

⁷⁸ *Ibid.*, 130.

⁷⁹ *Ibid.*, 6.

setting and this invaluable knowledge would assist him in the future when he faced even more unforgiving landscapes to the north. He continued to have a positive impact on his colleagues, but now, they also began to have an impact on his own ideas about science and nature. Gilbert and Russell continued to travel throughout the region for weeks at a time. Gilbert became favorably impressed with Russell over this time and ultimately gave Russell independent work investigating a series of Quaternary lakes in Nevada, California, and Oregon which Russell spent several years exploring, observing, and describing.⁸⁰

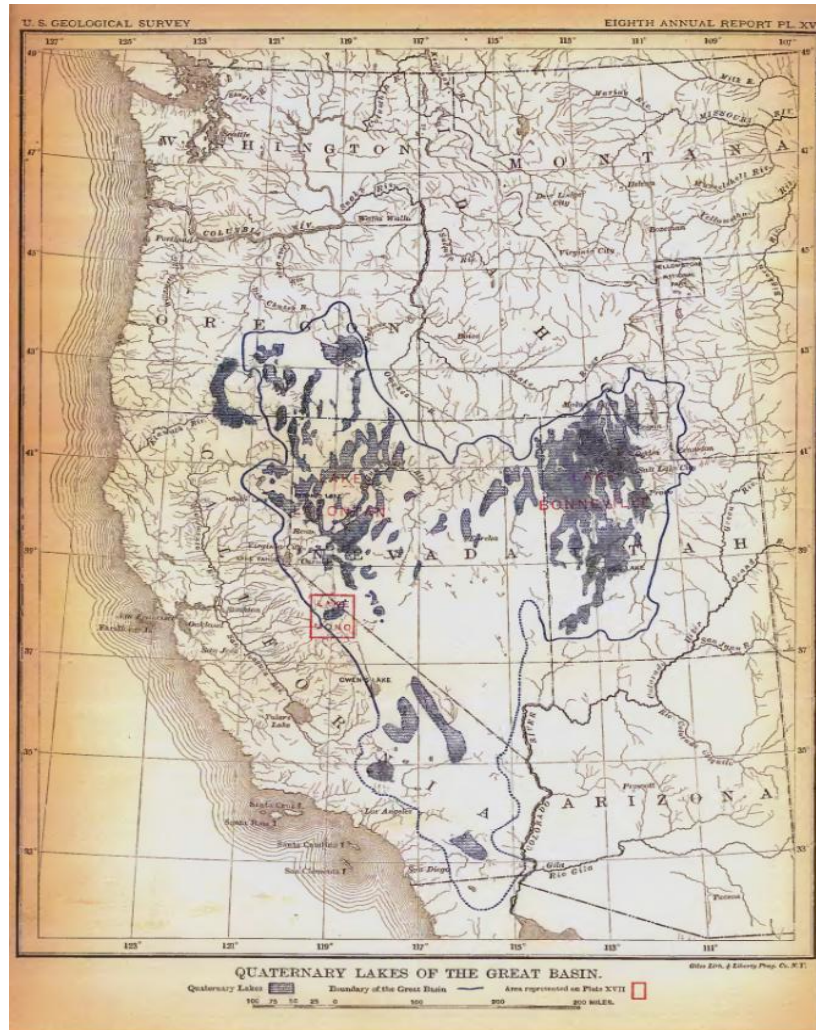
Russell's first published monograph, *Geologic History of Lake Lahontan: A Quaternary Lake of Northwestern Nevada*, was the initial result of these years of travel. *Lake Lahontan* was Russell's first in-depth attempt at combining an environmentally aware style of prose with scientific observations. He also demonstrated the ability to recognize natural splendor in otherwise desolate conditions. "The traveler in this region is no longer surrounded by the open, grassy parks and heavily timbered mountains of the Pacific slope, or by the rounded and flowing outlines of the forest-covered Appalachians...he must compare it to the parched and desert areas of Arabia and the shores of the Dead Sea and the Caspian."⁸¹ Although the land should be compared with the well-known desert areas, "the scenery...has a desolate grandeur of its own, and at times, especially at sunrise and sunset, great richness of color."⁸² It was the unique

⁸⁰ Gilbert, "Israel Cook Russell," 664; The term Quaternary belonging to the geologic time, system of rocks, or sedimentary deposits of the second period of the Cenozoic Era, from the end of the Tertiary Period through the present, characterized by the appearance and development of humans and including the Pleistocene and Holocene epochs. See John McPhee, *Annals of the Former World* (New York: Farrar, Straus and Giroux, 2000) for a more detailed exploration of geology in the United States.

⁸¹ Israel C. Russell, *Geology and History of Lake Lahontan, a Quaternary Lake of Northwestern Nevada* (Washington, D.C.: Government Printing Office, 1885), 7.

⁸² *Ibid.*, 13.

Figure 2.1: Map of the Great Basin. Eight Annual Report of the U.S. Geological Survey, Plate XVI.



Courtesy of the U.S. Geological Survey.

aesthetic qualities that the landscape posed which made the region rich and vibrant to those with a certain artistic viewpoint:

The glare of the noonday sun conceals rather than reveals the grandeur of this rugged land, but in the early morning and near sunset the slanting light brings out mountain range after mountain range in bold relief, and reveals a world of sublimity. As the sun sinks behind the western peaks and the shades of evening grow deeper and deeper on the mountains, every ravine and canyon becomes a fathomless abyss of purple haze, shrouding the bases of gorgeous towers and battlements that seem incrustated with a mosaic more brilliant and intricate than the work of the Venetian artists. As the light fades and the twilight deepens, the

mountains lose their detail and become sharply outlined silhouettes, drawn in the deepest and richest purple against a brilliant sky.⁸³

Poetic descriptions of landscapes over time and space became a hallmark of Russell's work. He would repeatedly use this method at the beginning of his scientific monographs to describe the various environments he was surveying. This method allowed the reader to form a vivid picture of the region and see how a simple walk or the natural cycle of a day or of seasons could inspire vivid images of natural magnificence if one had the proper outlook.

The succession of seasons is less plainly marked on the deserts of the Great Basin than on the forest-covered hills of the Atlantic slope. As autumn advances, but little change appears in the color of the landscape...The valleys with their scanty growth of sage remain unchanged, as do dusky bands of pines and cedars...As autumn passes away, the skies lose their intense blue, and become more soft and watery, more like the skies of Italy. The hues of sunset appear richer and more varied...The mountains wrapped in impenetrable clouds, the glare of lightning and the deep roll of thunder as it echoes from cliff to cliff and from range to range, bring to mind the scriptural account of the storms of Sinai. And when the black clouds at last roll back from the mountains, and the sun with a wand of light dispels the storm, behold what a transfiguration? The peaks are no longer dark and somber, but glitter with the silvery sheen of freshly fallen snow.⁸⁴

Beyond the artistic vision of these landscapes there did not seem to be any reason for civilized settlement. "The agriculture of this arid region is restricted to those scanty areas of land that can be irrigated...The Great Basin is not attractive to the [uninitiated] pleasure-seeker, but to the geologist it is peculiarly fascinating, both because the absence of vegetation gives such unusual facilities for investigation, and because of the character of the problems to be solved."⁸⁵ Hydrologic technology and progress did allow for settlements to prosper in the future, but the land remained relatively under populated when compared to more humid areas of the East and along the irrigated oasis' in the

⁸³ Ibid.

⁸⁴ Ibid., 15.

⁸⁵ Ibid.

West. The Great Basin also has become a destination for many “pleasure-seekers” who are probably pulled to experience the arid lands like their nineteenth-century forebears—of course in a much more modern, convenient, and safe manner.

Lake Lahontan was an official government document transmitted from Russell to Gilbert and ultimately to the Director, U.S. Geological Survey in 1885, John Wesley Powell.⁸⁶ Gilbert had left the field to take up an administrative position under Powell, but he still retained his supervisory role, mentorship, and professional influence over the men of the Great Basin surveys.⁸⁷ Gilbert’s later membership in the Sierra Club and his emerging ecological beliefs may have influenced Russell early on, even if they were overshadowed by Gilbert’s commitment to science.⁸⁸ The Sierra Club was founded in 1892 “to explore, enjoy, and render accessible the mountain regions of the Pacific Coast; to publish authentic information concerning them; [and] to enlist the support and cooperation of the people and the government in preserving the forests and other natural features of the Sierra-Nevada Mountains.”⁸⁹ Along with one of its founders, John Muir, many members of the Sierra Club diverged from the federal government’s version of conservation as scientific management for the maximum economic benefit to a model based on preserving nature for its own sake.⁹⁰ This split was not instantaneous, but it was a well publicized evolution of an environmental ideology. This most assuredly would have affected the outlook of many of the scientists who had explored the very regions that Muir wrote so passionately about. While Gilbert continued to oversee the Great

⁸⁶ Ibid., V.

⁸⁷ Goetzmann, *Exploration and Empire*, 595.

⁸⁸ Pyne, *Grove Karl Gilbert*, 252.

⁸⁹ Michael P. Cohen, *The History of the Sierra Club: 1892-1970* (San Francisco: Sierra Club Books, 1988), 9.

⁹⁰ Ibid., 16.

Basin surveys from Washington, Israel Russell incorporated the valuable lessons learned from his mentor as he went about making his own name synonymous scientific exploration.

During his work in the Lake Lahontan region, Russell was able to visit other geologically significant areas of the Great Basin. One of the places he visited was the Mono Lake basin along the eastern slope of the Sierra-Nevada range—just east of Yosemite National Park—in California. He was not able to conduct a comprehensive survey of the area until after he completed his work on Lake Lahontan. Once he had the time and resources, Russell explored the Mono Lake basin and recorded his observations between 1881 and 1883. Mono Lake is a closed basin located in a high, cool location on the far western corner of the Great Basin. It has been speculated that water has been present in Mono Lake for up to three million years.⁹¹ The name Mono Lake becomes Lake Russell to scientists if you look back about nine thousand years through the layers of geologic time when it was also much larger than its approximate current width of twelve miles across.⁹² The lake has been witness to extreme volcanic and glacial activity as well as to prospectors, Western cities in search of water supplies, bird-watchers, and writers. Russell's official report was printed in 1889 for the USGS and his vivid prose about the Mono Lake region cemented his reputation among local residents and later environmentalists as "Mono Lake's poet-geologist."⁹³

⁹¹ John Hart, *Storm Over Mono: The Mono Lake Battle and the California Water Future* (Berkeley, Los Angeles, and London: University of California Press, 1996), 9.

⁹² *Ibid.*, 13-14.

⁹³ Israel C. Russell, "Quaternary History of the Mono Valley, California," With preface by David A. Gaines (Washington D.C., Government Printing Office, 1889; Reprint, Lee Vining: Artemisia Press, 1984), preface.

Israel Russell's *Quaternary History of the Mono Valley, California* is considered a classic of scientific and environmental prose by many people familiar with the Mono Lake region of California. Russell's descriptions of the natural features that were found in and around Mono Lake created a vivid picture of a geologically and ecologically active landscape in a region most observers looked at as little more than desert and wasteland. Russell used his scientific empiricism to see how connections were made between rock, water, and wildlife in a geographically remote region of the West. "Russell saw grandeur where others saw desolation, and forged a literary style equal to that vision. His *Quaternary History of the Mono Valley* blends science with prose so vivid and powerful that early Mono Basin residents paid to reprint the study as an enticement to tourists."⁹⁴ Luckily for later appreciators of Mono Lake, Israel Russell's prose was not lost to history and was rediscovered during the modern environmental movement that spread during and after the 1960s. With his vibrant prose, Russell anticipated how later environmental explorers would look at the landscape and see more than limitless resources or lifeless deserts.

In 1984, Russell's *Quaternary History of the Mono Valley, California* was reprinted with the goal of increasing public awareness of the splendor and diversity that was located in the Mono Lake basin and what could be lost if the City of Los Angeles continued to drain the basin of water to supply the growing metropolis. Water had been a serious concern for Los Angeles since its inception. As the city kept increasing in size so did its demand for water.⁹⁵ By 1900, city officials realized that the Los Angeles River could not keep up with the demand so the Los Angeles City Water Company, later the

⁹⁴ Ibid., preface.

⁹⁵ Hart, *Storm Over Mono*, 31.

Figure 2.2: Map of Mono Lake Basin. Eight Annual Report of the U.S. Geological Survey. Plate XVII.



Courtesy of the U.S. Geological Survey.

Los Angeles Department of Water and Power (LADWP), began searching ever farther away for reliable sources of water. The Owens River Valley, just to the south of the Mono Basin, was the next to be acquired and it became the scene of a failed resistance in

1924 as ranchers and farmers fought for their own water rights.⁹⁶ Then the LADWP set its sights on the water rights to Mono Lake which it finally secured in 1930. It took a while for the effects of this decision to be noticed, but the lake slowly began to recede along with its ecological habitats.⁹⁷

Mono Lake's surface needs to stay at or above 6,390 feet so that it can sustain a habitat for a variety of animals, some unique to Mono Lake and a limited number of other locations on earth.⁹⁸ The lake appeared to be a remarkably desolate location to some of its earliest Euro-American visitors. Prospectors and boom towns arrived in the region during the 1850s for gold and silver, but the ores eventually dried up and so did most of the people. Mark Twain referred to Mono Lake as "this loneliest tenant of the loneliest spot on earth" in *Roughing It* (1871).⁹⁹ They all had failed to see how the local Mono Lake ecosystem worked and how vital it was to migrating birds. Ecologically, "algae and other microscopic plants" are the prime producers while a tiny crustacean, the brine shrimp, and an insect, the alkali fly, fill the role of primary consumers.¹⁰⁰ Then there are the migratory birds that are the secondary consumers and are most prolific in the spring and summer. The California gull, the Eared Grebe, Phalaropes, the American Avocet, the Snowy Plover, and numerous species of ducks make Mono Lake "one of the three or four most significant shorebird habitats in the western United States."¹⁰¹ Despite the fact that it was destroying this unique ecosystem, the LADWP continued to drain the lake. This is

⁹⁶ Ibid., 35.

⁹⁷ Ibid., 38-49.

⁹⁸ Ibid., 172.

⁹⁹ Mark Twain, *Roughing It* (New York: Signet Classic, 1962), 201.

¹⁰⁰ Hart, *Storm Over Mono*, 15.

¹⁰¹ Ibid., 19-20.

where the Mono Lake Committee, comprised of numerous environmental activists, stepped in.

In 1979, a conglomeration of environmental organizations including Friends of the Earth, the Sierra Club, the National Audubon Society, and the heart of the movement, the Mono Lake Committee, brought a lawsuit against the Los Angeles Department of Water and Power in order to save the lake as a wildlife habitat.¹⁰² For the next fifteen years, these activists slowly compiled enough legal and ecological evidence through investigations and impact studies, along with a national publicity campaign, that the LADWP had little choice but to discontinue unrestricted drainage of Mono Lake.¹⁰³ The habitats were returned to sustainable levels for the Mono Lake ecosystem and the Mono Lake Committee had reason to be proud. Although he had been dead for seventy eight years, Israel Russell still ably assisted these modern activists.

One of the admirers of Russell's classic study of Mono Lake was David Gaines, an environmentalist and the guiding light of the Mono Lake Committee.¹⁰⁴ Gaines was the person who argued that a reprint of Russell's timeless study would bolster the Mono Lake Committee's cause. In the preface to the 1984 reprint of *Mono Valley*, Gaines praised Russell's abilities "as scientist as well as writer."¹⁰⁵ Understanding that Gaines had a specific agenda to preserve Mono Lake's ecosystem and persuading his readers of the beauty found in Russell's literary style, it is still significant to see that a modern environmentalist could recognize "Russell's insightful prose."¹⁰⁶ Gaines may not have

¹⁰² Ibid., 61.

¹⁰³ Ibid., 173.

¹⁰⁴ Don Robertson, "David A. Gaines," *Who Was Who in California Birding*, Located on a website promoting Monterey Bay, California, <http://www.montereybay.com/creagrus/CAwhoDAG.html>, Accessed on 09 July 2007.

¹⁰⁵ Russell, *Mono Valley*, Preface.

¹⁰⁶ Ibid.

had the professional clout to pull off describing Russell as “one of America’s most brilliant geologists,” but he did have the authority—gained through a personal connection with Mono Lake—to say that “no white man before or since has come to know this dynamic land more intimately.”¹⁰⁷ Russell used his prose to move the reader through every draw, spur, valley, and mountain in a landscape of desert *and* bounty. Less perceptive observers may have described Mono Lake as an alkaline waste of water and resources, but Russell was able to see the unique diversity within the landscape, from the rocks and minerals to the brine shrimp and larvae. It was in landscapes like this that Israel Russell enjoyed taking his readers for a naturalist’s tour before he began describing detailed scientific descriptions and theories. In the beginning chapter of *Mono Valley*, Russell asks “the reader to go with me in fancy throughout the area we are to study and ascend Mt. Dana.”¹⁰⁸ The reader can now join Russell on his hike as he begins his approach to the Mono Valley basin.

After traveling by rail and stage for several days, Russell finally emerged over the crest of the Walker River range, looked to the south-west, and began unraveling his poetic tale of discovery. “Should this ascent be made near sunset, when the deserts are shrouded in purple shadows and the rugged peaks above are drawn in strong outlines on a sky of amber, merging upward into purple and blue and becoming almost black at the zenith, the traveler will have a peculiarly beautiful picture impressed on his mind which time can scarcely efface.”¹⁰⁹ The desert provided a picturesque backdrop which was made even more impressive when the distant mountain ranges came into view. “The lofty peaks and sharp crests of the Sierra Nevada and the Sweetwater Mountains arrest the eye

¹⁰⁷ Ibid.

¹⁰⁸ Ibid., 270.

¹⁰⁹ Ibid., 271.

and excite the wonder and admiration of all who have not been long familiar with the High Sierra.”¹¹⁰ Russell’s approach was also marked by the evidence of man’s ability to deface nature while “riding east from Aurora, just as the rising sun [was] making the ugliness of that nearly abandoned mining camp only too apparent.”¹¹¹ One of the purposes of government geologist in the West was to identify possibilities for resource extraction. Mines and minerals—especially precious gems—would have been at the top of the government’s wish list, yet Russell described his feelings towards the ugliness it produced while he served the federal government’s will. It seemed that the conflict was one he may have accepted in order to pursue his career as an explorer and scientist. Yet he was able to express a modicum of dissent through his prose that he continued to develop throughout his travels. In the meantime, the reader continued to accompany Russell on his trek to Mono Lake, “refresh[ing] our parched lips in the rushing creeks born of the snow-fields of the High Sierra, now nearly forty miles away”¹¹²

In due time, Russell’s destination and object of scientific inquiry was finally spotted. “In the middle distance there rests upon the desert plain what appears to be a wide sheet of burnished metal, so even and brilliant is its surface. It is Lake Mono. At times the water reflects the mountains beyond with strange distinctness and impresses one as being in some way peculiar, but usually their ripples gleam and flash in the sunlight like waves of ordinary lakes.”¹¹³ This lake sits on the border of desert and mountains which gives it a unique atmosphere in the contrasting landscapes and climate zones. “On either side of the lake are bold, rugged hills, rising more than a thousand feet

¹¹⁰ Ibid.

¹¹¹ Ibid.

¹¹² Ibid., 272.

¹¹³ Ibid., 273.

above its surface, which in many lands would be considered worthy of the name of mountains, but are here dwarfed and rendered almost insignificant by the proximity of the High Sierra.”¹¹⁴ But the lake holds the attention of the observer and acts as the centerpiece of a visual drama and the specimen for scientific investigation. It is when “strolling along the shore we find” how this magnificent outdoor laboratory can be reduced in significance.¹¹⁵ “But the feature in the landscape that absorbs the attention and overshadows all else is the vast mountain mass which rises abruptly from the southern border of the lake and forms a portion of the far famed High Sierra...[highlighting] the grandeur and magnitude of the scene.”¹¹⁶

In order to emphasize his point and allow his readers to get closer to his vision of nature, Russell included a panoramic drawing of the view west from Mono Lake along with his own vivid description of the scene. “The panorama forming Pl. XVIII...although failing to convey anything like the impressions derived from [an actual] observation, will serve as an introduction to the more prominent peaks in sight.”¹¹⁷ Russell flows across the panorama from right to left. He travels over summits, through canyons, and into mountain gorges in a visual sweep of the distant portrait. Russell completed his description of the view with the “striking exception” which is the Mono Craters.¹¹⁸ “So perfect are their shapes and so fresh is their appearance that the eye lingers about their summits in half expectation of seeing wreaths of vapor or the lurid

¹¹⁴ Ibid.

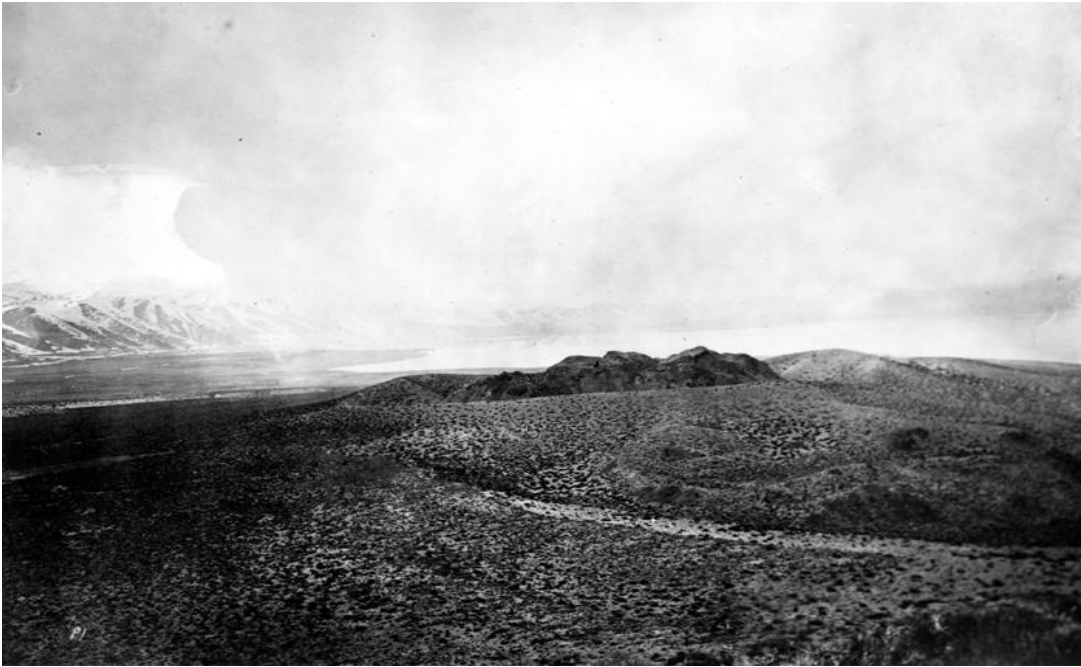
¹¹⁵ Ibid.

¹¹⁶ Ibid., 274.

¹¹⁷ Ibid., 274-275.

¹¹⁸ Ibid., 275.

Figure 2.3: Mono Lake in the Sierra Nevada Mountains of California. Obsidian Crater in the foreground.



Photograph by T.H. O'Sullivan. U.S. Geological Exploration of the Fortieth Parallel (King Survey), courtesy of the U.S. Geological Survey.

light of molten lava ascending from their throats.”¹¹⁹ Natural perfection was found in the distant views and unusual geologic sculptures that Russell so vividly described. These were the first, wild views, as described by Mono Lake’s poet-geologist, of a land that had enchanted and repelled so many men and women over time; California’s landscape was spread out before him in all of its natural wonder and scientific enlightenment. “Such in brief, are the elements of the picture that the observer from the tufa crags near Warm Springs has spread before him.”¹²⁰ Of course the scenes could change as quickly as the seasons.

“As winter approaches, the higher peaks become brilliant with snow, which trails far down the deep gashes in their sides, leaving lower slopes dark and somber. Again, the

¹¹⁹ Ibid.

¹²⁰ Ibid., 276.

whole range is frequently snow-clad in a single night, and in the clear atmosphere that follows a storm each peak and crest and wall of alabaster stands out clear and sharp against the blue sky, with such repose and grandeur and purity that no one can remain in their presence without a feeling of wonder and admiration.”¹²¹ The summer months add their own colors to the pallet of the mountains as the suns reflection leaves the rocks with a “purple haze” and “aglow with luminous purple light, while crests and spires above, resplendent with sunset tints, are sharply outlined against the evening sky. It is then that the grandest combinations of form and color are to be seen.”¹²² The rocks and minerals that allowed for a kaleidoscope of colors to be reflected into the atmosphere were what brought geologists like Russell to the West. The interplay of light and shadow across these landscapes was the purview of artists, not scientists, and it would have taken a very shallow person not to be affected by this display. Russell artfully described these landscapes and put the reader in the traveler’s place, as an animated observer of the natural world who felt “the thrill of anticipation experienced by the explorer when in the presence of a mountain on whose summit he is impatient to stand.”¹²³ However, he still had a long and interesting journey to make before he could describe the sights from any of the nearby mountain summits. “Once more in the saddle and continuing along the eastern shore of Lake Mono,” he continued to guide the readers through the illuminating landscape.¹²⁴

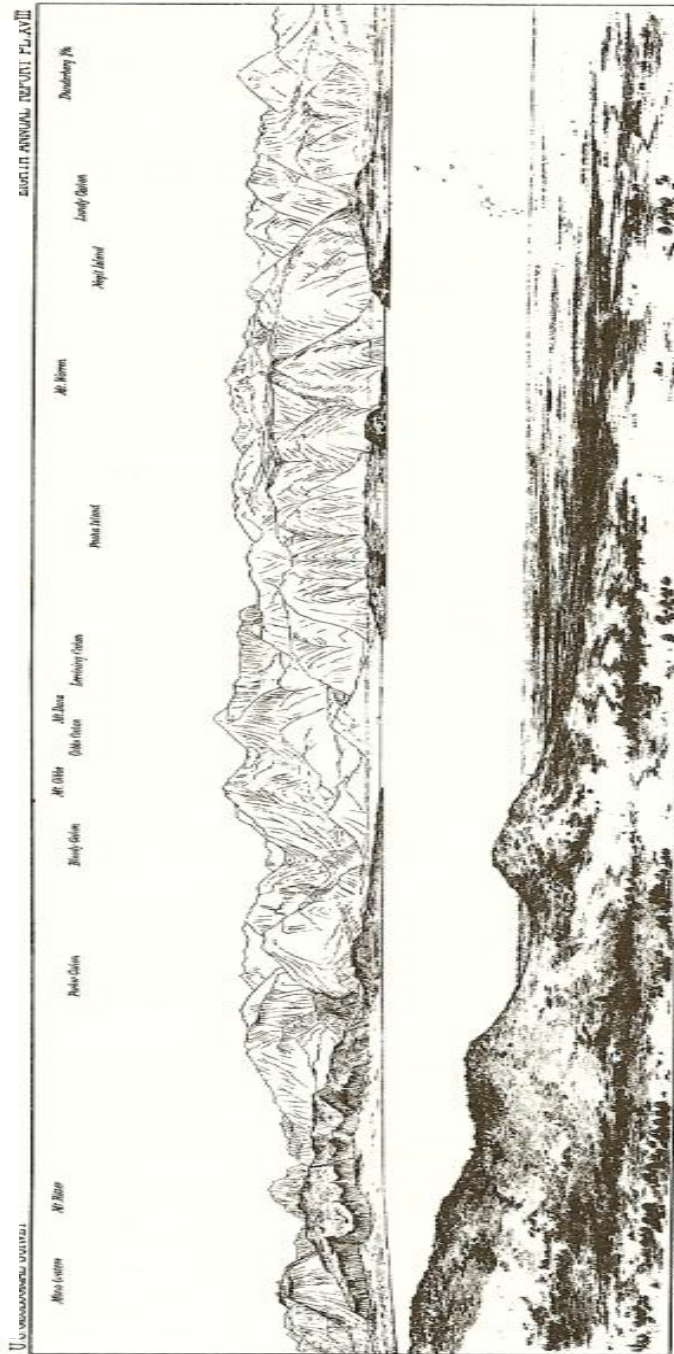
¹²¹ Ibid.

¹²² Ibid., 277.

¹²³ Ibid.

¹²⁴ Ibid.

Figure 2.4: View of the Sierra-Nevada Mountains from Mono Lake. Eight Annual Report of the U.S. Geological Survey. Engraving, Plate XVII.



Courtesy of the U.S. Geological Survey.

Figure 2.5: Sierra Nevada Mountains, viewed from Mono Lake.



**Photograph by T.H. O'Sullivan. U.S. Geological Exploration of the Fortieth Parallel (King Survey).
Courtesy of the U.S. Geological Survey.**

The negative impact of humans and their livestock was observed in this seemingly desolate region. “Nearly the entire valley is without the limit of civilization for the reason that water can not be had for irrigation. There was formerly sufficient wild grass in many portions of the basin to support considerable numbers of cattle and sheep; but owing to overstocking, these natural pastures are nearly ruined.”¹²⁵ Russell noted the ruin caused to a fragile ecosystem by overgrazing in an arid region that lacked sufficient potable water for “civilization.” The alkali waters of Mono Lake could not support human life, but that

¹²⁵ Ibid., 278.

did not mean life was absent in and around the lake. Like the humble bees he had once observed in his yard, Russell noticed the natural connections within the ecosystem. “Brine shrimp and the larval of a fly...are seen in immense swarms during certain seasons. In autumn and early winter the lake surface is literally darkened with countless numbers of ducks, geese, swans, gulls, grebes, and other aquatic birds, attracted thither by the brine shrimps and larva.”¹²⁶ Observations of the connections found in Mono Lake’s ecosystem further demonstrated the Humboldtian influence on Russell. Russell’s poetic prose, when combined with these observations, was easily transferred to twentieth-century environmentalist causes and rhetoric—if only on a limited and local scale at times. He also showed an understanding of native culture and influence on Mono Lake.

In seeking to name the two main islands that are located in Mono, “the writer preferred to record some of the poetic words from the language of the aboriginal inhabitants of the valley.”¹²⁷ After his return to Washington D.C. and consultations with John Wesley Powell—whose ethnology reports and language translations he used—Russell “name[d] the larger island Paoha Island” (for spirits believed to inhabit the lake) and “the island second in size Negit Island, the name being the Pa-vi-o-si word for blue-winged goose.”¹²⁸ Humboldtian influences were mixed with a contemporary Powellian scientific authority to present a picture that mixed man and nature. Civilization and white men were ruinous while wildlife and natives were the noble fortifiers of nature. All of this in an official government document for the USGS. He continued to believe in scientific racism and wrote simply about what he and many of his contemporaries believed to be scientific fact. Earlier in the century, an anthropologist named Lewis

¹²⁶ Ibid.

¹²⁷ Ibid.

¹²⁸ Ibid., 279.

Henry Morgan had become an influential theorist on social evolution. He “traced the history of the human family, government, private property, and technology through three sequential stages...from savagery to barbarism to civilization.”¹²⁹ Native Americans were placed within this model and ranked well below European civilization. “Morgan’s theory of social evolution became the backbone of late nineteenth-century” science and imperial expansion. His theory also justified the conquest of natives by Europeans as “the inevitable, inexorable expansion of civilized people around the world.”¹³⁰ Charles Darwin’s theory of evolution provided a scientific rationale for Morgan’s theories which became known as social Darwinism. Thereafter, many an educated and rational mind embraced this model of fitter civilized societies overtaking the primitive ones.¹³¹ In spite of this scientific racism, Russell continued to show enough respect for native culture and the work of men like John Wesley Powell to include aboriginal influences and traditions to a limited extent. Moving beyond the water, Russell finally reached the rock. “As we ride along in the grateful shade we come suddenly to a steep ascent and are surprised to find ourselves at the base of the mountains. Immediately the climb begins.”¹³²

His ascent into the mountains included scientific as well as aesthetic observations. Russell openly criticized armchair geologists who had not actually seen some of the physical features about which they claimed expertise. “As some writers—especially those who are given to solving the mysteries of nature from their closets—have thought that lakes filling true rock basins are a rarity, and have even doubted whether they exist at all, we shall be interested in examining this result of glacial action, while we wait for our

¹²⁹ David Hurst Thomas, *Skull Wars: Kennewick Man, Archeology, and the Battle for Native American Identity*, Foreword by Vine Deloria Jr. (New York: Basic Books, 2000), 47.

¹³⁰ *Ibid.*, 48.

¹³¹ *Ibid.*, 51.

¹³² Russell, *Mono Valley*, 280.

mule train to join us.”¹³³ This statement gives a small glimpse into the thought process of a man who would be at the forefront of professionalizing geology as a respected science in his later years. Professional scientists needed to get out into the field and experience the heat and dust for themselves. Ill-informed theories from desk-bound intellectuals had no place in an emerging profession that relied on empirical scientific practices. In order to earn a respected place in society and academia as a professional scientific discipline, geographers and geologists had to get in the field and observe how the natural world actually functioned. Russell had no place for unobserved hypotheses from the comforts of an Eastern laboratory when it came to his science, and he was very vocal—especially later in his life—in his opinions on the matter. In the mean time, there was still much to discover.

“Proceeding [up the mountain], we find the way becoming steeper and more difficult; only the shadow of a trail remains; but our course is upward and we need no guide.”¹³⁴ The trail became less clear and the terrain a little too dangerous for the pack animals so a comfortable spot full of forage was selected. “Here we establish camp, turn our animals loose, and after requisite rest and refreshment start for the summit of Mt. Dana on foot. The climbing is not difficult...[and] after about two hours’ easy climbing, we gain the topmost crag and stand on the verge of the great precipice.”¹³⁵ The view provides a “magnificent panorama of surrounding mountains and canyons and gem-like lakes” that dot the landscape as far as can be seen.¹³⁶ “The summit on which we stand is 12,900 feet above the sea; it is only exceeded in altitude in the Mono basin by Mt. Lyell

¹³³ Ibid., 281.

¹³⁴ Ibid., 282.

¹³⁵ Ibid.

¹³⁶ Ibid., 283.

and Mt. Ritter.”¹³⁷ If you were to slowly turn your gaze across the horizon the enormity of the scene would quickly overwhelm even the most seasoned explorer. “Far below to the southeast lies Lake Mono, apparently silent and motionless” yet, as we already know, teeming with its own unique variety of life¹³⁸ Towards the “north and south from Mt. Dana the crest line of the Sierra is marked by peak after peak as far as the eye can reach [and] at the western base of Mt. Dana there is a deep, picturesque valley, dotted with lakes traced with silvery streams...across the valley to the northwest rises Mt. Conness, bare rugged, and grand. On its northern face a small glacier nestles in the shadow of the bold cliffs.”¹³⁹ This was the picture of nature’s monumental architecture that greeted the mountaineer, but it is not only the massive achievements of nature that should be respected.

Returning from this vision (the view from the summit) of wild magnificence, the eye rests upon a scene of humbler charms, but no less pleasing. Between the crags crowning the mountain and the highest of the contorted and deformed pines struggling for existence along the timber line, the trail leads over rocks and crags that at certain seasons are bright with lichens and fringed with the purple and gold of the Alpine blossoms which flourish in every crevice and hollow where a little soil has accumulated. Sometimes the attention of the climber is attracted by what appears to be an Alpine glow on a mountain dome near the crest of the range, and he fancies that perhaps it is composed of some rock not yet recognized; but on reaching the summit he will be surprised to find himself in a field of lovely pink blossoms so thickly interwoven that it is impossible to tread the ground without crushing many of them at every step. In these elevated regions May Day is a festival of late summer, but it brings with it a multitude of charms that are unknown to dwellers in the world below.¹⁴⁰

¹³⁷ Ibid.

¹³⁸ Ibid.

¹³⁹ Ibid., 283-284.

¹⁴⁰ Ibid., 284-285.

Figure 2.6: Yosemite National Park, California. Mono Pass, viewed from the base of Kuna Crest. At the left of the pass is Mount Gibbs; through the pass, a glimpse of Mono Lake. 1903.



Photograph by Grove Karl Gilbert. Courtesy of the U.S. Geological Survey.

Russell described how the strange alpine world is as full of life as the alkaline harshness Mono Lake. Travelers just needed to open their eyes and see how life thrives throughout the diverse environments of nature. The Mono basin allows the open-minded and inquisitive traveler the opportunity to see wide ranging microclimates within a very close proximity. It also provides a vast array of specimens and natural processes for scientists to discover. “The traveler who may actually follow the route here indicated will find that he has only entered the borders of a wonderland when he gains the summit of Mt. Dana. Beyond not only lie deep valleys, unknown except to the shepherds who pasture their

flocks there in the summer, and lofty mountains unscaled even by the hunter, but almost in sight are the far famed Yosemite and groves of giant sequoias.”¹⁴¹

Despite his “desire to press on,” Russell needed to get back to his more scientific work since “even the fireside traveler has to limit his journeys and turn homeward.”¹⁴² He continued the remainder of *Mono Valley* with a scientific study surrounding the lacustral (pertaining to lakes and ponds), glacial, and volcanic history of the Mono basin, but Russell had written a classic environmental study with artistic prose which would be referred to again and again by the tourism boosters and environmentalists alike into the twenty-first century. Science was what the federal government sent Russell to the Mono basin to conduct, but nature’s laboratory affected Russell’s observations. He was still a white, upper-class, aspiring professional in the late nineteenth century who had dreams and desires similar to those of his peers. The difference with Russell was that despite his professional desires, social class, and employers, he still believed in nature’s ability to inspire man. His adventures and explorations may have been self-serving, but his artistic prose leaves traces of an environmental consciousness that was associated more with poets and wildlife preservationists rather than professional scientists.

In 1889, the USGS directed Israel Russell to accompany the U.S. Coast and Geodetic Survey (USCGS) in its mission to identify the boundaries of Canada and Alaska along the Yukon and Porcupine Rivers.¹⁴³ As a geological attaché, Russell did not have

¹⁴¹ Ibid., 285.

¹⁴² Ibid.

¹⁴³ Israel C. Russell, “A Journey up the Yukon River,” *Bulletin of the American Geological Society* 27, No.2 (1895), 143-160.

Figure 2.7: Mount Dana Glacier. Northern side of Mt. Dana. Yosemite National Park, California. 1883.

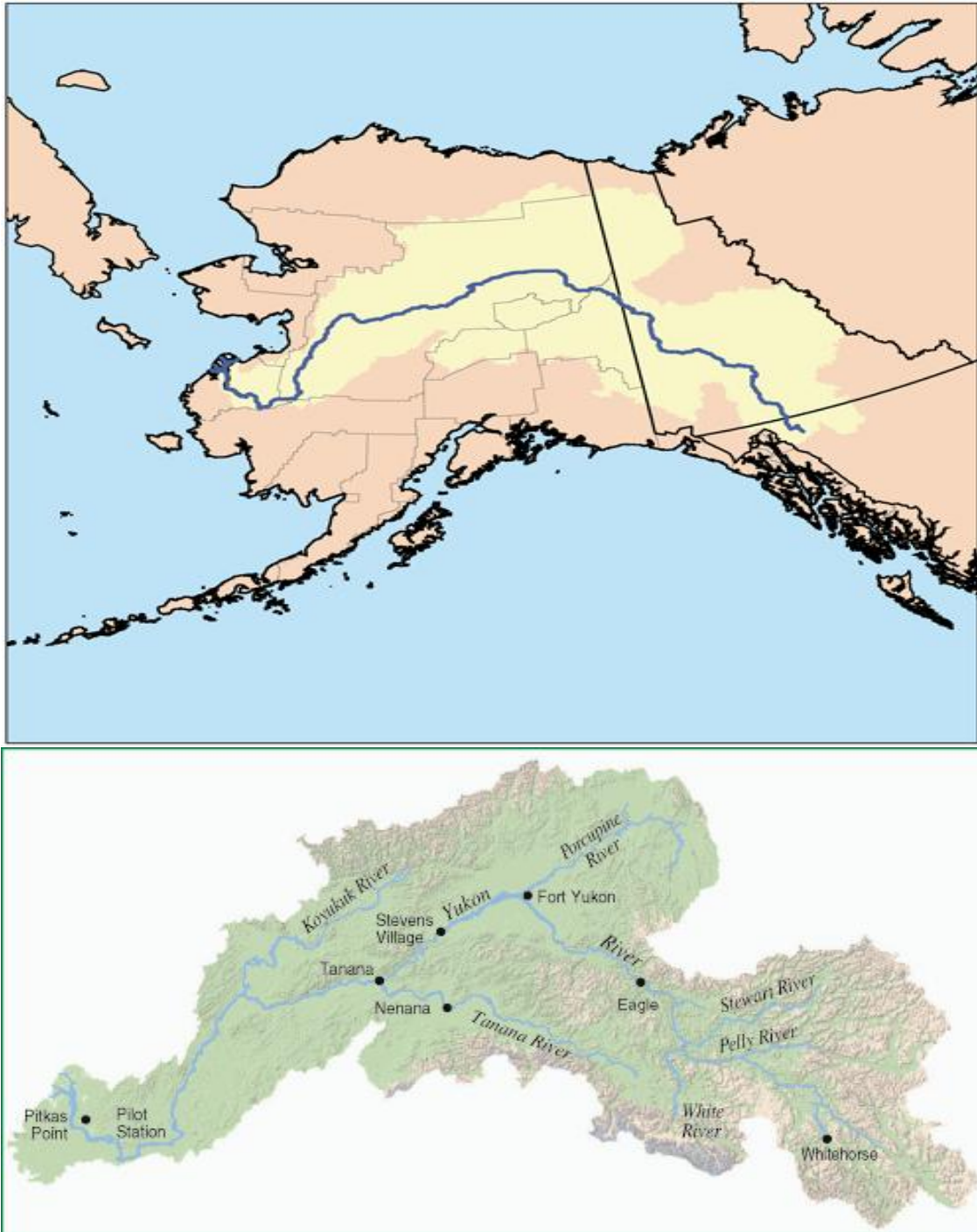


Photograph by Israel C. Russell. Courtesy of the U.S. Geological Survey.

any specific duties on the expedition; he was more of an expert advisor on geologic matters rather than anything else. This allowed him the freedom—as the course of the journey permitted—to make Humboldtian “observations on the character and resources of the country.”¹⁴⁴ This expedition was designed to be a detailed survey of the borders and was anticipated to take two years to complete. This trip was also Russell’s first to the Alaskan territory and it allowed him to see entirely new geographical landscapes and geologic features in an underexplored region of the world. Russell would only accompany the USCGS for a small portion of the expedition, but the time he spent on the

¹⁴⁴ Ibid., 143.

Figure 2.8: (Top) Borders of Alaska, the Yukon Territory, and upper British Columbia, Canada. Yukon River and drainage basin are highlighted in the center. (Bottom) Yukon River Drainage Basin



Courtesy of the Wikimedia Commons.

Yukon was sufficient to ignite a passion for Alaskan landscapes that would eventually lead him to the pinnacle of professional and personal success and fulfillment.

Russell traveled with the expedition up the Yukon River on the steamship *Yukon*. The “desolate” tundra that surrounded their approach during the initial stages of their journey was covered in a growth of “luxurious...mosses and lichens, beautified during the short summer by a wealth of brilliant blossoms.”¹⁴⁵ This part of their trip was relatively uneventful and consisted of “many stops of a few hours at the principal native villages.”¹⁴⁶ Russell described, in malodorous detail, how these indigenous Alaskans lived within these “picturesque scenes” of native life.

Figure 2.9: Natives [Indians] and dwelling. Onualaska, Aleutian region, Alaska. 1891.



Photograph by Israel C. Russell, courtesy of the U.S. Geological Survey.

¹⁴⁵ Ibid., 145.

¹⁴⁶ Ibid., 147.

Many of the houses were literally filled floor to roof, with salmon hung on poles with bark troughs below to catch the dripping oil. A fire smoldering on the floor in the centre of each house filled it with dense smoke which finally escaped through a hole in the roof. Our visits to these houses necessitated that we should crawl in on our hands and knees, beneath the mass of drying salmon, in order to reach the small open space in the centre where the people crowded about the fire. The density of the atmosphere and the indescribable odor of these combined dwelling and smoke houses usually made our visits as brief as courtesy would allow.¹⁴⁷

Although Russell may have been offended by the odor, he maintained a reserved respect for the Natives' customs and ability to survive in the harsh Alaskan environment. He continued to believe in scientific racism, but he could not help but be impressed with the ingenuity of the local inhabitants. His belief in the hierarchy of the races and survival of the fittest was counterbalanced by his keen observations of native life; especially after his own experiences revealed how difficult it could be for humans, regardless of skin color, to move and survive in the extremes of Alaska's landscapes and climates.

During the initial portions of this voyage, Russell focused primarily on the landscapes that could be observed from the river and its bank rather than detailed geological studies of the land. This enabled him to note the diversity of the woodland and how "the banks of the Yukon are forested, except on the delta. In the Alaskan portion of its course, the forests are dense, with thick undergrowth, but nearer its head waters the uplands are without trees and covered by luxuriant grasses."¹⁴⁸ Russell also was able to get a sense of the climate zones which almost certainly came from the influential writings of Alexander von Humboldt and his disciples. "Throughout the length of the Yukon, one is frequently reminded of the high latitude of the region drained by the great river, by

¹⁴⁷ Ibid.

¹⁴⁸ Ibid., 148.

seeing strata of ice in the recently cut banks, beneath the dense layer of moss and roots forming the surface of which the forests grow.”¹⁴⁹ Using scientific training and naturalist influences, Russell was able to observe and describe the unique interplay of rock, water, and climate within the Alaskan landscape. The ability to look at the larger relationship of global climate patterns and local ecosystems—down to the smallest members of the local flora and fauna community—was one of the legacies of past naturalists that Russell incorporated into his blend of scientific exploration. One of the smallest members of this Alaskan ecosystem made it difficult for anyone to understand, no matter how much he may have tried, to comprehend and appreciate the land. Yet Russell did try to understand.

Regardless of the splendor and new discovery’s waiting around the next bend of the river, the insects could make life completely unbearable for any traveler. “During the short hot summer, in Central Alaska, when the sun scarcely descends below the horizon, insect life is abundant and mosquitoes and flies make miserable the lives of both men and beasts.” The expedition had to go on, of course, and the men protected themselves as best they could. “When venturing into the forests we wore netting over our heads and gloves on our hand, but even then suffered from the relentless attacks of the millions of insects that swarmed on every hand.” Despite any protective measures, the insects remained persistent in their annoying quest, but they could actually be of assistance to a disoriented but astute explorer as he attempted to maintain contact with his companions in the underbrush. “When my companions were concealed from me by dense vegetation, I could frequently locate their position by the cloud of mosquitoes that hovered over them.”¹⁵⁰ The expedition had to continue, and finding even the dimmest bit of positive

¹⁴⁹ Ibid., 149.

¹⁵⁰ Ibid., 150.

feelings toward such negative members of Mother Nature could be a valuable tool in the kit of the scientist-explorer. A good attitude mattered.

The survey party split up at the site of old Fort Yukon where the Yukon River joins the Porcupine River. One party began to conduct surveys of the Yukon from land while the second, whom Russell accompanied, proceeded up the Porcupine River to make observations. They steamed up river as far as they could go and then made camp—Camp Davidson—on land. While the steamer returned to old Fort Yukon to retrieve supplies, Russell was free to explore the countryside. “Camp Davidson had previously been occupied by a surveying party sent by the Canadian government, which built a commodious log house, in which they passed the winter. The house was still in good repair, and was at once cleared out and enlarged. An observatory of logs, built over the stump of a large tree which served for an instrument pier, was also found standing and was at once fitted for use.” During Russell’s local excursions, he “found abundant signs of moose and bear” along with “the trails of mountain sheep and mountain goats” above 3,000 feet. “The river was known to abound in salmon at certain seasons, and grayling or Artic trout, were said to be plentiful. Taking all in all, Camp Davidson seemed to be an excellent place I which to pass the winter.”¹⁵¹ However, He could not linger in this idyllic setting. Upon the return of the steamer *Yukon*, Russell departed Camp Davidson and rejoined the first party on the Yukon River.

The steamer retrieved the first party of surveyors and continued to struggle upstream. The vegetation became denser as native settlements became sparser. Russell noted how “scarcely a trail could be seen” along the river and how birch bark canoes became the primary means of conveyance in this part of the world. The monotony of the

¹⁵¹ Ibid., 151.

deep wilderness was soon broken by the sight of a primitive white settlement “at the mouth of Forty Mile creek.” This settlement contained a few log homes and a store that served as “the centre of trade for the gold fields on Forty Mile creek and neighboring streams.”¹⁵² The settlement also contained coarse men in addition to the rough hewn homes. “The miners are a rough, hardy race, made up; it would seem, of representatives of nearly every nation on earth. Some are typical frontiersmen, dressed in buckskin, who are never at one except on the outskirts of civilization. Others were of doubtful character and it is said are seldom known by their rightful names. The remote gulches of the Yukon country seem to offer safe asylums for men who are ‘wanted’ in other districts.” This scene, when compared to Russell’s earlier description of the natives, causes the reader to ask questions concerning who was more civilized; the native or the “wanted” white men in their wilderness “asylums.” Following stops at a few other scattered mining settlements, the USCGS party reached its farthest point up river at “the site of old Fort Selkirk.”¹⁵³ This is where Russell parted with the USCGS and proceeded to accompany “four miners, who had taken passage on the Yukon at Forty Mile, to continue up the river.”¹⁵⁴ From this point on, “the most interesting portion” of Russell’s journey began.¹⁵⁵

The men retrieved and repaired an “open boat built by the miners when they began the descent of the Yukon some eighteen months previously.” Following packing and preparations the small party began their taxing ascent up the river by muscle power. “Each of my companions was provided with a strong pole, about ten feet long, furnished with a spike at the end...by pushing with the poles on the bottom or against the river

¹⁵² Ibid., 152.

¹⁵³ Ibid., 153.

¹⁵⁴ Ibid., 154.

¹⁵⁵ Ibid.

bank, the boat was forced along.”¹⁵⁶ Under these exhausting conditions, Russell was once again able to find positive aspects to lift his morale. “With the advance of the season the nights became cold, but this was favorable to us, as the mosquitoes ceased their ravages and allowed us to fully enjoy the beauties of the rugged land through which we were voyaging.”¹⁵⁷ As much as he may have wanted to enjoy the scenery, Russell still had to expend his portion of the work which was considerable. For the meantime, natural observations were superseded by the immediate needs of Russell’s physical labor. Their journey only became more arduous when portages were required around natural obstacles such as rapids and canyons. Respite from these labors was soon found when they reached larger lakes that were traversed by means of sail. “This portion of the journey was especially enjoyable, as a rest was afforded from the extreme fatigue of forcing our way against the timeless current of the river.”¹⁵⁸ This rest was only temporary because the prospectors and their resident scientist still needed to cross over the mountains before they could reach the mining claims.

Upon reaching Lake Lindeman, “the end of our journey by river was near at hand,” but “we still had a difficult and but imperfectly known mountain pass to cross [from east to west], on which the snows of winter had already begun to accumulate.”¹⁵⁹ Fortunately they came across another party of miners and were able to join with them for their traverse of the pass, and from them obtain much needed supplies. After final preparations, they began their “march up the mountains toward Chilklat (or Chilkoot)

¹⁵⁶ Ibid.

¹⁵⁷ Ibid., 155.

¹⁵⁸ Ibid., 156.

¹⁵⁹ Ibid.

pass.”¹⁶⁰ They were now forced to tax different muscles in their bodies as they slowly moved up the mountain and into the snowy pass. “On gaining the highest available clump of balsam trees...we made preparations for passing the night..., I slept soundly, and on awakening the next morning found my bed deeply covered with snow.” The new discomfort of cold and snow replaced the old one of incessant insects, but Russell maintained a positive outlook and continued on their climb. “Our course led upward over glaciated rocks, and across snow-filled valleys toward the dense cloud banks that veiled all the beyond.”¹⁶¹ Soon their way was lost and “in the obscurity of the clouds that enveloped us all was dark and uncertain. Every vestige of a trail had disappeared [in the snow], and no one knew which of the black gulches about us would lead to the trail on the other side of the pass.”¹⁶² Nature’s compass assisted them in finding their way when they noticed a formation of low flying geese and correctly surmised that the geese would choose the lowest gap [Chilklat pass] to cross the mountains. “Descending rapidly, along an exceedingly rugged trail, we were soon below the clouds, and a drizzling rain reminded us that we were on the Pacific slope, where days of clear weather are few.” They worked their exhausted bodies down the mountains until night fell and they “lay down on thick, water-soaked moss, each man with his head toward the tree that sheltered [them] and his feet toward the semi-circle of fire, and slept.”¹⁶³ In the morning, a sight greeted Russell that struck him as a particularly vivid and apt as a description of life in the Alaskan wilderness.

Of all the wild pictures of camp-life that linger in my memory, there are none more striking than our bivouac beneath the dark hemlocks of Taya valley. My

¹⁶⁰ Ibid., 157.

¹⁶¹ Ibid., 157.

¹⁶² Ibid., 157-158.

¹⁶³ Ibid., 158.

companions rough and uncouth as men could be, had been absent from civilization at least a year and a half, and some of them for three years. Their hair and beards had grown long, and their faces were tanned and weather-beaten by constant exposure. Their garments, then in the last stages of serviceability, had been made by those who wore them, from any material that chanced to be available, from buckskin and fur to flour-sacks, and had been repaired without regard to color or texture. Lying in many positions beneath dripping boughs, with the fire light streaming over them and gleaming on the falling rain drops, they made a picture of frontier life as wild and picturesque as could well be fancied. One not accustomed to the vicissitudes of exploration, coming suddenly on such a scene, would certainly believe he had stumbled on a band of the most desperate outlaws. (158-159)

Soaking wet, struggling through wet brush and across multiple ice-cold streams, Russell and the party of ragged miners worked their way towards civilization. “At last, however, when fatigue and lack of food had begun to tell on our strength, we saw before us the welcome sight of a chimney rising above the foliage, and in a few moments gained Chilkat village, and found food and rest at the trading post kept by Mr. Haley and his kind-hearted wife.”¹⁶⁴ His traveling companions continued on their journey to their gold claims while Russell remained for a few days in Chilkat village to explore the local landscape.

The postponement of Russell’s return to Seattle from his journey was rewarded with “brilliant weather, during which [Russell] climbed a neighboring mountain peak.” From this promontory, he was able to make geological observations which, in addition to his already healthy Alaskan exploration résumé, would help cement his selection for later Alaskan excursions. “At the elevation of 3,000 feet I crossed the névé of a small glacier and obtained an unobstructed view of the magnificent ice-crowned mountains in which the ancient river valley, now occupied by ocean water and known as Lynn Canal, was

¹⁶⁴ Ibid., 159-160.

carved. From one locality I counted forty glaciers.”¹⁶⁵ But his romantic vision was never too far removed from his science. “On the day that I looked down into the seemingly enchanted valley the air was clear and sunny in the upper regions, but the great gulf below was filled with drifting vapor. At one moment nothing was visible...and the next, the veil would be swept aside, revealing mountain spires, snow pinnacles and turquoise-tinted cliffs of ice towering heavenward.”¹⁶⁶ Russell departed the small Chilkat village with an Indian guide for Juneau and, eventually, Seattle. His first expedition to Alaska was complete, but he would return to cement his place in history as a pioneer and model for the twentieth-century’s environmental explorers who would follow in his footsteps.

After his geologic studies in the West, Russell conducted a series of studies on the East coast researching geologic formations. Grove Karl Gilbert thought Russell “always regarded the three years given them as nearly wasted. They comprised the detailed study and mapping of Paleozoic formations in the southern part of the Appalachian area, and, later, a general investigation of the Jura-Trias formations of the United States. The scope of the latter work was afterward reduced, and finally reported only on the Newark formation.”¹⁶⁷ While this passage gives some insight into the personal interests (or disinterests) of Russell, it also tells us that Russell continued this less attractive work with professionalism, maturity, and vigor. But why would he have considered this wasted time? Had the beauty and grandeur of the landscapes affected him to the point that an enduring passion for the West beckoned to him? Maybe the mountains had possessed his adventurous spirit or the multitude of light and colors that reflected off the vast peaks called to his aesthetic side. It is possible that Russell was simply bored with the work and

¹⁶⁵ Ibid., 160.

¹⁶⁶ Ibid.

¹⁶⁷ Gilbert, “Israel Cook Russell,” 664.

wanted to return to areas that offered more exciting possibilities. In any case, Russell's reputation for quality science and writing in the Great Basin and Alaska, along with his independent work on the Paleozoic formations in the East, led to one of his greatest achievements as a scientific explorer.

As a professional geologist with experience all over the United States and the world, Israel Russell was in an elite group. Men of science dominated explorations in the West and throughout the world in the late nineteenth century.¹⁶⁸ Bureaucrats overruled the skills of amateur explorers and soldiers in favor of civilian specialists. Of course the United States Army had its own role in subduing uncooperative Native Americans and protecting settlers, but it did not have the skills required for the exploitation phase in the West. Scientifically trained professionals filled this need to catalog and describe the resources the United States government and citizens later exploited. This is where men like Israel Russell excelled, especially when they supplemented their scientific expertise and respect for nature with physical endurance and a practiced knowledge of wandering through extreme landscapes.

¹⁶⁸ Goetzmann, *Exploration and Empire*, 595.

CHAPTER 3

MOUNTAINEERING SCIENTIST

Men wanted for Hazardous Journey. Small wages, bitter cold, long months of complete darkness, constant danger, safe return doubtful. Honor and recognition is case of success.

- Ernest Shackleton, British Explorer, Mythical Newspaper Advertisement (1912?)

Because it's there.

- George Leigh Mallory, New Zealand Mountaineer, *The New York Times* (1923)

Glory is fleeting, but obscurity is forever.

-Napoleon Bonaparte, French General and Politician (1769-1821)

The National Geographic Society's list of founding members included accomplished scientists of the day: Alexander Graham Bell, Grove Karl Gilbert, John Wesley Powell, Israel Cook Russell, and a multitude of other government officials, naturalists, and early proto-environmentalists.¹⁶⁹ These members had a common "curiosity about the world and everything in it" and they initially gathered together in 1888 for the purpose of "increasing and diffusion of geographic knowledge."¹⁷⁰ This initial mission statement would evolve over the next century to include "promoting the conservation of the world's cultural, historical, and natural resources," but there was

¹⁶⁹ Hubbard, "Members of the Society," 94-98

¹⁷⁰ Tom Melham, ed., *National Geographic Expeditions Atlas*, (Washington, D.C.: National Geographic Society, 2000), 14.

much groundwork to be laid first.¹⁷¹ Israel Russell used the reputation he had developed with the USGS in the west to help create a society that merged professional scientific inquiry with natural discovery and artistic prose. The society Russell envisioned is very different from what it actually became, but he was central to establishing a model of exploration and vivid narration that would become standard for later twentieth-century environmental explorers.

The Society's founders slowly built an intellectual base focused on how best to explore, record, and ultimately conserve the environment. These early environmental ideologies took decades to influence American culture before concerted action could take place. However, Russell and other National Geographic scientists were able to influence each other with ideas that would come to realization in future generations of environmental explorers. With assistance from future society members, friends, and colleagues like John Muir, Gifford Pinchot, and Theodore Roosevelt, the society began to develop the popular and official thoughts on the environment from exploitation to wise conservation and, eventually, to preservation. This, of course, was well in the future.

The important aspect to note for now is that a professionally trained scientific explorer like Israel Russell, who was initially influenced by his empirically minded scientific predecessors, was now being influenced by men with new ideas about the environment. Though Russell may have never come out and said he was a committed environmentalist or conservationist, his writings are full of romantic imagery about the natural world he was exploring. Russell's contributions were not as an environmentalist, but rather as a scientific explorer who wrote vividly and passionately about his natural

¹⁷¹ "Learn about the National Geographic Society," Located on the National Geographic Society's Website, <http://www.nationalgeographic.com>: Accessed on 20 Dec. 2007.

surroundings. He continued the tradition of military and scientific exploration that had been established well in the past, but Russell became one of the *first* explorers in a society that eventually took a leading role in fostering environmental awareness during the mid to late twentieth century.¹⁷²

From its initial inception in 1888, the National Geographic Society wanted to promote its purpose through various means. The initial meetings, essays, and discourse were expanded to include the *National Geographic Magazine* by late 1888.¹⁷³ As the magazine grew in popularity, albeit with a local, elite audience based in Washington D.C., the Board of Managers gathered to discuss other ways to promote their agenda. They realized that they already had the means to diffuse the knowledge through the essays in their magazine, but were lacking in methods for increasing geographic understanding. It seemed natural that geographic exploration would be the key to fill this void. In the spring of 1890 it was decided that the society would try exploration, starting with Alaska, and that the leader of the first expedition would be Israel Cook Russell on loan from the U. S. Geological Survey.¹⁷⁴ Funds were acquired from within the society through donations from men like John Wesley Powell, A.W. Greely, and Alexander Graham Bell.¹⁷⁵ Additionally, the transportation into Alaska itself was provided courtesy of the U. S. Navy. This not only shows the motivation of the National Geographic Society at this juncture, but it demonstrates the political connections and patronage the members were able to leverage for their purposes, a benefit which would help as the years went on. Science and imperial ambitions had been integral to the relationship

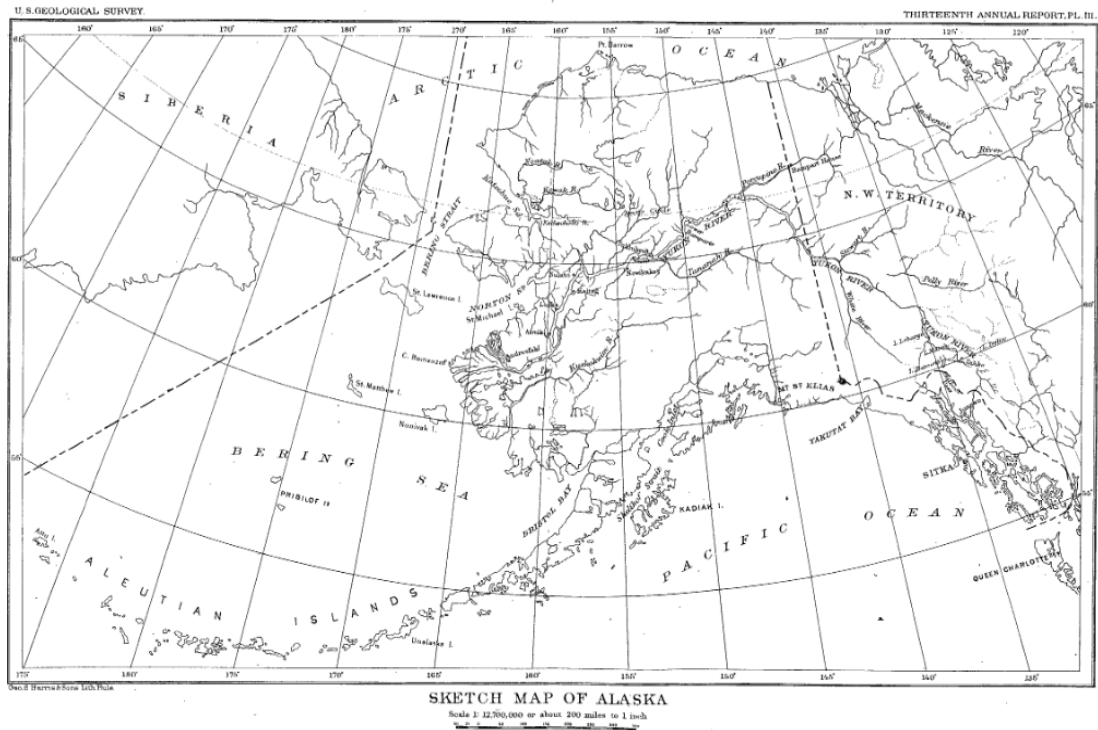
¹⁷² Hubbard, "Summary of Reports" *National Geographic Magazine* 2, no. 5 (1890): 302.

¹⁷³ Hubbard, "Members of the Society," 94-98.

¹⁷⁴ Hubbard, "Summary of Reports," 302.

¹⁷⁵ Russell, "An Expedition to Mount St. Elias, Alaska." *National Geographic Magazine* 3, (1891), 75.

Figure 3.1: Map of Alaska. Thirteenth Annual Report of the U.S. Geological Survey. Plate III.



Courtesy of the U.S. Geological Survey.

between civilian scientific societies and government policies since the beginning of European overseas expansion and the United States continued this tradition. As the expedition was being organized, the details were finalized and “the plan of work [was] to proceed to Yakutat Bay (Alaska) to study and map as large an area in the vicinity of Mount Saint Elias as practicable. It [was] also planned to redetermine the height of the mountain, and, if practicable, to ascend it.”¹⁷⁶ Israel Russell was given an incredible opportunity to further his career, the society’s agenda, and geographic knowledge as a whole.

¹⁷⁶ Hubbard, “Summary of Reports,” 302.

The Yakutat Bay region of Alaska was first observed by the Russian explorer Vitus Bering in 1741 after he landed at nearby Kayak Island and probably named the most prominent peak of the area Mount Saint Elias.¹⁷⁷ A succession of explorers over the next 150 years would also record their travels through the Yakutat bay area including Captain James Cook in 1778 and Captain George Vancouver in 1794.¹⁷⁸ Although these expeditions did not find a fabled “northwest passage,” they did produce valuable notes and maps that would assist future explorers like Russell. Russell would use these notes, maps, sketches, and descriptions in preparation for his expedition and he would confirm and deny their accuracy as he went about recording his own scientific calculations.

It has been argued that “mountaineering was an aesthetic experience; the men who opened up routes on high peaks were expressing their love for the mountains.”¹⁷⁹ This idea would have appealed to Russell, especially as he was tackling the unclimbed face of Mount Saint Elias. In 1890, the mountain had still not been scaled and it was thought to be the tallest peak in North America.¹⁸⁰ Even though it is not the highest peak on the continent, at 18,008 feet it is still awe inspiring, especially when viewed from eight miles away in the Gulf of Alaska. No other mountain on earth rises so abruptly from the sea to such an altitude. However, although the peak is within eight miles of the shore, the route from shore to the mountain’s base is a harrowing journey in and of itself. Ice fields like the massive Malaspina Glacier surround Elias and make traveling almost unbearably exhausting and time consuming. The proximity of the ocean and the sharp

¹⁷⁷ Kip Otteson, “The Politics of Remembrance: A Discussion of the Voyages of Vitus Bering and Lewis and Clark” (Master’s thesis, Colorado State University, 2004), 9.

¹⁷⁸ Russell, “An Expedition to Mount St. Elias, Alaska,” 58-74.

¹⁷⁹ Cohen, *The History of the Sierra Club*, 66-67.

¹⁸⁰ Jonathan Waterman, *A Most Hostile Mountain: Re-creating the Duke of Abruzzi’s Historic Expedition on Alaska’s Mount St. Elias* (New York: Henry Holt and Company, 1997), 6.

upslope of the mountains also means subfreezing weather and blizzards are possible at any time of the year. “Today, 5 percent of its suitors have died (mostly in avalanches)—making it one of the most dangerous mountains in the world; only 3 percent of climbers have died on Everest.”¹⁸¹ Russell did not have these statistics to assist him in his preparations, so he would have to rely on every resource available and every bit of his knowledge if he hoped to survive the environment, much less scale Mount Saint Elias.

Israel Russell did not conduct his expedition to Alaska alone. Mark Kerr, from the U.S. Geological Survey, who also served as the expedition’s topographer, signed on, and Russell also acquired the help of a volunteer from Washington D.C. by the name of E.S. Hosmer.¹⁸² These men were joined during final preparations in Seattle by seven “frontiersmen” chosen to be camp hands.¹⁸³ In addition to hiring men (and two dogs), Russell assembled all of his supplies and equipment from the latest technologies available for extreme camping. He now had the mission, men, and equipment for his explorations. The expedition departed for Alaska on the civilian steamship *Queen* from Seattle on June 16, 1890. The next ten days were spent observing the glacial fjords of British Columbia and Alaska. Upon arrival in Sitka, Alaska on June 25, 1890, the entire party transferred to the *U.S.S. Pinta* for the final leg of their journey to Yakutat bay.¹⁸⁴ At this point all the preliminaries were over and the important part of Russell’s expedition—exploration—would commence.

The next stage of their expedition involved canoeing up the bay. At this point in the journey, Russell’s descriptive prose grew deeply romantic. “We were approaching the

¹⁸¹ *Ibid.*, 5-6.

¹⁸² Hubbard, “Summary of Reports,” 303.

¹⁸³ Russell, “An Expedition to Mount St. Elias, Alaska,” 77.

¹⁸⁴ *Ibid.*, 78-79

Figure 3.2: Surface of central portion of Malaspina Glacier. Yakutat district, Alaska Gulf region, Alaska. cc 1891. Plate 16 in U.S. Geological Survey 13th Annual Report part 2. 1893. Plate 9-B in TARR Alaskan Glacier Studies. 1914.



Photograph by Israel C. Russell. Courtesy of the U.S. Geological Survey.

unknown: visions of unexplored regions filled with new wonders occupied our fancies, and made us eager to press on... the Bohemian spirit is so strong in some breasts, and the restraint of civilization so irksome that the homing instinct is reversed and leads irresistibly to the wilderness and to the silent mountain tops.”¹⁸⁵ From their first camp, Russell and his men began exploring the geology of the region, recording scientific observations on a variety of instruments, verifying and updating topographic information and making a general route reconnaissance for future legs of their journey. In this fashion, Russell and his team would spend the next month as they explored the lower elevations and glaciers surrounding Mount Saint Elias itself.

One theme Russell continued to develop was not only his observations of the natural world, but his observations of people. Russell remarked of one of his hired camp hands, that “on beginning frontier life once more, he discarded the hat of the white man,

¹⁸⁵ Ibid., 82.

Figure 3.3: View of Kings Island Natives in Boats. Nome district, Seward Peninsula region. Alaska. cc 1892.



Photograph by Israel C. Russell. Courtesy of the U.S. Geological Survey.

and wore a blue cloth tied tightly around his forehead and streaming off in loose ends behind.”¹⁸⁶ Russell also described the ingenious custom the Indians had for taking care of their canoes at night. “Not only were they drawn high up on the beach, out of the reach of possible tides, but each was swathed in wet clothes, especially at prow and stern, to prevent them from drying and cracking. The canoes, being fashioned from a single spruce log, are especially liable to split if allowed to dry thoroughly.”¹⁸⁷ Statements like these lend credence to a vision of Russell as a man who was fascinated by nature and human adaptation to it. His adventures in the deserts and mountains of the West began to have a profound impact on how he viewed nature, and his transformation from a purely

¹⁸⁶ Ibid., 84.

¹⁸⁷ Ibid., 85.

academic scientist to a proto-environmental explorer was demonstrated in his prose. Russell's romantic imagery and sense of wonder unfolded throughout this expedition, but he was still, first and foremost, a scientist-explorer.

As his men went about their camp duties, Russell began his own wanderings about the countryside in order to observe and record the local geological and glacial phenomena for himself.¹⁸⁸ In one terrifically descriptive day, Russell traversed his way through forests, across glaciers, and over cliffs with little more than the companionship of the two camp dogs and his writing instruments. The notes that he published about his scrambles through the Alaskan terrain would help set a precedent for a "lively first-person" account of the wilds which were emulated by generations of exploration narratives that were published in the *National Geographic Magazine*.¹⁸⁹ Russell described his surprise at finding "kettle-shaped" depressions within what he thought was a hill, only to realize it was actually a very old glacier covered with sediment and vegetation.¹⁹⁰ He then described his movement through the woods as he forced his way through dense thickets only to emerge onto broad open fields of rocks and dirt covering the glacier surface. It is here that he got his first brief glimpse, after many days of mist and rain, of the expedition's ultimate goal, Mount Saint Elias. He continued his day hike across more glaciers and ridges until, "after drinking in the effect of the magnificent landscape and endeavoring to impress every detail in the rugged topography upon my memory, and having finished writing my notes, it was time to return; for the sun was already declining toward the west."¹⁹¹ Russell decided to slide down the snow in order to

¹⁸⁸ *Ibid.*, 89.

¹⁸⁹ Melham, ed., *National Geographic Expeditions Atlas*, 35.

¹⁹⁰ Russell, "An Expedition to Mount St. Elias, Alaska," 89.

¹⁹¹ *Ibid.*, 93.

expedite his return to camp. During this enjoyable descent with the dogs “bounding along” beside him, he was startled to see two large brown bears on the same snow surface about one hundred and fifty yards below him. Apparently not startled, but rather curious, the bears walked toward Russell. Changing direction and increasing speed, Russell and his canine companions made great haste getting away from the curious beasts.¹⁹² After continuing through the Alaskan underbrush well into the darkening evening, Russell finally ended his trek at a warm camp fire and a hot meal. In Russell’s words, “this, my first day’s exploration, must stand as an example of many similar days spent on the hills and in the forests.”¹⁹³ Russell did not further describe his wanderings through the natural wonders of the Alaskan wilderness, but devoted much of his writings to the glacial make up of the area on his approach towards Mount Saint Elias itself.

The Yakutat Bay area is surrounded by some of the most beautiful and immense glaciers in the world and Israel Russell would later be relatively well known for his expertise on glaciers. Therefore, among the many other opportunities, Russell had the occasion to study some of the finest examples of these natural wonders. His party conducted several outings to survey the various glaciers of the bay, and his description of the view from the summit of Haenke Island conveyed the grandeur and scale of the ice. “The island occupies the position of the stage in a vast amphitheatre; the spectators are horny mountain peaks, each monarch robed in ermine and bidding defiance to the voiceless war of the elements. How insignificant the wanderer who confronts such an audience, and how weak his efforts to describe such a scene!”¹⁹⁴ From this vantage point, he could see the immense Malaspina glacier as well as the Hubbard, Dalton, and several

¹⁹² Ibid., 94.

¹⁹³ Ibid., 95

¹⁹⁴ Ibid., 98.

lesser glaciers streaming off the vast mountain ranges. One of the major themes of Russell's glacial observations was that they all seemed to be receding. He described numerous instances in which he observed the evidence of recent recession which "tells of recent climactic changes."¹⁹⁵ This is an interesting observation coming from a scientist in the 1890's who was, in effect, describing evidence of a global warming trend. Russell delighted in the glacial streams, which flowed out as melt water from enormous arched openings in the ice, meandered on the surface, and then disappeared through ice tunnels once again. His fanciful descriptions evoked some of the sounds that emanated from these tunnels; "it takes little imagination," he stated, "to transform these sounds into the voices and songs of the mystical inhabitants of the nether regions."¹⁹⁶ Russell described the process by which icebergs formed from the remnants of glacial cliffs as they crashed into the sea, and he called attention to the glaciers' great variety and danger they posed to the unwary canoeist. After one month's exploration around the bay, the party began to work its way inland, observing and recording as it went, across various glacial valleys and mountain passes towards Mount Saint Elias.

Along their route to the base of the mountain, the expedition had to cross multiple glaciers, crevasses, ravines, cliffs, streams, and jumbled moraine fields. Skill and determination were required by all, but along the way, Russell and his men encountered surreal surprises. As they chose a camp site one evening, on an island of vegetation away from the ice-streams, they never realized what beauty it could possess. As the next

¹⁹⁵ Ibid., 100.

¹⁹⁶ Ibid., 107.

Figure 3.4: In the Chaix Hills. Yakutat district, Alaska Gulf region, Alaska. 1891.



Photograph by Israel C. Russell, courtesy of the U.S. Geological Survey.

morning dawned, they awoke in “a little Eden,” an “Oasis in a desert of ice.”¹⁹⁷ They had chosen to camp in a paradise of countless colors of flowers surrounded by towering spruce trees and gently sloping hills which blocked the view of the endless glaciers. Russell gave the reader a literary treat as he described in great detail this incredibly picturesque oasis and all of its visual delights. “In full sunshine, the hill-slopes appear as if the fields of petals clothing them had the prism’s power, and were spreading a web of rainbow tints over the lush leaves and grasses below.”¹⁹⁸ From the peak of his island “oasis,” Russell soaked in the entirety of the surrounding landscape, and its sublime

¹⁹⁷ Ibid., 114.

¹⁹⁸ Ibid., 115.

effect on him poured out. “The foreground of every view is a bank of flowers nodding and swaying in the wind, but all beyond is frozen desert. The creative breath has touched only the garden which we, the first wanderers, have invaded. The land before us is entirely without human associations. No battles have there been fought, no kings have ruled, no poets have sung of its ruggedness, and no philosopher has explained its secrets. Yet it has its history, its poetry, and its philosophy!”¹⁹⁹ Russell had found an Edenic oasis within the threatening Arctic wilderness that was in its primeval state.²⁰⁰ In that time and place, wilderness was anything but terrifying. As Russell and his men settled back in their camp, they must have been filled with a sense of peace and contentment. The only views not blocked from their camp site were the mountains, and this was the only view they truly desired at this point.

Russell and his men continued over the ice fields on their journey deeper and deeper into the mountain ranges. As they pressed on, the expedition continued to record their scientific observations and, finally, Russell was able to get a clear view of his ultimate destination. “Could I give the reader a tithe of the impressions that such a view suggests, they would declare that painters had never shown them mountains, but only hills. So majestic was St. Elias, with the halo of the sunset about his brow, that other magnificent peaks now seen for the first time or more fully revealed than ever before, although worthy the respect and homage of the most experienced mountain-climber, scarcely received a second glance.”²⁰¹

¹⁹⁹ Ibid., 116.

²⁰⁰ Roderick Frazier Nash, *Wilderness and the American Mind*, Fourth Edition (New Haven and London: Yale University Press, 2001), 24.

²⁰¹ Russell, “An Expedition to Mount St. Elias, Alaska,” 136.

Figure 3.5: I.C. Russell (far right) leading a U.S. Geological Survey party across the moraines of the Malaspina Glacier. Yakutat district, Alaska Gulf region, Alaska. c. 1890. Upper photograph page 25, Images of the U.S. Geological Survey, 1879-1979.



Photograph by Israel C. Russell. Courtesy of the U.S. Geological Survey.

The final leg of Russell's journey to Mount Saint Elias took him up the Southeastern approach along the Newton Glacier.²⁰² On August 22, 1890, Russell with three of his men decided to make their first attempt at summing Mount Saint Elias. Seeing that the weather was clear, the men planned to depart their final camp at three o'clock in the morning. Leaving behind all non-essential equipment, the summiteers planned on making their assault in one quick movement to the top.²⁰³ "The higher

²⁰² Ibid., 150.

²⁰³ Ibid., 151.

mountain summits were no longer clearly defined,” Russell recounted, “but in the early light it was impossible to tell whether or not the day was to be fair.”²⁰⁴ The weather, as it prone to do in the mountains, did not agree with their plans. Unable to see what lay in store for them as they set out in the early morning hours, Russell pushed on with one eye cautious eye always looking to the sky. As they moved on, nature continued to display the wonders that were found in the upper limits of the world. “From the highest and sharpest peaks, cloud banners were streaming off towards the southeast, showing that the higher currents were in rapid movement. Vapor banks in the east were flushed with long streamers of light as the sun rose, but soon faded to a dull ashen grey, while the cloud banners between us and the sun became brilliant like the halo seen around the moon when the sky is covered with fleecy clouds. This was the first time in my experience that I had seen colored banners waving from the mountain tops.”²⁰⁵ Initially they had rapid progress over the frozen snow, but this quickly changed with the coming of daylight, storm clouds and snow. Russell had to make a tough decision as he stated that “after twenty days of fatigue and hardship since leaving Blossom Island, with our goal almost reached, we were obliged to turn back.”²⁰⁶ Their minds were soon distracted from their sorrows as they made the even more arduous descent to their base camp in a blinding snow storm. After two days of descending, they finally made it back to camp.

On August 25, 1890, Russell and one assistant, Kerr, decided to try for the summit one more time while the two remaining men descended to a cache for supplies.²⁰⁷ During Russell and Kerr’s second summit attempt, they stopped at a previous bivouac

²⁰⁴ Ibid., 152.

²⁰⁵ Ibid.

²⁰⁶ Ibid.

²⁰⁷ Ibid., 153.

Figure 3.6: Mt. St. Elias from north border of Malaspina Glacier. Yakutat district, Alaska Gulf region, Alaska. 1901.



Photograph by Israel C. Russell. Courtesy of the U.S. Geological Survey.

that they had used during their treacherous descent in the blizzard two nights earlier. Upon preparing lunch, the men realized they had miscalculated the amount of fuel they had for the camp stove. Recognizing the improbability of survival without more fuel, Kerr descended to overtake the men heading to the cache in order to retrieve their excess fuel. Alone on the mountain Russell lamented his predicament; “we then separated, Mr. Kerr starting down the mountain, leaving me with a double load, weighing between sixty and seventy pounds, to carry through the deep snow to the high camp previously occupied.”²⁰⁸

Russell continued up the mountain to their previous high point where he set up camp. Exhausted, he slept through a tumultuous night; upon awakening, he discovered

²⁰⁸ Ibid., 154.

himself to be in the midst of another blizzard.²⁰⁹ The blizzard forced Russell to conduct continuous excavations around his camp to prevent the snow from caving in his tent. He ran out of cooking fuel and was relegated to using recycled bacon grease and a rag for his cooking. The storm continued for days and Russell abandoned his tent for a snow cave he tunneled out of the ground.²¹⁰ When the storm finally abated, Russell was awestruck by the scenery. The entire mountain and all of its surroundings were covered in a total blanket of white and there were no sounds to be heard. Russell found himself in a place, as Stephen Pyne would say, “distilled beyond the essence to something close to geographic nihilism.”²¹¹ With travel unfavorable because of fresh, soft snow, Russell stuck to his mission and made some valuable scientific observations.

Russell had plenty to keep him busy even though he was stranded in this white wilderness. The avalanches that followed the snow storm gave him the perfect opportunity to observe this natural phenomenon up-close. Russell recorded their frequency, how they seemed to form, and the results along their destructive paths.²¹² In addition to the action of avalanches, he observed the stratification of snow fall and the influence of air, sun and moisture in producing them. He noted their similarity to the sedimentary rocks he was used to dealing with as a geologist.²¹³ Russell remained steadfast in his determination, but nature would not cooperate and he soon realized the moment was past to attempt a successful summit. Therefore, after six days alone on the

²⁰⁹ Ibid.

²¹⁰ Ibid.

²¹¹ Stephen Pyne, “The End of the World,” *Environmental History* 12, no. 3 (July 2007), <http://www.historycooperative.org/journals/eh/12.3/pyne.html>, Accessed on 08 Feb 2008.

²¹² Russell, “An Expedition to Mount St. Elias, Alaska,” 154-156.

²¹³ Ibid., 156.

mountain, Russell abandoned Mount Saint Elias, but he never abandoned his hope that he might one day reach its summit.²¹⁴

Though Russell was disappointed that he could not scale Mount Saint Elias, he seemed pleased with his expedition's accomplishments. In addition to the reams of scientific data gathered and the descriptive narrative of the expedition, Russell and his party became the first non-natives to lay eyes on and name Mount Logan, the highest peak in Canada.²¹⁵ This feat, in and of itself, was a notable accomplishment. As Russell reflected on the journey, their thirty five days spent above the snow line, and the incredible adventure they enjoyed, his pride was evident. "During our stay in Alaska not a man was seriously sick and not an accident happened. The work planned at the start was carried out almost to the letter, with the exception that snow storms and the lateness of the season did not permit us to reach the summit of Mount Saint Elias."²¹⁶ Later generations of explorers would name a glacier, a fjord, and an island in Yakutat Bay in his honor. His reputation and future seemed secure. But he still wanted to climb that mountain.

Since the first journey proved to be so successful in terms of scientific and geographic knowledge, "a second expedition, under the same auspices as the first, was therefore dispatched to the same region in 1891."²¹⁷ This expedition was another hastily planned affair that was left in the capable hands of Israel Russell to execute. He had the full backing of the National Geographic Society and the USGS, which assisted greatly when resources and patronage was required, but time was short so Russell quickly

²¹⁴ Ibid., 157.

²¹⁵ Melham, ed., *National Geographic Expeditions Atlas*, 32.

²¹⁶ Russell, "An Expedition to Mount St. Elias, Alaska," 163.

²¹⁷ Israel C. Russell, "Second Expedition to Mount Saint Elias, in 1891," *Thirteenth Annual Report of the United States Geological Survey 1891-'92* (Washington, D.C. : Government Printing Office, 1893), 7.

departed in mid-May 1891, while the season was ripe for exploration in the northern regions. Once again Russell would attempt to summit Mount Saint Elias and gain a deeper understanding of the land.

Russell arrived in Seattle soon after and began preparations for his journey. In addition to gathering supplies and coordinating transportation, Russell needed men. He recruited six men for his expedition, three of whom had been a part of his previous year's adventure. By May 30, Russell and his men had moved to Port Townsend, Washington for final preparations and loading of their transport vessel. The steamer *Bear*, under United States government orders, gathered the men and moved them north along the outer passage and arrived in Yakutat Bay on June 6. So far their journey was uneventful, but this soon changed.²¹⁸

The *Bear's* crew needed to launch smaller vessels capable of landing on the beach in order to deliver the expedition members and their supplies. This was a dangerous task with numerous risks in the ice-cold, choppy waters of the Alaskan coast. However, it was not rare and the crew went about conducting a reconnaissance for a safe landing sight with little concern. Once a sight was identified, a portion of Russell's men and supplies, not including Russell himself, left for the beach. This was when tragedy struck. Two boats launched and attempted to land, but only one was successful. In the uncompromising surf, one of the boats capsized with the loss of five seamen and one of Russell's men. The loss was shocking to Russell and his party, but after a brief grieving period, the landing of men and supplies continued. If anything, this episode reinforced the dangers of traveling in such inhospitable and remote locations. There was little they could do after having traveled so far but continue on with fresh memories of how even routine

²¹⁸ Ibid., 8-9.

maneuvers in these regions of the world could be one's last. Their moods soon cheered as they sorted out themselves and their gear for their journey to Mount Saint Elias.²¹⁹

Little time was wasted as they began to move inland and establish encampments on their way towards Elias. Russell was still awed by the landscapes he encountered along the way despite the urgency of his expeditions movements and the purposefulness of his scientific observations. The area immediately surrounding their landing site was “in reality a beautiful park in which the trees [were] as artistically arranged as if planted by a skilled gardener” that, even on overcast and dreary days, was full of wonders for the scientist to study.²²⁰ Once the cloud curtain lifted, an entirely new and stunning scene was revealed. “A magnificent panorama of mountains and glaciers with a foreground of flower-strewn meadows and moss-draped forests” was laid out before Russell in the morning, with “each blade of grass and each gracefully bending fern frond...jeweled with dewdrops; each fairy tent built by spiders among the flowers was a miniature canopy of pearls.”²²¹ The scene was one of inspiration and peace that helped settle his mind after the tragedy that accompanied his landing. It also stirred his desires to get deeper into the glacier covered valleys and begin the ascent of Mount Saint Elias.

The journey to Mount Saint Elias was not an easy one. Russell and his men built toboggans and sleds to ease their burdens, but the physical hardships were extreme in this icy, cold, wet, and remote landscape. Their journey took them over several glaciers, some of which were riddled with deep crevasses and jumbled boulders the size of houses. One of the most uncomfortable tasks involved crossing ice-cold streams too wide or swift to build bridges over. “To strip in such an atmosphere and plunge into an ice-water bath

²¹⁹ Ibid., 10-11.

²²⁰ Ibid., 12.

²²¹ Ibid., 15.

required considerable courage, but there was no other way.”²²² As Russell continued higher up into to the mountains, he continued to make interesting observations, and sometimes meals, of the wildlife.

“On the morning of July 4, when we started for the summit of the Chaix hills, we were more fortunate than usual in securing game.”²²³ A large brown bear was spotted coming toward them in a gorge. Russell reported that “within about 200 yards I fired,” and his men had fresh meat for dinner. Maybe he was showing some of his masculine bravado by including this small tale of man against beast, but it was mild when compared to some of the more masculine hunting and travel accounts that would come forth in later stories retold by the likes of Theodore Roosevelt. In addition to slaying ferocious animals, Russell took note of some of the smaller and more unusual creatures. He recounted how, on one patch of ice and snow on the west end of the Samovar hills, “small, slim black worms, about an inch long...were wriggling over the snow in thousands, but as soon as the sun rose and made its warmth felt they disappeared beneath the surface.”²²⁴ These are actually known as ice worms and they do in fact live in these extreme environments.²²⁵ Russell was a keen observer of his natural surroundings, but his ultimate goal on this trip was still to summit Mount Saint Elias.

Russell and two of his camp hands began their attempt at conquering the mountain in late July 1891. They slowly worked their way through the ice and snow until they reached the head of Newton glacier on the eastern side of Mount Saint Elias.²²⁶ They

²²² Ibid., 18.

²²³ Ibid., 27.

²²⁴ Ibid., 33.

²²⁵ Sandi Doughton, “Ice worms: They're real, and They're Hot,” Located on *The Seattle Times* website: http://seattletimes.nwsourc.com/html/localnews/2002818691_iceworms21m.html: Accessed on 06 Jan 2008.

²²⁶ Russell, “Second Expedition to Mount Saint Elias,” 41.

choose a location for their camp that was relatively sheltered from avalanches, at around 8,000 feet. Russell ended up spending a considerable amount of time at this camp waiting for the weather to clear so that he and his men could start their final push to the top. The mountaineers patiently waited in their tiny tent for twelve days as the “snow fell in fine crystals hour after hour and day after day.”²²⁷ They were finally able to work their way up the mountain in the early morning hours of July 24.

The morning was cool and clear, perfect for summertime mountaineering in Alaska, but this did not mean their climbing would be easy. “Owing to the steepness of the slope” and the innumerable crevasses, Russell and his men had to slowly carve their own trail out of snow and ice.²²⁸ They were able to make some faster progress in the paths of old avalanches, but for the most part, they had to cut steps into the near vertical slope, zigzagging their way across the face of the mountain. This took time, which they did not have to spare, but it was the only safe way. With alpenstocks, mountaineering ropes, and determination, they wormed their way to sights that no European American had recorded seeing before.

As the day wore on, Russell’s crew creep closer and closer to a ridge that divided the southern and northern half of the range that Mount Saint Elias dominated. With great anticipation, Russell crested this ridge and was astonished at what he saw. Having anticipated a landscape of “low, forested country, stretching away to the north,” he was not prepared for the endless view of snow-covered mountains that greeted him.²²⁹ For 40 or 50 miles, an endless array of mountain ranges and distant peaks “called to mind the pictures given by Arctic explorers of the borders of the great Greenland ice sheet, where

²²⁷ Ibid., 43.

²²⁸ Ibid., 45.

²²⁹ Ibid., 47.

rocky lands, known as ‘nunataks,’ alone break the monotony of the boundless sea of ice.”²³⁰ He also used a familiar comparison to set the scene for his fellow western explorers. “If those of my readers who are familiar with the Great Basin will fancy the most desolate portion of that arid land buried beneath a thousand feet of snow and ice, leaving only the southern slopes of the most rugged peaks exposed, they will have a mental picture of the land of desolation north of St. Elias.”²³¹ After a short break for lunch, they pressed on along the crest of the ridge, continuing to cut multiple sets of steps to maneuver around the many snow-covered obstacles.

They were now above the avalanche zone and surrounded by silence, except for the “occasional roar” from below, the “blows from [their] axes and the beating of [their] hearts.” For Russell, “there [was] no stillness more profound than the silence of the mountains.”²³² So they continued up the ridge in this quiet, surreal alpine landscape as more impending omens were appearing in the form of atmospheric pressure changes. This meant a storm was approaching and, with several thousand more feet to climb, their prospects for summiting that day did not look good. They did continue on for a short while longer, but the obstacles were too great to even think that they could possibly reach the peak. So, after reaching an altitude of 14,500 feet, they decided to head back to their last camp, 6,500 feet below and try again the next clear day.²³³

Over the next several days, Russell and his men hatched a plan to move camp to the ridge and there gather strength there for a final assault on Mount Saint Elias. Unfortunately for them, the weather did not cooperate. Snow storms were followed by

²³⁰ Ibid.

²³¹ Ibid., 47-48.

²³² Ibid., 48.

²³³ Ibid., 49.

sun and clear blue skies. This would have been fantastic weather for sightseeing, but it was extremely dangerous for mountaineering. The heavy snow and warm temperatures were perfect conditions for avalanches. Russell had missed his chance to be the first person to summit Mount Saint Elias. This honor would have to wait until Prince Luigi Amedeo di Savoia of Italy, otherwise known as the Duke of Abruzzi, with the assistance of Russells' notes and personal correspondence, completed this feat in 1897.²³⁴

Russell and his men returned from the mountain and reunited with the rest of their party on August 1. They continued to make scientific observations and even new discoveries. After they arrived back at Yakutat Bay and placed the most difficult portion of the trip behind them, Russell decided to do some exploring by boat into the unknown recesses of Yakutat bay. Previous explorers such as Alessandro Malaspina in 1791, and Peter Puget in 1794, had been halted by the vast glaciers that had gone much further into the bay. Since then, most of the glaciers in the area had receded, allowing a traveler access into the deeper recesses of the bay.²³⁵ Although his trip was short, Russell was able to confirm a large fjord existed to the southeast, later named after him, along with several other hidden glaciers and unknown mountain peaks. Despite his unsuccessful attempt at summing Mount Saint Elias, Russell maintained his inquisitive sense of adventure and respect for this rugged environment. He discovered and observed some of the most awe inspiring sights in nature and reported on them as a proto-environmental explorer who was at once trying to understand nature's inner workings and faithfully represent its magnificence for his reader. There is little question that Israel Russell was a successful scientific explorer of the American West and in Alaska, but his significance as

²³⁴ Ibid., 51

²³⁵ Ibid., 84.

Figure 3.7: Hubbard Glacier from Osier Island, Yakutat district, Alaska Gulf region, Alaska. 1891. Plate 14-A in U.S. Geological Survey. Professional Paper 64. 1909.



Photograph by Israel C. Russell. Courtesy of the U.S. Geological Survey.

an environmental explorer would remain unnoticed until much later. Perhaps if he had been the first to summit the mountain his name would be more than a footnote in history books. However, during his own life, Russell's future was secured through his academic work and his continued contact with the National Geographic Society and the U.S. Geographic Survey.

CHAPTER 4

DESCENT AND DISSENT

Try to learn something about everything and everything about something.

-Thomas Henry Huxley, English Biologist (1825-1895)

Human history becomes more and more a race between education and catastrophe.

- H. G. Wells, English Writer (1866-1946)

In 1892, at age forty, Russell became Professor of Geology at the University of Michigan.²³⁶ It would seem he had come full circle and was now headed back to the academic world he left fifteen years before. This incredible opportunity was not happenstance, but rather the result of many years of diligent, professional, and inspired work throughout the world. In certain circles, mostly professional science, his reputation had been secured through his western explorations and he would build upon his past successes in his new position. Russell moved away from Washington D.C. and with this, his contact with both the U.S. Geological Survey and the National Geographic Society became limited. However, even though he would focus his mind on university teaching and research, he carried on his association with the U.S. Geological Survey and the National Geographic Society. Russell simply could not abandon these organizations

²³⁶ Gilbert, "Israel Cook Russell," 665.

which had been critical to his success, and he continued to work for them during summer breaks and sabbaticals for the remainder of his life.

Russell's summer excursions for the U.S. Geological Survey allowed him the opportunity to continue his explorations throughout the West.²³⁷ Though most of the American West had been systematically explored, the land still held mysteries which needed to be investigated.²³⁸ Russell traveled with an eye for the natural resources that would be required to fully realize the economic potential of the land and he focused mainly on the water resource. Additionally, he continued his research on the physical geography of the land, specifically volcanoes, glaciers, lakes, and rivers. Russell also continued to rely on the woodsman and mountaineering skills he had developed over the years, and these enabled him to enter some of the most remote and inaccessible portions of the western landscape.

In summer 1896, the U.S. Geological Survey sent Russell to Washington in order to make geographical observations around Mount Rainier.²³⁹ His wonderment at a new mountain to summit issued forth; "in this portion of our fireside explorations," he later wrote, "let us enjoy a summer outing, deferring until later the more serious task of questioning the glaciers."²⁴⁰ At 14,110 feet, Mount Rainier is the highest volcanic peak in the Cascade Mountains. It is located along the Pacific Ocean's "ring of fire," but has been dormant since its last minor eruption in 1854.²⁴¹ Approximately 12 million years ago, molten rock began forming layers below Rainier. Then, about one million years ago, lava

²³⁷ Ibid., 665.

²³⁸ Frederick Jackson Turner, *The Frontier in American History* (New York, Dover Publications, 1996), 1.

²³⁹ Edmund S. Meany, ed., *Mount Rainier: A Record of Exploration* (New York: The Macmillan Company, 1916), 159.

²⁴⁰ Ibid., 163.

²⁴¹ "Geologic Formations." Located on the Mount Rainier National Park website.

<http://www.nps.gov/mora/naturescience/geologicformations.htm>; Accessed on 31 Jan. 2008.

rupted through the earth's crust and began building the mountain up to an estimated height of 16,000 feet. Rainier was reduced to its current height about 5,800 years ago following a rather violent eruption which spewed ash and a river of mud all the way to the Puget Sound. Volcanic activity is only a portion of Rainier's allure. Some thirty four glaciers, the largest emanating from one peak in the lower forty-eight states, spread out from Mount Rainier's summit. These rivers of ice have slowly and steadily shaped the mountain and given us its familiar face.²⁴² Rainier presented a very tempting specimen for the mountaineer and the scientist within Russell, who would later help in making it the fifth national park in the United States in 1899. During the campaign leading up to the creation of Mount Rainier National Park, "a handful of scientists who had had personal experience with Mount Rainier might be considered the driving force behind the campaign" and Russell was most assuredly among this group.²⁴³ In an article he later published in *Scribner's Magazine*, he recalled that to visit Rainier and its meadows was to restore the spirit and unleash "the aesthetic sense that is awakened in every heart by an intimate acquaintance with nature in her finer moods."²⁴⁴ Yet, back on the approach to the mountain in 1896, Russell simply wanted to climb the mountain and get down to the scientific business later.

During his ascent, Russell described the environment in a naturally flowing, first-person narrative style that was by now his trademark. Whether in a government document, a scholarly monograph, or a magazine article, Russell's love of nature was clear. As he pushed up the mountain, he reveled in the grandeur of the slopes: "Acres of

²⁴² Ibid.

²⁴³ Theodore Catton, *Wonderland: An Administrative History of Mount Rainier National Park*, (May 1996), Located on the Mount Rainer website, <http://www.nps.gov/archive/mora/adhi/adhi3.htm>:. Accessed on 31 Jan.2008.

²⁴⁴ Israel C. Russell, "Impressions of Mount Rainier," *Scribner's Magazine* 22, no. 2 (August 1897), 174.

meadowland, still soft with snow water and musical with rills and brooks flowing in uncertain courses over the deep, rich turf, are beautiful with lilies, which seem woven in a cloth of gold about the lingering snow banks.”²⁴⁵ His serenity on the slopes of Mount Rainier dissolved when he confronted the arduous task of reaching the summit. This was not Russell’s first attempt at climbing a large mountain; his failures at Mount Saint Elias had taught him valuable lessons about timing, preparation, and luck. He had all of these on Mount Rainier.

Russell and his climbing party of four others found ample opportunity to test their skills.²⁴⁶ As they ascended the mountain, the weather and terrain became more treacherous and the labor more intense in the thinning atmosphere. Their unique mountaineering knowledge served them well when they needed water. Rather than boiling water and wasting fuel, they “spread snow on smooth rocks and rubber sheets, allowing it to melt in the afternoon sun.”²⁴⁷ Russell seemed to excel at this type of activity. His climbing colleagues noted that he “picked his way confidently among the seracs and crevasses with the caution of a competent mountaineer; always ‘quiet and self contained, his manner never betrayed any excitement.’ When a snow bridge had to be crossed, he would tell [one of the men] to plant his alpenstock and take a turn of the rope about it, then he would cross over and give [the other man] the same security.”²⁴⁸ This type of confidence and leadership soon came in handy. “While traversing the ice above a crevasse, one of the climbers slipped, slid down the slope and was carried over the edge. Due to their technique of staying roped together and quickly burying their alpenstocks

²⁴⁵ Meany, ed., *Mount Rainier*, 164.

²⁴⁶ *Ibid.*, 171.

²⁴⁷ *Ibid.*, 172.

²⁴⁸ Aubrey L. Haines, *Mountain Fever: Historic Conquests of Rainier* (Portland: Abbott, Kerns, and Bell Co., 1962), 191.

into the snow as anchors, the man was saved and climbed back up the rope.²⁴⁹ Disaster was averted by experience, careful preparations, and a little good fortune. Never one to dwell on close calls, Russell pushed on to the top. Of his moment at the summit, Russell expressed his disappointment at not being able to see much because of the cloud cover below. However, he did take pleasure in viewing some of the classic Cascade volcanoes: Baker, Adams, and St. Helens in the near distance.²⁵⁰ His explorations and mountaineering skills on Mount Rainier later were recognized when future mountaineers named a cliff and glacier for him and his report was considered by some to have laid “the foundation of our knowledge of Mount Rainier.”²⁵¹ Russell concluded his scientific observations around Rainier with characteristic professionalism, but he found true happiness during the summer of 1896 on the mountain itself. Russell didn’t always achieve dramatic exploits during his summer work for the U.S. Geological Survey, but he always seemed to find natural beauty wherever he went.

Over the next decade, Russell continued his summer excursions to the West as a scientist.²⁵² His work was mainly focused on Washington, Idaho, and Oregon. The Pacific Northwest is well known for its natural wonders, but less so for the supposedly barren regions east of the Cascade Mountains. In these areas, Russell found meaning in landscapes that past accounts had described as desolate, and some of his work in the region is said to be “the most accurate and useful work in its field.”²⁵³ During his research in the summer of 1897, Russell looked at water resources in southeastern

²⁴⁹ Meany, ed., *Mount Rainier*, 174.

²⁵⁰ *Ibid.*, 177.

²⁵¹ Haines, *Mountain Fever*, 194.

²⁵² Warren P. Lombard and Martin L. D’Ooge “Israel Cook Russell” *Science* 24, no. 614 (1906): 428-429.

²⁵³ Houghton, *A Trace of Desert Waters*, 45.

Washington below the Snake River.²⁵⁴ This was a very specific, scientific project, yet Russell still managed to make it an adventure. He described his accommodations during his work as rugged and unattractive. “To facilitate my work and to be able to reach all parts of the region to be examined, I chose to ‘camp out.’ At Walla Walla I hired two men, Messrs. F. W. De Forest and A.C. Rud, to act as cook and teamster, respectively. We had a two-horse farm wagon, a saddle horse, tents, cooking utensils, etc. To one familiar with the vicissitudes of exploration in unsettled regions, camp life in southeastern Washington offers but few attractions.”²⁵⁵ Russell presented camp life as difficult for him and his men in a harsh natural environment. Yet as he actually depicted the country in which they traveled and worked, he truly appreciated the subtle aspects of the environment. He wrote of scattered pine trees he noticed in a particular canyon adding “additional charm to that wild and picturesque region.”²⁵⁶ His final assessment that Washington is “not only one of the most interesting States in the Union to the geologist and geographer, but that it also rich in mineral and other resources” displayed his keen scientific eye and his ability to find potential in seemingly desolate regions.²⁵⁷ He displayed this talent even more clearly in Idaho.

During the summers of 1901 and 1902, Israel Russell spent considerable time observing the natural resources of the Snake River plain in Idaho.²⁵⁸ The creation of the Snake River valley began some “seventeen million years ago, during the Miocene, [when] a giant meteorite smashed into the earth in what is now southeastern Oregon. The

²⁵⁴ Israel C. Russell, *A Reconnaissance in Southeastern Washington* (Washington, D.C.: Government Printing Office, 1897), 9.

²⁵⁵ *Ibid.*, 10.

²⁵⁶ *Ibid.*, 13.

²⁵⁷ *Ibid.*, 93.

²⁵⁸ Israel C. Russell. *Geology and Water Resources of the Snake River Plains of Idaho* (Washington, D.C.: Government Printing Office, 1902); and *Idem, Notes on the Geology of Southwestern Idaho and Southeastern Oregon.* (Washington, D.C.: Government Printing Office, 1903).

Figure 4.1: The Thousand Springs, Snake River Canyon,. The water issues from the open textured basal portion of the lava sheet and flows over compact clay and volcanic lapilli, Height of falls is 180 feet. Gooding County, Idaho 1901. Plate 3-A in US Geological Survey Bulletin 199. 1902.



Photograph by Israel C. Russell. Courtesy of the U.S. Geological Survey.

impact was so violent that it broke the earth's crust and opened a fissure in the underlying mantle."²⁵⁹ Over deep time, the shifting continental plate and volcanic action moved the fissure towards its present location in Wyoming and Yellowstone National Park. Water and wind slowly carved the Snake along with a "cataclysmic flood" about 15,000 years ago. The region has been witness to long periods of dry weather punctuated by shorter periods of cool and wet weather, "but overall the valley became a dry place." Yet the

²⁵⁹ Mark Fiege, *Irrigated Eden: The Making of an Agricultural Landscape in the American West*, Foreword by William Cronon (Seattle and London: University of Washington Press, 1999), 13.

Figure 4.2: Canyon of Snake River, looking north from point near Wawa (?), shows Columbia River basalt 2,000 feet thick. Clearwater escarpment is seen in background. Nez Perce County, Idaho. 1900. Plate 13 in U.S. Geological Survey. Professional paper 27. 1904.



Photograph by Israel C. Russell, courtesy of the U.S. Geological Survey.

water kept flowing due to distant mountains and underground aquifers. The dry climate coupled with good soil and the steady flow of water attracted settlers who were lured by the agrarian dream.²⁶⁰ These were the conditions that faced Russell while he went about trying to understand the water and the land that surrounded it.

He had a scientific mission to complete for sure, but he could hardly help from being affected by his natural surroundings once again. He directly challenged past

²⁶⁰ Ibid., 14-17.

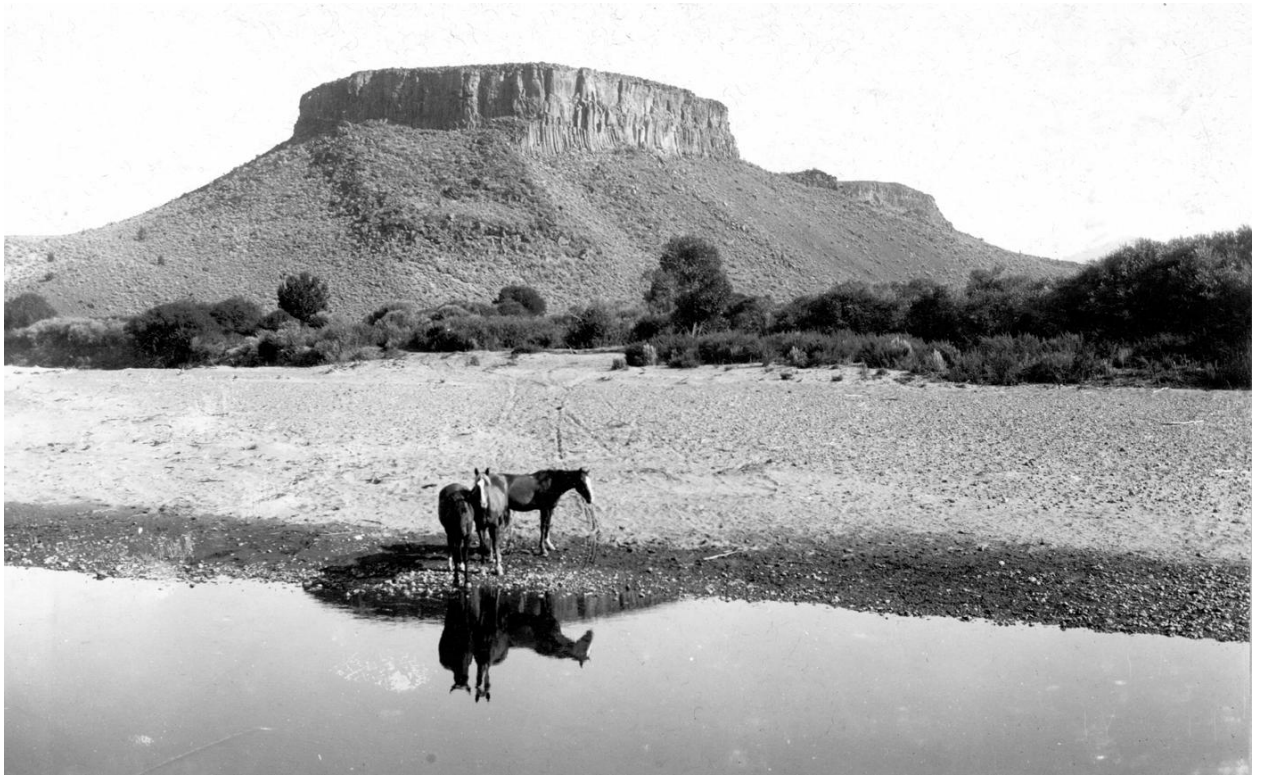
observers when he described what was to be found where others found nothing. “To lovers of nature and all who rejoice in scenes of natural wildness unmodified, or what is too frequently essentially the same thing, unmarred by the hand of man, the plains of southern Idaho present exceptional attractions. One must become familiar with their characteristics, however, and learn to judge them by their own standard before their beauties are fully revealed.”²⁶¹ Russell also seemed surprised to find a “true forest over several hundred square miles of the surface which is designated on many maps as the ‘Snake River Desert.’”²⁶² What seemed to perplex him the most was that the term desert referred to the area’s lack of water, not its lack of vegetation. “On the three prominent buttes situated in the central part of the plain between Blackfoot and Big Lost River there is a thrifty growth of junipers. This forest extends far out on the plain lying east of the buttes, and covers in all about 175 square miles. The trees although small, seldom, in fact, attaining a height of over 15 or 20 feet, are thrifty and are valuable for fence posts, firewood, etc.”²⁶³ He also described several other stretches of forests and grasslands in the region that, “instead of being a desert, [are] park-like in appearance, and, in reality, [it] is a beautiful and attractive country.” These statements are very telling not only about Russell, but also about previous explorers. Regardless of how they would have been classified, previous explorers failed to see or describe what Russell saw and described. The Army explorers, civilian naturalists, professional scientists, and traders only saw desert where Russell saw beautiful forests. As we have seen, Israel Russell became many things; explorer, geographer, scholar, scientist, naturalist, mountaineer, and poet.

²⁶¹ Russell, *Snake River Plains of Idaho*, 19-20.

²⁶² *Ibid.*, 22-23.

²⁶³ *Ibid.*, 23.

Figure 4.3: Remnant of basalt sheet, six miles west of Prineville Crook County, Oregon. 1903. Plate 9-B in U.S. Geological Survey. Bulletin 252. 1905.



Photograph by Israel C. Russell. Courtesy of the U.S. Geological Survey.

However, during the later part of his life, the majority of his time was focused on teaching and he used all of his experiences to produce several scientific textbooks which were considered the standard works on their subjects for years.²⁶⁴

The texts he wrote: *North America*, *Volcanoes of North America*, *Rivers of North America*, *Lakes of North America*, and *Glaciers of North America*, were the culmination of years of personal, direct experience with the natural world.²⁶⁵ While all of these works are what one would expect of textbooks aimed at beginning students—scholarly, easy to read, and direct—one stands apart for a very different reason. Even though Israel Russell

²⁶⁴ Gilbert, “Israel Cook Russell,” 666.

²⁶⁵ Lombard and D’Ooge, “Israel Cook Russell,” 429-430.

was a trailblazing explorer, scientist and naturalist, he remained a product of his times. Despite the contact he had with native cultures he seemed to respect, he still could not reject Lewis Henry Morgan's theories on social Darwinism. His textbook *North America* featured a section focused on "the Aborigines" and is filled with descriptions of North American native's characteristic of the ethnography and science of the early twentieth century.²⁶⁶ He described the human race as having three stages: savagery, barbarism, and civilization. Of these he credited the most accomplished Native Americans, at best, to be at "the highest state of barbarism."²⁶⁷ He further stated that, "In mental qualities the Indian is the inferior of the Caucasian and the Asiatic, but is superior to the Negro."²⁶⁸ His section on "the Aborigines" is full of unabashed racism characteristic of his time, and included the following: "In the struggle between the white and the red man it became evident that the latter must yield, assume habits of industry, and earn his bread by the sweat of his brow or be exterminated."²⁶⁹ After reading about all his accomplishments and honors it is difficult to imagine that he continued to support these theories, but one must understand Russell and place him in the context of his time. Russell was an upper-class, white male who grew up during the height of the Indian Wars, the Civil War, the turmoil of Reconstruction, and the imposition of Jim Crow. He was inundated with conceptions of race and the superiority of his own over the "Others" of his world. His views were the norm and they must be understood in that light, and not undermine his accomplishments to science, exploration, and the general understanding of our natural

²⁶⁶ Israel C. Russell, *North America* (New York and London: D. Appleton and Company, 1904), 354; Also see Idem, *Lakes of North America* (Boston and London: Ginn and Company, 1895), Idem, *Volcanoes of North America* (New York and London: Macmillan and Company, 1924), and Idem, *Glaciers of North America* (Boston and London: Ginn and Company, 1897).

²⁶⁷ Russell, *North America*, 363-364.

²⁶⁸ Ibid, 379

²⁶⁹ Ibid., 400.

world. During this period of his life, even though Russell was very active with his scholarly and government work, he still found time to support the National Geographic Society.

In 1902, the National Geographic Society dispatched Russell as a member of an expedition to observe volcanic eruptions on the West Indian islands of St. Vincent and Martinique.²⁷⁰ His status as a founding member of the National Geographic Society and Professor of Geology allowed him the privilege to travel once again on a scientific expedition. This expedition was different in that Russell and his fellow explorers were going into a disaster area and not a romantic landscape. His descriptions during this expedition focus primarily on volcanic action and the scope of the disaster with, aptly, no real romantic imagery. He sums up what he observed as: “Never before in the history of man has such complete destruction been wrought on an area of equal size.”²⁷¹

While he was a full-time professor and part-time explorer, he also became more outspoken about the health of geography as a profession in the United States. He was mainly concerned with the lack of unity between the various geographic societies and the lack of sponsored research for new geographic knowledge. Russell published an article in the March 1897 edition of *Science* that criticized all of the societies currently in existence along with the journals and magazines they published. In addition to the various publications’ lack of circulation, Russell pointed out that “none of them can be said to have a high standard or to make a near approach to what may be considered as an ideal geographical magazine.”²⁷² He also recommended that these various societies unite into

²⁷⁰ Israel C. Russell. “Recent Volcanic Eruptions in the West Indies.” *National Geographic Magazine*, (July 1902), 267.

²⁷¹ *Ibid.*, 272.

²⁷² Israel C. Russell, “A New Geographical Magazine,” *Science* 5, no. 116 (1897), 478.

one American Geographical Society—a society by this name already existed, but Russell seemed to be using the name and not the organization as an example—which would provide geographers with a higher standard of publication rather than the unprofessional material that the societies were then currently releasing. This was a direct criticism of the society he helped found and it would not be the last.

There was a trend among the various scientific societies to become more popular during the turn of the century. Economic stability was one of the major factors that pushed organizations like the National Geographic Society to search out new members “appealing instead to an amateur tradition that was under assault in the reorganized American universities.”²⁷³ The emergent academic geographers were more concerned with establishing their discipline as a professional, scholarly affair rather than a less authentic popular version. The very reputation of these geologists and geographers seemed to be on the line and they desperately needed to establish scholarly societies that would justify their positions in the academic world. As an example, the National Geographic Society had been created with this understanding, but it had strayed from this vision and was slowly transforming into a more amateur, public endeavor. Scientific exploration and the creation of new knowledge were being transformed, to the harm of the professional reputation of geologists and geographers, into bits of information for mass consumption and profits. At the time, this appeared to be leading to an unacceptable fate for the reputation of men like Israel Russell.

²⁷³ Susan Schulten, *The Geographical Imagination in America, 1880-1950* (Chicago and London: The University of Chicago Press, 2001), 49.

Russell published an article in the January 1902 edition of *Science* magazine in which he further criticized all of the geographical societies in America.²⁷⁴ In 1904, the International Geographic Congress was set to hold its annual convention in Washington D.C., and Russell felt that the American geographers were not prepared. He still did not approve of the multiple and uncoordinated efforts between various—more than ten that he knew of—geographical societies in America.²⁷⁵ Russell once again recommended that all of the separate societies be combined into one American Geographical Society.²⁷⁶ To him, the most important reason for combining their efforts was to advance the “science of geography in a more efficient way than” was in place at the time.²⁷⁷ Though he still had not mentioned any of the societies by name, this would seem to have been another assault on the National Geographic Society as then constituted and the direction it was taking as a scientific organization. Russell also stated that the arguments against his plan “seem to refer entirely to local pride or, more accurately, local self-interest.”²⁷⁸ This statement suggests that he had been in discussions with members of the National Geographic Society and they, of course, did not agree with his conclusions. Russell’s feelings that the society was straying from its initial charter and becoming more of a popular society are evident. This argument is supported by a December 1904 letter from the young editor of the *National Geographic Magazine*, Gilbert H. Grosvenor, to his father, Edwin Grosvenor.

In the letter, dated 23 December 1904, Grosvenor wrote to his father about, among other things, the current estate of affairs at the *Society*. “The N. G. Society is

²⁷⁴ Israel C. Russell, “An American Geographical Society,” *Science* 15, no. 370 (1902), 195-196.

²⁷⁵ *Ibid.* 195

²⁷⁶ *Ibid.*

²⁷⁷ *Ibid.*

²⁷⁸ *Ibid.*

closing [the] year with a net gain of over 800 for the year. It has now a membership of about 3400 and has risen during the year in prestige, influence, and power. Our edition is now 4000 each month.”²⁷⁹ Grosvenor then added his own assessment concerning the internal affairs of the *Society*. “The next President [of the National Geographic Society] will probably be Willis L. Moore, Chief [of the] U.S. Weather Bureau. He, [O.P.] Austin and I get on finely. I probably shall be elected to [the] Board at their annual meeting in January (1905). We are getting [the] Society where it is not run entirely by U.S. Geological Survey men; who are good but think there is nothing in geography but geology.”²⁸⁰ This letter seems to convey quite clearly that Grosvenor had little respect or need for former and current members of the U.S. Geological Survey. His agenda was focused on “prestige, influence, and power” rather than the diffusion of scientific knowledge. Russell and Grosvenor were going in two separate directions. Unfortunately for Russell and any acknowledgements concerning his contributions, Grosvenor did go on to have a considerable amount of “prestige, influence, and power” as he transformed the National Geographic Society and its magazine into a worldwide phenomenon.

Gilbert H. Grosvenor has been credited with transforming the *National Geographic Magazine* into “one full of illustrations and appealing to the educated general reader.”²⁸¹ This is undoubtedly true, but he did not accomplish this without having a merciless drive and ambition. He used the influence of his father-in-law, Alexander Graham Bell, hard work, and an increasing power within the Society to transform the magazine to fit his image of a successful periodical that reported on the pleasant side of

²⁷⁹ Gilbert H. Grosvenor to Edwin Grosvenor, 23 December 1904, Gilbert H. Grosvenor Papers, Manuscript Collections, Library of Congress, Folder 22, Box 6, Part II.

²⁸⁰ Ibid.

²⁸¹ Schulten, *The Geographical Imagination of America*, 48.

life.²⁸² The Society became a reflection of Grosvenor himself and he took insults to the magazine personally. He was known to cultivate employees and friends who became very loyal to him, but was also known to use “a sledgehammer to dispatch a mosquito.”²⁸³ If Grosvenor perceived anyone as hostile to the Society, he would ensure that the culprit was properly punished. Israel Russell probably did not care a bit about what Gilbert H. Grosvenor thought about his opinions concerning the magazine, but it seems evident that Grosvenor would have been none too pleased with Russell’s comments and this may help to explain why Russell is still a relative footnote in the annals of scientific-exploration.

Russell’s stance on the progress of the various societies softened somewhat in his later writings, but his general arguments remained consistent. In an article published in the January 1905 edition of *Science*, Russell reevaluated his criticisms of the various societies’ successes. Although many of the societies—at the time Russell counted seventeen—had diffused geographic knowledge and promoted a general interest in geography, they were still far from fulfilling the purposes for which they were created. It was mostly the geographic societies’ quality of the work that Russell continued to criticize. Popular lectures rather than specialized scientific discussions were the norm. The societies all seemed to be more concerned with the quantity of their membership rolls, and the associated monetary dues, rather than the overall quality of their research and the value of their contributions to scientific knowledge. Russell took a special exception with the state of scientific publications at this time. He noted that they fell “far below the standard of the better class of literary magazines. Their appearance [was] in general not attractive, the illustrations in many instances [had] not been wisely chosen”

²⁸² Robert M. Poole, *Explorers House: National Geographic and the World it Made* (New York: The Penguin Press, 2004), 116.

²⁸³ *Ibid.*, 148.

and they were generally weak as a means for diffusing knowledge.²⁸⁴ Russell singled out the publications and the editors of these publications as lacking in the proper leadership skills needed to see the public face—the magazines—of the societies succeed. Grosvenor would not have been pleased.

However, Russell did see a popular future for his profession. “Added to the fascinations of exploration we now have the equally absorbing results of scientific physical geography, pertaining to the fields through which we walk, the brook whose murmurs have appealed to us since childhood, the waves that beat on the shore where we perhaps spend vacations, and many other equally familiar scenes. The ability to read the history of the earth at first hand should be within the reach of every civilized man, woman, and child.”²⁸⁵ Russell’s concern for nature education was decades ahead of, what we would recognize today as, environmental education. In essence, Russell was foreshadowing the future of the National Geographic Society and its publications because, despite the disagreement between professionals and amateurs over that state of the geography, nature still had a transforming effect on people. Eventually, Gilbert H. Grosvenor would become more and more devoted to the environmental ideal. “He used the magazine to celebrate natural wonders and to stress their preservation, themes that would be repeated down through the generations.”²⁸⁶ An agreement of sorts seems to have been reached whereby periodicals like the *National Geographic Magazine* were to become the geography for the masses while societies with professional journals like the Geological Society of America and the American Association of Geographers would lead the way on the professional front.

²⁸⁴ Russell, “Cooperation Among American Geographical Societies,” 130.

²⁸⁵ *Ibid.*, 135.

²⁸⁶ Poole, *Explorers House*, 123.

Israel Russell continued to teach, explore, and write, but it seems that his influence had been diminished in the National Geographic Society's eyes, and that meant he was *persona non grata* in the eyes of Gilbert H. Grosvenor. In 1906, he was still a relatively young man and he had the potential to make a greater impact on society. He was helping to create a new profession and had hopes for the future of science and its ability to understand the natural world. His criticism of popular geography and his increasing professionalism may have destabilized his place in the lineage of proto-environmental explorers, but these points are less significant when compared with all of his accomplishments. I have argued that Russell's artistic prose, and the sympathetic imagery of nature that his prose invoked, provided a model for modern environmental explorers, and this argument remains valid despite his increasing concern for professional status and his criticisms of popular geography later in his life. Russell had to prioritize his causes, and his promotion of a more professional science of geography and geology had to take precedence. Popularization of the natural world would have to wait until professional research could produce reliable knowledge. Once this was complete, science could be distilled to the popular level and used to support causes from the local to the national level. Russell could not have envisioned the devastation humans would bring to nature and his choice of a more professional science over popular science seemed appropriate at the time. It would take later generations of scientists to use the knowledge that professional research produced for social and environmental causes. As he demonstrated throughout his life, Israel Russell held a profound sense of wonder and respect for the natural world and he had only begun to have a positive impact on the changing vision of science's relationship with nature, but he never lived out his potential.

I imagine Russell walking through a local wood near the University of Michigan's campus on a warm April morning and soaking in the silence and odors of the landscape. He is observing the natural diversity that surrounds him and noticing the first humble bee of the season. He smiles and thinks back on a life of passionate exploration through the American West. He is looking forward to his next expedition. He looks up through the trees and can see the summit of Mount Saint Elias. But he shivers, and coughs. Over the next few days, a slight chest cold quickly develops into a more severe case of pneumonia, unexpectedly cutting short a life of promise at the age fifty four.²⁸⁷ Israel Russell is now only a ghost from a time when science seemed close to understanding and coexisting with nature rather than destroying it.

CONCLUSION

THE ENVIRONMENTAL CENTURY AND EXPLORATION

Mankind has probably done more damage to the Earth in the 20th century than in all of previous human history.

- Jacques-Yves Cousteau, Underwater Explorer and Environmentalist (1910-1997)

The greatest danger to our future is apathy.

- Jane Goodall, Chimpanzee Researcher and Conservationist (1934-)

The future relationship between science and nature seemed to offer limitless possibilities on the eve of Israel Russell's death. Many leading scientists had personally experienced nature in the American West and this intimate knowledge of the landscape had profound impacts on how they envisioned the natural world. Not only did many of them possess an appreciation for the aesthetic and spiritually refreshing qualities to be found in nature, but several of Russell's contemporaries were seeing the necessity to protect it. The Sierra Club may best be known for its first president, John Muir, and his fight to preserve Hetch Hetchy Valley in Yosemite National Park, but the Club also should be remembered for the early influence professional scientists had on it. Some of Russell's old earth-science friends like Grove Karl Gilbert and Mark Kerr were part of this early scientific influence on the Sierra Club, but there were also several chemists,

physicists, mathematicians, botanists, zoologists, and climatologists who shaped it.²⁸⁸ A number of these men developed an anxiety concerning the local environments they encountered during the course of their scientific work and they were able to express these concerns through the Club. Although scientists made up only about 14 percent of the Club's membership in the years leading up to the Hetch Hetchy controversy, they constituted between 33 and 55 percent of the Club's board of directors during the years leading up to the Hetch Hetchy fight.²⁸⁹ With this power, scientists used the Sierra Club as a platform for their professional development and for their environmental politics. However, this experiment in scientific environmentalism did not last.

Western based scientists were able to leverage their expertise to address local environmental problems, but the federal government's support for the more scientific utilitarian view of conservation and land management presented a large obstacle for the more preservationist-minded western scientists. I do not mean to imply that the western (especially Californian) scientists were unwilling to embrace conservation; to the contrary, they were very favorably disposed to rational conservation policies for a variety of landscapes and commodities. A similar argument can be made for the Washington, D.C., utilitarians who were predisposed to preservation in certain circumstances.²⁹⁰ But by 1913, when Congress finally approved the Hetch Hetchy reservoir, the role of scientists in the public debates over the use of public lands had shifted considerably. The more politically active generation of scientists who made up the early rolls of the Sierra Club's membership were not nearly as energetic as they once had been. Deaths, declining health, and complacency helped to diminish these men's ambitions and energies, but

²⁸⁸ Smith, *Pacific Visions*, 144.

²⁸⁹ *Ibid.*, 146.

²⁹⁰ *Ibid.*, 172.

other factors also dampened scientist's participation in environmental issues for decades to come²⁹¹

As the various sciences began to separate and specialize during the late nineteenth century, these emerging professionals needed to define their roles within the larger scientific community, which included universities and the federal government. While the members of Israel Russell's generation slowly became more and more concerned with the acceptance of their individual scientific fields, the wider connections between science and an emerging environmental ethic began to deteriorate. During the early twentieth century, a new generation of scientists emerged which began to equate activism and artistic expression with unprofessionalism and unemployment. This younger generation was less likely to experience the cosmos as intensely as its predecessor. Laboratory work and new theories overtook field work and empirical observation in natural settings. However, the primary cause for the dissolving link between science and environmental ethics was to be found in early twentieth-century economic realities.²⁹² Emergent science-based corporations in the chemical, oil, mining, and electrical industries, along with the federal government, began to financially support universities that trained future generations of scientists and engineers who, in turn, would focus on the scientific and technological needs of the corporations.²⁹³ Money mattered to these young scientific and engineering professionals. The power, political influence, and wealth that Corporate America wielded coupled with the evolving professional values of the scientific community as a whole can

²⁹¹ Ibid., 181.

²⁹² Peter J. Bowler and Iwan Rhys Morus, *Making Modern Science: A Historical Survey* (Chicago and London: The University of Chicago Press, 2005), 337-339.

²⁹³ Smith, *Pacific Visions*, 190.

help explain why scientists conducted a general retreat from environmental activism and expression during the first half of the twentieth century.

But there were other developments during this time that also demonstrated how the links between science and nature were never too far removed from the more mainstream accounts of progress. Prior to World War II and the rise of Big Science, ecological thought and development can be seen in Frederick Clements' work on "climax communities," Aldo Leopold's conversion into a proponent for the "natural rights" of predators, Charles Elton's suggestions about the necessity of "food chains," and A. G. Tansley's "ecosystem" model of the environment.²⁹⁴ These examples help show that concern for the environment was not dead, but was far from being at the forefront of scientific thought or the public's attention. By the outbreak of World War II, the institutionalization of science and industry had become so entrenched that it seemed natural and patriotic for science, industry, and the federal government to combine their intellectual and monetary resources in the fight against fascism. The environment would have to wait, however, until the very effects of wartime scientific development helped bring the fragile character of the environment to the mainstream public's attention. Atomic fallout was just one, but probably the most fearful, consequence of man's ability to alter and destroy our environment. Along with chemicals and other pollutants, scientifically engineered results of political and economic progress became the antithesis of responsible scientific inquiry and a direct threat to the survival of our environment and all the species that live within it. Rachel Carson became the spokeswoman for environmental causes and sparked an environmental revolution, but there were other proponents for the environment who, in the tradition of scientific explorers like Israel

²⁹⁴ Worster, *Nature's Economy*, 209, 288-295, 302.

Russell, were just as important in making the public aware of the diverse environments found on our planet and the need to understand, appreciate, and protect them. These environmental explorers combined the scientific observations, experience of extreme landscapes, and aesthetic imagery and prose characteristic of Russell with an environmental awareness meant to inform the general public. From the mid-twentieth century on, these men and women helped popularize a new era of exploration and create a new identity for the period that I refer to as the environmental century.

On May 29, 1953, Sir Edmund Hillary (1919-2008) and Tenzing Norgay (1914-1986) became the first humans to reach the summit of Mount Everest, the world's highest peak. This event, which Hillary never attempted a second time, marked the end of an era of dramatic exploration that, among many other achievements, witnessed the attainment of the poles by Robert Perry and Roald Amundsen and also marked the beginning of a new age of environmental awareness. Hillary was a famously modest man who listed his official "occupation as beekeeper," but he became fervently active in the awareness of Everest's environment, including the native Sherpas, and the need to protect them both.²⁹⁵ Hillary used his notoriety as the first explorer to summit Everest to form the "Sir Edmund Hillary Himalayan Trust, which raised millions and built schools, clinics, airfields, and other facilities for the Sherpa villages in Nepal."²⁹⁶ He was also active in conservation efforts through the New Zealand Peace Corps and ecological improvement efforts through the American Himalayan Foundation. The entire world knew of his death within hours. After he died on January 11, 2008, New Zealand flew its flags at half-mast and held a state funeral for him. His environmental initiatives received as much attention

²⁹⁵ Robert D. McFadden, "Sir Edmund Hillary, Mountaineer Who Conquered Everest, Dies at 88," *The New York Times* (Jan. 11, 2008), A17.

²⁹⁶ *Ibid.*

as his physical achievements. Hillary stands as an example of the changing attitudes of post-colonial explorers as they used their experiences with nature to promote a wider understanding of our fragile environment, rather than imperial ambitions and resource exploitation. Hillary embodied one example of an environmental explorer and how that person could use his exploits on land to increase the environmental awareness of the public.

Jacques-Yves Cousteau (1910-1997) demonstrated this same ability underwater. Cousteau is best known for co-inventing the Aqua-Lung (the precursor to modern scuba gear) and bringing the ocean depths into the living rooms of millions of people worldwide through his undersea explorations. In the 1960s, his oceanographic television specials became so successful that he was able to expand his message to include his understanding about the fragile nature of the undersea ecosystems. Cousteau had traveled extensively throughout the world's oceans and he began to realize that the vast oceans were "an extremely threatened environment."²⁹⁷ Cousteau's expeditions from his research vessel *Calypso* enabled him and his viewers to obtain a better understanding of our planet's oceans and the negative impact of human activity on it. "Realizing that it would take an organized effort to protect the planet, in 1974, Captain Cousteau created The Cousteau Society, a US-based, not-for-profit, membership group" that perpetuated his message beyond the television screen.²⁹⁸ Cousteau was internationally recognized by numerous environmental organizations for his efforts to promote environmental awareness and protect our planet's oceans. The entire world knew of his death within hours. After he died on June 25, 1997, France planned a state funeral in the famed Notre

²⁹⁷ Melham, ed., *National Geographic Expeditions Atlas*, 198.

²⁹⁸ "The Captain," Located on the *Cousteau Society's* Website, <http://www.cousteau.org/>: Accessed on 24 Feb. 2008.

Dame Cathedral that was observed by thousands including President Jacques Chirac.²⁹⁹ This defender of the environment used his passion for underwater exploration to further his environmental causes and spread his message to an ever-expanding mass audience through television and popular writings.

Carl Sagan (1934-1996) demonstrated this same passion, except that he was focused on deep space rather than deep oceans. Carl Sagan was a Pulitzer Prize winning astronomer who helped reignite a sense of wonder and amazement about the universe among a generation of children and adults during the 1970s and 1980s. He is probably best remembered as the host of the 1980 Humboldtian television series *Cosmos*. With *Cosmos*, Sagan introduced millions of viewers to the vast diversity of our universe and how insignificant humankind is to the larger story of cosmic development, now sometimes referred to as Big History. Sagan was also deeply committed to popularizing science: "there are at least two reasons why scientists have an obligation to explain what science is all about. One is naked self-interest. Much of the funding for science comes from the public, and the public has a right to know how their money is being spent. If we scientists increase the public excitement about science, there is a good chance of having more public supporters. The other is that it's tremendously exciting to communicate your own excitement to others."³⁰⁰ While he was dedicated to making scientific knowledge less esoteric for the public, he was also devoted to the belief that science could provide

²⁹⁹Marlise Simons, "Cousteau Honored at Service in Notre Dame Cathedral," Located on *The New York Times* Website (July 1, 1997).
<http://query.nytimes.com/gst/fullpage.html?res=9D01E4DB1630F932A35754C0A961958260>: Accessed on 24 Feb. 2008.

³⁰⁰William Dicke, "Carl Sagan, an Astronomer Who Excelled at Popularizing Science, Is Dead at 62," Located on *The New York Times* Website (December 21, 1996).
<http://query.nytimes.com/gst/fullpage.html?res=9A03E3D81531F932A15751C1A960958260&sec=&spon=&pagewanted=1> Accessed on 19 Mar 2008.

the answers to “all of life’s eternal questions.”³⁰¹ Among these questions were how to best protect the earth from further ruin, and how to reconcile the tensions between science and religion for an environmental cause. Sagan offered a simple solution for an age-old conflict when he stated that, “we do not have to agree on when and why the Earth was created in order to work to save it.”³⁰² The entire world knew of his death within hours on December 20, 1996. His memorial service was held in the Cathedral Church of St. John the Divine in Manhattan and was attended by hundreds of luminaries including Vice President Al Gore.³⁰³

For twentieth and twenty-first-century audiences, television programs became the primary means that environmental messages were spread through the weekly exploits of contemporary environmental-explorers like Steve Irwin (1962-2006). Otherwise known as “The Crocodile Hunter,” Irwin, with his khaki uniform and exuberant televised presentations, became the face and voice for environmental protection and wildlife conservation during the late-1990s and early-2000s. Through various *Animal Planet* television programs, Irwin used an enthusiastic approach to presenting environmental issues that seemed to go over well with most viewers. In 2002 he established the Wildlife Warriors Worldwide “to protect and enhance the environment.”³⁰⁴ Irwin represented the culmination of decades of environmental exploration and demonstrated how broadly an environmental explorer could convey a message about the environment. There are few people who have not seen his television programs and heard his message about the

³⁰¹ David M. Herszenhorn, “Sagan is Remembered at Service As Scholar With Faith in Science,” Located on *The New York Times* Website (February 28, 1997). <http://query.nytimes.com/gst/fullpage.html?res=9D06E7DD1331F93BA15751C0A961958260>. Accessed on 19 Mar 2008.

³⁰² Ibid.

³⁰³ Ibid.

³⁰⁴ “About Us,” Located on the *Australia’s Zoo Wildlife Warriors of the Worldwide* Website, http://www.wildlifewarriors.org.au/about_us/index.html: Accessed on 01 Mar. 2008.

necessity to protect our planet from further human-induced degradations. Many ordinary people may have heard of Hillary and Cousteau, but most watched and connected on some level with Irwin and his message. The entire world knew of his death within hours. After he died on September 4, 2006, flags were flown at half-mast throughout Australia's Queensland Province and millions watched his memorial service attended by numerous celebrities and Prime Minister John Howard. During the service, Steve Irwin's father, Bob, said, "Please do not grieve for Steve, he's at peace now. Grieve for the animals. They have lost the best friend they ever had, and so have I."³⁰⁵ The view that man was superior to nature seemed to have come to a close with statements like this from a father over the loss of his only son.

The twentieth-century witnessed the decline and rise of an environmental ethic that had seemed so close to becoming reality through the writings and sentiments of late nineteenth century scientists like Israel Russell. These scientific explorers left a legacy of adventure, imagination, and wonder that was not lost to future generations despite the inability of Russell and his contemporaries to have a major impact on how our environment was viewed during the early twentieth-century. Environmental explorers like Hillary, Cousteau, Sagan, and Irwin used various sciences, environmental outlooks, and media presentations to reach a wider audience and convey their messages about our planet and its place in the universe. They also demonstrated the globalization of environmental understanding and ethics. The citizens of Britain, France, the United States, and Australia are all a part of similar economic and industrial polities that helped set the conditions for contemporary environmental degradation. Therefore it makes sense

³⁰⁵ "Thousands Show for Steve Irwin's Memorial Service in Australia," Located on the *Fox News* Website (Sep. 20, 2006), <http://www.foxnews.com/story/0,2933,214517,00.html>; Accessed on 01 Mar. 2008.

that modern environmental explorers would derive from across these international locations. Without men like Israel Russell, who helped create a scientific foundation for environmental awareness, the later environmental explorers would have found their tasks much more difficult to initiate, comprehend, and execute.

Israel Cook Russell led an adventurous life. His immense contributions to scientific knowledge and exploration in the American West are evident. It seems that his name became less emphasized and eventually unknown due to personal vendettas and a general lack of publicity. Though there is no direct evidence that the National Geographic Society officially censured Russell after his comments concerning the course of geographical societies, Gilbert H. Grosvenor's notorious bitterness and resentment with dissenting options is probably enough evidence to demonstrate why Russell is still little more than a footnote in history books. Israel Russell was the first National Geographic explorer and his name should be synonymous with scientific and environmental exploration, but it is not.

The list of more popular National Geographic sponsored explorers³⁰⁶ and the publicity they received overshadowed any of Russell's accomplishments. These men and women, with familiar names like Roald Amundsen, Robert Byrd, Jacques Cousteau, Edmund Hillary, Carl Sagan, Robert Ballard, Louis and Mary Leakey, Hiram Bingham, Howard Carter, Charles Lindbergh, Diane Fossey, and Jane Goodall, were not only extreme explorers and researchers, but incredibly well publicized ones. The advent of flight, radio communications, and a burgeoning mass media set the stage for mass marketing campaigns and the feeding of the American public's desire for environmental

³⁰⁶ The *National Geographic Society* would often attach themselves to explorers after they had made their initial (and popular) exploration feats. They would then sponsor further expeditions for that explorer, make sure it was well publicized, then reap the benefits, both money and prestige.

conquerors and heroes.³⁰⁷ When Israel Russell conducted the *Society's* first two expeditions, it was little more than a local club of elite scientists who were seeking scientific insights and knowledge for a very limited audience. Profits are always good, but the *Society's* original goal never envisioned a mass audience with amateur members. I don't think Russell would have cared much to become a hero for armchair scientific amateurs. Professional accolades and a prestigious academic post, which he did receive, probably provided all the reward he desired. Israel Russell was not a perfect man, but he is more than qualified to be remembered for the contributions he made to science, exploration, and an environmentally-sensitive style of prose. His name has lived on through the various honors mentioned in this essay. In addition to cliffs, islands, glaciers and fjords, Russell's name adheres to a mountain in California. This does not seem sufficient enough, but it will have to do for now.

Israel Russell has been buried in history by the "heroic" explorers for whom he helped set the precedent. Additionally, his naturalistic prose and dramatic first person narratives are obscured by the immense volumes and "true life" adventures that followed. He has received little credit for his contributions to exploration in general and no credit for the influences he had on twentieth-century environmental thought. This should change. Russell was a scientist who followed the intellectual lead of men like John Wesley Powell. Science and exploration were a means to unlock the secrets of nature for the betterment of mankind and the economy of our nation. Yet, as he went about his scientific mission, the landscapes he encountered transformed how he interpreted scientific-exploration. "The foremost mountaineer is an explorer," wrote Russell near the

³⁰⁷ For more information on these explorers see C.D.B. Bryan, *The National Geographic Society: 100 Years of Adventure and Discovery* (New York: Harry H. Adams Inc., 2001).

end of his life, “following in [previous] foot-steps but [also] improving the path he has made and discovering side excursions from it...gain[ing] glorious alpine gardens, and traverse[ing] shimmering snow-fields never before pressed by human foot.”³⁰⁸

³⁰⁸ Israel C. Russell, “Research in State Universities,” *Science* 19, no. 492. (June 3, 1904), 842.

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