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A COMPANION TO AMERICAN ENVIRONMENTAL HISTORY

EDITED BY

Douglas Cazaux Sackman

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A Companion to American Environmental History

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Introduction

Douglas Cazaux Sackman

Look upon this canvas (see cover). You see an image of the American sublime – the Grand Canyon. Its steep, plunging walls open up a chasm into the earth into which sunlight glances down as far as it can go. Deep down below flows the water of the Colorado – one of the archetypal American rivers. Up above, standing at the edge of this vast precipice, you see the icon of American wildlife – the buffalo. This is American nature, it would seem. This is the place to come in search of American environmental history.

And environmental historians have come here, and to places like it. They have written about the buffalo – and have come back to revisit the surprisingly complex story of how they were pushed off, by the hundreds and thousands, to their deaths. They have written about the National Parks and sublime landscapes – and have come back to revisit the topic to assess what has been gained and who has lost. They have written about the river – showing how its waters were dammed for growth and power, or how dams planned near this canyon were stopped by environmentalists. Each time they go back to these sites, they seem to develop a different and often multifaceted picture of the relationship between nature and humanity. Neither nature nor history is static, fixed. Take a picture in the 1960s – as Roderick Nash did in his pioneering book on the American view of wilderness (1967) – and take another in the 1990s – as William Cronon did when he reexamined the American idea of wilderness and found trouble therein (1995b) – and two very different images representing Americans' relationship with the natural world develop. The earlier picture showed the free-flowing river against a backdrop of earlier industrial rampage as a hopeful sign of an unfolding ecological consciousness. The later one pointed to how we were nonetheless separated from the natural world when we idealized a certain view of wilderness, and how "we" did not actually include all of us after all. This canyon looks very different if you put the Havasupai into the picture as full participants in this

landscape (Jacoby 2001). It looks very different as well when you look at the Colorado from the vantage point of Los Angeles or irrigated fields in California's imperial valley (Worster 1985; Davis 1999; deBuys 1999).

Environment and history shift before our eyes in this canvas. Look down to the bottom, and you start to see something the artist has hidden in plain sight – people. Their presence violates the genre of wilderness imagery, and so we do not expect to see them. But now that we do, we have to wonder what they are up to. They appear to be miners and builders. They are working – doing something in nature that is essential to human life, but which had escaped the serious attention of environmental historians until recently. The people are, as the artist Mark Tansey gives away in the title for this work, "Constructing the Grand Canyon."

Of course, we remake nature – even seemingly pristine places. Tansey's painting literalizes the "constructivist" perspective – the walls of the canyon, on close inspection, turn out to be red-tinted collages of words cut from magazines. Through words, people (like Fred Harvey, John Wesley Powell, or Wallace Stegner) did indeed construct the Grand Canyon as grand (Rothman 1998; Pyne 1999). But the geological and hydrological forces, over millions of years, have a great deal to do with it as well. As Marx said of history, we may make nature, but not just as we please.

The so-called cultural turn in the humanities and social sciences built on a constructivist basis sparked one of the great academic debates of a decade ago. It hit environmental history late, but it set off a conflagration of controversy. The postmodernists were ridiculed from some quarters. The notion that reality is in some fundamental way constituted through human ideas and representations struck many environmentally oriented scholars as solipsistic, hubristic, and anthropocentric to a nauseating fault. Someone suggested he would like to see a postmodernist encounter a real bear. Meanwhile, a group of scholars went out and looked at, say, Smoky Bear and the cross-cultural politics of nature preservation. Their work enriched the field. Some saw a drift to the representational as dangerous, as if it was a firestorm that might come sweeping through destroying everything that was good and real in its path. Instead, it proved to act more like a seasonal fire, clearing out some thickets and inspiring some new growth.

The debate hooked into a central analytical tension that has characterized the field of environmental history. Some environmental historians have concentrated on the so-called material dimensions of history – ecology and political economy or modes of production. Others have looked primarily at changing ideas about the natural world. This book as a whole does not take a side on the issue of whether environmental history should hew to a more materialist path, or a more representational or cultural one; proponents and practitioners of both approaches are included. There is clearly a need for both kinds of histories, as well as for studies that show the interrelationship between the material and the ideological on all levels.

In some of the most illuminating studies, the environment is viewed not as a thing but as a set of relationships under ongoing construction; matters of perception, political economy, and the dynamics of living ecosystems are viewed together, using interdisciplinary approaches. Environmental historians have argued that nature is a force to reckon with; many regard it as an actor. In the best studies, nature is not portrayed as a stone-faced slab and society is not reduced to a monolith. A dynamic nature, rather, is fitted into riddled human history, so that the place of the familiar social fault lines of class, gender, and race can be traced over time and through space.

When they look for human relationships with the natural, environmental historians no longer confine our vision to the "Big Outside" (or the legislative chambers where the future of those places was decided). Now, environmental historians take us to the streets of Philadelphia, to the 9th ward of New Orleans, to golden arches along route 66. Having traveled over hill and dale – and into canyons, down rivers, and up mountain tops – environmental historians have struck out into new territory to examine cityscapes and spatial segregation, the body, climate change, energy, consumption, genetically modified flora and fauna, the technological reinvention of nature itself. They have probed the cultural and political construction of the wilderness idea, laid bare its class, gender, and racial prejudices, and opened room for investigations of environmental justice in the past. They have jettisoned the impulse to tell past environmental history as a dramatic conflict pitting "man" against "nature," with nature as the inevitable, tragic loser. Environmental historians now search for a more complicated narrative, one that probes the social and cultural differences in the category of "man" and shows how they matter if we are to truly understand the role and place of nature in North American history. Environmental historians are as likely to look at human health as they are to look at efforts to preserve bison, redwood trees, or wild rivers; they are as likely to trace the connections among cockroaches, asthma, and an "urban ecology of inequality" in Harlem (Mitman 2007) as they are to trail a John Muir into the Sierra Nevada. An earlier generation of environmental historians often seemed to do just that, becoming camp followers of a sort, hoping to inspire themselves and others with the great cause of environmentalism by sanctifying a heroic few who found a way to rise above the industrial din of their day.

In the days of its emergence in the 1970s, the pioneers of environmental history, propelled by the spirit of environmentalism, sought a vista that would allow them to see into, and through, the smog of the contemporary metropolis. They wanted to reveal the lay of the land as it had changed over the nation's industrializing history, uncovering the story of environmental declension as well as creating a pantheon of environmental heroes, from George Marsh, Henry David Thoreau, and John Muir to Aldo Leopold, David Brower, and Rachel Carson. To be sure, from the beginning, American environmental historians have done much more than establish a canon of environmental heroes in the past. Early works showed the critical

importance of nature and biological exchanges in shaping the modern world. The diverse interests of historians interested in the environment coalesced in 1976, with the initial call to form the American Society for Environmental History. Over the next three decades, environmental history proved its worth by providing innovative perspectives on the history of the United States, its environs and its peoples. Over that time, the field evolved and diversified, and earned capital within the discipline of history and academia more generally.

By the beginning of the 1990s – marked by the roundtable forum on environmental history in the *Journal of American History* (Worster et al. 1990) and by the publication of William Cronon's widely acclaimed *Nature's Metropolis: Chicago and the Great West* (1991) – environmental historians had managed to elevate the status of their field within the profession. Most other historians finally took serious notice of the field, though there remain many misconceptions about the field (most common among them, that it is fired by a myopically presentist environmentalism, that it is misanthropic and not interested in people or class, race, and gender, and that it limits its attention to wilderness areas). But our field can now claim four Bancroft Prizes (for Donald Worster's *Dust Bowl: The Southern Plains in the 1930s*, Cronon's *Nature's Metropolis*, Jack Temple Kirby's *Mockingbird Song: Ecological Landscapes of the South*, and Thomas Andrews' *Killing for Coal: America's Deadliest Labor War* – and the first Bancroft was given to Bernard DeVoto, a proto-environmental historian). An interdisciplinary field – often combining forces with the natural sciences, literary or eco-criticism, anthropology, science and technology studies, American studies, geography and other fields – environmental history is gaining interest across the academy and among the public. In addition to Americans' continued fascination with wild places, there is a growing appetite for work exploring historical dimensions of food, climate change, urban environments, and sustainability or catastrophe.

In its organization, *A Companion to American Environmental History* seeks to showcase the vast array of works in our field and reflect as well as probe the ways we have pursued our work. Part One, "The Elements of Environmental History," begins with Louis Warren's essay on landmarks in the field, in which he wonderfully situates a place – one that many would like to imagine as existing outside of history and beyond the reach of humanity – in its historical, cultural, and ecological context. We then go to the elements themselves – or the *roots*, as Empedocles, the pre-Socratic philosopher and herbalist who is often credited with identifying the four elements of the Western tradition called them. In very different ways, Nancy Langston, Donald Worster, Stephen Pyne, and Rebecca Solnit explore Air, Earth, Fire, and Water. Our authors take their subjects seriously, and have tracked them not only on the continent of North America but to the ends of the earth (but they have stopped short of what Empedocles is said to have done in his pursuit of fire – plunging to his death in a volcano).

In Part Two, "Nature and the Construction of Society and Identity," Colin Fisher, Chad Montrie, Susan Schrepfer and I examine what environmental historians have said, and might yet say, about the ascendant categories of analysis in the discipline of history – race, class, and gender. Environmental historians, contrary to stereotypes, have done important work showing what difference difference makes in understanding American relations with the natural world. Indeed, they have shown the reciprocity between making gendered, racial, or class identities and structuring access to, experiences of, and wealth derived from nature. Neil Maher then looks at the body – an important topic that has been explored by a number of different disciplines in recent years. Detractors of the various studies of the body often complain that there are no real bodies in this Foucault-inspired scholarship. Be that as it may, environmental historians, with their interest in materiality and nature as well as the cultural history of the body, have important insights into human beings as animals on this planet shaped by culture and nature.

Part Three, "The Nature of American Culture," begins with Richard White's essay situating environmental histories after the "cultural turn" – considering works that explore the boundaries between as well as the hybridization of "nature" and "culture." Matthew Dennis, Aaron Sachs, and Finis Dunaway contribute three original essays to form the core of this section: they explore Americans' multifaceted relationships to and ideas about nature from the colonial era through the twentieth century. This chronologically organized set of essays is flanked by David Rich Lewis's authoritative and probing discussion of American Indian environmental ideas and practices and Andrew Kirk's reflection on the "ecotopian" countercultural strain in post-World War II environmentalism. Tom McCarthy concludes the section with a broad-ranging and penetrating essay on that essential human activity – which is at once cultural, economic, and ecological – consumption.

Part Four, "Contact Zones: Americans Conjoining the Natural World," presents a series of essays examining the different ways we have, and may yet, explore particular places where Americans have interacted with the natural world, from flora (Frieda Knobloch), fauna (Edmund Russell), forests (Ellen Stroud), fields (Sara Gregg), and food (Douglas Sackman) to cities and suburbs (Chris Sellers), energy (Brian Black), mining (Katherine Morrissey), water (Patty Limerick), oceans (Helen Rozwadowski), and the overseas landscapes Americans have colonized to capture the wealth of nature (Richard Tucker). To some extent, this section tends to be more material in orientation to balance the cultural orientation of Part Three. Still, that easy distinction is broken down, or transcended, in many of the essays in both sections.

Part Five, "Outside of the Grid: Place, Borders, and Scale," explores the fundamental conceptual building blocks of our field. How do we carve up our field – conceptually, spatially, chronologically? The usual ways that US

history is bounded and periodized are often at odds with the way environmental historians have looked at the past. Sometimes, we have wanted to consider the *long durée* (of evolutionary or geologic time) rather than the usual half-decade or half-century focus of many monographs in US history. Sometimes, we have wished to look at regions or "bioregions" rather than states, as Dan Flores explores in his essay. Geographer Richard Walker and environmental historian Sarah Thomas show how the approaches of geography can continue to enrich and expand the analytical reach of environmental history. David Igler looks at the Northeastern Pacific as a water-connected region. His sharp essay helps us think about how we go about writing histories of places, whether they are littoral, oceanic, or, for that matter, land-locked. How are the places we study bounded (in our conceptions and out there in the real world)? When and to what effect are borders crossed? A volume on "American" environmental history is unsettling to many environmental historians, because we often look beyond political boundaries in writing our histories. Environmental history can play a key role in intimating the ways in which people and goods now enjoy, and have endured, social lives that are at once local and warped into transnational and global pathways and exchanges. In other words, following the movements of plants and animals in global commodity chains and through the Columbian, Pacific, and other exchanges is one way that environmental historians can continue to contribute to the transnationalization of American history. Focusing on the overlapping or comparable environmental histories of the United States and Canada, Ted Binnema maps a number of ways to do transborder history. Finally, Paul Sutter persuasively shows how US historians, whether or not they will trace the global or international connections in their topics, could see new horizons open up for their work by following the environmental histories written about nations and places beyond our borders.

As you will discover, each of the essays in this *Companion* takes on a different form. I did not impose a rigid grid to follow. Instead, I wanted essays to result from journeys the authors wished to make, so that they could best reflect their energies and convey their gifts of knowledge and insight. I proposed topics for each of the authors, but these were only points of departure. Some authors, to be sure, departed more quickly from where I left them than others. The first essayist in the volume, for example, went wildly off course – and I'm glad he did. I asked him originally to make a list of "landmark" studies in the field of environmental history. He instead went to the land itself, and wrote an essay that embodied the best of environmental history writing, turning "landmarks" from a metaphor into an orienting practice of interpretation.

But I never found out just what would have been on Warren's list. The essays collectively portray the vast work that has been done in our field in little over a generation. Like other scholars in other fields, we stand on the shoulders of giants. But the giants sometimes stand on the rest of our shoulders

as well when they reach for the next level. So any list of landmark works in American environmental history is bound to be woefully incomplete, regrettably leaving out essential contributions. But I'll go ahead and offer a list of two dozen important books anyway – 14 from what we might now consider the middle period of American environmental history, four from the period before "environmental history" existed as such (1977, when the American Society for Environmental History was founded) and six for the period after 2000 (which has not yet been subjected to the historians' test of time): first, Walter Prescott Webb's *The Great Plains* (1931), Samuel P. Hays' *Conservation and the Gospel of Efficiency* (1959), Roderick Nash's *Wilderness and the American Mind* (1967), and Alfred Crosby's *The Columbian Exchange* (1972); next, Donald Worster's *Dust Bowl* (1979), Stephen Pyne's *Fire in America* (1982), William Cronon's *Changes in the Land* (1983), Worster's *Rivers of Empire* (1985), Arthur McEvoy's *The Fisherman's Problem* (1986), Carolyn Merchant's *Ecological Revolutions* (1989), Cronon's *Nature's Metropolis* (1991), Robert Gottlieb's *Forcing the Spring* (1993), Andrew Hurley's *Environmental Inequalities* (1995), Richard White's *The Organic Machine* (1995), Cronon's edited volume *Uncommon Ground* (1995), Mart Stewart's *"What Nature Suffers to Groe"* (1996), William deBuys' *Salt Dreams* (1999), and Mike Davis's *Ecology of Fear* (1999); finally, Karl Jacoby's *Crimes Against Nature* (2001), Edmund Russell's *War and Nature* (2001), Ted Steinberg's *Down to Earth* (2002), Paul Sutter's *Driven Wild* (2002), Linda Nash's *Inescapable Ecologies* (2006), and Gregg Mitman's *Breathing Space* (2007). I invite you all to make up your own lists, either before or after you read these essays (or both). There is a stunning array of quality work in our field, and the essays in this volume will guide you to them.

In these essays written by both younger scholars and established leaders of the field (including several past presidents of the American Society for Environmental History), you will find handles and toeholds, but this is not a step-by-step guide to get you to a single peak. It does not chart every approach, nor does it document all of the climbs that have come before. Though this volume is robust in the range and scope of the essays, it is by no means exhaustive. Many topics, many places, remain unexplored. But many places are charted. Moreover, in each essay you are exposed to manners of exploration – multiple approaches to environmental history, if you will. You may be interested in a topic not touched on here directly. You may wish to adapt some of the approaches here – or, having seen what's been done before, find your own way. Go off the trail. Light out for a new territory. My hope is that this volume will equip you as a scholar or a reader with orientation skills, an understanding of the places we've come from and encouragement to follow your curiosity about what lies beyond the next bend. In the end, what we are bringing back are tales from the field, as William Cronon (1992) reminds us.

History is always an alchemy of research and imagination. It is facts and stories – intermixed. Environmental history is people and places, flora and

fauna, soils and waters, fire and steel, growth and decay, work and leisure, race making and haymaking – intermixed. Environmental history insists that the great green, blue, and brown setting of human experience – the planet – always be in the mix of history. Without the earth, human history is diminished – in fact, it is eroded and parched. If it does not critically engage with the ecological context of human experience, history in effect turns humans into mummies – dehydrated shells of their real selves suspended in an airless netherworld. Environmental historians, by contrast, hope to put us fully in our place – and thereby make the past come alive.

Vashon Island, Washington

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Part I

The Elements of Environmental History

Chapter One

Paths Toward Home: Landmarks of the Field in Environmental History

Louis S. Warren

This is nature – it must be.

Getting here was not easy. You drove five hours out of the city, then parked at Mammoth Ski Resort on the eastern slope of the Sierra Nevada. There you unloaded your gear, and boarded the shuttle bus to the trailhead in Reds Meadow. On disembarking, you lifted your backpack and began a dusty hike through the foothills, until you came up a steep set of switchbacks to the outlet of Shadow Lake. Now, hiking along the lakeshore, you've come to your campsite. Here you pause.

You could hardly imagine a place more natural. The mountain slopes you ascend are part of the Ansel Adams Wilderness Area, which contains some 230,000 acres of the eastern Sierra Nevada. This rugged geography practically reverberates with the grand personalities and events of environmental history. A haunt of John Muir, who exhorted Americans to take to the wilderness as early as the 1870s, this mountain was first draped in the protective codes of conservation with a flurry of laws passed in 1890, when the federal government temporarily attached much of it to Yosemite National Park (which today abuts the Ansel Adams Wilderness just north of here). Three years later, the ground where you stand became part of the national system of "forest reserves" (now the national forests), and Theodore Roosevelt added more of the mountainside to that system in 1907 (Rose 2000: 77).[1]

In 1964, Congress compounded its protections by enshrining this very spot in a designated wilderness area. The Wilderness Act of that year declared this "an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain" (Wilderness.net 2009; US Congress 1964). Originally called the Minarets Wilderness – after the jagged peaks that crown this section of the mountain range – authorities posthumously honored the nation's leading wilderness photographer by renaming it the Ansel Adams Wilderness in 1984.

The stunning beauty of this place is fitting tribute to Adams, whose images of unpopulated mountains and meadows are imprinted across everything from calendars and posters to coffee cups and T-shirts. To a significant degree, Adams taught millions of Americans the meaning of wilderness as it became enshrined in the Wilderness Act, the place "where man himself is a visitor who does not remain."

If you could look past the relatively few hikers and campers in view you might be tempted to see this as a mountain outside of history, a place indeed "untrammeled by man." From the crashing cataract in the stream below your campsite beside Shadow Lake to the thick trunks of Jeffrey pine surrounding it and upward to the soaring mountain peaks, this "community of life" could indeed fool you into thinking you have stepped into an Adams photograph.

But for a place without history, there sure are a lot of rules here. To enter the trailhead from the road, you had to show your permit to a ranger. This is a popular destination, and for the permit itself you had to apply months in advance, and pay a fee.

Then you had to find a way in. Entrance is permitted only on official trails, and you entered on the one assigned to you by the National Park Service, which administers this wilderness. Now that you're here, you're on deadline. The permit requires you to enter the wilderness on a particular day, and leave within a set number of days to make room for the next permittee.

The permit spells out a host of other regulations you must obey: You cannot have fires if you camp at elevations above 10,000 feet. You cannot cache equipment, and you cannot take along any wheeled cart to carry any of it. You cannot camp within fifty feet of any stream or lake, and you have to carry all your garbage out. You cannot play touch football or participate in any other "competitive event." You cannot bring a dog.

These administrative proscriptions have a history of their own, some of which is inscribed into the very earth. To discourage cross-country rambling – which erodes slopes and damages meadows – the Park Service maintains trails (which you are required to use). In many places a steady column of hikers has worn them deep into the soil. On hard terrain, where pathways might become less legible, temporary laborers have carved them into the earth with shovels and adzes. The switchbacks about a mile below were lined with stones, and graded with carefully placed steps. In one place above, they are even blasted into bedrock with dynamite and reinforced with concrete.

The trails and rules serve similar purposes. They exist because so many visitors resort to these peaks that they easily reproduce urban problems. Thus, if you collect water from that cascade below, you would be wise to endure the tedium of pumping it through a filter to avoid ingesting *giardia intestinalis*, a parasite that infests watersheds all over the rural US in part

because of the feces of backcountry hikers. (Containing *giardia* is one of the reasons for the ban on camping within fifty feet of a lake or stream.)

The rules also stipulate you must stow your food in a small, fiberglass barrel provided by Forest Service headquarters. This "bear can" is impervious to assault by the black bears. Once the animals were rare, but in the last two decades the abundant refuse and ill-tended provisions of hikers have provided them with enough food to colonize this mountain, even to elevations where they have little or no natural habitat.

So authorities manage hikers to preserve as much as possible of the "untrammeled" wilderness experience they – you – seek. The rules are a means of making this landscape look and feel the way you want, reflecting the fact that you are part of a powerful constituency that deploys votes and money to support the regulatory system that governs this slope. It is not too much to say that if recreationists like you were not here then the Ansel Adams Wilderness would not be here either. The condition of this mountain is partly an expression of the power of its visitors.

And this is a remarkable thing, because wherever you might be from, the vast majority of people who visit here actually live in distant cities and suburbs. How did the mountain end up in the hands of people who live so far away, in landscapes so different from this one? What compels so many of them to seek respite in this place? How is this landscape connected to the one they flee or, more specifically, how has the making of this place been connected to the making of that one? What are the implications of city-dweller dominance for near-by people, and for the natural systems of this mountain, and how did the government – "the state" in scholarly parlance – gain the power to direct your travels and your behavior across a landscape that symbolically represents anarchic American freedoms?

Environmental historians explore the changing connections between people and nature, a project that has been dominated by questioning, abrading, interrogating, and otherwise troubling the boundary between nature and culture. In recent years, they have expanded their field to include landscapes close to most homes, and the environmental history of suburb and city is now a major component of our work (Hurley 1995; Tarr 1996; Kelman 2003; Orsi 2004; Klingle 2008; Melosi 2008; Walker 2008a). This essay, which introduces some of the major insights and debates of environmental history, might just as easily have considered a city as a wilderness area.

But in the end, to confront the landscape of the Ansel Adams Wilderness is to risk a profound sense of bewilderment at how a superficially pristine and natural landscape in fact represents a weird and potent mix of country and city, nature and culture, a mélange whose history is complex, confusing, and for that reason all the more intriguing. Thinking as a historian on this journey means confronting questions of law and the state, race and class and gender, work and leisure, the confluence of the natural and the artificial, and the forces that draw them together. To find your way through

this place and its history is to discover that the Ansel Adams Wilderness is less a world apart from the city than a peculiar, contingent expression of the city's connections to the most remote rural landscapes. To understand what you see on the trail to Mt. Ritter and back is to travel not only through space but to consider key connections to environmental histories of country, city, and the spaces between.

Your backpack weighs in around 60 pounds. Loaded with almost everything you need for your survival, it suggests a cultural connection to the mountains and your ecological separation from them. Onerous as it is, it is also a material, historical legacy of Victorian naturalists like John Muir, who first crossed the Sierra in 1869, descending toward the eastern lowlands via a canyon not far north of where you are standing at Shadow Lake. Like you, he was a seasonal visitor, a lowland dweller who sought respite from his daily cares in the sublime mountain peaks and canyons. And like you, he carried urban goods on his back, everything he required for his journey.

As he made his way down this eastern Sierra slope, he encountered a band of Indians from Mono Lake headed the other direction, "on their way to Yosemite for a load of acorns" (Muir 1911: 294).

In that passing, two ways of seeing the Sierra Nevada and of understanding its creatures also passed. Muir was hiking for fun. The Mono Paiutes were hiking for food.

Muir and the Monos differed, too, on what these mountains were. Muir saw them through a lens at once secular and religious. An intellectual heir to Romantics like William Wordsworth and William Blake, his nature was the home of a God who seemed, after the scientific and industrial advances of the eighteenth century, profoundly distant from everyday experience. Although Muir published scientific articles on the geologic origins of the Sierra, his mountain wilderness was also benign and holy, the creation of a decidedly merciful God who intended it to serve as "the People's Playground."

The Mono Paiutes also loved the mountains, and still do, but in ways profoundly different from Muir. To them as to many other Indians, the land was not part of a unitary "Nature" but the home of many powerful spirits who had to be appeased to retain luck in the hunt, in childbirth, in health. Good fortune flowed only to those who made the proper offerings and gifts to spirits like Kwi'ina, Golden Eagle, who created the Sierra Nevada when he flew so low his wings touched the soft mud of the young earth and raised it into mountain peaks (Beesley 2004; Lee 1998; Heizer and Elsasser 1980; Nelson 1983).

For Mono Paiutes, the mountains were not a mere playground, but home. They played here, to be sure, but unlike Muir and you, they also worked here, fashioning lodges, food, and tools from these forests. You can believe in a mythical land, untouched and "untrammeled" if you want, but if you know where to look there are traces of Indian occupation – Indian

labor – everywhere. By the trail, here and there, flakes of obsidian glitter in the sun, detritus left by Indians crafting knives, hide scrapers, arrow straighteners, and weapons from the black, volcanic glass.

And then there is the path itself. The first people to enter the Sierra Nevada probably came the same direction you have, the same way those Mono Paiutes did on the day they met John Muir: up the slopes from the Great Basin some 8,000 years ago, on the heels of the retreating glaciers (Beesley 2004: 20).

For them and for succeeding generations, there were many reasons to travel into these mountains. Perhaps the biggest prize was protein-rich pine nuts, which drew gatherers who collected them by the ton in the fall of each year. These and other resources from the Sierra, such as acorns, sustained even distant villages, helping to make the future state of California one of the most densely populated regions in early North America.

When Columbus crossed the Atlantic, there were probably 100,000 Indians living in these mountains, including not only Mono but Sierra Miwok, Pit Rivers, Maidu, Nisenan, Awhaneechee, and others (Beesley 2004: 21). Many of the trails so carefully reinforced by today's Park Service were first worn into the Sierra soil and rock by Indian travelers, who carried obsidian along with pine nuts, red paint and sinew-backed bows to trade west of the Sierra. There, Yokuts, Miwoks, and others offered skins of deer, antelope, and elk, baskets of willow bark, acorns and shell beads (Farquhar 1965: 12–13).

Beyond trails and flaked tools, you have to look more carefully for clues to the Indian peoples who lived here. Indians pruned and coppiced mountain plants and thereby influenced the size and composition of thicket and glade. In valleys like Yosemite, for example, Awhaneechee people cut the ends of branches off oak trees to enhance acorn production the following year. Here by Shadow Lake, Mono women cut specific elderberry bushes to ground level, which actually made them grow faster and increased production of berries, and they sometimes transplanted productive plants nearer trails for easier access (Anderson 2005: 138–9).

But their most powerful tool was fire. In the words of Stephen Pyne, fire is both a force of nature and an implement of culture – "the first product of the natural world" domesticated by people (Pyne 1982: 3). Like North American hunters east and west, Indians of the Sierra Nevada fired underbrush to encourage the growth of meadows and forage for game. An occasional burn increased the availability of food plants like gooseberry, chia, and wood strawberry. Flames consumed decaying plants first, making room for the healthier plants that survived. They scorched insects and diseases that threatened wild food and basketry plants. And burning off the old brush encouraged sprouts that were most useful for making baskets, fish weirs, and clothing (Anderson 2005: 136; Lewis 1993).

Along the trail on the way to your campsite, nearly hidden in the forest, are old burned stumps, clues to a fire in decades past. You might also note

a profusion of wild onions growing here. Perhaps it is a coincidence, but Mono Indians once fired gentle slopes like this – for the onions that grew from the ashes (Anderson 2005: 138–9).

To reveal Indian traces in the land is to discredit one of the oldest tropes of "savagery" in the European canon, the powerful stereotype of Indians who lived without working. In fact, what Indians created here on the eastern slope of the Sierra Nevada was a mixed landscape where labor and natural processes wove together in what Thomas Andrews calls a "workscape." The Mono workscape was neither completely natural nor completely cultural, but a "constellation of unruly and ever-unfolding relationships" in which people and the natural world constantly responded to and reshaped one another. Indian work required understandings of mountain slopes and their natural communities that have all but vanished (Andrews 2008: 125). Not only did working in the land reshuffle its biotic communities and contribute to Indian sustenance, it also shaped Indian identity, as people of this place.

You keep your fire carefully at night and douse it completely before you leave camp in the morning. If once this was a landscape tended with fire, today it is a monument to fire suppression. A series of lightning strikes ignited a blaze not far from Shadow Lake just a couple of months ago. The area is so remote that it burned for over a week before authorities got word of the blaze and dispatched a helicopter with fifty firefighters to extinguish it (*McClatchy News* 2008a).

Whether this mountain remains a workscape is a question we shall return to below. For now, if cultivating a landscape through fire is work, so is firefighting. And as work, a century of firefighting has made of the eastern Sierra a dramatically different place from the one we have just described. Whereas the forests around Shadow Lake used to burn every ten to twenty years, at current rates two hundred years might elapse between sustained blazes. The effects may not be immediately visible to the untrained eye, but they are all around you. Trees unculled by fire grow more closely together. They are thinner in diameter. In part because the trees compete with one another for water, they grow weaker, and insects that once were minor pests become major threats. Stands are more uniform. Where once the most useful plants for Indian cordage and baskets were abundant, today they are often rare (Beesley 2004; Anderson 2005).

The ecology of this new workscape is remarkably different from the old. In the long decades between blazes, deadwood accumulates. When fire does come, it tends to burn much hotter and more extensively. A century ago, fires were frequent enough that they seldom generated enough heat to kill large stands of trees. Today, Sierra fires rampage through hundreds of thousands of acres at a time, at temperatures so extreme they incinerate every living thing – and the soil, too (McKelvey et al. 1996; Walker 2009; *McClatchy News* 2009).

How fire suppression became such a major strand of modern management is an issue to which we shall return, but of course, the removal of Indian fire from these forests began with the removal of Indians, and that began centuries ago with colonial expansions that pushed Indian populations sharply downward. The Spanish colonists who claimed the California coast in 1769 brought not only weapons of war, but also Eurasian pathogens such as smallpox, measles, influenza, and malaria. The arrival of these microscopic organisms constituted an ecological revolution. Because they had been isolated from Eurasia since before these diseases evolved, Indian bodies had never developed resistance to them. As Alfred Crosby and others have made so clear, this "ecological imperialism" was responsible for sweeping away millions of Indian people. In California, epidemics repeatedly hammered the coastal missions and the surrounding countryside. The Sierra Nevada was somewhat protected from these outbreaks because of its distance from the coastal missions, but even here some disease, possibly smallpox, decimated villages in 1800 (Crosby 1972, 1986; Hackel 2005; Runte 1990: 9).

Along with diseases, the missionaries and their soldier escorts brought other invaders. As you proceed up the mountain, you are on occasion obliged to step out of the way for pack outfits. Horses have their own history here, and it begins, too, with the Spanish, who brought not only horses to California but cattle, pigs, sheep, and goats as well as alien plants, including not only farm crops but weeds in animal feed.

Initially, livestock remained on coastal meadows, far from the Sierra Nevada. But by the first decades of the nineteenth century, Spanish and Mexican ranches were raising vast herds of cattle to provide leather for the factory belts and other goods needed for the industrial revolution in the United States. To manage the cattle, they also accumulated huge horse herds.

By the 1830s, Shoshones, Utes, and Paiutes from east of the Sierra Nevada routinely stole large numbers of these horses and drove them over the mountains – at times, perhaps, on this trail. Once over the Sierra Nevada, the animals went to trade fairs on the Great Plains, where some of them sold to the expanding Plains nomads. Others went as far east as Missouri, where they were snatched up by residents of the burgeoning United States (Fountain 2007; Flores 1999: 81–124).

The *sale* of these animals is a clue to another dimension of the environmental revolution that came with European colonialism. Today, this area is a retreat from commerce: there is nothing to buy and no place to pay for it in the Ansel Adams Wilderness. But if trade between Indian peoples helped motivate ancient peoples to carve trails through these mountains, market capitalism would have even greater impacts. Work in nature long pre-dates capitalism, as we have seen. But market exchange had a way of dramatically altering the ends toward which people worked the land.

Thus, even in the earliest days of European expansion, colonists often showed up in North America owing money to creditors back home. And, as the world economy expanded in the nineteenth century, debt and the dream of profits drove the conversion of American nature into urban commodities, so that country and city continually remade each other. Meadows became pastures for producing hide, beef, cheese, butter, and milk; forests became timber for ships and houses; fur-bearing animals from beaver to bears became simply furs. In New England, the vast European appetite for these goods drove the region's transformation from a patchwork of biological communities shaped by Indians to a largely deforested farmland by 1800. Indian and non-Indian hunters combined to trap fur bearers for cash and trade goods, and many Indians took up horse-powered nomadism to exploit the market in bison robes (which sold as cold weather gear in the United States). In Mexican California, cattle and horses ravaged native grasses and helped spread wild oats and other European grasses naturally selected for grazing – all processes which accelerated after the US annexed California in 1848, and again when the transcontinental railroad was completed in 1869.[2]

Here, in the Sierra Nevada, the horse trade may have been a tenuous link to Euro-American markets, but the full force of urban commerce arrived with the suddenness of an earthquake in 1848, in the form of the Gold Rush. For all its gaudy mythology, the rush represented a gigantic intrusion of urban exchange into these mountains. Gold lubricated trade in London, Paris, New York, and every industrial capital around the world. The quest for it brought hundreds of thousands of miners. Their camps lined virtually every Sierra stream, no matter how small, and the workscapes they created were profoundly different from what came before. Miners were at once laborers in nature, often exposed to the natural world in ways utterly new to their experience, but also dependent on small town or even city markets in Sacramento and Stockton to provide their food, clothing, and other supplies. The eastern Sierra did not see the massive removal of slopes by hydraulic mining outfits that prevailed on the western side of the mountains. But even here, miners in pursuit of the precious metal diverted entire rivers, pillaged stream beds, and poured millions of gallons of mercury into Sierra waters in hoping to aggregate flecks of it into clumps big enough to catch in the riffled bottoms of the sluices they built from the trees they felled (Isenberg 2005).

Like the Mono Paiutes, the miners' work in nature was a key to their identity. While we do not know as much as we would like about Chinese, Mexican, or other minority mining groups, US miners saw themselves as profoundly "natural" laborers who drew wealth directly from the land (at least until their claims failed). Many idealized the work as essentially masculine. Panning and digging seemed to be (but usually were not) means of earning independence through labor in nature, like the farming of an earlier era.

Such dreams proved especially appealing in the middle of the nineteenth century, when increasing numbers of men and women were drawn into the rapidly expanding market economy, where they found themselves ever more vulnerable to business cycles and industrial accidents, and ever more dependent on credit (Morse 2003; Johnson 2000; Rohrborough 1997; Streeby 2002; Isenberg 2005).

In the Sierra, miners' labor required their complete attention, for hours on end. In the summer months, they worked relentlessly and to the exclusion of their other needs like food (for which they paid cash or gold). To miners, Indian work seemed like leisure. Combined with pre-existing notions of their inborn superiority because of their "white" natures, miners' perceptions of Indian work led them to see themselves as radically different from (and better than) the prior inhabitants of these mountains.

Thus, as with colonists and Indians on nearly every front, the Gold Rush brought war between Indians and miners, whose race hatred reached genocidal proportions. Miners and other settlers frequently raided Indian villages, slaughtering the adults and selling children into *de facto* slavery, helping to drive California Indian populations from perhaps 150,000 in 1848 to 23,000 by 1880. Just north of here, in 1852, after a number of conflicts with miners and farmers from the lowlands, a band of Awhaneechee drove a party of miners out of Yosemite Valley; Army volunteers soon retaliated by killing five of the Awhaneechee and driving the rest temporarily into hiding (Hurtado 1988: 100; Russell 1926).

To nineteenth-century Americans, making commodities was perhaps the highest use of natural goods. Theirs was a far more market-oriented workscape than that of the Indians whom they murdered and dispossessed.

But on the heels of the Gold Rush and its genocide, there emerged a distinctive way of seeing the Sierra Nevada, one that foreshadowed recreation of the city dwellers who today flee to the Ansel Adams Wilderness. Soon after soldiers related the stunning mountain glories of Yosemite to journalists, a series of writers and artists began to extol their beauties. By 1865, the Yosemite Valley had become a state reserve for tourists to retreat to the wilderness.

This enthusiasm for the wilderness was a new cultural phenomenon. But as with the mania for resource extraction, tracing its origins leads us to the city, which was in many ways its point of genesis and the site of its most vigorous consumption. The first writer to promote the valley's natural attractions was J. M. Hutchings, a San Francisco publisher who was educated in Birmingham – a smoky, roaring crucible of England's industrial revolution. The first artist, Thomas Ayres – whose paintings of the serene valley surrounded by craggy peaks mimicked popular paintings by Hudson River School artists like Thomas Cole and Frederick Church – was born in New Jersey and worked in an engineering firm in St. Paul, Minnesota before emigrating to California. Hutchings and Ayres, each dependent on the city

to provide their respective livelihoods, also shared popular longings to escape the industrial, urban revolution that was creating modern metropolises like New York, Chicago, and San Francisco (Runte 1990; Russell 1926; Palmquist and Kailbourn 2000; Browning 1990; Hutchings 1962).

Their success in promoting Yosemite suggests how much the romance of wilderness had already captured American imaginations by 1859. Traditionally, Americans were most fond of pastoral landscapes, the farms that represented the reclaiming of the Edenic garden from the looming, forbidding wilderness. But as industrialism and commercialism expanded, wilderness came to seem less forbidding, a welcome redoubt from modern life, an Eden in its own right (Marx 1964; Merchant 2003). The depths of anxiety provoked by America's urbanization can be deduced from the vehemence of Frederick Law Olmsted, who became the first chairman of the state commission that governed the valley in 1864. Olmsted was a Bostonian who had designed New York's Central Park to be a retreat from urban anxieties and commercial stress and a place for the fractious community to regroup. In his view, Yosemite's wild nature would allow Americans to recover from the ills of urban living, which included "the severe forms of softening of the brain, paralysis, palsey … [and] insanity … mental and nervous excitability, moroseness, melancholy … [and] irascibility" (Olmsted 1865; Hickman forthcoming).

Olmsted's litany of symptoms would soon be pathologized as an actual illness – neurasthenia. Supposedly, this malady most threatened white, middle- and upper-class people because they were most prone to "over-civilization," to the softening of their minds and bodies in the offices, banks, and managerial desks where they disproportionately worked. Because it dampened their sexual ardor, neurasthenia allegedly threatened the fertility and dynamism of the Anglo-Saxon race (Bederman 1995; Lears 1981). Such threats were particularly ominous as immigration brought millions of Irish and Germans to the US prior to the Civil War, and millions more southern and eastern Europeans in the closing decades of the nineteenth century. As Jake Kosek has observed, the wilderness movement was born in part from a national moment "filled with obsession over the purity of bloodlines and the nation's body politic" (Kosek 2006: 154). Romantic wilderness retreats promised to shore up beleaguered white masculinity. In the right circumstances (which often meant in the company of the right class of white men), its meadows and streams appeared as sites of reproductive energy that promised to strengthen femininity, too. Yosemite became a healing place for gender norms, a tonic for white Americans seized with dread by the city of the future, ever more nostalgic for the frontier receding into the past (Scharff 2003; Merchant 1980, 2003; Schrepfer 2005).

Although Olmsted and other Yosemite advocates often believed they were preserving an uninhabited wilderness, in reality they had to create it first. Across the United States – at Grand Canyon, Yellowstone, Glacier, Death

Valley, and other national parks – the campaign to preserve monumental landscapes often entailed eviction of Indians who lived among them. In Yosemite, the ideal of uninhabited wilderness obscured how much Indian coppicing and burning – Indian work – had contained the oak groves and maintained the valley meadows that Americans now saw as pristine wilderness. Indeed, Indians continued to live in Yosemite long after it became a park. They survived by combining old forms of work – acorn gathering, hunting, and fishing – with new forms: day labor, selling baskets to tourists, and performing dances and stories for money. The long-running effort to exclude Indians from the valley would end with their expulsion in the 1930s, as a "degraded," modern people who were unsuitable for tourists in search of the primeval (Spence 1999; Warren 1997; Jacoby 2000).

Today, wilderness recreation is ostensibly open to all. But to an unsettling degree, the early history of wilderness as resource for whiteness continues to ramify through modern politics. California was the first state in the modern age to see its white majority slip into a minority, in 1999 (Quay 2008: 9). But even now, wilderness enthusiasts – the people around you – are overwhelmingly white and middle class. Indian peoples still contest resources in national parks and wilderness areas, while the increasingly non-white populations of California and the nation relate to nature in ways that, for now at least, exhibit little enthusiasm for wilderness (although as Solnit [2005] observes, there are far more non-white visitors to Yosemite now than there used to be).

Of course, race was not the only marker of exclusion at Yosemite. There were class lines, too. Miners, market hunters, herders, and loggers all saw their work curtailed or banned. Increasingly, US legal codes inscribed elite assumptions that those who used the wilderness should be cash-paying recreationists who packed in their gear rather than laboring ruralites who depended on natural goods of the landscape (Jacoby 2000).

After the first legal protections of Yosemite in 1864, the Sierra Nevada and many other places were at the center of an increasingly intense clash of environmental ideals – the one that saw nature as resources waiting to be extracted and marketed, the other that believed it a retreat from the modern world. The lines between these schools of thought were not always clear. Indeed, enthusiasm for wilderness solitude on the one hand and wilderness destruction on the other often waxed in the same individuals, simultaneously. When Frederic Law Olmsted proposed protecting the Yosemite Valley from mining and timber felling, he was supervising those two activities himself as manager of a near-by gold mine (Hickman, forthcoming).

So the growing reputation of the Sierra as romantic retreat ran headlong into the expanding exploitation that was rapidly changing them. In the 1870s, as John Muir began extolling the beauties of the Sierra as a vacation resort in popular magazines, ranchers in the San Joaquin and Sacramento

Valleys sent millions of sheep into the high Sierra for summer grazing, so as to provide more wool and mutton not only to the population of booming San Francisco, but to overseas markets, too. At the foot of the eastern Sierra, mining towns like Aurora, Mammoth Lakes, and Bodie erupted. Their loggers and herders and sheep and cattle exacted a fearsome toll from the forests.

These kinds of work dramatically altered the pre-existing Indian workscape. Climbing upward, as you reach the outlet of Garnet Lake, you may stop to rest on a small meadow among the boulders. This patch of grass probably would not have been here had you visited a century ago, when sheep stripped the mountains practically bare, unleashing severe erosion. As one visitor here put it in 1898, "The great obstacle to the explorer is not the danger of crag or chasm," but the starvation of his pack animals because of "the destruction of the fine natural meadow pasturage by sheep" (McKelvey and Johnston 1992: 232).

The work of sheep herders was not completely dissimilar from the work of Indians. In fact, some of them *were* Indians: beginning in the 1870s, the Mono Paiutes began running their own livestock on these slopes, alongside herds tended by Basque, Greek, Mexican-American, and white shepherds. Like earlier Indian inhabitants of this forest, sheep herders often set fires to stimulate meadow growth. But their exclusive focus on creating food for sheep contrasted sharply with Indian cultivation of variegated stands of grass and cordage, wood, and food for people (sheep grazing itself often deprived Indian women of the grass seed they gathered to feed families). In the end, pastoralism in the high elevations brought weed invasions, increased uniformity of plant types, and dramatic erosion.

The gnarled trunks of the forest and the thick green meadows around you are a sign that something changed between then and now, and the change is so dramatic that you might believe for a moment that nothing of the old lumbering and grazing workscape persists. But signs of it endure – in the decaying stumps you might notice among the Jeffrey pines (a prime lumber tree) and in the weeds which proliferated with grazing and which flourish still. As you rest here, you may still pluck from your socks the spearhead seeds of cheatgrass that brushed off on your shoes at the trailhead. Kentucky bluegrass, a European import, punctuates even these high alpine meadows, and in many places native sagebrush has colonized the grassy swards of bygone days (D'Antonio et al. 2004).

A crucial difference between you and those mountain shepherds, loggers, and miners is that you are not here to work. You are here to play. Although it contains elements of workscape in fire suppression and trail maintenance, this mountainside is now a landscape of leisure, enforced by the state. Law and regulation constituted the primary bridge from the overcut, overgrazed workscape of the past to this landscape of tall Jeffrey pines and lush high country

meadows. John Muir and other preservationists helped build that bridge, turning to the state to remake this place as "the People's Playground."

Of course, law and the state had been a major force in the shaping of the mountains for decades. Law guaranteed so few rights for Indians that killing and dispossessing them seldom brought consequences. California's legislature and the US Congress ensured that claims to just about every kind of resource – minerals, timber, land, and water – were easy to stake and easy to transfer for American white men, enabling them to profit from commerce in mountain resources. The making of a market in land and other natural goods was a primary achievement of the American legal system in the nineteenth century (Hurst 1956; McEvoy 1986; Isenberg 2005).

But now, preservationists followed on their successes at Yosemite by invoking the state as a means to constrain market activity. In 1892, scientists from the University of California and wilderness enthusiasts created the Sierra Club to lobby for mountain protections, with John Muir as its first president and figurehead. Even before they founded the Sierra Club, many of the same people joined in a successful campaign for Sequoia National Park and General Grant National Park[3] in the southern Sierra Nevada, and a Yosemite National Park to surround the earlier state reserve (for a brief time they even expanded its protections to include much of the area that is now in the Ansel Adams Wilderness) (Runte 1990: 55–6; Worster 2008: 323–30).

From those tentative beginnings the state has become a primary force in the making of Sierra nature. California forests have never been so closely regulated as they are now. Even outside wilderness areas, the state of California and the US Forest Service, having determined that forests are overcut, have clamped down on the lumber industry. Throughout California, over sixty lumber mills have closed since 1990 (Knudson 2003). And sawmills are only among the most recent workplaces to disappear in the Sierra. Like the other wilderness areas that straddle the crest of this mountain range, the Ansel Adams Wilderness is a space where most kinds of work – such as lumbering, grazing, and mining – are now forbidden.

To put it mildly, locals have been unsettled by the absence of work opportunities. In today's rural West, a living wage is a rare thing, and a working sawmill is one of the few places you might find it. A wilderness area offers little consolation for the unemployed, and not just because there are few jobs in them. Because the Wilderness Act of 1964 defines wilderness areas as roadless, wilderness designation means a ban on new roads and often the closing of old ones. For hikers, this is paradise. But to hunters, fishers, and off-road vehicle enthusiasts – many of whom live nearby – wilderness areas often seem to be an assault on the rural economy and rural identity by well-heeled, urban elites.

Aggravating these disputes over work and mobility is an abiding rural sentiment that country people sacrifice for wilderness in ways urban

recreationists do not. Despite the rural poverty that rolls in waves around each shuttered sawmill, in the cities there is no shortage of wood. When California timber disappeared from markets, builders went right on making homes, office parks, apartments, and the furniture that fills them by cutting forests that are out of state and conveniently out of sight. The old-growth, boreal forests of Canada have been clearcut in some places to meet the demand. In 2001, Canada shipped enough wood to the US to build a city the size of San Diego (Knudson 2003).

Such are the dynamics of capitalism. When the forests of Wisconsin and Pennsylvania were cut to exhaustion in the late nineteenth century, local jobs vanished. Cities kept growing – with wood from the Pacific Northwest. Their residents barely noticed the change (Cronon 1991).

But in today's Sierra, declining incomes, constrained mobility, and unapologetic urban blindness about the real costs of urban appetites have fueled booming anti-wilderness sentiment. They help to explain the bombings and vandalism of Forest Service offices in neighboring Nevada in recent years, and the appeal of anti-wilderness politics in rural western counties generally, where the industry-funded Wise Use Movement garners much of its local support. By eliding or obscuring the connection among work, nature, and identity, historians have too often omitted a central feature of human experience and a major force in shaping the natural world and the politics that swirl around and through it (White 1996; Montrie 2008; Andrews 2008).

To the degree that the wilderness around you is a functioning natural system, it is a monument to environmental consciousness, and a vital reserve of ecological networks.

To the degree that the Ansel Adams Wilderness allows you to ignore your appetites and their costs – the two-by-fours and plywood from the hardware store and the new pine trim around your doors – it is arguably helping to destroy distant woodlands. Thus the wilderness you are enjoying and whose management you have assisted with your permit fees simultaneously expresses environmental virtue and environmental blindness (Cronon 1996b; Price 2000).

But assessing the modern fights over wilderness begs a central question. How did we get from the (arguably overworked) workscape of the 1890s, to this landscape where there is practically no work at all? To answer that is to see why there is no easy way to change the management of the Ansel Adams Wilderness. For the mostly work-free mountain and its forests continue to serve utilitarian purposes that are reinforced by their Romantic attractions.

You may meditate on this at the base of Mt. Ritter. At 10,000 feet, snowbanks endure into August. Where the melt rushes out from under the snow, you can drink: no parasites, no filter. Mix snow with a shot of tequila

and a package of Gatorade powder, and you have a margarita – sort of. Savor it while you watch the stream rush down the mountainside to cobalt blue Lake Ediza. There it pools before plunging through an outlet, out into another stream, and down the mountain.

Follow that stream and you would learn that this deceptively premodern landscape has in fact been created partly to serve one of the most modern, complicated, and heavily manipulated in the world. These are the headwaters of the San Joaquin River, which gathers run-off from the eastern Sierra Nevada, curves south and west around the mountains and then heads north. Along its course, the river waters the Chinook salmon's southernmost spawning site on the entire globe. Not far to the east of San Francisco, just before it empties into the Pacific Ocean, it pours into the world's largest inland river delta.

That is, it used to. Today, the dams, siphons, and diversions throughout its course mean that it often dries up completely at various points along its 150-mile length. In the nineteenth century, private irrigation companies and wealthy ranchers – among them the West's dominant firm of Miller & Lux – carved out a lucrative farm landscape by mixing river water with earth via irrigation canals (Igler 2001; Hundley 2001).

In the twentieth century, the US Bureau of Reclamation, the Army Corps of Engineers, and the state of California spent billions to spread the San Joaquin over one million acres of valley farmland. The gift of water in the arid summer created a year-round growing season in what has become the nation's most productive agricultural landscape. The valley today produces annually billions of dollars in apricots, almonds, beans, and cherries, thousands of tons of alfalfa and wheat, vast herds of dairy cows, and tractor trailers packed with beehives (Worster 1985; San Joaquin County 2006). There is in fact an excellent chance that, a year or so ago, the stream before you flowed into the peaches, apricots, and almonds that were subsequently picked and dried before being packaged as that trail mix you bought at the grocery store last week and have now carried in your backpack up to these headwaters … to eat with your margarita.

In addition to farmland, cities, too, spring from these mountain streams. Fresno receives 40 percent of its water from the San Joaquin River (City of Fresno 2007). Other Sierra streams become even more metropolitan. To the east, down the mountain and a little south, are the headwaters of the Owens River. Follow those and you would come to the town of Bishop, and soon after that you would reach the diversion channel of the Los Angeles aqueduct, through which most of the Owens River crosses 200 miles of desert before watering the second largest city in the United States.

If the San Joaquin Valley is in your food, there's a strong likelihood that Los Angeles, too, has a claim on your visit. Your lightweight gear is manufactured from petroleum-based synthetics and high-energy products like aluminum and plastic. If your equipment was not made in the City of Angels, it likely came through there (LA's port is now the biggest in the nation).

Moreover, your gear and your food are processed with petroleum – in fact, food production with its combines, petroleum-derived fertilizers, and long-distance transport requires more fossil fuel energy than the food itself conveys to you in calories. As you were driving from home to this mountain, you might have considered that since Los Angeles County provides over half the refined oil in California, and 6 percent of the oil refined in the US, there is a good chance that some quantity of LA oil powers your wilderness sojourn (Thornton 2009).

Incongruous as it might seem, the flow of these mountain rivers into such heavily corporatized farmlands and densely populated urban landscapes is not a historical accident. These streams are wild, but the laws that preserve them are expressions of politics. Those politics, in turn, have long reflected visions and plans for lowland cities and golden harvests, dreams that drove preservation of Sierra forests at the expense of the pastoral and lumbering workscape of the Gilded Age. In the early 1860s, at the same time Frederick Law Olmsted was urging protection of Yosemite Valley to ensure racial health, George Perkins Marsh was making a different but related case for protecting high country forests. A one-time ambassador to Turkey, Marsh was fascinated with the mysterious disappearance of civilizations in the Mediterranean. What had caused the collapse of the great cities of Greece, the empires of Rome and the Near East? And would the United States follow them into oblivion?

In 1864, Marsh published his conclusions in his classic study *Man and Nature*, explaining that overgrazing and deforestation were keys to the puzzle. By devastating their forests and fattening their herds on high country grasses, the ancients had eroded mountains into rivers, desiccating the land and turning fertile plains into deserts. By allowing unrestrained cutting and grazing in modern forests, and by not suppressing the numerous wildfires that swept through them, Americans were taking the same dark path (Marsh 1864).

Man and Nature became a touchstone for the modern conservation movement, its warnings becoming more pressing as the era of frontier expansion approached its close. The appeal of Marsh's prescriptions mounted as prospects for new infusions of lumber dimmed, and as the public became more anxious to maintain America's traditional abundance of resources and avert the downfall of American civilization. Thus, almost immediately upon the closing of the frontier in 1890, Congress passed the Forest Reserve Act of 1891, which authorized a system of forest reserves to constrain grazing, lumbering, and wildfire, and thereby to prevent erosion. Influential Californians like Muir echoed the call, and some officials were pointing out that severe erosion from the Sierra was filling the higher reaches of the San Joaquin River with mud. Farmers and farm country advocates soon joined the clamor for watershed protection to protect the irrigated lowlands of the San Joaquin Valley (McKelvey and Johnston 1992).

Responding to these concerns, President Benjamin Harrison in 1893 created the Sierra Forest Reserve. Blanketing five million acres of the San Joaquin headwaters with new protections, the reserve was the biggest in the United States. Although timber harvesting, grazing, and mining could continue in the new reserve, they would be more rigorously controlled and scientifically managed. By the late 1890s, cavalry patrols were enforcing the new regulations, seizing livestock from Mono Paiutes and forcing others to pay for permits or find new range. The forest remained a workscape, but it was no longer a home. In the words of Mono Paiute historian Gaylen Lee, the new regulations in the 1890s "effectively closed the Sierra National Forest to habitation" (Rose 2000: 79; Lee 1998: 123).

The Sierra Forest Reserve was but one example of how conservation implied state bounding of resources – from forests to fish, game, and water – as forms of public property, often at the expense of the poorest local people. "The first duty of the human race is to the control the earth it lives upon," wrote Gifford Pinchot, first head of the US Forest Service. In his view, that control should be exercised to secure "the greatest good to the greatest number for the longest time" (Pinchot 1910: 45, 48). In practice, this often meant diverting local resources from minority users. By controlling who used natural resources and how, and by utilizing scientific methods to make trees, animals, and plants produce a "sustained yield," conservationists hoped that resource abundance could become a permanent feature of national forests and the American landscape (Hays 1955).

Indeed, for conservationists, science quickly became a kind of technological fix, the means to split the baby of nature between the competing demands of resource extraction and scenic recreation (Taylor 2000). At times, the compromises were unsustainable. The Sierra Nevada was site of the period's most famous battle between utilitarian and preservationist ideals, the struggle over the damming of Hetch Hetchy Valley in Yosemite National Park to provide water to San Francisco (Righter 2005).

But on the whole, utility and preservation were usually enshrined together in Sierra management regimes. "In California," observed Theodore Roosevelt in 1903, national forests meant nature would be preserved "for the sake of its use *and* of its beauty" (McKelvey and Johnston 1992: 225; emphasis added). In 1907, Roosevelt added the Inyo National Forest to this region of the eastern Sierra, further ensuring water for lowland users and recreation for high country tourists (Rose 2000). Thus was created the system whereby mountain streams would be preserved for manipulation by farm and city.

But if conservation married science and the state to achieve perpetual abundance, the long-term results were often disappointing. "People indeed make their landscapes," Mark Fiege reminds us, "but they do not make them exactly as they please" (Fiege 1999: 209). Instead of healthy forests thick with timber, suppressing fires produced trees with thinner trunks that are more prone to pest invasion – and the fire threat is greater than ever.

Wildlife biologists too often assumed that breeding stocks alone determined a species "yield" in a given year, and failed to recognize the wide array of habitat factors, from the availability of food and cover to the levels of pollutants in water and competition from other species that might drive fish and game populations up or down (McEvoy 1986; Langston 1999; Warren 1997). In 2009, as Congress was committing some $800 million to restore a continual flow to the San Joaquin River and hopefully save its faltering salmon, the salmon runs of the much better protected and less polluted Sacramento River suddenly and mysteriously collapsed. Scientists hope to restore Sacramento River salmon by planting fry in the soon-to-be-restored San Joaquin (Weintraub 2009).

And if the state has succeeded in keeping the San Joaquin River flowing into the valley, the results have not always been what even the best science might have predicted. Nature's dynamics shaped the fields and the ditches, and at times the mixing of nature with technology and farmland proved disastrous. In the most notorious episode, for a period in the 1970s and 1980s, run-off from farms on the west side of the San Joaquin Valley was diverted into what was conceived as a restorative wetland and waterfowl habitat at Kesterson Reservoir, which was part of the San Luis National Wildlife Refuge. But the run-off deposited concentrations of naturally occurring elements, especially selenium, in toxic proportions. This led to monstrous deformities – legions of one-legged, one-eyed chicks, and chicks with no eyes at all – and finally an enormous battle over the fate of the reservoir and the obligations of growers and the state to clean it up. By the late 1980s, the reservoir had been closed, capped with soil, and declared a toxic waste dump (Garone 2006).

The pungent odor of mosquito repellent emanates from your clothes days after you spray it on. If your brand is effective, it likely contains the miracle chemical DEET (technically known as *N,N*-diethyl-*m*-toluamide), which is the most widely used insect repellent and until very recently the only one approved by the EPA (Environmental Protection Agency 2009).

You mean to repel mosquitoes, not kill other creatures. But you can never do just one thing in nature. DEET, it turns out, is hazardous to fungi and freshwater zooplankton. It may bioaccumulate – increasing in concentrations in the bodies of hosts as it moves up the foodchain. As thousands of backcountry sojourners spray repellent onto their clothes even now, so molecules of DEET drift into streams and lakes, permeating small organisms in the water and perhaps gathering in Sierra fish (Seo et al. 2005). What will the chemical do to them? EPA assurances aside, what is it doing to you? Whatever its effects, hiker enthusiasm for DEET is particularly ironic, insofar as what brings so many of them to this wilderness is, in part, its assumed remoteness from chemical dangers.

In contrast, few places in America have been more identified with such perils than the San Joaquin Valley. The fashioning of California's agricultural

dominance was intimately linked to pesticides, which became a central technology in modern agriculture after World War II. In particular DDT, a chlorinate organic hydrocarbon, achieved widespread popularity among farmers soon after 1945. As insects developed resistance to this "miracle chemical," the growers of the San Joaquin eagerly embraced newer pesticides, including highly toxic organophosphates. By the mid-1960s, they applied more pesticides in greater variety than any farmers anywhere else on earth. Over 16,000 different pesticides drifted onto fields along the San Joaquin River, in literally dizzying combinations that could bring on unforeseen and often fatal interaction in workers. By that time, California's migrant workforce – which was overwhelmingly Mexican – had the highest incidence of occupational disease in the state (Nash 2006; Russell 2001; Dunlap 1982).

"Unequal distribution of environmental pollution burdens based on race," as scholar Julie Sze observes, would come to be known as environmental racism only in the 1980s (Sze 2007: 13). But for scholars of the subject, one of the primary and most salient examples was in the San Joaquin of the 1960s.[4] As early as 1967, California farm workers mounted a campaign to separate pesticides from their bodies. Their efforts drew substantially on Rachel Carson's *Silent Spring*, which appeared in 1962 and achieved a wide public readership. Carson's warning against the unforeseen effects of DDT exposure and the hubris of "economic entomology" did much to discredit the old conservationist ideal of managing nature exclusively to produce goods for people. As Carson argued (with a jab at Gifford Pinchot), "The 'control of nature' is a phrase conceived in arrogance, born of the Neanderthal age of biology and philosophy, when it was supposed that nature exists for the convenience of man" (Nash 2006; Carson 1962: 297).

Exposures of working people to toxics in California's farm fields and in other industrial settings had been among Carson's case studies, and after the book was published, farm worker rhetoric was crucial to building public support for Carson's warnings. Amid mounting concerns about radiation in fall-out of Cold War nuclear testing, *Silent Spring* and news of farm worker poisonings helped reinvigorate older ideas about environmental health as a kind of balance between a body and its natural surroundings, and to create a radically new consciousness of ecological systems. Insofar as the modern environmental movement drew its inspiration from *Silent Spring*, we might say that it was a product of the modern workscape, for it was workplace encounters that gave Carson much of the data for her arguments (Pulido 1996; Sellers 1997; Nash 2006).

But by the same token, public awareness of pesticides heightened the appeal of "untouched" landscapes like the Ansel Adams, driving ever more recreationists here.

That the poisoned bodies of workers helped galvanize support for the Wilderness Act and leisured landscapes in which few of those workers recreated is one of the chief ironies of our story. By the early 1990s, the

unwillingness of major environmental organizations to address environmental health of the workplace or public health more broadly led activists to form what has become known as the environmental justice movement, one of the most diverse and engaged sectors of environmental activism today (Sze 2007; Bullard 1997, 1999, 2005).

Today, environmentalists discover they cannot avoid issues of environmental justice, in part because even the most remote Romantic escape is no guarantee of safety. If few people thought about chemical pesticides before World War II, you have been aware of such threats practically since you could read. That is why you wonder about DEET. And you will not be completely surprised to learn that even here you are at some risk. Occasionally, plumes of valley insecticides drift high into the Sierra Nevada. In minute quantities, they are likely in that snow, and in your drink. And so they run back down into the San Joaquin River, into fish and into the bodies of consumers in Fresno, and workers in the fields (McConnell et al. 1998).

In a sense these mountains, the river, and the valley below comprise what Richard White has called an "organic machine." We depend on the mix of river, land, and technology to generate goods, including farm crops, electricity, drinking water, fish, and waterfowl. To secure these, we manipulate the river and manage it much like a factory. Dammed into reservoirs, drained through hydroelectric generators, pumped onto fields, mixed with petroleum-based fertilizers, misted with pesticides, infused with feedlot growth hormone, and transpired into the cellulose of plants seeded by computer-monitored machines, what reaches the delta that the San Joaquin shares with the Sacramento is no longer the same river it was at its headlands.

But for all that – for all the fertilizer, pesticides, and other technological wonders imposed upon the river – the goods we derive from it can only be produced by its natural dynamics. And these remain in many ways mysterious.

As White has observed about a different river, when Californians struggle over the fate of the San Joaquin River, they confront a system "they in part create but which contains within it, at its heart, something they have not made" (White 1995: 111). The river's nature remains the central engine of production in our machine, even if we do not know how it works, let alone how to control it. We cannot take this machine apart to fix it or even to see how it functions. We cannot shut it down without causing enormous political and social damage. For all the harm we continue to inflict on it intentionally or not, we labor mightily, and sometimes blindly, to keep the river from failing completely. This is the Faustian bargain of the organic machine. All we can do is attempt to manage it – and that imperative entails a thousand disputes, among them how best to behave at its headwaters so the river, however unnatural it may be, can continue to flow.

One long day of hiking will get you from the base of Mt. Ritter to the trailhead at Reds Meadows. There you catch the shuttle bus back to town,

where you parked your car. As you wait for the shuttle, cars and trucks occasionally roll past on the road. Strange to see cars after days away from them, stranger still to ride a bus after hiking so many miles.

This tension between driving and hiking can easily obscure how profoundly connected they are. The car is in a sense a parent to this and every other modern wilderness area. To understand that, we might return to America's most car-obsessed city, that mighty creation of the Owens River, Los Angeles.

Strictly speaking, modern Los Angeles is a product of the Southern Pacific Railroad, which reached the place in 1887 and promoted settlement to attract customers. But the city boomed after World War I (after the Owens River water arrived) and thereafter it grew up with the emergent transportation technology of the day, the automobile. As Douglas Sackman has observed, Los Angeles "initially portrayed itself as the most natural city on earth." Paradoxically, the automobile became a key component of that image. Americans moved to LA for detached suburban homes, private dwellings on private lots in the garden setting of the orange groves. But the more popular this mode of settlement became, the more geographically dispersed Los Angeles grew. In this sense was the private car – today associated with traffic jams and air pollution – the means to a more *natural* way of living: a dwelling in the garden with easy connections to work, schools, and shopping. By the mid-1920s, more cars drove on Los Angeles streets each day than were registered in all of New York state, and the intersection of Adams and Figueroa, through which nearly 70,000 cars traveled on a typical day, was the busiest in the United States (Sackman 2005: 24; Starr 2005: 185; Fogelson 1967).

This pattern of dispersed development woven together by auto traffic continued even as the burgeoning aerospace industry led southern California into its industrial age. With abundant water from city and state water projects (which rerouted to LA not only the Owens River but the Colorado and even the Sacramento), cheap food from California's agribusiness, and plenty of affordable real estate, Los Angeles and the state grew prodigiously. In the 1960s, California became the nation's most populous state, and its top agricultural producer. Soon after, it became the nation's leading manufacturer. Californians commanded a relatively high degree of disposable income and leisure time, and they were among the nation's most urbanized people. Today, 97 percent of Californians are metropolitan residents (Nash 2006: 130; Quay 2008: 9; Walker 2008b: 85; US Department of Agriculture 2009).

Where American nature enthusiasts once had to content themselves with traveling into the countryside by train, by the 1920s increasing numbers had turned to the car. The results were dramatic. Traffic jams at the Yosemite entrance, and the explosion of motorist amenities there in other national parks, and the proliferation of roads in ever more remote places, led to

widespread concern that the "natural" qualities of parks and forests were diminishing (Belasco 1979).

So a backlash gathered against the road and the car itself. In the early 1930s, Aldo Leopold and Arthur Carhart helped craft the "Special Primitive Area" designation for select areas of national forests, in which new roads would be forbidden in order to preserve the natural setting and the "pioneer" heritage of backcountry hiking. One of the first such public areas was in today's Hoover Wilderness just east of Yosemite. To carry the fight further, Leopold joined with other prominent conservationists to create the Wilderness Society, which became the leading force for wilderness preservation in the United States (Sutter 2002; Louter 2006).

Developments of the postwar era strengthened public demand for wilderness. In many cities, and particularly in Los Angeles, mass production of suburban developments after World War II facilitated even more rapid population growth. Like their prewar predecessors, postwar suburbanites hoped for a healthy mix of nature and culture on their private lawns. But as each wave of new suburbanites watched surrounding fields and ravines fill with still newer developments, votes in favor of preserving open space and natural systems multiplied, and sympathy for Sierra Club wilderness campaigns grew (Rome 2001; Hays 1987).

Partly because of demand for postwar homebuilding, lumbering in national forests skyrocketed. Increasingly, outdoors enthusiasts bemoaned the timber-oriented policies of the US Forest Service, the agency which had exclusive control over "special primitive areas" and which all but refused to designate new ones after 1939 (Hirt 1994). After decades of struggle to expand wilderness areas, activists persuaded Congress to pass the Wilderness Act of 1964, thereby securing more "primitive" landscapes as recreational retreats and ecological reserves – as places where one could escape not only the city, but the car and its attendant roads, gas stations, traffic, noise, and exhaust (Harvey 2007).

California's ongoing love triangle between the car and the mountain perhaps helps to explain some peculiarities of its political ecology. The state that has one of the nation's most urbanized populations also has what is arguably the greatest dependence on the automobile; Californians consume more gasoline and diesel fuel than any country in the world except the United States itself (California Energy Commission 2007: 11). In the context of its wealth and auto dependence, it begins to make considerable sense that the state today has the greatest concentration of wilderness in the lower 48 states. California's abundant wealth in the postwar period, and particularly in the 1960s and 1970s, led to a vast increase in auto ownership and wilderness recreation. With the San Francisco-based Sierra Club leading the way, the state's environmentalists fought hard for new wilderness areas, and they often won. The Sierra Club was critical to remaking vast acreages in the Sierra and Inyo National Forests into the Minarets Wilderness

in 1964, and finally into the Ansel Adams Wilderness twenty years later, in 1984. That same year, in the same piece of legislation, much of the crest of the Sierra Nevada was swept into the wilderness system, and most of its lumbering, grazing, and mining was banned. Today, California has more acres of designated wilderness than any state but Alaska.[5] It has more distinctive designated wilderness areas than any state, even the Last Frontier (Beesley 2004: 199–201; US Forest Service 2009).

The shuttle will take you to the town of Mammoth Lakes – population 7,000 – where you may buy dinner and beer from people whose primary employment is providing services to tourists. For all the care you took on the mountain, what you and others do here is likely to have at least as much impact on the nature of the Ansel Adams Wilderness as anything you did there. In the last twenty-five years, the glaciers of the high Sierra have declined by 31 percent. A warming climate has seen the pika, a small mammal, move to higher elevations, and it – along with many other species – may soon be extinct (*McClatchy News* 2008b). The molecules of CO_2 in your car exhaust and pouring out the smokestacks of electrical plants that power your home will soon be multiplied many times over as Asia industrializes. The earth's heat-trapping atmosphere will continue to expand. Once you had to be in the forest to change it. Then, as markets in forest products took shape, local people would do the work of changing the forest on your behalf. Now, all you need do is start your car, or heat your home, or leave your lights on. You don't need to do any work at all to change the world in ways you never intended. Around the globe as electric lights click on at the end of the petroleum age, so the Sierra peaks grow darker.[6]

Notes

1 This essay is inspired by a wide range of readings, most of which are cited parenthetically. Of particular influence have been William Cronon (1990, 1992, 1996a), Jennifer Price (2000), Donald Worster (1990), Richard White (1990), Steven Pyne (1990), and Carolyn Merchant (1990).

2 These themes are so ubiquitous in the literature as to make simple citation impossible. But major works include Cronon (1983, 1991), Worster (1979), Flores (1991), Isenberg (2000), Brosnan (2002), White (1980), and Preston (1998).

3 General Grant National Park was absorbed into the larger Kings Canyon National Park in 1940.

4 How labor, race, and place combine in the reshaping of nature and community have inspired some remarkable new works of environmental history, and how farm workers and other laborers have sought to manipulate nature toward their own ends is a fertile field for further research. See Montrie (2008), Stewart (1996), Sackman (2005: 123–53), Kosek (2006: 103–41), and Chiang (2008).

5 California has 4,491,055 acres in 54 designated wilderness areas; Alaska has 5.8 million acres in 20 wilderness areas. See US Forest Service (2009).

6 A representative sampling of Sierra Nevada glaciers in 2004 revealed declines between 31 and 78 percent over the past century (Braasch 2009); the image of dark peaks is a reference to Orlove et al. (2008).

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Chapter Two

Air

Nancy Langston

The air within our lungs ties us to our planet's past and to its precarious future. Each molecule within the atmosphere circulates through the biosphere time and again. Those molecules cross scales, moving inwards through our lungs, and outwards into atmospheric currents that moderate the planet's temperature and protect us from the sun's radiation. Scientists with spare time on their hands have estimated that one to ten molecules breathed by the Buddha in his last breath are making their ways through our lungs right now. The carbon taken up by forests in Brazil once may have moved through your body; the carbon that threatens our shared futures on earth comes from the coal once taken up by plants in ancient forests. Across time and space, the atmosphere connects us all (Fleming et al. 2006: ix–x).

Anxiety about climate change and its potential effects on society dominates contemporary environmental concerns, but it is important to recognize that anxieties about climate are not new. For centuries, climate concerns have been part of discourses about colonization, power, and place. This essay explores the environmental history of air, using climate change as its central theme. It will focus on America, but because the atmosphere escapes national boundaries, and because political concerns about the atmosphere challenge our understanding of these boundaries, I will consider examples outside of America as well. Air encompasses many topics other than climate, of course, and this essay could equally well have focused upon pollution or energy.

The essay will begin with a brief examination of changing climates over earth's deep history, focusing on a few key episodes of abrupt change with powerful repercussions for life on earth. I will then turn to a history of scientific and public concern about climate change, asking when that concern began and what social and political forces shaped it. Finally, I will explore

climate-society interconnections, examining ways that various disciplines have perceived relationships between climate and society, and ways that these understandings may affect current debates over climate change and society. I argue that the seemingly macro scale of climate change has everything to do with the intimate scale of sense of place – and with it, issues of cultural identity that are bound up with history and policy.

Changing Climates

Quantitative understandings of past climates have grown far more detailed in the past four decades. Historians have reconstructed regional and local climates over the last several centuries from archival sources, including diaries, church records, weather station records, and ships' logs. Across longer time scales and broader spatial scales, climate scientists have developed what are called "proxy" data – indirect estimates of past climates that researchers construct from the size of growth rings on trees, the gas vapors trapped in ice cores taken in Antarctica and Greenland and the bed of the ocean, and pollen trapped in peat bogs and lake sediments. Often working collaboratively, scientists have reconstructed climate going back more than 700,000 years, and historians have pieced together remarkably detailed, local climate records for more recent centuries. Being able to reconstruct past climates doesn't necessarily mean that scientists can understand why those climates changed, much less predict how climates might continue to change. For these tasks, climatologists have developed complex computer models, particularly ones known as "general circulation models," or GCMs. Innovations in computing technology have allowed researchers to run increasingly sophisticated analyses that attempt to predict possible future climates by comparing model outputs to reconstructions of past climates (Carey, forthcoming; Weart 2008).

The more information scientists gain about past climates, the more they recognize that climate systems are extraordinarily complex. Interconnected feedback loops among the components of the atmosphere, soils, oceans, plants, and people make climates subject to abrupt, unpredictable changes. Even as climates affect life on earth, living systems affect those climates. Earth's atmosphere has been anything but stable over the history of this planet, and life on earth has been changing the atmosphere ever since single-celled organisms first evolved.

Four and a half billion years ago, the atmosphere contained very little oxygen, far too little to sustain animal life. About three billion years ago, an extraordinary innovation – photosynthesis – transformed the earth's climate. Cells adopted sunlight as an energy source, in the process fixing carbon, releasing oxygen, and creating carbohydrates. By about 2.4 billion years ago, photosynthetic bacteria were producing so much oxygen that the gas created an ozone layer, which in turn absorbed a significant amount of

ultraviolet radiation, allowing cells to leave the ocean surface and colonize land. Some of the first multi-celled organisms evolved the ability to incorporate bacteria and their photosynthetic machinery into their own cells, leading to an explosion of green plants that covered much of the planet quite quickly. The result was a series of evolving feedback relationships that dramatically transformed the earth's atmosphere and climate into a vast, interactive system tying together atmosphere, oceans, rocks, soil, bacteria, plants, and animals. Plants, in other words, through photosynthesis, helped to create the climate and atmosphere that sustains them, and indirectly, ourselves (Morton 2008: 234). The fossil fuels we burn today come from energy trapped three hundred million years ago by photosynthesis. The carbon we give off by burning those fuels is carbon taken from the ancient atmosphere. Each mile we drive, each step we take, is part of an intimate exchange with the climates and ecosystems of the past.

Abrupt climate changes over the past two hundred million years shaped the evolution of earth's plant and animal communities. When dinosaurs walked the earth two hundred million years ago, the carbon dioxide level was more than three times our current level (which is about 360 parts per million), and dense tropical forests spread across much of the globe, creating a warmer, wetter atmosphere. When plate tectonic movements churned up the earth, they altered earth's climates as well. When India collided into Asia, silicate rocks from deep within the earth's crust were exposed to the weathering forces of wind and rain. These chemical weathering processes used up much of the carbon dioxide in the atmosphere, thus cooling and drying the climate and lowering carbon dioxide levels.

As the climate dried, fires increased, which fostered the spread of grasses, which in turn increased fires – a positive feedback loop that resulted in an evolutionary advantage for grasses. In this cooler, drier, climate, open sweeps of savanna grasses were able to replace dense forests, fostering the fire cycles described in detail by the environmental historian Steven Pyne (1997, 2001). As the science writer Oliver Morton puts it, "In the burning world, just over a quarter of the land covered by vegetation is covered by forests; in the world without fire, that more than doubles" (2008: 289–90). Periodic climate changes triggered bursts of evolution and extinction in many mammals, including hominids. Mammals that relied on fruit and browse disappeared early in the transition from forest to savannah vegetation and were not replaced, while those that ate broad leaves and grasses either adapted and persisted by changing their diets to include more grass or disappeared and were replaced by immigrant species with similar diets. Mass extinctions followed abrupt climate changes, yet over evolutionary time, mass speciation led to numerous new species evolving to fill the vacant niches.

Starting about two million years ago, the modern ice age began, with continental glaciers periodically expanding over much of North America. Each glacial cycle lasted for about one hundred thousand years of ice growth,

followed by twenty thousand years of warming, with massive repercussions for individuals and community assemblages in the path of the ice. When the ice retreated, plants regained their hold on formerly glaciated landscapes, shaping climate feedback cycles that chased the ice back even faster. The most recent (but probably not the last) ice age ended abruptly some 11,500 years ago, ushering in what the archeologist Brian Fagan (2004) calls the "Long Summer" of the Holocene Era. It was during this long Holocene summer that human societies in America expanded and diversified. Climatologists once thought the Holocene's climate had been quite stable. New paleoclimate records, however, show that several widespread cooling events occurred, persisting for centuries and recurring every 1,500 to 2,000 years. Megadroughts were also common, affecting regional and continental climates. These climate shifts were often quite abrupt, occurring over just a decade. Between 7,000 to 4,000 years ago, the climate was warmer in Europe and parts of the Americas than it is now, as was also true during the Medieval warm period (AD 1000–1400). During the Little Ice Age (1400 to 1860), the climate was substantially colder in Europe and North America. George Washington and Thomas Jefferson commuted to Washington, DC by sleigh, and the Dutch skated on their canals (deMenocal 2001; Carey, forthcoming; see also Pfister 1980; Richards 2006: 56–88; Lamb 1995; Hulme 2008).

With the expansion of fossil fuel economies, humans began to have profound effects on climate, yet the relationships were rarely simple or direct. In Great Britain, the shift from wood fuels to coal increased carbon dioxide emissions into the atmosphere, but it also slowed deforestation. Without the shift to fossil fuels, fewer of Britain's forests might have survived. With new sources of energy, canals gave way to railroads, steam engines gave way to steam turbines, and eventually they all gave way to the internal combustion engines of the car, truck, and aircraft. These technological innovations unleashed stored energy into the atmosphere, releasing the buried carbon of a hundred million years in just a few centuries, changing the earth's climate cycles in ways that scientists are only beginning to comprehend (Morton 2008: 343).

History of Climate Concerns

The historian James Fleming writes:

> Climate apprehensions did not begin in 1988 or in 1957, or even in 1896. There were colonial, early modern, and even ancient precedents. From a climate discourse steeped in the tradition of literary analogy, through a long and continuing effort to establish positive climate science, we have arrived, late in the twentieth century, at a climate discourse that is again saturated with metaphor, values, and apprehensions. (Fleming 1998: 136)

As historian of science Karen Kupperman (1982) argued, European perceptions of climate shaped colonization of the New World. Fears of American summer heat and humidity and winter cold were balanced by desires for the commodities colonies might offer. Extracting those commodities required extensive monitoring of the new world's actual climates, stimulating the development of a new climate science (Kupperman 1984).

Settlers in the Americas were initially shocked by the continent's extremes of summer heat and humidity, and in the north, by its winter cold. Europeans who stayed at home thought the colonists were foolhardy, risking their health and lives in a climate unsuited to European health. Initial boosters for American colonization attempted to frame the American climate in the best possible terms, but after the cold winter of 1607–8, when so many Jamestown colonists suffered deprivation, disease, and death, the task was more difficult. Then colonists and boosters began to argue that the American climate may not be ideal in its wild state, but that it was susceptible to human intervention. In 1769, the colonist Edward Antill wrote "we are every year fast advancing to that pure and perfect temperature of air, fit for making the best and richest Wines of every kind." Many American patriots agreed, insisting that their efforts would rapidly improve the climate, and that such improvements justified the colonial project. Hugh Williamson of Harvard College wrote in 1811: "While America remained a great forest, inhabited by savages, under the constant dominion of westerly winds, there was not any climate on the eastern coast, in which we could expect a fair skin. By the progress of cultivation, the general course of the winds is materially affected … as shall prevent the tendency of complexion to the clear brunet." European thinkers such as Peter Kalm the traveler speculated that women were particularly vulnerable to the harsh American climate. Kalm believed "women reached menopause" earlier in America, and many Europeans were convinced the climate was unsuitable for white women, for it "produced degeneracy among the aborigines." Colonists were defensive about such charges, arguing that deforestation would improve the healthfulness of the country, "ventilate" the country, and thus "furnish the most salubrious and consequently valuable situation for settlers" (quoted in Fleming 1998: 23–30).

Even as many observers celebrated climate change, others worried about it. As historian Richard Grove notes in *Green Imperialism* (1995), colonial powers in the eighteenth century expressed grave concerns about Caribbean deforestation and its potential to lead to climate change, particularly to drought. Such desiccation theories led to the first forest conservation policies of many of Britain's colonial states.

Such beliefs about climate change in response to European settlement were met with some skepticism, and that skepticism helped to motivate the growth of climate science in America. The colonial physician Benjamin Rush, for example, agreed that eventually cultivation might ameliorate the

American climate, but noted that initial clearing of forests seemed to have actually made local climates less healthy. Benjamin Franklin, Thomas Jefferson, and other American intellectuals recognized that memories of climate change might be unreliable, and that detailed weather records were critical for the development of a new country under scientific principles. Physicians, natural scientists, and state agencies began to collect, chart, map, and collate weather observations, establishing the foundations of climatology (Fleming 1998).

The drive to standardize and coordinate weather observations created what historians Fleming, Jankovic, and Coen call a meteorological "synopticon." Such science evolved to serve the course of empire and corporations, enabling surveillance and control (Fleming et al. 2006). Markets and military efforts alike required detailed knowledge of climates, in order to plan agriculture, health, and military campaigns. Climate scientists played important roles in nation building. The professionalization of climate science marked important changes in American and European ideas about nature's agency, as well as about links between humans and nature.

The anthropologist Julie Cruikshank discusses Alaskan native beliefs that glaciers have willful agency, responding to human violations of a social order with disastrous consequences. She points out that, foreign as these ideas seem to modern scientists, similar beliefs about sentient landscapes were also part of Western European history. During the eighteenth and nineteenth centuries, European scientists and industrialists rejected such ideas about what Cruikshank calls "a country that listens." With the rise of systematic data collection, beliefs about nature's agency and human influence on climate change lessened, replaced by mechanical models of causation (Cruikshank 2001).

Yet beliefs about human influence on climate did not entirely vanish. In 1896, the scientist Svante Arrhenius showed that changing concentrations of carbon dioxide in the atmosphere could affect the earth's heat budget and surface temperature. Moreover, he also pointed out that such changes might trigger feedback cycles such as changes in glaciation that could lead to even greater climate changes. Three years later, the scientist Nils Ekholm expanded on Arrhenius's work by showing that coal burning could double the concentration of atmospheric carbon dioxide, leading to a change in temperature. More concerned about global cooling than about warming, Arrhenius believed that the burning of fossil fuels could help prevent another ice age (Fleming 2006). In the mid-twentieth century, the British scientist G. S. Callendar documented links among increasing temperatures, increasing emissions of carbon dioxide from human sources, and global warming. As Fleming notes, Callendar's writings "revived the theme of human agency, which had been dormant since the age of Jefferson, pointing out that humanity had sped up natural processes and had become an agent of global change by interfering with the carbon cycle" (2006: 237).

Climate and Society

In 1915 the American geographer Ellsworth Huntington argued that climate determined human "migration, racial mixture, and natural selection" (1924: 3). Above all, climate dictated how civilized a society might become. Temperate climates led to more advanced civilizations; hot climates led to savagery. Carey (forthcoming) notes that Huntington's racism and environmental determinism stigmatized climate studies, discouraging many American historians from its study.

The French historian Emmanuel Le Roy Ladurie's classic *Times of Feast, Times of Famine* (1971) showed that historians could produce climate data that were quantifiable, rigorous, and detailed enough to reconstruct fine climate shifts at local scales. Nonetheless, Ladurie doubted that these climate shifts had important consequences for human history, writing that "in the long term the human consequences of climate seem to be slight, perhaps negligible, and certainly difficult to detect" (11). In the late 1970s, scholars began to challenge Ladurie. The British historian Hubert Lamb (1995), for example, argued that while climate change might not be the major factor shaping events such as wars, climate could still profoundly affect individuals and societies.

A special 1980 issue of the *Journal of Interdisciplinary History* presented a lively debate between scholars who retained Ladurie's skepticism about climate's influence on society, and scholars who agreed with Lamb that climate was indeed a force in human history. In this volume, the historian John Post recognized that attempts to find simple correlations between low temperatures and high mortality rates or crop prices would not be particularly fruitful. European preindustrial societies were able to develop resilience to climate change, a resilience based on the diversity of crops, stored grain, expanding trade, and welfare systems (Post 1980). Such resilience meant that simple correlations would not exist; social and political factors made the relationships between culture and society far too complex to be revealed by statistical analyses. David Fischer (1980) begged fellow historians to take climate seriously nonetheless – not as the only force determining European politics, but as one critical factor among many. Fischer acknowledged that "climate and culture have not been connected through history in one simple, universal causal relationship of the sort which so many scholars have tried in vain to discover." Instead, climate change might lead to "crises of adaptation" during times of rapid or particularly variable climate change (828).

Since the 1980s, scholars have attempted to explore not just direct effects – did climate change cause economic or demographic chaos? – but indirect effects. Some of the most fascinating work has been done by anthropologists and archeologists, who examine the ways that changing climates might influence social networks that in turn influence resilience. The archeologist Brian

Fagan's research on varied European responses to the Little Ice Age examines some of the ways that social institutions, technology, power, perceptions, and culture influenced the different choices that societies made. As Fagan writes: "Climate is, and always has been, a powerful catalyst in human history, a pebble cast in a pond whose ripples triggered all manner of economic, political and social changes" (2004: xiv).

The Little Ice Age's effects on the Norse in Greenland provides an important case study of the complexities of climate and society interactions. In the 1990s, Thomas McGovern and his colleague Astrid Ogilvie had argued that the "impact of climate change, the failure of their pastoral subsistence base, and an inability to adapt were key factors in the end of Norse settlement in Greenland" (Dugmore et al. 2007; see also McGovern et al. 1988; McGovern 1994, 2000; Ogilvie and McGovern 2000). McGovern's thesis was popularized by Jared Diamond, who argued in a *New York Times* op-ed piece that the critical factor leading to the Norse's lack of resilience to climate change was an

> unwillingness to re-examine long-held core values, when conditions change and those values no longer make sense. The medieval Greenland Norse lacked such a willingness: they continued to view themselves as transplanted Norwegian pastoralists, and to despise the Inuit as pagan hunters, even after Norway stopped sending trading ships and the climate had grown too cold for a pastoral existence. They died off as a result, leaving Greenland to the Inuit. (Diamond 2005)

In the last several years, McGovern and his colleagues have revised their earlier views of Greenland Norse responses to climate change. In an important 2007 paper, the archeologists Andrew J. Dugmore, Christian Keller, and McGovern argued that economic changes and patterns of trade, not climate alone, could have marginalized the Norse Greenland settlements, leading to their abandonment. The authors explore the factors creating resilience to environmental change among the Norse, concluding that the social and economic elements that made the Greenland Norse viable for most of the colony's existence were precisely the same factors that led to their collapse during the Little Ice Age.

Rather than being victims of "hide-bound thinking," the Norse developed complex subsistence networks that were excellent at providing resilience during normal environmental fluctuations. Exploiting a wide range of food resources buffered the Norse against normal food shortages, but the system required a great deal of collaboration between households. Such an integrated system, with its ability to cope with small-scale variation, may have been overwhelmed when climate change began to unravel the links between communities (see also Haberle and Lusty 2000; Wigley et al. 1981). In other words, the Greenland Norse might not have collapsed

because their population was too high for the available resources, but rather because their population dropped too low, unraveling the cooperative social structures that they relied upon to survive times of environmental fluctuation. The archeologists are not arguing that climate change was unimportant for the Norse. Rather, social, political, and economic structures mediated the Norse's resilience to climate change.

The Americas

Archeologists and paleoecologists have recently collaborated on studies of the ways cultures in the Americas responded to climate change. As the paleoecologist Peter DeMenocel writes in *Science* (2001), comparing the archeological record of cultural change with detailed Holocene paleoclimate records allows scholars to explore how complex societies responded to climate changes. During the late Holocene droughts, some empires collapsed, while others adapted. Showing that societal changes happen at about the same time that climate changes doesn't necessarily prove that one caused the other, but such correlations suggest avenues for future, more detailed research (Diaz and Stahle 2007).

Researchers have observed that prolonged drought, rather than temperature changes alone, appears to be the key climate factor affecting preindustrial American societies. Megadroughts, or extreme droughts leading to major ecological changes, have been a frequent force shaping environments in the Americas since the retreat of the glaciers. Tree-ring chronologies and lake sediment records from across the United States have helped researchers reconstruct summer droughts extending back to AD 1200. Megadroughts were extremely intense, persisted for decades, and recurred roughly once or twice every 500 years. In California before 1350, even longer, more intense droughts appear in the record.

The Classic Maya in Mexico and Central America 1,200 years ago, the Moche in Peru 1,500 years ago, and the Tiwanaku in Bolivia and Peru 1,000 years ago, were all affected by megadroughts, but they responded in quite different ways. Some societies changed subsistence levels, abandoned cities, and simplified systems of supply and production. Other societies developed more complex political structures to control shrinking water supplies. DeMenocel notes that these events are particularly relevant to modern concerns over climate change because they show both the resilience and vulnerability of complex civilizations to environmental variability.

In a special 2007 issue of the journal *Climatic Change*, scholars from history, paleoecology, and the earth sciences presented research on the potential links between climate change and societal change in the Americas. Larry Benson, Kenneth Petersen, and John Stein investigated the interrelationships among maize cultivation, drought, and settlement in the Chaco

Canyon region of New Mexico. They found that drought had indeed contributed to abandonment and migration. Cultural factors also played a key role, however, because even during a severe drought, some areas would have been viable for growing enough maize to support small populations. Drought alone did not determine migrations, but rather intensified the effects of deforestation, warfare, and religious turmoil (Benson et al. 2007). D. A. Hodell, M. Brenner, and J. H. Curtis explored associations between droughts in the Yucatan Peninsula and several critical Mayan cultural markers over a thousand year period. Their work suggests that a major drought occurred near the end of the Late Preclassic period of Mayan history, coinciding with an increase in deforestation for agriculture. The shift in climate may in turn have shaped Mayan political development, as irrigation became increasingly important for agriculture during the drought. Control of water resources, in turn, contributed to changes in political power during the Classic period (Hodell et al. 2007). Archeologists studying Peru's Moche people in the seventh and eighth centuries collaborated with climatologists studying ice cores in the Andes. They found that prolonged drought and El Niño-Southern Oscillation events occurred just when the Moche people increased human sacrifices, and then abandoned their complex coastal settlements. The fine detail available in the new climate reconstructions helped archeologists make sense of the Moche people's fate (Carey, forthcoming).

The sixteenth-century megadrought across North America may have been one important factor affecting English and Spanish colonization in the New World. Drought, clearly, was not the cause of the demographic collapse of American Indian peoples following colonization. But it may have intensified the epidemiological tragedies of European settlement in the New World. Similarly, the collapse of bison populations on the Great Plains after the Civil War was influenced by both climate change and society. New technologies such as guns and railroads, new economic opportunities, and new political pressures all shaped the human decisions that led to intense market hunting of the bison. Drought, however, led to the bison's lack of resiliency in the face of this intense human predation (Stahle et al. 2007). Decades later on the Great Plains, another ecological catastrophe followed the onset of drought, and this too was shaped by interrelationships between climate and society. As Donald Worster argues in his classic *Dust Bowl* (1979), cultural factors shaped the decisions made by farmers on the southern plains, and those decisions led to greatly heightened vulnerability to drought. Culture, not climate change alone, led to the Dust Bowl.

Scholars in political ecology have recently stressed the ways that power relationships influence the effects of climate change on people. For example, recent research on El Niño-Southern Oscillation (ENSO) events has shown that ENSOs are indeed correlated with famines, particularly in parts of Brazil, as earlier scholars had argued. In *Late Victorian Holocausts* (2001),

the political ecologist Mike Davis demonstrates that the El Niño events did not *cause* the famines; political decisions led to famines. Climate change acted as a trigger, but the structure of the global economy and political decisions led to massive starvation. Discrepancies in power determine access to resources, shaping why some people survive and others die when the climate changes.

Recent Concerns about Global Warming

In February 2007 the Intergovernmental Panel on Climate Change (IPCC) released its report, "Climate Change 2007: The Physical Science Basis." Established by the United Nations to provide decision-makers with an objective source of information about climate change, IPCC reports attempt to find consensus among climate scientists (Solomon et al. 2007). The 2007 IPCC report opened with the statement that the burning of fossil fuels is "very likely" to be responsible for the current climate change trend, an assessment that indicated "more than 90 percent" certainty. The IPCC reports highlighted the overwhelming evidence that the climate was changing, and humans were substantially contributing to those changes.

As soon as the 2007 IPCC reports were released, the denial industry swung into action, offering $10,000 to scientists willing to attack the reports. The historian of science Naomi Oreskes (2007) shows that since the late 1980s, global warming deniers have coordinated a campaign to create doubt and paralysis around climate change. The deniers use many tools to make their case, including advertisements, op-ed pieces, lobbying, and commissioned reports from the few scientists who agree with them. First, they argue that the world isn't warming. Second, they argue that even though the world really isn't warming, any warming that does seem to be happening is entirely natural. And finally, they argue that the human impacts of any warming that did happen would benefit people (at least those in the temperate zones). Oreskes' work shows just how powerful this well-funded campaign has been, particularly in dismantling legislation, eviscerating government reports on climate change, and creating a sense among the public that scientific consensus is lacking.

Abundant parallels exist between the global warming skeptics and an earlier generation's tobacco lobbyists. Not only are the strategies the same; the people, funding sources, hired consultants, and media firms are often the same as well. Oreskes argues that one key political tactic involves manufacturing a fake debate to dispute emerging scientific consensus. The same thing has happened with the consensus that sulfur and nitrogen emissions cause acid rain, the consensus that chlorofluorocarbons cause the hole in the ozone layer, the consensus that cigarette smoking causes cancer, and the emerging consensus on environmental carcinogens. These efforts follow a

similar pattern. First, denialists argue that the science is uncertain. Second, they argue that concerns are exaggerated and the true risks are small, particularly compared to natural risks already existing in the environment. Third, they state that technology will solve the problem, so there's no need for government interference. The campaigns against global warming and public health regulation involve the same institutions, run by the same people, funded by the same sources (Oreskes 2007; see also Begley 2007).

As an earlier section of this essay detailed, concerns about climate change have had a long history. These anxieties had intensified in the 1950s, when both the scientific and the popular press had expressed concerns about warming temperatures, rising sea levels, and their possible effects on agriculture and cities. What the historian of physics Spencer Weart calls "the discovery of global warming" in the twentieth century represented a key shift in post-Enlightenment scientists' views of the earth. For generations, climate scientists had believed that the climate system was a kind of machine, one that we could eventually understand and control if only we developed powerful enough tools. Scientists believed climate changed, but only slowly, driven by forces external to human influence. But as Weart (2008) demonstrates, by the end of the twentieth century, new understandings of climate had emerged. As a physicist, Weart focuses on the efforts of physical scientists to comprehend climate change, paying particular attention to the emergence of modeling technologies. Weart tends to overlook, however, the work of biologists and climate historians who have long explored the roles of biological systems in climate feedbacks (Cushman 2005).

Weart argues that increasingly complex climate models – particularly the GCMs – have been critical in helping scientists understand the unpredictable feedbacks from climate systems. Yet such models are not simple or direct representations of nature; they are filled with assumptions and uncertainties. Models that incorporate human dimensions, for example, often tend to take for granted a set of external factors such trade rules, intervention possibilities, and human behavior, often without acknowledging that these social factors are historically contingent rather than fixed constants (Rayner 2003: 282–3). When policymakers extend these models into social and cultural realms, model assumptions can lead to disastrous oversimplifications.

For example, consider the 1995 IPCC report. This report considers human dimensions of climate change, addressing adaptation responses, decision-making frameworks, equity, and economics. Yet adaptation considerations focus almost entirely on national-level decisions, even though the anthropologists J. McIntosh and colleagues argue that most human adaptation will come at the local or regional scale. Often, these environmental responses are based on local knowledge which remains hidden from national governments (McIntosh et al. 2000: 3–4). People survive by what the anthropologists call "networks of social relations." The large-scale technological problem-solving recommended by model outputs can disrupt such social networks, leaving people vulnerable. In *Intimate Universality* (2006),

James Fleming and colleagues note that climate modelers have grown increasingly enamored of engineering efforts to manage and control human impacts on the climate. The history of intentional climate engineering is riddled with unintended consequences and technological hubris, making Fleming quite wary of such efforts.

Historians rarely believe history can be prescriptive for policy. Yet several themes do emerge from fine-grained studies of historical responses to climate change. Societies use their past experiences of environments – their shared environmental histories – as guides to the future. Environmental memories help people develop ways of living in place, by teaching people how to monitor land use, population levels, and economic activities. But at times of abrupt, unpredictable change, shared environmental histories may become deceptive. Historians can examine the ways people use, and misuse, environmental histories when they are trying to adapt to unpredictable change (Dugmore et al. 2007; McIntosh et al. 2000).

A second central theme is that economic and political structures shape a society's resiliency to climate change. Economies based on exploitation of a wide range of resources may be less vulnerable to gradual climate change because people can shift resources when the climate shifts, but as the Norse example shows, those same economies may become more vulnerable during times of abrupt change. Economies based on commercial exploitation of fewer resources may connect dispersed communities, but that can create increased vulnerability during climate changes, if remote markets upon which a community has come to depend are affected (Dugmore et al. 2007).

A third key theme is that scale matters. On an evolutionary time scale, extinction of species is a perfectly natural process. Species assemblages do continually change, and as the earth's climate warmed at the end of the last ice age, numerous species migrated north, colonizing landscapes freed from the ice. Some species went extinct, unable to adapt to changing environments; other species evolved new forms. The critical difference today is one of scale. These changes now are happening at what the ecologist Sarah Wright calls "break-neck speed. They are slow on our human time scale, but on Earth's time scale they are as sudden and violent … leaving little time for species to adapt and to maintain their relationships with one another" (2007: 16).

Scale is likewise a critical factor shaping human responses. When the Greenland Norse failed to adapt to climate change, commercial changes in Europe, rather than decisions the Norse made in Greenland, may well have been a key driver that created heightened sensitivity to climate change. Donald Worster argues that many modern, complex societies have learned to adapt to natural variation by concentrating "enough power and wealth at the center in order to overcome most natural vicissitudes. They learn how to create stability out of chaos by sending out money regularly to compensate for local loss" (1999: 68–9). While this helps minimize vulnerability to small fluctuations, such strategies may increase vulnerability to large-scale, abrupt environmental change. Historians can work with

anthropologists to learn which political and social structures have led to more resiliency in the face of abrupt change.

The importance of narratives emerges as another key theme for historians to bring to the conversations about global warming. The anthropologists Sarah Strauss and Ben Orlove, after observing meetings of the UN Framework Convention on Climate Change and the Kyoto Protocol teams, noted that while the teams hoped to alter human actions, their major activities to date had actually been an effort "to construct a shared narrative, a verbal framework that links specific actors, institutions, and political entities" (Strauss and Orlove 2003: 11). Similarly, Patricia Romero-Lankao, a sociologist working with the IPCC teams, stresses the importance of narratives in interpreting the causes of climate change. Narratives are central to the work of environmental historians (Cronon 1992), and our training can help scientists understand the ways competing narratives influence climate change – both the causes and the responses (or lack of responses to evidence of global warming).

Narratives are a way of understanding cause and effect relationships, which help communities construct their perceptions of agency and ethical responsibility. The anthropologist Julie Cruikshank argues that with concerns about global warming, westerners are returning to a sense that humans are engaged in intricate relationships with climate. She locates similar patterns in traditional indigenous narratives. Cruikshank writes: "Narratives underscore the social content of the world and the importance of taking personal and collective responsibility for changes in that world.... In the past, then, things and people were always entangled. In the future, they will be more entangled than ever" (2001: 391).

What's threatened by global warming is not the earth but ourselves. What won't persist is our sense of place and time – our own human histories on this earth. It's the places we love, the relationships we cherish with the species that make their homes in those particular places, that help to make us human. As Wallace Stegner (1992) reminded us, we see the world through our own human eyes, and it's that human vision of the world that is under threat. John Burns, a naturalist in the northwoods of Wisconsin, writes in *Paradise Lost: Climate Change in the North Woods*:

> The climate change scenarios currently projected for Wisconsin at the end of this century utterly boggle the mind. Conservative middle-ground scenarios show Wisconsin becoming the climatological equivalent of Arkansas, whileh Madison's climate will morph into a twin of Oklahoma City.... Meanwhile, the North Woods may gradually transition into an oak savannah. That's so difficult to imagine, so close to what we can only think of as science fiction, that all of us have a great deal of trouble even conceiving of the possibility. Yet there it is, looming on the horizon like the eerie bruised sky that so often precedes a tornado. But how does one address the coming of a tornado, much less the coming of a global environmental upheaval? (Burns 2007: 3)

The potential loss is indeed difficult to comprehend, and the perspectives that historians can bring to the discussion are critical. Who wins, and who loses, when the climate changes? Who has the power to define the terms of the debates over global warming? How can humanistic perspectives help us understand people, places, and landscapes through time?

In a seminar this fall on the past and future of the Great Lakes forests, we closed with a discussion of global warming. One of our seminar members was a forest planner from the Wisconsin Department of Natural Resources, whose job involves trying to plan future forest conditions for the state. She expressed her frustration at how difficult it was to manage forests given the growing uncertainties of global warming. Our forest plans are based on history, she pointed out. Desired future conditions, allowable cuts, silvicultural treatments – they're all based on trying to restore forest types from the past, forest types that we now know are ghosts. They'll never exist again. But if we give up on trying to restore historic conditions, then how can we manage forests? Ecologists tell us to focus on restoring processes, not historic patterns, but global warming is also changing those ecological processes. Are we supposed to give up on the hemlock, the white pines, on Wisconsin's forests altogether?

Ecological historians feel as if they are watching the collapse of ecosystems they spent their careers immersed in learning about, and then in learning to love. Things that to the rest of us seem trivial, or even sweet – a family camping trip with a load of firewood from home, a fishing trip with a can of earthworms for bait – spell disaster to them, because they understand the ecological history of abrupt community collapse. They know that a stick of firewood may well contain several emerald ash borers, and if just a few of those insects get out of the firewood and into the surrounding forest, that could mean 95 percent of our ash trees are dead within five years as the climate warms and trees lose resistance to insect attacks. So much for a key component of the forest (and so much for the cultural associations local Menominee women have with ash trees, which are important for basket making.) The ecologists know that wiggling worms don't all get impaled on fishing hooks. A few squirm free, and havoc results in the hemlock forests, because non-native earthworms transform nitrogen cycling on the forest floor. If you walk with an ecologist in Sylvania Wilderness Area, essentially the last old growth hemlock forest left in the Great Lakes states, you can trace what the ecologists call a "killing wave" of earthworm activity. The combined stresses of insects, invasive species, and climate change may mean that the forests we now know and love are unlikely to persist and unlikely to return, at least within the historic time scales that matter to people.

What then can environmental historians do that scientists and social historians might have a hard time doing, in the face of rapid, irreversible ecological and social transformations? I hope we can do some translation: speak to the ecologists of cultural changes, and speak to other historians of ecological changes, in a language that helps both communities understand that

complex relationships are being unraveled. Global warming challenges us to reexamine what history means to us, when we are changing the earth so quickly that our shared environmental histories are vanishing, possibly never to be witnessed again. Without reference to an ecological past that may no longer resemble our ecological futures, how will we learn to live responsibly in place?

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Chapter Three

The Living Earth: History, Darwinian Evolution, and the Grasslands

Donald Worster

> *What we are all able to do is to realize this gap [between nature and culture], to be impressed by its abyss with reverence and humility, and to go our paths on its respective sides without self-deluding attempts to bridge the eternal chasm, or empty boasts that its span is achieved.*
>
> (A. L. Kroeber 1917)

Early in 1834 the young naturalist Charles Darwin left his ship's berth aboard the *HMS Beagle* to venture across the grassy plains of Patagonia. The plains, or at least what was buried in its soil, left an impact on his mind that was almost as powerful as the impact of the more famous Galápagos Islands. Despite their dusty monotony, the plains offered him vivid glimpses into the deep, unknown history of life on earth – vestiges of creatures now extinct and ways of life now vanished.

At Port St. Julian, where grassland meets ocean, he discovered the fossilized remains of a large mammal. It was the first time in his voyage of exploration that he had come across such ancient bones. They turned out to be those of an extinct giant llama, not the mastodon he supposed, but unmistakably they spoke of "the changed state of the American continent," where species succeeded species, throwing "more light on the appearance of organic beings on our earth, and their disappearance from it, than any other class of facts." Patagonia forced Darwin to confront the power of nature, the mutability of organisms, and the ecological revolutions that had occurred in the past (Darwin 1860: 74, 500–1; Worster 1994: 122–4).

Born two hundred years ago, Darwin is surely the most influential scientist in modern times, not only as the founder of evolutionary biology and ecology but also as the inspirer of anthropologists, economists,

psychologists, and philosophers. Despite the stubborn resistance of many religious people, his science has profoundly reshaped our modern worldview – indeed, evolution is its very foundation. His book *On the Origin of Species*, published one hundred and fifty years ago, argued that life has evolved by wholly natural processes, without any supernatural design or intervention. The nature of every organism, he pointed out, varies in some degree or trait from all other organisms, and that variability is basic to evolution. In a world of limited resources, variation must compete against variation, sometimes in an intense struggle for existence, and those individuals that survive and leave offspring give shape to the future. They provide the next generation of organisms who, in turn, may leave heirs of their own. The less successful – those less fitted to their environment – may eventually vanish into the earth, unless conditions suddenly change in their favor.

Today, we know far more about the history of life than Darwin did, although the main outlines of his theory of evolution through natural selection have held up amazingly well. Since the discovery of the structure of DNA in 1953, scientists have learned how to track natural selection and other forms of evolution back in time millions of years. Through the science of ecology we know a lot more about how complex ecosystems evolve, often in response to large-scale and sometimes sudden and violent environmental disturbance by shifting climatic regimes, drifting continents, and crashing meteors. And not least in significance, we have directly observed what Darwin did not actually see in Patagonia or his native England: evolution actually taking place, not in some long ago period and at imperceptible rates, but in the present at a measurable pace (Weiner 1994: 6–9).

We also know much more than Darwin did about how *humans* have evolved in mind and body, and we are beginning to establish scientifically how much of our behavior is rooted in nature, proving that we are not solely the product of society or culture. The evolutionary biologist Edward O. Wilson suggested in 1975 that our behavior has much in common with other species – a view that led to much controversy and even acts of intimidation. But that suggestion no longer meets fierce resistance when it is not reduced to a simple genetic determinism. The study of evolutionary psychology is making significant gains toward explaining how the brain has evolved and how it shapes what we see and how we behave. Today, more and more social scientists, following the lead of the natural scientists, are eagerly pursuing neo-Darwinian theories at the level of the individual mind, group interaction, and even religion and culture.

We humans, those scientists tell us, are not born into this world with minds like blank pages, waiting to be written on by others – family, church,

politicians, advertising executives. We emerged as a species a half-million years ago, during the Pleistocene, and ever since we have followed what Wilson calls "epigenetic rules," which he defines as "innate operations in the sensory system of the brain. These are rules of thumb that allow organisms to find rapid solutions to problems encountered in the environment. They predispose individuals to view the world in a particular innate way and automatically to make certain choices as opposed to others" (1998: 210). The list of those inherited predispositions is still speculative and much disputed, but they may include the mother-child bond, a sense of fairness and justice, loyalty to one's tribe, the avoidance of incest, bonding with other forms of life, and a propensity for religion – all possible ways in which nature melds the diversities of people into one species.

This is not to say that inborn genetic drivers explain every bit of human behavior. In many species, evolution can be cultural as well as biological, as Darwin himself realized and modern scientists agree. Cultural variants – or what some call "memes," the cultural counterpart to genes (Dawkins 1989: 192–201) – pass from individual to individual or from group to group by learning and imitation rather than by genetic transmission. Particularly in the case of *Homo sapiens*, the processes of cultural evolution deserve at least an equal place alongside those of biological evolution.

If one means by culture simply "learned behavior," then apes and whales, ravens and finches, are all cultural animals. But clearly humans have carried cultural evolution beyond their fellow creatures. With us, "culture is best seen not as complexes of concrete behavior patterns – customs, usages, traditions, habit clusters … but as a set of control mechanisms – plans, recipes, rules, instructions (what computer engineers call 'programs') – for the governing of behavior" (Geertz 1973: 44). Thus, humans may act in accordance with epigenetic rules but also in accordance with the cultural rules that societies invent, propagate, sometimes vote on, and sometimes impose and try to enforce. Those man-made control mechanisms can be a powerful means of survival – more rapid and flexible in their responsiveness to environmental change than genetic variations alone.

Human evolutionary theory thus rests on the concept of a "dual inheritance," in which genes and culture both have determinative powers and co-evolve. Cultural change is distinguishable from genetic change and they follow an independent path, but no "eternal chasm," as the anthropologist A. L. Kroeber (1917) would have it, separates them. Over time, genes and cultures interact repeatedly, constraining or reinforcing each other, forming a "dual inheritance" that shapes the life ways of the human organism (Durham 1991: 159–61; Richerson and Boyd 1978).

If ever there was a scientific theory that purports to explain change over time, it is evolution through natural selection and its corollary, humankind's

dual inheritance. Yet the guild of historians who professes to study that process of change has been conspicuously resistant to evolutionary theory. Why, from the publication of Darwin's *Origin of Species* down to the present, has that been generally so? Why have historians insisted on maintaining and policing a rigid boundary separating culture from nature? What are the possibilities for overcoming this persistent chasm?

Perhaps the biggest reason why historians have resisted the evolutionary worldview is that they still cling to an ancient Judeo-Christian moral belief that humans stand completely separate from and above the rest of nature. Like anti-Darwinian creationists, they do not like to think of themselves or their subjects as animals. In their view all humans, whether corporate executives or hunter-gatherers, are a "special creation," uniquely possessing a soul, consciousness, ethics, or language (as if we were the only species that did so). "Special creationism," which is just another way of saying "exceptionalism," applied in this case not to nations but to species, is an antiquated way of thinking that protects itself against the sciences by defending a "humanistic" outlook, ignoring the impressive advances those scientists have made in redefining what it means to be human and reestablishing our link to other species.

Few historians, it would appear from their bibliographies, have read much evolutionary science, and perhaps as a result they may have acquired distorted ideas of what it might lead to in moral and political values. They associate Darwin's legacy with superficial and sometimes horrific efforts to argue that cutthroat economics must be allowed as the law of nature or that "unfit" people should be sterilized or exterminated. Taking up Darwin, however, does not mean endorsing the views of either the political right or left or advocating repulsive notions of innate racial superiority or controlled breeding. Modern evolutionary theory does not teach us that nations should let their poor starve to death or force them to undergo sterilization. Those ideas appeared long before Darwin and owe little to his or other scientists' ideas about how change over time occurs.

Historians sometimes justify their resistance to evolutionary science by saying that they are opposed to all "laws" and all "theories," that they prefer a less "deterministic" approach that gives weight to the unique, contingent, and particular. Evolutionary theory, however, is based precisely on understanding how contingency rules in nature and how unique and particular circumstances influence the direction of evolution (Gould 1989: 285–91). If it is *theorizing* about such qualities that is objectionable, then historians should admit that in fact they have always followed theories and could hardly do otherwise. Albert Einstein once noted, "it is the theory which decides what we can observe" (1972: 63). Like scientists, historians have always adopted theories in the form of broad explanatory ideas about politics, economics, race, class, gender, nature, and technology, and those theories have shaped their observations. But when it comes to the natural sciences, historians are still trying to close the theoretical gates.

The good news is that the field of environmental history has emerged to contest the old dualism and to broaden our view of the changes that have occurred in human life. Environmental historians focus specifically on the relations that people (defined as individuals, societies, or cultures) have carried on with the rest of nature. They take for granted that humans are part of the natural world and that historians should make history more truthful by placing human life in that broader context. They have repeatedly criticized bifurcated views ("man vs. nature"), whether derived from Judeo-Christianity or from Cartesian philosophy, that pose a rigid moral separation and lead to psychological alienation. Compared to their colleagues in social or political history, environmental historians tend to read scientific books and articles on evolution and ecology and seem willing to bridge the gap separating them from the natural sciences.

So far, however, environmental historians have focused mainly on the *human impact on nature* – i.e., on man-made changes in the land, exploitation of natural resources, the wilderness giving way to cities – and on the rise of conservation and environmental reform movements. Some have written out of a sense of loss, as witnesses to a wild nature disappearing under the advancing tread of conquering machines. Others, in contrast, have tended to accept this transformation as part of human progress; they would bridge the chasm with roads and bulldozers. Environmental historians have not agreed, in other words, on whether the modern transformation of the natural world has been good or bad. Should environmental change be judged by what was good for *people*, in the sense of whether that change promoted economic growth, social justice, or improved health and nutrition? Or should historians judge the past by less anthropocentric standards, i.e., what was good for other species or ecosystems? However one answers those questions, the new historians have seen their role not only as reporters of how humans have transformed nature but also as advocates for making that change more just or ecologically sustainable in the future.

This tendency among environmental historians to see the past through the lens of various political reform movements explains part of their negative reaction to the recent history-writing efforts of Jared Diamond. An evolutionary biologist and physiologist, Diamond tries to bridge the chasm between culture and nature in new ways. His Pulitzer Prize-winning book *Guns, Germs, and Steel* (1997) attempts to explain, through ecology and biogeography, why there is inequality in the world and why wealth and power have become distributed as they are, with Europeans and their offspring nations – especially the United States – dominating the globe. His answer to that big question is that, going back 11,000 years ago, different natural environments allowed different rates of economic development. Briefly, nature in the Middle East was blessed with an unusually large number of plants and animals that showed a high potential for domestication, while the geography of Eurasia allowed for quick and easy dispersion to Europe.

With that advantage the Europeans ended up more technologically advanced than anybody else. Only much later did people in Africa or the Americas invent their own agriculture, leaving them far behind in the competitive race. "Geographic variation in whether, or when, the peoples of different continents became farmers and herders," writes Diamond, "explains to a large extent their subsequent contrasting fates" (86). He denies any significant genetic differences among humans, arguing instead that nature decided the pace of cultural evolution and the unequal distribution of wealth and power.

Whatever the merits of his overall argument, Diamond has not explained satisfactorily why two closely related cultural variants, capitalism and industrialism, first arose in Europe but not in China, although both regions were parts of the same Eurasian land mass. A complete answer to that question would lead to a more complicated story than who first domesticated crops or livestock. But for many critics, Diamond's biggest error lies not in explaining the present by ancient "ultimate" causes, but in seeming to make inequality a permanent and impersonal condition. If inequality is so ancient in origin and so rooted in biogeography, then how could anyone really criticize the Europeans for their rise to empire? Or how could any poor nation expect to escape their inferior position? Capitalism, industrialism, colonialism, and imperialism all seem, in Diamond's approach, the irresistible work of natural selection – a conclusion that historians who have devoted so many volumes to attacking those Western evils cannot accept. A similar reaction greeted the book on which Diamond heavily drew: Alfred Crosby's *Ecological Imperialism* (1986), which argued that Europe's ascension to global power was not due to innate superiority but rather to unwitting non-human allies, including smallpox, pigs, and weeds that invaded with the Europeans and gave them victory.

Another strategy for merging evolutionary science and environmental history comes from the scientifically trained scholar Edmund Russell, who is less controversial than Diamond or Crosby because he emphasizes the more familiar and popular theme of how culture changes the environment. Russell's essay "Evolutionary History" (2003; updated and expanded as chapter 18 in this volume) begins with the fact that evolution can occur through domestic or artificial selection, like the breeding of dogs or cattle, as well as through natural selection. Darwin, he reminds us, drew inspiration from plant and animal breeders to argue that nature does for the whole earth what the cattle breeder does for the farm. Russell turns Darwin's reasoning around to show that what the cattle breeder does for the farm, humans are doing for the whole earth – guiding evolution to suit their needs. The chasm between what is natural and what is artificial vanishes, as the whole environment becomes increasingly a product of human intervention.

But there are a few anomalies in this picture of an increasingly man-made planet: those organisms that evolve in response to human presence but

without any human control. Insects, for example, have evolved rapidly to withstand the barrage of modern pesticides; deadly germs have evolved even in sterilized hospital rooms, defying all efforts to stamp them out; and mountain lions have learned how to wait for new kinds of prey along the jogger's trail. This is not natural selection as Darwin understood it, nor is it similar to deliberate breeding or hybridization, which is to say, artificial selection. An insecticide-resistant mosquito or herbicide-resistant thistle is not the product of human intention in the way that a show dog or a book of poetry is. In such cases organisms have self-evolved in an environment that humans have created but do not truly manage; those organisms elude control and often pose a nuisance or a danger to their hosts.

These provocative efforts by Diamond, Crosby, and Russell do not exhaust the possibilities of merging history and evolutionary science. Another strategy would be to approach cultures, not as completely independent, self-determined phenomena, but as strategies that people develop in order to adjust to the natural world and exploit its resources. Instead of bridging the nature-culture chasm by making nature a subset of culture, in other words, historians might begin to approach culture as a subset of nature. We can think of this approach, following the lead of biologists, as redefining culture as a mental response to opportunities or pressures posed by the natural environment. In other words, culture can be defined as a form of "adaptation."

The word "adaptation" is not unfamiliar to historians any more than it is to biologists. Scholars often talk of cultures clashing and adapting to one other, mixing and merging through trade, immigration, and mass communications; or they talk about societies adapting to new technologies like the automobile or computer. More rarely, however, do they talk about people adapting through cultural change to their natural environments, not only in so-called primitive societies but also in the most technologically advanced. Historians have paid insufficient attention to this view of culture as an adaptive strategy – as a response to the capacity of soils to grow crops, the supply of water that can sustain life, the vicissitudes of climate, the limits to growth and material consumption in a finite landscape.

The *Oxford Dictionary of Science* defines adaptation as "any change in the structure or functioning of an organism that makes it better suited to its environment" (1999: 13). After the word "organism," we should add the phrase "or society or culture." In the case of biological organisms, adaptation occurs whenever a new shape of wing or beak allows a bird to fly better or crack more seeds than its rivals. Such physiological change does not, of course, depend on intention or will power; it proceeds blindly to fit organisms better to their environments, enabling them to use resources more efficiently. In the case of artifact-making organisms – the beaver building a lodge or the heron a nest – adaptation can mean modifying the environment to improve the organism's chance of survival and those of her offspring.

In the case of culture-making organisms like humans, adaptation can involve acquiring new information, learning new rules, and altering one's behavior. Communities can develop strategies to meet changes in climate, energy sources, or diseases they confront. They can discover, through thoughtful observation, how to avoid degrading or depleting the environment on which they depend. They can learn (or they can fail to learn) how to become more resilient in the face of such change.

Pre-Darwinian naturalists like Bishop William Paley, author of the 1802 religious classic *Natural Theology*, pointed to the marvelous fitness of plants and animals to their environments, showing the handiwork of a rational God. They assumed that everything in the world must be perfectly organized and perfectly adapted to its assigned place. But Darwin's theory of evolution overturned that assumption and its theological lesson by drawing attention to the reality and frequency of *maladaptation*. After him, the science of adaptation could no longer claim to reveal a perfect world in which everything works for the best or where nature always achieves the ideal solution to a problem. Nature cobbles together solutions from whatever material is available. When those solutions fail, the costs of maladaptation can be severe. Contrary to modern critics like Stephen Jay Gould and Richard Lewontin, the so-called "adaptationist program" in modern biology – which acknowledges failure, impoverishment, dysfunction, and death as much as fitness, functionality, and good health – does not teach that we live in the best of all conceivable worlds (Gould and Lewontin 1979; Mayr 1983). This is certainly the conclusion we are led to when we examine adaptation in the case of human cultures.

No society, whether the mammoth hunters in ancient Nebraska or the commuters in Tokyo's suburbs, has ever reached a state of perfect fitness to its environment. Yet some societies have managed to sustain themselves far longer than others. Historians should ask why that was so, why some endured over long stretches of time while others did not, why some societies created strong environmental rules while others did not, and how those rules changed as conditions changed. Historians, in other words, should join evolutionists to ask what both adaptation and maladaptation look like. They should investigate how societies can be trapped by a maladapted cultural inheritance and even become extinct, leaving their remains behind in libraries and museums.

As young Darwin discovered in South America, the grasslands are a wonderfully legible place to watch evolution, adaptation, and maladaptation at work. The North America grasslands, too, have furnished an instructive laboratory. As recently as the nineteenth century, those ecosystems stretched across almost a billion acres, covering most of a territory now divided into more than twenty states and provinces. At their maximum extent the North American grasslands swept from the Texas panhandle into Saskatchewan

and extended westward from Ohio and Indiana to the Rockies, with significant outliers in the intermountain West. Grasses dominated that vast expanse because the environment was neither consistently humid nor arid, because droughts were frequent and temperatures fluctuated dramatically.

The grasses survived by investing most of their growth underground in elaborate root structures that captured the moisture and held the soil in place. They never achieved a static equilibrium but spread and shrank back, died and recovered. Today, because of human intervention, they are at a historic low point: the tall-grass prairies of the Midwest have diminished to a single-digit percent of their circa AD 1800 extent, replaced by corn and soybeans, while the native short-grasses of the High Plains have lost more than a third of their range.

In very recent geological time humans from Asia and Europe entered these grasslands and tried to wrest a living there. Some eventually became bison-hunting Comanche and Lakota; others, Spanish, English, and German-speaking farmers, ranchers, oil drillers, and railroad builders. Each group entered the place with different assumptions and values. Yet they shared a common tendency to work collectively to exploit their environment, and each group made an ecological impact, whether it was by setting fires and pushing back forests, by killing large animals to the point of extinction, or by plowing up vegetation.

The first historian of the North American grasslands was Walter Prescott Webb, author of *The Great Plains* (1931). No historian before him had made adaptation so important a theme, although forty years earlier Frederick Jackson Turner had begun to write in vaguely Darwinian terms. "The peculiarity of American institutions," Turner declared, is "the fact that they have been compelled to adapt themselves to the changes of an expanding people – to the changes involved in crossing a continent, in winning a wilderness" (Turner 1961: 37). Turner's story of a white man's civilization evolving new institutions in response to the "wilderness" turned out to be a narrative of conquest, as "civilization" finally obliterated "nature." Webb, on the other hand, saw a more permanent impact of nature on the settlers who entered the grasslands. His chief interest lay with his own tribe, the Anglo-Americans. The dry, treeless plains, he argued, forced them to alter their way of life – weaponry, fencing, transportation, water law, animal husbandry, and farming. A grassland version of what it meant to be American emerged, forever distinct from that of the eastern United States (Webb 1931: 8–9).

Nowadays, historians tend to dismiss Webb's work as an oversimplified and untenable "environmental determinism." They are wrong because most of the adaptations Webb chose were indisputable examples of how nature did determine what tools or techniques would work and what would not on the plains. They are right, on the other hand, because Webb's adaptations were limited to the level of material culture and did not include deeper attitudes. He convincingly showed, for example, how barbed wire

had to be invented where there was little wood for fencing, how cattle came to be herded on an open range, and how windmills were needed to pump up groundwater where rainfall failed. He seems to have believed that such material adaptation indicated also a change in the values and beliefs that settlers brought to the grasslands. But that non-material culture did not undergo any metamorphosis. Whatever regional stories they invented, the Texas rancher's view of the world did not differ significantly from that of the Georgia cotton planter or the Massachusetts textile manufacturer.

Webb's failure to show any deep cultural adaptation has continued among grassland historians down to the present. Following closely on his heels, James Malin published in 1936 a pathbreaking study of "adaptation of the agricultural system" that had gone on in his native western Kansas, and well into the 1950s he persisted, almost alone in the profession, in trying to follow an evolutionary approach to history (Malin 1984). More knowledgeable than Webb about scientific concepts and more devoted to quantitative research, he was also quicker to defend the Anglo-Americans' use of land as successful adaptation. Malin was a champion of the plow. He had begun writing during the Dust Bowl years, when drought, high winds, bare soils, and massive erosion turned the region into a world-class disaster and when conservationists, scientists, and government officials were pointing fingers at plow agriculture as the main culprit. Stung by those critics, Malin set out to show that farming had achieved a successful equilibrium, until nature had blasted the terrain with catastrophic drought.

Malin, however, could not overcome a wealth of evidence showing how poorly adapted commercial, industrial agriculture had been on the plains. Contemporary scientists like John Weaver, Frederick Clements, and Paul Sears (and more recently, scientists at the Land Institute in Kansas), along with many rueful farmers, rightly concluded that the plowman was partly responsible for his plight. The Great Plains Committee appointed by President Franklin Roosevelt in 1936, which was influenced by those scientists, called for major changes, not merely in machinery or techniques, but in the plowman's "attitudes of mind" – including his attitude of environmental domination, economic individualism, and extreme risk-taking for the sake of profit.

Malin admitted that Great Plains farmers had overused the plow in the beginning:

> On invading the grasslands, forest man refused to recognize native grass as the vegetation best adapted to the region, plowed up the native grass, and attempted to grow eastern tame grasses. When these grasses did not grow, he condemned the country. It took many years to learn that native grasses would perpetuate themselves and provide pasturage and hay for an unlimited time if only man would give nature a fair chance – which consisted mostly in just letting it alone. (1984: 66)

Here was a frank admission that settlers had *not* adapted to nature's evolutionary strategies. But Malin went on to argue that a new generation of post-frontier farmers, armed with improved knowledge and better practices, had learned to avoid such errors, had used their plows more wisely, and had achieved a better fit.

Other historians, scientists, and even some farmers have debated that conclusion. After the passing of the pioneer generation, they ask, did the people of the plains truly develop more adaptive attitudes? Or did they ignore the limits of their environment before, during, and after the 1930s, indeed right down to our own times? Has the driving logic behind plains farming ever truly respected or adapted to nature to the point of becoming sustainable?

James Malin did not try to demonstrate in detail that a culture well adapted to the Great Plains had evolved during the post-World War I era. That task has been taken up by Geoff Cunfer, whose recent prizewinning book *On the Great Plains* (2005) marks an impressive milestone in the quantitative study of the region's history. Cunfer makes far more sophisticated use of census data, plant ecology, and soil chemistry to provide a fuller history than Malin, but he ends up with the same shaky conclusion: Anglo agriculture on the plains, after an initial period of maladaptation, evolved to be more adaptive and sustainable. "Farmers quickly learned," Cunfer writes, "which land could support crops and which would serve only as pasture for cattle." Already by the 1930s, he believes, this region's agriculture had reached a state of evolutionary fitness that only an unforeseeable change in the weather could disrupt. The Dust Bowl, by this reckoning, was such a destabilizing event – "a temporary disruption in a stable system" (2005: 5–6). This upbeat assessment, however, cannot be reconciled with the reality of economic decline and persistent vulnerability all over the region. It pays little attention to what farmers have long known about plains volatility and long ignored, to how they have perceived the worth of native grasslands as buffers against disaster, and to how they have regarded the taking of risks in a competitive economy or weighed the merits of short-term profit versus long-term stability.

If in fact farmers did learn to listen to nature, her voice proved less audible whenever crop prices rose substantially and promised quick and easy returns. In such times louder voices in the financial and manufacturing sector convinced farmers to buy more machinery, use more chemicals, and put more acres under the plow or use their lands more intensively. Over and over during the twentieth century, farmers chose temporary technological panaceas over new "attitudes of mind." For example, in the decades that followed the "dirty thirties" they put their hopes in the miracle of deep-well irrigation, purchasing powerful water pumps to tap the immense Ogallala Aquifer in order to irrigate fields and free themselves from the persistent threat of drought. This "man-made rain" earned billions of dollars for those irrigating

crops to feed to cattle in confined animal feedlot operations. But it also led to the breaking out of marginal lands with unstable soils or keeping lands in production that should have reverted to natural vegetation, and it exposed the irrigators to a new potential catastrophe – eventual ground-water depletion leading to economic collapse (Opie 1993: 122–60; Cunfer 2005: 164–200; Worster 2004: 251–4).

The voice of government, like the voice of credit and industry, has often spoken against, not in favor of, agricultural adaptation. Take, for example, federal subsidies and disaster assistance, which have become a perennial prop to the Great Plains economy, shifting large amounts of cash from urban taxpayers to farmers while encouraging a mass-production, factory mentality, often in defiance of environmental realities. It was a government official who in a moment of wild-eyed exuberance proclaimed that through deep-well irrigation farmers could achieve a "climate-free agriculture" on the plains. Not only was it a false promise, it was a dangerous one. In this era of global warming and the threatening long-term desiccation of the plains, such wishful thinking may prove to have severe consequences (Worster 1999).

An evolutionary approach to Great Plains settlement would require us to pay attention to the interplay of nature and human belief systems as well as technology. To be sure, it is not easy to measure a society's beliefs or methods of reasoning in the way that bushels of wheat or numbers of tractors can be counted. The historian of cultural adaptation must rely on written documents generated by farm organizations, political leaders, agricultural economists, and newspaper editors, and it is never easy to know whether those documents reflect the whole community or only a few of its members. The difficulties in studying cultural evolution and adaptation are great, but to ignore the cultural side of the dual inheritance would be profoundly unscientific.

So how might we characterize the full cultural phenotype that Euro-American settlers have introduced to the grasslands? To map it completely, as geneticists are mapping the human genome, would be an enormous undertaking, requiring the identification of every resident's beliefs about race, gender, religion, citizenship, health, the body, food, landscape aesthetics, work, progress, Congress, Wall Street, and overseas trade, and then determining their distribution through the population. A somewhat simpler strategy would be to isolate the dominant *economic* beliefs that have had so much to do with how people have used the land. Those beliefs are also difficult to map in their full complexity, but we will not go far astray if we focus on key terms like "market rationality" and "market logic."

We also will not be wrong if we assume that Great Plains economic culture is not indigenous to the region, any more than Christianity or the English language. Market or capitalist economics first emerged on the other side of the Atlantic Ocean more than three centuries ago, long before

Europeans made it to the interior of North America in large numbers. Since then those beliefs have traveled far and wide like the invasive dandelion, until they have established themselves in every corner of the plains region.

Economists have long tended to view the historical origins of European capitalism as a non-issue, since for them capitalism's behaviors are all rooted in a supposedly unchanging human nature – a tendency of all peoples at all times to trade and seek a profit. That view may sound Darwinian, but in truth it has not been established by evolutionary psychology or cultural evolution. On the other hand, those who have seen capitalism as an emerging cultural phenomenon, as a more recent invention, have tended to follow Karl Marx's theory of dialectical materialism, which flattens modern history into a simple, all-explaining war pitting evil capital against noble labor. That view also is not Darwinian, and therefore generally not convincing. Pointing to the exploitation of labor by capital, within Europe or across the globe, as the sole engine of change has usually led historians, with a few exceptions, to ignore the impact of a changing natural environment. In contrast, evolutionary theory would seek to explain capitalism's rise to prominence, and its support even among those without capital, by asking what changed in terms of the environment, ecology, and natural resources. A change of that kind, within Europe and abroad, could give rise to new economic ideas, make them triumphant over their rivals, and encourage their spread all over the world.

This is a huge topic beyond the purpose of this essay. But as a beginning point we should note that the rise of market culture coincided with the "Age of Discovery," the period from about AD 1500 on when ambitious navigators like Christopher Columbus, Ferdinand Magellan, and Francis Drake, through their voyages to the New World and the Pacific, stimulated Europeans of all classes to dream about the possibility of vast natural resources lying on the other side of vast oceans, so much more abundant than their depleted, overtaxed home environments. Capitalists and many others began to ask how those resources might be possessed and exploited. That discovery of an entirely "new" hemisphere lying on the other side of the Atlantic Ocean, not to mention the hitherto unknown or underappreciated world of the Pacific and Asia, was one of the most extraordinary events in human history. It represents, to borrow from the language of invertebrate paleontologists, a moment of punctuation, when evolution abruptly picks up new energy and a more rapid pace, following a long period of relative stasis. As in biology, so in culture: a new global environment and an influx of natural resources challenged the fairly stable body of European culture, which had long been characterized by slow, gradual change. What Walter Prescott Webb called the New World "windfall" stimulated innovation, a burst of cultural reinvention that brought success to some and catastrophe to others (Webb 1964: 173–9; Eldredge and Gould 1972; Braudel 1984: 387–8).

Evolutionists have shown how biological traits like the scales of reptiles or the hemispherical eyeballs of fish can persist more or less unaltered for very long periods. On average, mammalian species survive for a million years, clams for ten million. In contrast, human cultures can rise and fall much more rapidly. In this day of mass communications, the life span of a cultural innovation may last less than a year. Capitalist culture has survived much longer than that. It is no passing fashion, but has been around since what the French *Annales* historians have called the "long sixteenth century." In that period of spreading global ascendancy, capitalism has changed its phenotype a great deal as it has tried to reorganize diverse societies and ecosystems. Compared to alternative economic cultures that have lost out in the struggle for existence, it has been a tremendous success and nowhere, despite its many busts and booms, does it seem to be in immediate danger of extinction. But its stunning successes in terms of cultural evolution and spread should neither obscure past failures nor guarantee a permanent future.

The adaptive advantages of market culture lie mainly in its ability to mobilize capital and labor quickly and efficiently in order to seize resources in distant lands and make them available to consumers living far from the site of extraction. The end result is what Marx and others have called "metabolic rift," a displacement in the cyclical flows of resources and wastes from the local to the global (Moore 2003: 326). The grasslands were among those distant lands – located thousands of miles away from the centers of finance and trade. The farmers and manufacturers who arrived in that region bearing that culture, understanding and believing in it, were the ones who managed to reap its largest rewards, including access to credit, government aid, and public approval. Similarly, nations that proved to be good replicators of the new economic culture gathered in wealth and power on a scale unprecedented in world history.

But market culture looks more successful as an adaptation at the global rather than local level. While it was spreading rapidly across continents to discover and exploit resources, it was often destroying its local ecosystems, depleting soils, forests, and minerals, and piling up its wastes – a strategy that can work only until every locale is appropriated and exploited. The environmentally maladaptive aspects of this economic culture need to be as carefully examined as its triumphs. The historian should ask whether capitalism has produced in any place a sustainable way of life or whether it has typically led to land depletion and land degradation, pollution of air and water, population instability, derelict rural or industrial districts, dying towns, and abandoned farmsteads. Could this economic culture have survived as long as it has without the windfall of the New World's rich ecosystems and geological deposits? Could it have survived without the restraining, counterbalancing rise of a conservation movement calling for laws and regulations of economic growth and enterprise? What rival cultures have managed to survive, overwhelmed but still lurking in the shadows, and how

might they lead to a different future where they would prove better suited for survival in a now heavily plundered world environment?

The evolutionist in biology tries to explain change over time by constructing what Ernst Mayr calls a "historical narrative" that addresses such questions as these: why did this trait appear in an organism when it did, what function did it serve, how did it reshape the whole organism and help it reproduce itself, when did the trait decline and disappear? (Mayr 1983: 325). These are good questions for an evolution-minded historian to pursue as well. They should suggest the framing of more of our historical narratives around changes in soil or climate conditions, accessibility of new resources, technological innovation, modes of production, the rules people make up and follow, and the moral ideals they invent to guide their relations with the natural world.

Above all, historians need to follow the natural sciences by taking the environment more seriously as a powerful force in human life. We need to acknowledge, with the aid of evolutionary psychology, the reality of a human nature that evolves through time – the in-born but never static behavioral tendencies that unite all people in a common humanity and influence decisions as much as cultural norms have done. And we need to think about the role of those cultural beliefs and rules as a quasi-independent but never isolated force on the planet – a force that never functions in an ecological void, a force that can have a devastating effect on other forms of life and can enhance or threaten our survival.

The human mind is remarkable for finding multiple pathways through the natural world, but those paths are always contingent on what came before and what is happening now to the planet. Historians need to acknowledge that dependency on the environment and to embrace the science of evolution for the dazzling light it sheds on the origins, development, and fate of humanity.

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Chapter Four

Fire

Stephen J. Pyne

Point of Ignition

We are a uniquely fire creature on a uniquely fire planet. Among the ancient elements fire is the exception because it alone is a reaction while the others are substances. Fire is what its circumstances make it: understand those circumstances and you understand fire, control those circumstances and you control fire. This makes fire both a process and a synthesizer. Moreover, while fire has long existed quite apart from people, humanity holds a species monopoly over its manipulation: it's what we do that no other creature does. It is a diagnostic signature of our ecological agency. All human societies have fire, and only humans. So one might expect fire to claim at least a focal point of any history of how humanity and the Earth have interacted. ("Focus," after all, is the Latin word for "hearth.") It hasn't. It may never.

Why? Is there something about fire as a phenomenon and subject that resists study, or at least prevents fire from acting as an informing principle? Is there a firebreak (as it were) between the scientific study of fire, including fire history, and the humanistic study of fire? The one resembles a crown fire, the other a candle. Or does the reason lie with the fact that from an early stage one author, without successor students, has dominated the topic with a suite of volumes not easily slotted into existing historiography? Or is it all inertia, the sheer ruttedness of history as an intellectual enterprise done by a guild, aggravated by entrenched categorical imperatives and an incapacity to fashion narratives organized around actors other than the overtly human? Gaston Bachelard (1987) once concluded that the reverie induced by flame prevented any rational analysis of fire (and then demonstrated that argument by his own hallucinatory inquiry). Light a fire and people will be drawn to it, but write a fire book, and it will likely burn by itself. The only fire department at a university is the one that sends emergency vehicles

when an alarm sounds. Perhaps the reason for fire's historiographic isolation includes a bit of all the above.

Still, over the past twenty years, a diverse literature has emerged. In many respects scholarly interest has mirrored the media enthusiasm that blossomed after the 1988 Yellowstone conflagrations. Where fire once appeared episodically, a random expression of western American violence like a grizzly bear attack, fire season now belongs in an annual almanac that embraces hurricanes, tsunamis, floods, and other disasters. While the output does not add up to a corpus that might underwrite a discipline of fire studies, or that could even constitute a self-identified subfield within environmental history, it has a presence it lacked before, a few identifiable trends and genres, and by some standards, scholarly heft.

And if it cannot constitute a subfield by itself, it has proved adept at interbreeding with other genres. Among those scholarly hybrids are urban fire, fire technology, Native American fire, big fires and disasters, memoirs and meditations, and histories of forestry, public lands, and fire institutions. In addition, scientific studies abound from which to construct more humanistic histories, some organized in ways that can constitute a shelf of reference materials. And there is, awkwardly, one attempt to provide a first-order, multi-volume survey of planetary fire history.

Fire and Cities

Perhaps the most consistent trend places fire within urban studies. This should hardly surprise anyone: fires have long gutted cities with the frequency they did surrounding countrysides, particularly during frontier times. Cities were made of the same materials as their wooded environments and burned analogously under similar conditions of drought and wind. The critical difference of course is that people construct those cities and either burn them or seek to protect them from fire. The built landscape is a clear reflection of its builders. It belongs within a shared political, institutional, and moral realm. The story is about people interacting with people with fire as a medium of exchange, which allows fire to find niches among existing topics and tropes.

Two outstanding studies help to frame that narrative. Mark Tebeau's *Eating Smoke: Fire in Urban America, 1800–1950* (2003), while necessarily selective in its choice of cities, furnishes a connective chronicle of themes and events that spans the great era of urban conflagrations. Peter Hoffer's *Seven Fires* (2006) is an exercise in synecdoche. The book samples, as its title indicates, seven fires for what they reveal about the state of urban fire from 1760 to 2001. Each blaze has its own theme and narrative. Both books are major advances over the more popular texts that had previously prevailed: Paul Lyons' *Fire in America!* (1976), written under the auspices

of the National Fire Protection Association, and Dennis Smith's *The History of Firefighting in America: 300 Years of Courage* (1980).

Another strategy is to combine urban history with those themes that already prevail in urban studies, using fire to make an intellectual weld. Amy Greenberg's *Cause for Alarm* (1998) thus examines volunteer fire departments within the prism of gender studies, as others will no doubt do for race, ethnicity, and class. Rachel Maines does something similar for technology and body studies, with *Asbestos and Fire* (2005). In fact, a large literature on firefighting technology exists written largely by and for the urban fire-services fraternity. Most emphasize appliances, protective clothing, and of course engines.

Probably the future will follow Mike Davis' "The Case for Letting Malibu Burn" in *The Ecology of Fear* (1998), in which he uses fires to burn away obscuring rhetoric and politics and expose core political realities. In this case he contrasts the money and media attention lavished on Malibu, a place that nature has designed to burn – a veritable floodplain for fire – with inner-city tenements that have become death traps for the poor because their owners have shrugged off fire codes. The success of his study will surely inspire other, similar attempts.

Fire as Disaster

As Hoffer's book suggests, fire history segues seamlessly into separate studies of big fires. The attraction is obvious: fire comes with an internal narrative structure complete with beginning, middle, and end; it has action; and it can pivot around politics and choice by individuals and institutions, which endows it with moral drama. Here, at the point where disaster and adventure converge, is where most writers aspiring to a truly popular audience will cluster.

The fires that matter most to historians are those that affect lots of people, especially those that rack up fatalities, and major events have sparked a sub-literature for such urban catastrophes as Chicago (1871), San Francisco (1906), and (one can expect) the World Trade Center (2001), and such celebrity calamities as the Triangle Shirtwaist Fire (which has spawned a subgenre of its own). Locally published photo essays have become popular to document such outbreaks as the Oakland fires (1991), Santa Barbara (1990), San Diego (2003) – what the Lake States were for fires in the late nineteenth and early twentieth centuries, California is today. It is to wildfires what Florida is to hurricanes.

A parallel literature exists for frontier communities consumed by conflagrations. While badly dated, Stewart Holbrook's *Burning an Empire* (1943) is still useful as a register of the major events. The great fires that plagued the Lake States, in particular, from 1870 to 1930, have catalyzed accounts

as soon as the ash cooled (e.g., Larson 1912; Wilkinson 2008), and these continue today with such retellings as Grace Swenson's *From the Ashes: The Story of the Hinckley Fire of 1894* (1988) and Francis M. Carroll and Franklin R. Raiter's *The Fires of Autumn: The Cloquet-Moose Lake Disaster of 1918* (1990). The 1871 disaster that incinerated Peshtigo, Wisconsin constitutes almost a genre in itself. Among the most recent contributions are the republication of the Reverend Peter Pernin's eyewitness account as *The Great Peshtigo Fire* (1990), and a popular retelling by Denise Gess and William Lutz, *Firestorm at Peshtigo* (2002). Although Peshtigo is widely boosted as "America's forgotten fire," it is in truth its best known and its story the most frequently retold.

A second subgenre involves the fabled Big Blowup of 1910. At least four books are devoted wholly or in large measure to that story (Koch n.d.; Spencer 1956; Cohen and Miller 1978). The most recent, which includes a bibliography of its predecessors, is Stephen Pyne's *Year of the Fires: The Story of the Great Fires of 1910* (2001b), which has the advantage that it seeks to relocate the story from simple adventure into a political context and examine what the Big Blowup has meant for the larger history of fire. Already other authors are under contract to tell the story again; and again.

In recent times two events have kindled interest among the literate public. One is the 1988 Yellowstone fire scene; here a media campaign met a celebrity landscape. A swarm of picture books immediately fed on the burns, like bark beetles. A more thoughtful though still journalistic account that places the fires within the context of Yellowstone and the national debate about fire policy is Rocky Barker's *Scorched Earth* (2007). A twenty-year retrospective conference on the fires is planned; more books are sure to follow.

The other event was the publication of Norman Maclean's posthumous study of the 1949 Mann Gulch disaster, *Young Men and Fire* (1992). The book won literary awards and became a bestseller, but what granted it real power was the 1994 South Canyon fire that overran a fire crew in ways eerily reminiscent of what Maclean described at Mann Gulch. That collusion sparked new subgenres of fire literature, notably the further investigation of disaster fires and fascination with fire memoirs.

To complete the cycle, Maclean's son, John Maclean, has commenced a series of investigations into contemporary fires: *Fire on the Mountain* (1999) examined the 1994 South Canyon burn; *The Thirty-Mile Fire* (2007), a firefighter fatality fire in Washington; and *Fire and Ashes: On the Front Lines of American Wildfire* (2003) included essays on similar events. The likelihood is that enterprising writers will seek out other "forgotten" historic fires to supplement those that contemporary times have provided. The downside is that the genre, written as catastrophe, reinforces the sense that fire is somehow an exogenous presence in the environment, or at least to human agency; that it is a visitation rather than an ecologically integral process. Like other "natural disasters," even fire, upon closer inspection,

becomes a story of interaction between people and the world around them. Too often the disaster yarn emphasizes action over agency, and forces of nature over the *force majeure* of politics.

Fire as Memoir

The field is (surprisingly) lean on biographies; it needs them. What do exist, like Earl Cooley's *Trimotor and Trail* (1984) or John Buckley's *Hotshot* (1990), tend to be collections of adventure anecdotes and are locally published, or like William Greeley's *Forests and Men* (1951) include fire incidentally as part of a larger career. In a few instances the gray literature, printed by agencies, has been cleaned up and republished formally, as Hal K. Rothman did by editing *"I'll Never Fight Fire with My Bare Hands Again": Reflections of the First Forest Rangers of the Inland Northwest* (1994). Most of the anthologized tales concern firefighting.

A couple of practicing career memoirs do exist for scientists: Herbert Stoddard's *Memoirs of a Naturalist* (1969) and Harold Biswell's improbably titled *Prescribed Burning in the California Wildlands Vegetation Management* (1999). (Stoddard has been the subject of a recent essay by Albert Way [2006].) But none of the major figures, including such patriarchs as Ed Komarek or such formative researchers as Richard Rothermel, or even prominent administrators such as Roy Headley, who oversaw Fire Control for the US Forest Service from 1919 to 1942, have been the subject of scholarly biographies. One partial exception are two autobiographies, Gifford Pinchot's *Breaking New Ground* (2009) and William Greeley's *Forests and Men* (1951), in both of which fire figures. More genuine biographies, however, would make good transitional studies to full-gauge histories.

What the field does have, however, are firefighter memoirs sprouting like fireweeds. These have long been a staple of urban firefighting (Smith 1972, 2002; Brown 1994). The inspiration for wildland counterparts is Maclean's galvanic *Young Men and Fire* (1992), which takes the form of a meditation, and assumes the status of an intellectual memoir; it is probably the most influential book on fire published in America. Stephen Pyne's *Fire on the Rim* (1989), a coming-of-age story set amid a fire crew at Grand Canyon's North Rim, preceded Maclean's book by three years, but it led nowhere, and found trade publisher interest largely by catching smoke trails of still-smoldering interest in the Yellowstone outbreak.

Since Maclean's triumph, however, wildland fire memoirs have found a market, especially those that try to leverage personal fire experience into a more meditative essay. They seem inextinguishable. David Strohmaier has published two: *The Seasons of Fire: Reflections on Fire in the West* (2001) and *Drift Smoke: Loss and Renewal in a Land of Fire* (2005). Murray Taylor has

written about the Alaskan experience in *Jumping Fire* (2000) and Peter Leschak (1995) has written about Minnesota. Even Sebastian Junger has weighed in with a personal essay in *Fire* (2001). They serve as the reworked journals and rough notes on which fire histories in the future will likely depend. Expect a lot more.

Fires and Indians

One arena in which fire scholarship is contributing to a larger question concerns the fire habits of Native Americans. Whether Indians burned, and if so, how, to what purposes, and with what effects, mark a point of intersection among anthropology, ethnicity, wilderness, and fire. A consensus has emerged that Indians did indeed burn, but no agreement exists as to its scope or meaning. The discourse pivots around whether, by burning, indigenes upend the concept of pristine nature and if that heritage might justify interventionist burning today. Some fire scholars, usually anthropologists, have concluded that burning was widespread. Wilderness advocates insist the answer to both concerns must be "No."

The lost classic is Omer Stewart's *Forgotten Fires: Native Americans and the Transient Wilderness* (2002); lost because Stewart wrote it in the 1950s, and then let it languish in manuscript until Henry Lewis recovered it after Stewart's death, and with editorial help from Kat Anderson saw it into print in 2002. It remains a good source of references. Supplement it with Gerald W. Williams' unpublished (but available) compendium "References on the American Indian Use of Fire in Ecosystems" (n.d.), and with Shepard Krech III's *Ecological Indian: Myth and History* (1999), which includes a chapter on fire among its roster of indigenous manipulations and which has helped advertise the topic to groups otherwise insulated from the subdisciplinary literature.

Henry Lewis himself – like almost all the other contributors, an anthropologist – published one of the earliest entries with *Patterns of Indian Burning* in *California: Ecology and Ethnohistory* (1973) and *A Time for Burning: Traditional Uses of Fire in the Western Canadian Boreal Forest* (1983). A good distillation of his *oeuvre* is available in an essay co-authored with Teresa Ferguson, "Yards, Corridors, and Mosaics: How to Burn a Boreal Forest" (1988). See, too, Kat Anderson's exploration of similar fire themes in her own *Tending the Wild* (2006), and her earlier, co-edited volume, *Before the Wilderness* (Anderson and Blackburn 1993).

Several mixed anthologies tackle the topic. A useful beginning is Robert Boyd's *Indians, Fire, and the Land in the Pacific Northwest* (1999). Depending on where you stand on fire and wilderness, Thomas Vale's edited volume, *Fire, Native Peoples, and the Natural Landscape* (2002), is either brilliant or badly blinkered by an ideology of wilderness (I favor the

latter; but then almost the entire literature by natural science is blinded by a subconscious wilderness ethos). William Balée's edited volume, *Advances in Historical Ecology* (2002), includes several useful essays on the ethnography of fire.

The topic endures mostly within the disciplines of anthropology and geography, and as a subset of wilderness scholarship. Environmental historians have not much plumbed the topic. They have probed into a cave illuminated by candles, and find themselves enthralled by the shadows produced rather than the source of the flame itself.

Fire and Technology

The literature on fire technologies is ancient; literally. It enjoyed a revival during the Renaissance with such classics as Agricola's *De Re Metallica* (1950) and Vannoccio Biringucci's *Pirotechnia* (1966). Since then, fire has vanished as an overt theme in the history of technology. Still, surrogates abound. Hazel Rossotti's *Fire* (1993) is, in reality, a study in fire technology, and has value for historical research. But like fire itself, ever a catalyst, pyrotechnology appears if it is searched for.

Among the few studies that focus specifically on fire is Margaret Hindle Hazen and Robert Hazen's *Keepers of the Flame: The Role of Fire in American Culture, 1775–1925* (1992). The "keepers" in the title are the various devices and appliances that "hold" fire for productive use. Alfred Crosby has expanded this range to include projective technology in *Throwing Fire* (2002). But fire also underwrites his popular inquiry into the history of energy, *Children of the Sun* (2006). And that suggests a productive line of inquiry, for while renewables are enjoying newly enfranchised enthusiasms, it is combustion that has powered humanity's world, and it's humanity's capacity to manipulate fire that has made a fossil-fuel world possible.

So while not normally appreciated as a "fire" subject – that topic gets reserved for public lands – it is. And because technology cannot be separated from its creators, pyrotechnology can furnish the links to join nature's fires to humanity's combustion habits. That perspective puts fire into the nuclear core of technology history; and it puts people as fire creatures at the pith of fire's narrative. It's a valence that merits further study. It leads, for example, to such classics as Vaclav Smil's *Energy in World History* (1994) and John McNeill's *Something New Under the Sun* (2000).

An interesting subset that further illustrates how fire is universally present and universally invisible is military history. Again, because fire gets defined by most sponsored research as "natural" flame on wildlands, incendiary weapons and their consequences aren't recognized. Yet national fire prevention campaigns arose out of World War II, under the direction of the Wartime Advertising Council; fire and sword have shaped landscapes as

fully as fire and axe; and humanity's use of fire for weaponry speaks to both our identity and to fire's history in our hands.

Consider, for illustrative purposes, two samplers. First, the Stockholm International Peace Research Institute's *Ecological Consequences of the Second Indochina War* (1976), which (among other topics) shows the unholy alliance between defoliants such as Agent Orange and military attempts to kindle firestorms in the Mekong Delta. Secondly, Horatio Bond's edited book, *Fire and the Air War* (1946), which summarizes the fire lessons from the strategic bombing campaign conducted by the Allies in World War II. Here, fire, technology, and urban history converge with lethal results. (An interesting obverse is occurring in Europe as former military sites are being rededicated to nature protection, and suffer losses of biodiversity precisely because they are no longer being slashed and burned during maneuvers.)

Fire and Agriculture

The real forgotten fires are those in agriculture. As with technology, there is no subset of agricultural history that self-identifies as fire-based. Instead – no surprise here – fire appears in passing. Older geographies often include it, as do anthropologists concerned with swidden (slash-and-burn). But most agricultural histories obsess more about the patterns of field rotation than with the fires that were integral to that strategy.

Yet most of the world's fires exist within an agricultural matrix of farming and herding (sub-Saharan Africa overwhelming dominates global statistics on area burned). There are good reasons to consider agriculture outside of floodplains as a biotic pyrotechnology, as an exercise in applied fire ecology. For aspiring fire historians, fire is unavoidable; that agricultural historians misread its significance speaks perhaps more to the inertia of academic education than to its absence in the field.

As an example of what a fire perspective might contribute, take the "problem" of fallowing. Most historians, following their historic agronomic sources, condemn it or dismiss it. It is either pointless, superstitious, wasteful, opaque, or all of the above. But a fire history would recognize immediately that fallowing was the necessary prelude to burning. That is, the farmers did not burn the fallow to remove it like waste, but grew it in order to burn it and thus get the fertilizing and fumigating effects flame produces. In such ways fire again proves a torch through labyrinths.

No American agricultural fire histories exist explicitly. Rather, fire appears in settlement accounts, stories of frontier conflagrations, reports by touring consultants, and in passing within agricultural histories like Steven Stoll's *Larding the Lean Earth* (2002). The most abundant references are located outside the US. There are, for example, Axel Steensberg's *Fire Clearance*

Husbandry (1993); François Sigaut's *L'Agriculture et le feu* (1975); a special issue on swidden published by *Suomen Antropologi* (Raumolin 1987); H. H. Bartlett's magisterial 3-volume *Fire in Relation to Primitive Agriculture and Grazing in the Tropics: Annotated Bibliography* (1955–61); and the varied passages devoted to fire in Europe in Stephen Pyne's *Vestal Fire* (1997c).

The typical task is to take something like Terry Jordan and Matti Kaups' *The American Backwoods Frontier* (1998) and add the flames it ignores. This particular book manages to trace the colonizing impulse of Finns throughout the Baltic and then across the American continent by focusing on styles of fencing, log cabins, and long hunts, but not through the fire-catalyzed practices that actually converted the new lands or periodically renewed them. For that one must go into the Finnish literature – say, the massive surveys by Arvo Soininen (1974) and Olli Heikinheimo (1915) – and then insert them through interlinear transposition, as it were. In this instance the omission seems doubly odd since Finland has long celebrated its peculiar variants of swidden as an index of cultural distinctiveness.

Fire and Public Lands

When most people think fire history, they conjure up flames on wildlands, which is to say, free-burning fires on public lands, complete with stirring firefights, policy debates, and ecological controversies. In truth, this is a special case in fire history, an outcome of industrialization and imperialism that has left America, Australia, Canada, and Russia as the Big Four fire-powers. If, however, you consider agriculture, then the major countries shift to places like Brazil, and to continents like Africa.

In 1880 C. S. Sargent constructed a map of forest fires for a study of American forests for the census. Compare that cartography with the USGS map of large fires from 1980 to 2005 and you immediately see that America's fire history has inverted its fire geography. The 1880 scene is a map of agricultural burning, quickened by industrialization; the US then looks much like Brazil today. The 2005 map traces, with almost eerie fidelity, the public domain. Through technological substitution, private lands have removed open burning, while public lands have established a quasi-permanent habitat for it.

Fire-burning fire has all but disappeared from quotidian life in America, save as a disaster and as a TV spectacle staged on the public domain. Funding for fire "research" is almost wholly directed toward scientific or technical inquiries, done to assist management on such lands. Sponsors in the humanities think of fire as a topic for science, while scientific sponsors are reluctant to address anything involving people, save, perhaps, a little, in token quantities, for disciplines like economics and sociology that claim to be scientific

or at least can mimic its appearance. The sources for fire history as academic history are lean. The field doesn't exist.

It gets some assistance from public history, that is, through agencies that are interested in recording their institutional stories, particularly if their mission involves fire management as the public-land agencies do. The major surveys, Stephen Pyne's *Fire in America* (1997b) and Hal Rothman's *Blazing Heritage* (2007) were conceived as administrative histories and funded, respectively, by the US Forest Service and the National Park Service. The first leverages what commenced as an administrative history of policy into a panoramic narrative of wildland and rural fire up through the late 1970s. The second burrows more deeply into the NPS and its awkward relationship with fire. This matters particularly because twice the agency has led national reform, once when the cavalry assumed control of Yellowstone in 1886 and established a paramilitary model of fire protection that still persists, and again in the 1960s when it led the movement to reinstate wild fire in wild lands.

Much fire material remains embedded within institutional histories of public land management agencies or places under their administration. Good examples are Harold Steen's *The US Forest Service* (2004), Nancy Langston's *Forest Dreams, Forest Nightmares* (1995), Richard Sellars' *Preserving Nature in the National Parks* (1997), and Robert Cermak's *Fire in the Forest* (2005), a chronicle of the US Forest Service in California. Additionally, consider agency histories such as Duane Hampton's *How the US Cavalry Saved Our National Parks* (1971), which explains how the federal government backed into its paramilitary model, and John Salmond's *The Civilian Conservation Corps* (1967), which summarizes the existence of a temporary agency that made possible the adoption by the federal government of a somewhat enforceable suppression-only policy in 1935.

In fact, however, most fire protection falls under the purview of the states (which is why fire is fought rather than "managed"). A state history particularly rich in fire references is Raymond Clar's 2-volume study, *California Government and Forestry* (1959, 1969). Most state agencies have in-house records if not outright histories; some have published accounts in a kind of gray literature that is enormously useful. And some critical private institutions have either incidental histories (e.g., Tall Timbers Research Station) or none at all (Nature Conservancy).

Over the past couple of decades a literature has emerged regarding fire policy, most of it from practitioners and scientists arguing in favor of a more progressive strategy. Examples include David Carle, *Burning Questions* (2002); Stephen Arno and Stephen Allison-Bunnell, *Flames in Our Forest* (2002); and Christopher Huggard and Arthur Gomez's edited volume, *Forests Under Fire* (2001). An attempt to transfer fire history into fire policy is Stephen Pyne's *Tending Fire* (2004). A deep-ecology polemic against the policy is George Wuerthner's *The Wildfire Reader* (2006).

That implicit polemical character is what animates these studies; it is also what limits their tractive power. They remain locked in the 1960s when America's great cultural revolution on fire bubbled over. They continue to dress up the conflict in a Smokey Bear costume; they quote over and again the patriarchs who voiced the need for fire pluralism; they frame the narrative against what preceded the reformation of the 1960s when, for some agencies, what has happened since then has enjoyed a longer lifetime. The revolution no longer needs manifestos: it needs histories that will begin, not end, with it.

Fire and Forestry

Forestry is a highly self-conscious profession. Whether or not outsiders consider it such (or view it more as a guild) matters less than the fact that its self-esteem has spun off many histories, and since imperial forestry defined itself very largely on its capacity to control fire, these professional histories are also often fire histories.

Particularly promising are comparative studies, especially since the Big Four firepowers have all shared analogous colonial experiences and had granted to foresters the administration of acquired public (or crown) lands. Such histories now exist for the major fire countries, and in the case of France, for the countries under its colonial rule (Woolsey 1917; Kuhnholtz-Lordat 1938). And beyond fire *per se*, there are impressive studies of imperial forestry for India, Madagascar, North and West Africa, Canada, Australia, and Cyprus, all of which contribute to a general fire history since they help explain the principal institution that sought to govern fire on the land (e.g., Boudy 1948; Kull 2004; Thirgood 1987; Stebbing 1922).

India constitutes almost a subgenre in itself. This matters particularly because British India was the inspiration for state-sponsored forestry in most of the colonial world, and directly affected three of today's firepowers (Australia, Canada, and the US). The classic accounts are Edward Stebbings' comprehensive (if tedious) 3-volume *The Forests of India* (1922) and Berthold Ribbentrop's *Forestry in British India* (1989), which gives the practical views of an Inspector General and something of the obsession presented by fire. ("More frequently than of any other subject, I have mentioned that of fire-protection; but it is one of the most important in forest administration in India, and I have no hesitation in doing so once more": vol. 1: 149.) For a good summary of what colonial forestry meant, see Madhiv Gadgil and Ramachandra Guha, *This Fissured Land* (1993). For a distillation of Indian fire history, see my essay, "Nataraja: India's Cycle of Fire," in *World Fire* (1995).

Indians themselves have boosted the general topic in recent years, and because of fire's relevance to pastoralism, swidden cultivation, aboriginal hunting and foraging, and forestry, fire seeps through their texts. Among

that growing roster are Mahesh Rangarajan, *Fencing the Forest* (1999), Ajay Rawat, *Indian Forestry: A Perspective* (1993) and *History of Forestry in India* (1991), and K. Sivaramakrishnan, *Modern Forests* (1999). More is likely to come; and similar literatures are emerging from Africa and Dutch colonialism.

Those studies range beyond the assigned scope of this essay; but anyone serious about fire within environmental history will find them indispensable. Moreover, a library of country-based "reports" on the contemporary fire scene has been gathered by the Global Fire Monitoring Center. While they speak to immediate concerns – disastrous fire or fire seasons – they often include historical introductions or point to sources that historians could well find instructive. Helpfully, they are available online.

Fire and the History of Science

Moreover, it is part of forestry's self-identity that it is a science-based branch of engineering; foresters did with trees what mining engineers did with ore and hydraulic engineers with water. This determined the character of fire science, or more broadly, of fire research. Since most fire science is government science, the vast proportion of which comes from agencies charged with fire management, the history of fire science over the past century can properly fall under their general rubric.

Of course, fire involves far more than firefights on the public domain, but the history of fire as natural philosophy is spotty, divided by the scientific revolution, for as John Donne expressed it:

> The new philosophy casts all in doubt
> The element of Fire is quite put out.

Once fire ceased to be an informing element, its history became subordinated to that of more comprehensive fields. Some aftershocks persisted in the form of phlogiston and caloric theories, the last echoes of alchemy (*philosophus per ignem*), but since the discovery of oxygen, fire has been snuffed to the status of a mere reaction and no longer worthy of its own autonomous history.

This also proves true for the modern era of agency-sponsored science. One excellent study exists, Ashley Schiff's *Fire and Water* (1962), an exposition of how the Forest Service's responsibility to manage compromised its ability to do research. Other sources include administrative histories of research stations and experimental forests and ranges. Otherwise, the only attempt to incorporate fire research within environmental history is lodged within several of Pyne's volumes: *Fire in America* (1997b), *Burning Bush* (1998), *Vestal Fire* (1997c), and *Awful Splendour* (2007). In all of them, fire research

constitutes a distinctive subtheme, part of a larger aspiration to understand how people (and agencies) have imagined fire and why they did so.

Fire and Fire Science

A vast literature exists of self-described "fire history" within the natural sciences, based on fire-scarred trees, charcoal in soil and lakes, some ice cores, age-stand mapping, and the like. The scope for estimating the contemporary geography of fire has expanded enormously with the advent of remote-sensing satellites. These data, coded into GIS and correlated with population statistics, are overwhelming historical sensibilities simply because they are abundant and visually graphic, and can attract funding.

As one might expect, such studies get published in scientific journals, but also in conference proceedings (frequently as government documents). Often the data, coded into GIS and correlated with raw population statistics and burned area, mirror the kind of exercise scientists dismiss as anecdotal when historians draw them from archives. Naïve, flawed, but quantitative (even if consisting of anecdotal numbers) – such studies today flood the "fire history" field. Climate change can generate funding for them in the way carcinogens can for biomedicine. Amid such circumstances it can be hard for a humanistic-based scholarship to find a handhold.

Still, the data are a source that can be absorbed within historical scholarship, and it is valuable to know where they can be found. Increasingly, that means websites. Perhaps the single most useful is NOAA's International Multiproxy Paleofire Database (at www.ncdc.noaa.gov/paleo/impd/paleofire.html). It links to other, regional databases. Such sites serve as bibliographies, or online libraries, for fire scientists. They can do likewise for historians interested in long-term records, many extending back far beyond the arrival of humanity's firestick.

Fire Caches: Sources and References

Is there something equivalent for environmental historians? The simple answer is "No." Like fire itself, sources are diffused throughout the general literature; searching for them can be like trawling the open sea. Still, some useful references and collections exist that can help anchor searches and prevent pointless drifting.

David Newton's *Encyclopedia of Fire* (2002) is valuable for defining terms and concepts. Philip N. Omi's *Forest Fires* (2005), part of ABC-CLIO's Contemporary World Issues series, introduces wildland fire, and directs interested readers toward agencies, literature, and sources generally. Also instructive for establishing a general appreciation for how and why fire

exists in places are the (sadly dating) summary volumes assembled under UNESCO auspices by the Scientific Committee on Problems of the Environment on fire ecology for the northern boreal, Australia, and South Africa, supplemented by more recent anthologies on northern Eurasia, global biomass burning, among more local collections. A thorough bibliographic summary lies outside the purview of this essay.

Instead, consider such sources as the E. V. Komarek Fire Bibliography overseen by the Tall Timbers Research Station and accessible online (Komarek 2009). This provides entry into the scientific literature and to the Tall Timbers fire ecology conferences, begun in 1962, which are the single most comprehensive collection available. While few contributions are self-consciously "history" as historians understand the term, most include historical material, and in themselves document changes in understanding (and of course of science as an enterprise). Most of the articles relate to the US, but there were special issues on Africa and Europe, a number of articles on Australia, and of course lots of Canadian references.

The literature on fire science has metastasized. Using the Komarek bibliography, Peter Frost has traced the increase from the 1960s, when an average thirteen articles appeared per year, to the early 2000s, with over three hundred per year. Science journals published by Blackwell, Elsevier, and Springer featured two articles a year in the 1970s, and forty-one a year in the early 2000s. The "fire" articles are interbreeding with many sciences, far beyond their origins in government forestry. What had been a campfire around which a small group could gather and exchange stories is now a free-burning conflagration propagating across the countryside. The scientific literature is becoming a more difficult place to begin.

For American historians, a few classic sources from the later nineteenth century are unusually rich in fire references: Franklin Hough's *Report Upon Forestry* (1882), C. S. Sargent's volume on "Forests" for the 1880 census, and, more tangentially, J. W. Powell's *Report on the Lands of the Arid Region of the United States* (1879), which includes a map of burned area in Utah. Worth mentioning too is Alianor True's edited anthology of American fire texts, *Wildfire: A Reader* (2000). Although there is nothing original in the choice of selections, it is useful to have many of them gathered together.

The many publications of Carl Sauer, one of the giants of American historical geography, are rich in fire references. Almost alone, Sauer kept the flame burning, arguing consistently that humanity's control over fire was critical to its habitation of the Earth. See his collection of essays in *Land and Life* (Sauer and Leighly 1974), and his 4-volume survey of the New World as revealed by explorers, *The Early Spanish Main* (1992), and North America in the sixteenth and seventeenth centuries (Sauer 1968, 1971, 1980).

Cycle of Fire

Viewed as a hybrid – fire and something else – historical scholarship about fire is surprisingly robust. Viewed in itself – fire as a subject in its own right and as an organizing principle for narrative – the scholarship is sparse. There is, however, one striking exception, and discussing it is awkward since I am its author.

This is a library of fifteen books to date, seven of which are organized into a panorama of global fire history called the Cycle of Fire. At present, the cycle suite includes *Fire in America* (1997b); *Awful Splendour* [Canada] (2007); *Burning Bush* [Australia] (1998); *Vestal Fire* [Europe, including Russia] (1997c); *The Ice* [Antarctica, the land without fire] (1999); and two global surveys, one an anthology of essays, *World Fire* (1995), and one a systematic though popular summary, *Fire: A Brief History* (2001a). At least one more volume is planned that will introduce the fire histories of Latin America, sub-Saharan Africa, and Asia, and perhaps a second volume that will survey the fire history of Mexico. Flanking this set is a bevy of other fire books that include a short revisitation of Australia (*The Still-Burning Bush*, 2006), a college-level text (*Introduction to Wildland Fire*, 1984, in two editions), an exposition on policy options (*Tending Fire*, 2004), a retelling of the Big Blowup (*Year of the Fires*, 2001b), a successor collection to *World Fire* (*Smokechasing*, 2003), a popular distillation (*America's Fires*, 1997a), and a memoir (*Fire on the Rim*, 1989).

Together they constitute a nearly unique corpus of scholarship. The only comparable works are Johan Goudsblom's *Fire and Civilization* (1992), a sociologist's inquiry that centers primarily on Europe, and Christian Kull's *Isle of Fire* (2004), a political-anthropological study of fire on Madagascar. Few indeed are the books that grapple with fire as a theme in a way that allows fire to claim a distinctive scholarship of its own, that grant it standing as an organizer of fundamentals. Given the contextual nature of fire as a reaction, perhaps that fact should not surprise us.

Yet the Cycle suite, in particular, raises other awkward questions. As a biologist might put it, it appears to be growing but not reproducing. In part, this reflects a lack of students drawn to the subject in this way, which is another expression of how insecurely fire history as a branch of the humanities rests within the Academy; and in part, the sheer magnitude of the Cycle makes the cost of entry high. The heft of the series now equals, by volumes, Francis Parkman's *England and France in North America*. The more it expands, the more formidable the barrier for a newcomer. In some respects, the Cycle is *sui generis*.

The other problem, however, is that it does not readily relate to existing historiography. It does not fit into course syllabuses (at least in history). It did not emerge out of contemporary concerns and theses argued by

historians. It did not grow out of the literature. This was not a case of recognizing in fire a topic that could contribute decisively to existing discourse. It grew, like fire itself, from its sustaining environment. I took the raw materials available about why fire existed as it did and how this has evolved over time and created a narrative. The text was not designed as a thesis, or counter-thesis, or revision of a counter-thesis for this school or that. Instead, it created a world as illuminated by fire, and used that world to evoke and explain the significance of fire. Fire, particularly anthropogenic fire, became what literary theorists call an informing principle: it organized and gave shape to the narrative. Fire took the place of primary human actors. It was never anthropomorphized, but it *was* animated, and it even assumed a moral dimension by forcing people to choose and by illustrating the consequences.

Is this a style that can be taught? bred? emulated? Perhaps. But without a secure institutional base, the likely outcome is that it will be more honored than imitated, and may ultimately resemble a gated community. It is not my place to say. I can only say that fire, alone among the elements, and perhaps alone amid the topics of environmental history, will enjoy a historical synthesis that no other theme or topic will. If my assessment is correct that fire is a unique expression of our ecological agency, a particularly revealing symbiosis between humanity and nature, then the Cycle may find extra justification. It may even serve as a generic exemplar, as a way to demonstrate the power of history applied to environmental topics, and the value of constructing history from the ground up (literally) rather than from out of the literature.

This seems to me a promise of environmental history generally, that it can transcend somewhat the circularity of text-only scholarship by reading from the Book of Nature. The particular expressions as coded in Cycle of Fire may well prove too idiosyncratic and bonded to the personality of its author to spark successors or even overt imitators. Still, its larger vision of fire as an elemental narrative and an exemplar of environmental history may survive. We'll have to see.

After all, the Academy is full of improbabilities. It will accommodate and often celebrate productive scholarship, even when it admires what it does not understand. Moreover, the power of fire resides in its power to propagate. There is ample room for thematic fire to spread far, far further in historical scholarship than it has done. Biographies, intellectual histories, regional histories, comparative histories, ecological histories, agency histories – all are kindling awaiting a spark. In *De Igne* Theophrastus argued that it was the property of fire to fill voids. This is certainly proving true in the contemporary Earth (think of the recently abandoned rural landscapes of Portugal, now overflowing with feral fires), but whether the observation holds equally in the landscapes of environmental history remains to be seen.

Pyromancy: The Future of Fire History

It's hard to imagine fire as an organizing principle in contemporary scholarship. It's tricky even to conceive of a fire studies program emerging, although that has been suggested (on the model of justice studies). If it did, there would likely be scant room for the humanities, since they are unlikely to contribute significant external funding. (In scholarship as in politics, a good rule is, *Follow the money.*) Nor is it likely that we will see fire taught as a subject within history programs. It might find a place in environmental studies or sustainability programs, although it would probably not be offered as history.

But while history may decide it doesn't need fire, fire researchers most assuredly need history. Historical scholarship would plug two gaping holes in current conceptions. First, it would make the anthropogenic landscape the originating field of study. Today – such is the power of wilderness and a particular philosophy of physical science – the assumption is that any serious study must begin with the "natural" scene and build out. In practice this means the research never gets to people, even though they dominate the Earth's fire realm. It just doesn't happen. Human history spooks scientists – all that cultural stuff, all that spongy talk about discourses and tropes, they regard as religion and blather. Besides, dealing only with measurable physical quantities – that's science.

In truth it's a misplaced reductionism. The evolutionary reality is that humanity's species monopoly completes the cycle of fire for the circle of life. Ecologists would be lambasted if they began lopping off categories of top-end creatures because including them complicated equations. Yet that is exactly what they do in that they deem fire history solely "natural" and exile humanity from its realm. What results is a hypothetical world like the ideal frictionless surface beloved by physicists. Rather, simply to do fire science properly they need to incorporate humanity's fire agency. Historians can show how.

Secondly, redirecting fire history, centered on human agency, is the great missing link in the chain of combustion causality. The ruling environmental crisis of today, climate change, is the outcome of humanity's combustion habits, yet because they refuse to organize fire history around humanity's species monopoly, theorists cannot link industrial combustion of fossil fuels to the open burning of surface biomass. But it is precisely because people are routing their firepower through machines rather than through flames that the Earth suffers from too much of the wrong fire and too little of the right, and too much combustion overall. The failure to get fire right is a subset of that larger failure to understand the ecology of industrialization – which after all might be defined as a change in anthropogenic fire practices.

This is a flaw so fundamental it casts a shadow over the entire enterprise. But for historians to contribute usefully, they have to understand the

ecologically elemental character of fire and its peculiar valence to humanity. Instead, we seem too often content to exchange the candle for the light bulb, and then fret over whether that bulb should be incandescent or fluorescent.

Yet fire is there: that is its irrefutable reality. The heroic age of any field emphasizes the extraordinary; the founding era of environmental history has been no exception. For fire, this means the grand, the catastrophic, the flame ennobled by wilderness or art. It has meant fire as epic. This may have been, and may continue to be, necessary to make vivid what has been so ordinary and pervasive that it seems invisible. It has made fire fill the Earth, like the world-announcing and world-ending fires of the Stoics and Aztecs and gods of Aesir. That is not, however, an act that can be routinely repeated.

In time, fire will be seen for what it has typically meant for nature and people, defined by its quotidian presence and the vernacular arts. It may not require a special scholarship of its own. It will be in the hearth, the stove, the furnace, the forge, the field, the pasture, the office, the engine, the ship's hold, the dynamo, the forest, and the mountains; it will be in every part of scholarship, as it is in human life. The most defining of fire's attributes may be its capacity to catalyze; fire may be the ultimate interactive technology, recalling the ancient dictum of Heracleitus that all things are an exchange for fire, and fire for all things. Eventually, fire's scholarship, like fire, may be everywhere people are and so intimate with their presence that it becomes unremarkable and so common in humanity's dealings with the rest of nature that it may again become unrecognizable.

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Chapter Five

Water

Rebecca Solnit

The seashore is an edge, perhaps the only true edge in the world whose borders are otherwise mostly political fictions, and it defies the usual idea of borders by being unfixed, fluctuant, and infinitely permeable. The seashore is the place that is no place, sometimes solid land or rather sand, sometimes the shallow fringe of that huge body of water governed by the remote body of the moon in a mystery something like love or desire. A body of water is always traveling, and so the border between the land and sea is not a Hadrian's Wall or a zone of armed guards, it's a border of endless embassies, of sandpiper diplomacy and jellyfish exportation, a meeting or even a trysting ground. An open border but a dangerous one between the known and the unknown, which only a few sibyls, amphibians, crustaceans, and marine mammals traverse with impunity. The shore is also the site of the mutual offerings of the dead, our drowned, their beached, another edge effect, this washing up of corpses, metaphors, myths. The mind is such a meeting ground: its ideas are less often laboriously thought out than suddenly washed up from unknown hatcheries and currents far beneath the surface, the dry ideas of logic that drown in the sea, the dreams that like whales die crushed by their own weight when they wash up on shore in the morning, and amphibious poetry in between, for the seashore also suggests the border between fact and imagination, waking and sleeping, self and other, suggests perhaps the essential meeting of differences, essential as in primary, essential as in necessary. Wandering the coastline with downcast eyes to find what there is to be found, a material correlation to composing and thinking, is a disreputable profession with its own word, beachcombing. Shopping at one's feet for stories, for the unknown, for the thing lost so long one can no longer name it, for treasure that will transform, for that inhuman material that sets free whatever is most human and immaterial. For adults, there is the question of how to set the eyes – whether to beachcomb or more upliftedly

regard the view of sea and land – but for children who have not yet learned that rocks and shells will generally dwindle into rubbish away from the shore, combing the beach is irresistible. Beachcombing, to comb the beach as though it was the hair those mermaids are forever combing with one eye on the sailors, for there is a litter of images, metaphors, inspirations that are more portable and better looking removed from the beach than its physical stuff. Generative graveyard, this coastline littered with shells from which the dwellers have been evicted, sailor-strangling seafoam, and, says Rachel Carson at the beginning of her book *The Sea Around Us*, Mother Sea. "The sea floats her, ripples her, flows together with her daughter, in all our ways," writes Hélène Cixous. "Then unseparated they sweep along their changing waters, without fear of their bodies, without bony stiffness, without a shell.… And sea for mother gives herself up to pleasure in her bath of writing." Fluidity, the biological body, Aphrodite of the unsanitary seafoam rather than of marble, generated when Chronos, or Time, threw Uranus's severed genitals upon the open sea. The sea is a body in a thousand ways that don't add up, because adding is too stable a transaction for that flux, but the waves come in in a roar and then ebb almost silent but for the faint suck of sand and snap of bubbles, over and over, a heartbeat rhythm, the sea always this body turned inside out and opened to the sky, the body always a sea folded in on itself, a nautical chart folded into a paper cup. A person who nearly drowns is more readily revived if her lungs are full of seawater than freshwater, for the sea just as salty as the body does not dilute the blood and burst the cells. It was the sea in which all life evolved we were all told long ago, and somewhere further along in biology blood became one kind of salty ocean circulating nutrients, oxygen, flushing toxins and detritus along the estuaries and channels of the body, and amniotic fluid another sea in which each floated in darkness the first nine months of life until, as they say, the waters broke. But where I come from the first people say that originally Coyote or Raven or Creator drew solid land up as a fistful of mud from the spreading waters, and the ones who live on the coast say that the dead go west over the sea when they die, the place that every river on this Pacific slope runs to. Another story from this terrain has the earth as Turtle Island, a swimmer forever afloat in the sea, and all these stories assert that the liquid is primary and solidity merely floats on it (and the night before I go to this coast to think out this essay, I dream I am carrying a tortoise or turtle before me in two hands, held out before me like an altarboy's Bible, and the creature keeps leaking water, far more water than ought to be in its body, and only upon waking do I realize that the room around which we proceeded was my childhood bedroom). One thing leads to another: there are the seashells children are told to hold to their ears to hear the sea, and only later are they told that they are listening to the inward sea of their own body's pulses echoing in the seashell that was itself once a favorite metaphor for a delicate ear: these are pearls that were his eyes, but seashells that were her ears.

Pearly eyed Alice cries an ocean and then swims in the sea that flowed from her eyes to the strange world on the other side of her tears, and the American artist Robert Gober's Madonna comes flanked by two suitcases full of tidepool life that seem like allegorical wombs, for though it is obvious enough that rivers are veins and arteries, the ocean is everything. Call it a sea of amniotic fluid, the fluid in which life generated, but uterine hardly describes this most open space under the sky unless to the most wide-open imagination. The seashore, everything always in motion, a place that seems the essence of change, but the pelicans that skim the waves look like pterodactyls and the trilobites scuttled blindly through the coming and going of the dinosaurs without any more interest than they take in, say, photography with its womblike darkrooms and amniotic developing washes, or in politics or in poetry. The sea lapping like a cat at a saucer of milk or rather since it is the liquid which acts, the sea like a vast saucer of milk lapping at a recumbent cat. The sea laps at the land, or the sea is in the lap of the land, the ancient earth whose unseen depths cradle the seas and whose heights we inhabit mostly at the altitude called sea level which global warming is due to change and with it outdate all the coastal maps. This is not quite the allegory meant in old movies when sex was implied by a cut to the waves whose steady rhythm had more to do with hips than lips. "Yes, as everyone knows," remarks *Moby Dick*'s Ishmael when he's still on shore waiting to ship out, "water and meditation are wedded for-ever," asking us to accept the play on the liquidities of language in which the substance and the cerebral act can be imagined as married like two members of the same species, a pairing like love's parentage of severed genitals and seafoam. "In all rivers and oceans," says Melville a little later, "is the image of the ungraspable phantom of life; and this is the key to it all." The linear narrative of following the coast, the plot, the history, the sequence of pages versus the steady rhythm of the tides, the waves, the desires. The book and the sea turn into each other at the end, a stranding of black letters on the paperwhite shore, and the pages of a book at the windy seashore blow one over another like waves, a curl, a comb of pages. The box of a book is a misleading shape, call it a pirate chest made to be opened, call it the long thread of a story wound up on the spool of a book's solid shape, every page spread a valley landscape, though the term gutter urbanizes the intimate central cleft between the pages. Open a book and look at it endwise and it looks like a bird seen in flight far away, spine for body and pages for wings, a fat black bible like a raven, slender art books with thinner curves of pages to either side like albatrosses. This book could be bound as a circle, the pages like spokes on a wheel, a turning investigation of the sea, a continuity that folds back on itself, a walk that went all the way around an island to end at its beginning, or it could be imagined as an aquarium, every page like the Madonna's tidepool suitcases a sample so fresh that some pages seem to splash, to have depth the hand could plunge into to seize some of their treasure. Walk on the seashore: strands of seaweed

lie hieroglyphically upon the strand and are sucked up by the sea and like words turned back into fluid ink waver in the water before being cast up on the sand in another equally unreadable version, roll of the dice, toss of the yarrow sticks. Reading the sea, transparent at one's feet, green as arching wave and white as spray, its depths an opaque accumulation of transparencies with blue borrowed from the sky. Building a museum case and filling it with types of mussels is one way of knowing mussels, but on the shore a mussel leads to a crab or a curious stone, which leads to another thing and eventually leads back to mussels, which is another and perhaps a more far-reaching way to know mussels. The sea that always seems like a metaphor, but one that is always moving, cannot be fixed, like a heart that is like a tongue that is like a mystery that is like a story that is like a border that is like something altogether different and like everything at once. One thing leads to another, and this is the treasure that always runs through your fingers and never runs out.

Part II

Nature and the Construction of Society and Identity

Chapter Six

Race and US Environmental History

Colin Fisher

Environmental historians routinely castigate their own field for its failure to use race as a category of historical analysis.[1] But in so doing, these historians overlook two important things. First, from the onset, US environmental historians made one racial minority – Native Americans – central to their narratives. Second, during the last fifteen years, the environmental justice movement prompted many historians to write books, articles, and dissertations that investigated that intersection of race and nature in new ways. The upshot, then, is that race is hardly absent from the now-sizable literature in environmental history. Indeed, from the beginning, race has often served as a crucial hinge upon which environmental history narratives have swung.

Many Euro-American environmentalists of the 1960s and 1970s, especially those influenced by the counterculture, juxtaposed contemporary American society (which they characterized as artificial, individualistic, materialistic, and deeply alienated from the natural world) with pre-Columbian Native American tribal societies (which they imagined lived harmoniously in a wild Garden of Eden). Such anti-modern romanticism shaped environmental history during its first decades. In "The Indian and the Frontier in American History: A Need for Revision" (1973), Wilbur Jacobs, for instance, argued that Indians had ecological answers for a late twentieth-century American society that was out of balance with nature. The Indian's "religious and totemic beliefs and tribal customs prevented him from following a policy of soil exhaustion or animal extermination," Jacobs wrote. The Indian "solved the ecological dilemmas that all Americans now face" (50). In *American Indian Ecology* (1983) J. Donald Hughes wrote that Indians knew "the secret of how to live in harmony with Mother Earth." They adapted to the North American environment "without destroying, without polluting, without using up the living resources of the natural world" (1). In *The Pathless Way* (1984) Michael P. Cohen painted John Muir as

a Zen Buddhist of sorts, but he also lamented that Muir had so little understanding of and respect for Native American cultures and that he did not integrate the "figure of the Native Man into his ecological vision of the American wilderness" (189).

Anti-modern romantic yearning for a primeval Indian wilderness (as well as for Buddhism and East Asian thought) is also evident in the field's first classic, Roderick Nash's *Wilderness and the American Mind* (1967). In this intellectual history of Euro- and especially Anglo-American views of the wilderness, history begins with the arrival of the Puritans and their problematic "civilization" (including their wilderness-hating religion). As wilderness and Indians (who like "so-called primitive people everywhere … grounded their religion in the concept of the community on earth of all living things") are destroyed, Americans come to yearn for the wildness and savagery that they themselves conquered (Nash 1972: 366). But, for Nash, it is clearly too late. Real wilderness and real wild men have been eclipsed by modern technological society.

Even during the 1970s, the vision of a harmonious pre-Columbian Indian wilderness outside of time imagined by some historians and many environmentalists could not stand up to scrutiny. Static Indians living in a primeval, unchanging wilderness made little ecological, ethnographic, or historical sense. An early implicit critique was Alfred Crosby's *The Columbian Exchange* (1972), as well as its sequel, *Ecological Imperialism* (1986). In these works, Crosby portrayed Indians as environmental actors who transformed their environment, sometimes dramatically. He noted that although pre-Columbian Indians domesticated few animals, they were some of the most adept farmers on the planet, and the plants they domesticated would later revolutionize the diet of Europe. He also made the controversial case that Paleo-Indians hunted Pleistocene mega fauna, such as the mammoth, to extinction. Indian overhunting in fact created the ecological niche that would later be exploited by Europeans and the "grunting, lowing, neighing, crowing, chirping, snarling, buzzing, self-replicating, and world-altering avalanche" that accompanied them to the New World (1986: 194).

One problem with *The Columbian Exchange* and *Ecological Imperialism* is that while Indians were certainly portrayed as environmental actors, they, like the weedy European invaders, came across as just one more organism struggling to exploit ecological niches. Crosby convincingly showed that biology powerfully shaped contact, but in so doing he (as well as followers, notably Jared Diamond [1997]) neglected to explore how economics, politics, religion, and social divisions mediated the ways both Indians and Europeans encountered new environmental realities. In other words, Crosby portrayed humans as animals, but not particularly *special* animals.

Like Crosby, Richard White (1980, 1983), William Cronon (1983), Albert E. Cowdrey (1983), Carolyn Merchant (1989), Timothy Silver (1990), and other environmental historians writing during the 1980s

showed how pre-Columbian Indians transformed landscapes, and in so doing they dispatched the myth that early Indians lived in perfect balance with a primeval wilderness. But unlike Crosby, these historians wrote regional, place-based (rather than continental or global) accounts of Indian/European contact. As such, they could give far more nuanced accounts of environmental change; they also took culture seriously. In these books, changing views on the sentience of animals, the ownership of land, the nature of weather, and the relationship between status and goods shaped Indian environmental choices. At the same time, Europeans arrived not only with their animals, their weeds, and especially their diseases, but also with cultural baggage, in particular capitalism, an economic system that suggested that land could be possessed, purchased, and sold and that capital ought to be accumulated rather than distributed. Overall, these place-based histories represented simultaneously a major step forward for environmental history and a substantial contribution to US Indian history, and they inaugurated a rich, productive conversation between these two fields that continues to this day.

While books such as William Cronon's *Changes in the Land: Indians, Colonists, and the Ecology of New England* (1983) and Richard White's *Land Use, Environment, and Social Change: The Shaping of Island County, Washington* (1980) incorporated biology and culture into their histories in novel ways and set new standards for the field of environmental history, they also, in important ways, recapitulated the story of the fall – a fall from a nobler (rather than noble) past into a debased capitalist-oriented present. These before and after accounts left little doubt that European contact and the arrival of capitalism represented decline, not just for Indians, but for nature as well. At the end of many of these accounts, nature is degraded, and Indians, formerly self-sufficient, are reduced to a state of dependency, their cultural traditions eroded. As such, these histories from the 1980s, good as they were, unintentionally sidelined stories about Indians and nature that took place *after* the fall.

During the 1980s and 1990s, environmental politics again shaped the ways in which environmental historians incorporated racial minorities into their narratives. In 1982, black activists in Warren County, North Carolina in effect launched the environmental justice movement when they attempted to block truckloads of PCB-laced soil headed for a new landfill that the state had built in their community. The fact that the Governor of North Carolina chose a poor African-American community as the site to bury the state's toxins seemed to confirm something that many people of color had long suspected: that there was a strong link between race and the location of hazardous waste. The connection was confirmed in 1987 when the United Church of Christ Commission for Racial Justice published "Toxic Wastes and Race in the United States," a study that found that neighborhood racial composition was the best variable for predicting the location of

hazardous waste facilities. Robert Bullard then buttressed this conclusion with his landmark book, *Dumping in Dixie* (1990). These studies, as well as the 1991 National People of Color Environmental Summit in Washington, DC, gave the environmental justice movement national prominence and fueled criticism of mainstream environmentalism, which many saw as an elite white movement that privileged wilderness protection over the health of minorities, especially of those living in cities (McGurty 2007).

The environmental justice movement also brought with it a new historical narrative. During the 1970s and 1980s, as we have seen, wilderness advocates and environmental historians often told a story of decline, from a noble or nobler Indian past to a more degraded technology or market-oriented Euro-American present. In contrast, environmental justice advocates most often talked about progress rather than decline. While some expressed nostalgia for pre-contact America, Africa, or Aztlán, most of the new environmentalists associated the past with conquest, land loss, slavery, and racial segregation. Instead of looking to a "wild" hunter-gatherer past for an alternative to a degraded present, environmental justice activists looked to the future when the marriage of social justice and environmentalism would begin to create a world that was simultaneously more just and more sustainable. In other words, the new environmentalists yearned not for origins, but a *telos*.

Like environmentalism during the 1960s and 1970s, the environmental justice movement of the 1980s and 1990s shaped environmental history. Historians explored the racial politics of mainstream conservation, identified earlier moments of environmental inequality, and documented incidents of minority environmental activism. In so doing, this new work sometimes offered fresh interpretations of US Indian environmental history; it also belatedly incorporated African-, Latino-, and Asian-American historical actors into environmental history.

But while the assumptions underlying environmental justice shaped research agendas, historians did not follow the new movement in lockstep. In fact, just as Cronon, White, and other environmental historians of the 1980s undermined the myth of the "ecological Indian" central to the wilderness movement, historians during the 1990s and early twenty-first century sometimes came to conclusions that did not fit the environmental justice paradigm. In particular, some historians concluded that environmental inequality was based not just on race, but also on class; showed that the correlation between race and class and environmental hazards was due to more than discriminatory siting by corporations and/or the state; introduced nature as an important and chaotic actor that not only reinforced but also sometimes disrupted power relations; identified hopeful moments in the past where social justice and nature advocacy coincided; and questioned hopeful thinking about the inevitable confluence in the future of social parity and environmental sustainability.

Just like environmental justice advocates, prominent environmental historians criticized traditional wilderness preservation (which they implicated in the politics of class, gender, and race) and called for a more inclusive environmentalism. For instance, Robert Gottlieb – author of *Forcing the Spring* (1993), one of the first book-length responses to environmental justice – characterized traditional environmentalism as a white, male, middle- and upper-class movement that had, after Earth Day in 1970, consolidated power, hired lobbyists and experts, and pursued objectives from within the Washington, DC power structure. Gottlieb also called for a new environmentalism "that is democratic and inclusive, an environmentalism of equity and social justice, an environmentalism of linked natural and human environments, an environmentalism of transformation" (404). Carolyn Merchant (1995, 2003a, 2003b) also linked mainstream environmentalism to the politics of race, class, and gender, and she called for the development of a sustainable and equitable partnership of humans (including women and minorities) and nature. Patricia Limerick noted that "the history of conservation is thoroughly connected to a hierarchy of racial inequity," and concluded by guardedly hoping that the pursuit of social justice and environmental quality would "combine" and make "the world a brighter place" (2002: 353). Meanwhile, Richard White and William Cronon linked the American wilderness fetish not only to alienation from nature (in particular from nature close to home, especially in cities), but also to class-based elitism, the cult of masculinity, and racial exclusion. Both were hopeful. White argued that if we move beyond our fixation on leisure in the wilderness, "we may ultimately find a way to break the borders that imprison nature as much as ourselves" (1995: 185). Cronon urged his readers to turn away from the call of wilderness and focus on nature closer to home. In so doing, we will "learn ways of imaging a better world for us all: humans and non-humans, rich people and poor, women and men, First Worlders and Third Worlders, white folks and people of color" (1995: 85–6).

Environmental historians not only dethroned traditional environmentalism and called for a new, more inclusive movement, they also looked into the past, identified historical examples of environmental inequality, and chronicled the response of marginalized communities. Gottlieb, for instance, described how the horrendous environmental conditions in early twentieth-century American cities gave rise to an alternative environmentalism (comprised of settlement workers, industrial hygienists, and public health officials, many of whom were women). He also described how women, workers, and people of color (who, he argued, were "subjected to the most intense environmental hazards") continued to fight for safe environments at the end of the twentieth century (1993: 38).

Another important response to the environmental justice movement was Andrew Hurley's *Environmental Inequalities: Class, Race, and Industrial*

Pollution in Gary Indiana, 1945–1980 (1995). Hurley blamed the social distribution of pollution not simply on free-standing racism, but more centrally on industrial capitalism, which, in seeking to control nature, created race, class, ethnic, and gender divisions. Hurley also complicated the thesis that corporations and the state deliberately targeted minority communities as sites for housing hazardous waste. He noted that just after World War II, corporations exposed all of Gary's residents to hazardous waste; in fact, due to the idiosyncrasies of local housing segregation, African Americans found their communities less exposed to pollution. At the same time, US Steel relied on an unequal racial division of labor and exposed black workers to greater levels of pollution on the factory floor. During the 1960s this situation slowly shifted. Due to the civil rights movement, the racial division of labor began to break down and workers found themselves more equally exposed to hazards. At the same time, pollution in black and poor white neighborhoods increased relative to white middle-class areas. This was due in part to white flight to the suburbs, racial segregation in housing, and the use of smokestack scrubbers, which transformed air pollution into more localized solid waste. "The age of ecology," Hurley wrote, "corresponded with the rise of environmental inequality" (172).

Hurley not only explored the social distribution of pollution, but also the response of distinct working-class, middle-class, and African-American environmental movements, which Mayor Richard Hatcher united in an uneasy alliance during the early 1970s. Hatcher's administration is the closest we get to a utopian moment in Hurley's account. There is no golden age, but nor is there a happy ending. During the 1970s, a failing economy (which US Steel used to its advantage in resisting environmental regulation) ushered in conservative pro-business politicians at the local and federal level. As a result of these new economic and political realities, "it became unlikely that cities such as Gary would witness any reversal in the patterns of environmental inequality, despite sporadic bursts of grassroots activism" (181).

Hurley followed up his book on Gary with work on the roots of environmental inequality in St. Louis. He noted that the poor and racial minorities shouldered a higher pollution burden, but he argued that correlation did not necessarily mean discriminatory siting. In an article on the Wagner Electric company, for instance, he observed that historically most of those who occupied heavily polluted industrial areas of St. Louis had in fact been white, and this had been the case in the neighborhood around Wagner Electric. When whites left for better neighborhoods during the 1960s, realtors steered blacks into the area. And when Wagner Electric closed shop in 1981, the politically weak local African-American community inherited the company's toxic legacy. As with the situation in Gary, the ending to the story is far from hopeful (Hurley 1997a, 1997b, 1997c).

Similarly, in "Troubled Waters in Ecotopia" (1999), Ellen Stroud explored why the most polluted section of Portland – the Columbia

Slough – was home to African Americans and recent immigrants, as well as some poor whites. Like Hurley, she found industry did not target communities of color. Pollution pre-dated the arrival of minorities, who moved into the area in search of better and more affordable housing. But the fact that minorities had not been deliberately targeted did not mean that racism played no role in the correlation of race and waste. Stroud attributed the situation at the Columbia Slough to subtle forms of institutional racism in housing, zoning, and environmental policy.

In the first of two case studies in *Environmentalism and Economic Justice: Two Chicano Struggles in the Southwest* (1996), geographer Laura Pulido explored how, during the late 1960s and early 1970s, the United Farm Workers responded to the threat posed by pesticides. She argued that the environmental organizations, committed to "quality-of-life issues," expressed little or no interest in Chicano workers' exposure to these poisons. It was left, then, to the UFW to fight this battle. In contrast to mainstream environmental organizations, the union engaged in "subaltern environmentalism," which Pulido defined as the seamless merging of environmental, labor, and racial identity politics. While Pulido's book was pathbreaking in a number of ways, some complained that her definition of subaltern environmentalism left little room for white working-class struggles (Mitchell 1997).

In her book *Packing Them In: An Archaeology of Environmental Racism in Chicago, 1865–1954* (2005), Sylvia Washington joined other historians in arguing that racial segregation in housing was critical to understanding environmental inequality. She also incorporated late nineteenth- and early twentieth-century Euro-American immigrants into the story of environmental racism by drawing on "whiteness studies" and arguing that these newcomers were in fact not yet fully white. At least one reviewer, though, worried that Washington's approach, while novel, elided the importance of class in shaping environmental inequality (Blum 2007).

While most of the environmental justice-inspired work addressed disproportionate minority exposure to human-made toxins, some historians explored unequal exposure to natural hazards. In "The Case for Letting Malibu Burn," Mike Davis (1998), for instance, juxtaposed the 1993 Malibu wildfires with a near-simultaneous fire in a Los Angeles tenement notorious for unfixed code violations. Despite the exact same death toll, resources flowed to affluent Malibu while the Mexican and Guatemalan victims of the tenement fire were ignored. Andrew Hurley (1997c) showed the disproportionate effects of rats and floods on African-American communities in St. Louis. In *Acts of God: The Unnatural History of Natural Disaster in America* (2000), Ted Steinberg showed the federal role in spurring development in hazard-prone locations and also identified race- and class-based disparities in federal allocation of post-disaster compensation. In *Rising Tide* (1997), John Barry told the story of how, after the 1927

Mississippi Flood, Will Percy, an affluent scion of a Mississippi planter family, essentially re-enslaved local blacks, forcing them to work on disease-ridden levees without adequate supplies while whites were evacuated. The flood response, according to Barry, made Americans more comfortable with federal disaster assistance and catapulted Herbert Hoover (the man in charge of the federal flood response) to the presidency. Meanwhile, blacks, who had a very different view of the way Hoover handled the crisis, migrated in even greater numbers to the Democratic Party.

The response to Hurricane Katrina will undoubtedly prompt more historians to study the intersection of race and natural disaster, which is currently understudied. Hopefully, historians will not only continue investigating the disproportionate ways in which these hazards impacted racialized communities, but also how these communities sometimes used these disasters as opportunities to upset traditional American racial hierarchies. For instance, as historian Joanna Dyl and others have shown, the 1906 San Francisco earthquake and fire disproportionately affected the city's Chinese population, who were nearly permanently banished from the city during the cleanup. At the same time, the Chinese creatively used the disaster (which destroyed official birth and citizenship papers) to thwart the racist Chinese Exclusion Act and bring "paper sons" over from China (Dyl 2006, 2008; Ngai 2005: 204–6).

Another area that needs work by environmental historians is disproportionate exposure to disease. Environmental historians have long looked at how the biological realities of disease shaped American history, from the effect of "virgin soil epidemics" on Native Americans, to African-acquired resistance to malaria and yellow fever (Crosby 1972, 1986; Curtin 1968; Kiple 1988, 2002). At the same time, cultural historians have explored the ways Anglo-Americans associated contagious disease with marginalized populations and how public health became an important site of the social construction of race (Kraut 1994; Shah 2001; Fett 2002; Molina 2006). Few studies on health and race, though, successfully integrated biology and culture. One exception is Gregg Mitman's excellent book *Breathing Space: How Allergies Shape Our Lives and Landscapes* (2007). Not only did he show how late nineteenth- and early twentieth-century doctors and others imagined allergies as an upper-class white malady, he also linked high rates of asthma in late twentieth-century black and Puerto Rican communities to an "ecology of injustice that structures urban life," an ecology characterized in particular by pollution, lack of city services, poor health care, and slumlords (134).

Minorities and disproportionate exposure to hazards was the initial focus of environmental justice activism, but many in the movement also questioned the inequitable distribution of resources, such as water, energy, and land. Environmental historians have explored this side of the coin as well. Mathew Klingle and Coll Thrush in their books *Emerald City* (2007) and *Native Seattle* (2007) described how Indians and immigrants lost access to

tidelands and other spaces in Seattle as a result of privatization and urban development. "Changing Seattle's physical terrain," Klingle wrote, "reinforced inequality, concentrated it, and made it more visible. Re-engineering topography had channeled the city's castoffs, quite literally, to the bottom" (2007: 181). Matthew Morse Booker (2006) used San Francisco Bay to tell a similar story. In *Shaping the Shoreline* (2008), Connie Chiang chronicles racist efforts to banish Chinese squid fishermen from the Monterey, California shoreline. David Torres-Rouff (2006) showed that the move from the Spanish *zanjas* water and sewage system to modern pipes resulted in environmental inequality for Mexican and Chinese residents of Los Angeles: not only were these communities underserved by the new sewage system (resulting in a dangerous disease environment and fueling racist stereotypes of minority communities as unclean), but they also lost access to public water.

In the antebellum South, slaves not only had limited access to nature's bounty, but little control over their own bodies. In his book *"What Nature Suffers to Groe"* (1996) and in several insightful articles (2004, 2005a, 2005b), Mart Stewart noted that on the Georgia Coast and throughout the South, growers used slaves to control nature and to grow rice and cotton, in the process severely taxing black bodies and sometimes putting slaves in harm's way. Slaves, then, faced disproportionate exposure to natural hazards, such as intense heat, insects, and floods, but at the same time, white masters limited severely African-American access to the South's abundant natural resources. Despite the restrictions imposed by slavery, slaves did make widespread use of the South's forests, swamps, rivers, and coasts, where they hunted, fished, farmed, and found a modicum of freedom from the brutality of plantation labor. White planters sometimes responded to even this modest use of natural resources by restricting slave movement and enclosing many of the "commons" used by both blacks and poor whites.

Responding in part to the removal of local villagers attendant to the application of the American wilderness ideal in contemporary Africa, Asia, and Latin America (Guha 1989), a number of historians have chronicled how American park building resulted in the displacement of racial and ethnic minorities from traditional hunting, fishing, and gathering areas as well as from homelands. In *The Hunter's Game* (1997), Louis Warren chronicled how state and federal hunting laws championed by "elite" sportsmen and wildlife advocates marginalized subsistence hunters, in particular Italian immigrants and Native Americans. The transformation of local commons into state-run parks not only resulted in unanticipated ecological change, but also led to rural protest, poaching, and even, in one case, the killing of a game warden. In a similar vein, Mark Spence (1999) and Robert Keller and Michael Turek (1998) explored how government officials (often at the behest of nature advocates) displaced Indians from national parks and how Indians responded to these efforts by poaching, squatting, adapting to the new tourist economy, and/or hiring lawyers. In the second case study

explored in *Environmentalism and Economic Justice* (1996), Laura Pulido chronicled the unsuccessful efforts of Granados del Valle (a Mexican-American cooperative devoted to sheep raising and the artisanal manufacture of woolen goods in northern New Mexico) to gain access to public lands that had once been part of the Tierra Amarilla Land Grant established under Mexican rule. In *Crimes Against Nature* (2001), Karl Jacoby showed that displacement from homelands and the closing of local commons was an issue not simply of race and ethnicity, but also of class. He showed the ways in which state control of the Adirondacks, Yellowstone, and the Grand Canyon disrupted traditional Indian and rural white land use. Drawing on the literature of peasant rebellion, Jacoby interpreted poaching, timber theft, trespassing, and other "crimes against nature" as resistance to the imposition of an authoritarian system by distant elites.

Displacement from homelands and places of traditional subsistence labor did not only occur in rural areas. In their social history of New York's Central Park, Roy Rosenzweig and Elizabeth Blackmar (1992: 64–73) showed that to create a pastoral oasis in the center of New York, park commissioners obliterated Seneca Village, a mixed African-, Irish-, and German-American working-class community that used the future park site to build their home, grow food, and raise livestock.

During the last forty years, environmentalism has inspired environmental history, and historians, in turn, have looked into the past and sometimes critiqued the political movement that originally inspired their research. As we have seen, some historians, inspired by the wilderness movement, came to challenge the notion that Indians lived in a pre-Columbian Garden of Eden and even came to undermine the entire notion of wilderness itself. Similarly, historians, inspired by the environmental justice movement, sometimes ended up complicating the useable past employed by some activists. It would be a serious mistake, though, to imagine that the role of the environmental historian is to simply inform contemporary activists. The relationship between politics and history remains dialogical, and the environmental justice movement (and other variants of environmentalism, such as political work on global climate change) continues to push the field in new and fruitful ways, especially when it comes to the issue of race.

In 1991, Dana Alston, an environmental justice activist who worked on African-American and "Third World" environmental issues, gave a speech at the First National People of Color Environmental Leadership Summit in which she noted that "the environment, for us, is where we live, where we work, and where we play" (1992: 103). There are excellent works on how the state and companies disproportionately exposed minority (as well as working-class) homes and places of work to hazards. There is also a rich literature on how minority communities have lost access to homelands as well as local commons where they engaged in subsistence labor. While much more work needs to be done on environmental inequalities at home

and work, we also need to look at play, which I take in the broadest possible sense. We need work on how, during their leisure time, African, Asian, Latino, and Native Americans as well as European ethnics used the natural world to play, pray, think, make meaning, and forge identity. Historians have long chronicled European-American views of landscape in "nature's nation"; it is time to do the same for other Americans.

Some historians have made valuable steps in this direction. Eco-critics and intellectual historians have begun the process of reconstructing a rich tradition of African-American nature writing and environmental thought. Kimberly K. Smith, in her book *African American Environmental Thought: Foundations* (2007), and Mark Hersey, in his article "Hints and Suggestions to Farmers: George Washington Carver and Rural Conservation in the South" (2006), illuminated a rich black agrarian tradition in which slavery and peonage are linked to environmental destruction; simultaneously, black thinkers linked free labor, citizenship, and property ownership to good stewardship of the land. Smith also noted how, as African Americans began to migrate to cities, intellectuals, such as W. E. B. DuBois, romanticized Southern blacks as a folk deeply connected to the land – this despite the corrosive effects of American racism.[2]

But it is not only intellectuals of color who developed cultures of nature. In "Disorientation and Reorientation: The American Landscape Discovered from the West" (1992), Patricia Limerick noted that she at first thought that migrants and ethnic Americans, unlike more privileged sojourners from the east of the Mississippi, had little or no leisure time to develop aesthetic responses to Far Western landscapes. She found, though, that despite the imposition of racial restrictions, Asians and Asian Americans found moments to imbue these landscapes with meaning and to play in nature. Even in the World War II internment camps of the arid west, Japanese and Japanese-American detainees found time and space for gardening and therapeutic landscape design. Similarly, Dianne Glave (2006) has written on rank and file African-American women, who gardened not just for subsistence, but also to beautify their homes.

In "*What Nature Suffers to Groe*" (2003) and in his article "If John Muir Had Been an Agrarian" (2005a), Mart Stewart showed that black slaves in the South not only used swamps, forests, fields, and shoreline that lay beyond the rigid rows of the plantation to sustain themselves, but also to worship, to create cultural meaning, and to forge and re-enforce familial and community bonds (2005a: 144–51; 2005b: 14–20). "For African Americans who were slaves," Stewart wrote, "the wilderness made quite a different impression than it made on Thoreau.… In the wilderness they found each other rather than themselves" (2004: 248).

Similarly, in *Native Seattle* (2007: 3–16, 162–83), Coll Thrush showed how Seattle city fathers enclosed and transformed tidelands where Indians clammed, fished, and lived and how local Indians fought government efforts

to remove native inhabitants to the city's hinterland. Not only were these foreclosed landscapes places to live and to work, they were also good to think with. Indians told what Thrush called "place stories," which they used to generate identity. For instance, Seattle Indians (local and not) forged a pan-Indian identity by investing local Seattle landscapes with meaning.

Racial minorities not only used nature to overcome internal divisions, but to bridge racial divides. In Richard White's *The Middle Ground: Indians, Empires, and Republics in the Great Lakes Region, 1650–1815* (1991), Algonquian-speaking Indians, decimated by the effects of disease, famine, and Iroquois warfare, made common cause with French fur trappers. The middle ground here is simultaneously a place (the southern Great Lakes region known as the *pays d'en haut*) and also a cultural space where Indians and the French (and later, to a lesser degree, the British) forged a shared symbolic, economic, linguistic, and diplomatic world where racial distinction between Indian and European made little sense. It was only after the American Revolution that this "common world yielded to a frontier over which people crossed only to shed blood" (456).

I think my own work also elucidates minority cultures of nature as well as the use of landscape to create hybrid, interracial community. In "African Americans, Outdoor Recreation, and the 1919 Chicago Race Riot" (2006), I show not only how official Chicago restricted African-American access to parks, but also how African Americans used landscapes available to them to forge an urban African-American identity. The article is part of a book (Fisher 2009) that explores also how European immigrants used Chicago nature to imagine Irish, German, Polish, Czech, and Italian national identities, as well as American ethnic identities. At the same time, I show how anarchists, socialists, and union leaders used natural landscapes in and around the city to bridge racial, national, and ethnic divisions and forge a working-class identity.

Dana Alston's speech at the First National People of Color Environmental Leadership Summit hit upon another theme instructive for historians. She made it clear that environmental justice ought to be seen in international terms. Her call and the environmental movement's focus on the global threat of climate change suggest that in some ways the contemporary environmental movement is more cosmopolitan than the field of US environmental history. As historian J. R. McNeill notes, US environmental history "looks rather like some American TV weather maps, where everything, including advancing thunderstorms and high pressure cells, stops at the border" (2003: 18).

There is some important work that follows those thunderstorms across US borders. In particular, Richard P. Tucker's *Insatiable Appetite* (2000) looked at the effects of twentieth-century American consumer capitalism on tropical ecosystems. He argued that while American corporate leaders and their agents prided themselves on uplifting the uncivilized and cultivating

the tropical wilderness of Africa, Asia, and Latin America, they in reality often displaced local people and replaced complicated ecosystems with unsustainable monocultural agriculture. In "'Green Havoc': Panama Disease, Environmental Change, and Labor Process in the Central American Banana Industry" (2001), Steve Marquardt used Panama Disease as a lens on the United Fruit Company's efforts to simultaneously control tropical nature and Central American labor. Paul Sutter and Gregg Mitman are working on books that address the intersection of American colonialism, disease, and race in, respectively, the Panama Canal Zone and Liberia (see also chapter 32, this volume). The editors of the anthology *Echoes from the Poisoned Well: Global Memories of Environmental Injustice* (Washington et al. 2006) assembled histories of American environmental inequality alongside cases from Australia, Martinique, Taipei, Thailand, Niger, South Africa, Finland, and elsewhere. There is much, much more to be done.

Until recently, environmental and social history, both "new" fields born of the tumult of the 1960s and 1970s, remained two separate planets. But since the inception of the field, US environmental historians have incorporated race into their analyses. Although some in the field romanticized pre-Columbian Indians, more careful environmental historians ultimately transformed our understanding of pre-contact and colonial Indian history. That said, until relatively recently the field made no contribution to African-, Asian-, Latino-American, and European immigrant history, as well as the history of America's colonial, economic, and military adventures abroad.

Today, there are excellent histories born of cross-fertilization between American ethnic and environmental history, and the insights generated by these works will inspire more to come. Some ethnic, labor, and social historians now recognize that nature is a powerful lens through which to view race, ethnicity, and labor, not to mention gender, nation, and sexuality. Partially in response to the environmental justice movement and activism on global climate change, environmental historians are also beginning to explore the intersection of race and ecology in America's colonial, economic, and military adventures abroad. Increasing numbers of environmental historians recognize that attention to subaltern populations produces richer, more nuanced histories of the human encounter with nature. All evidence suggests that this cross-fertilization will continue into the future, inspiring even more work that illuminates the relationship among nature, power, and social division.

Notes

1 The author thanks Mart Stewart, Sarah Elkind, Robert Johnson and Doug Sackman for reading and commenting on earlier versions of this chapter.

2 African-American eco-criticism is beyond the scope of this essay. See Myers (2005) and Wallace and Armbruster (2001).

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Chapter Seven

GENDER

Susan R. Schrepfer and Douglas Cazaux Sackman[1]

The Work of Gender is Never Done

The intersection between gender and environmental history has not been particularly busy. Sometimes it seems more like Robert Johnson's lonely crossroads than the corner of Main and Broadway.[2] Vera Norwood is one of the scholars who has traveled to that crossroads and left a lasting mark with *Made From This Earth: American Women and Nature* (1993). In that book, Norwood wanted to find out the extent to which "gender roles have influenced what women have valued in nature." She also wondered, how have American women "found meaning in, and ascribed meaning onto, the biophysical landscape? Do they speak of nature as mother, sister, friend, lover? If so, what do such metaphors imply?" (xii). Her answers, built out of deep research into the experiences of nature of a variety of women over the full chronological range of American history, were conveyed eloquently and persuasively. Though Annette Kolodny (1975, 1984) and, especially, Carolyn Merchant (1990a, 1989) had earlier made important contributions combining women's and environmental history, Norwood put down another milestone with *Made From This Earth.*

But in an essay contributing to a forum in the *Pacific Historical Review* on the state of environmental history in 2001, Norwood could still observe accurately that "Environmental history is just beginning to integrate gender analyses into mainstream work" (2001: 84; see also Scharff 2003b). In his contribution to the same forum, Richard White acknowledged the importance of gender to environmental history, but issued a caution: "The danger is not that gendering will be ignored in environmental history but that it will become too predictable – an endless rediscovery that humans have made nature female. Gender has more work to do than that" (2001: 109). Metaphors used to describe nature as mother (or virgin or whore)

certainly reflect and reinforce social divisions between men and women, expressing and reinforcing relations of dominance; gendered metaphors certainly do work, as White implicitly concedes. But there are other ways and areas in which gender works to mediate and inform relations between people and the rest of the natural world. Though on the historiographic level we can say that work on gender and American environmental history has hardly begun, the work of gender in history is never done. It works endlessly in all sorts of domains – not only in gardens, fields, the wilderness, and in the environmental movement itself, but also in cities and their streets, in homes and factories, in scientific dioramas and supermarkets, and on the very bodies of women, men, girls, and boys (and those who cross these "natural" categories of identity).

In this essay, we will point to some of the ways that gender has done work in mediating relations between people and nature and, in turn, how those relations have contributed to the construction of gendered identities. We first outline how historians have pondered the human/nature and the male/female nexuses when gender was little more than a grammatical term and the words "ecology" and "environmentalism" were yet to appear. We will also outline the changing relations among men, women, and nature into the age of ecology and feminism. We discuss how gender has worked in some environmental histories, and consider what work theories of gender have done for environmental history and what work they might do next for a field that is less than two generations old.

Nature's Nation and the Natures Claimed by Men and Women, from the Colonial Period into the Progressive Era

Scholars of American ideas and culture have long noted the way the environment has been keyed to American identity. Perry Miller called the country "Nature's Nation" (1967) and John Opie later used the term as the title for his survey of the environmental history of the United States (1998). Certainly, there has been a lot of nature in the formation and expansion of the United States over its almost two and a half centuries of existence. It laid claim to much of North America – the regions of generally temperate climates, rich biological "edges," the more fertile of the world's soil types, and the tallest of trees. The United States established what may have been the world's first national parks and what were certainly the strangest of landscapes: the wilderness. Frederick Jackson Turner (1961) famously argued that the encounter with this so-called wilderness made American men. (Since women, except for a mention of Kit Carson's mother, are significantly absent from Turner's essay, we don't know if he thought wilderness also shaped American women.) If a nation is an imagined community (Anderson 1983), then the United States has often imagined its community

as growing out of the wilderness. In this view, American men and women are the offspring of nature.

While such a vision implies a sense of submission to nature and an acknowledgment of its protean, life-giving force, the faith that America was Nature's Nation has actually reflected and abetted a righteous sense of ownership that has often led to violence against other people, and other animals, that might lay claim to the same land. Nature's Nation is a close cousin to Manifest Destiny. Both terms sublimate the facts of conquest and cast national expansion as the unfolding of a script written by a deity or nature rather than resulting from political acts of domination. US national expansion has roots in the colonial contacts and conquests of the three centuries prior to 1776. Of course, Europeans often feminized the continent, and turned such imaginings into licenses for domination. Land grabs and sexual violence went hand in hand (Castañeda 1993; Trexler 1999). In addition, sexual liaisons between Native women and Euro-American trappers and traders were the intimate cross-cultural connections between men and women that in turn linked Native American societies and their landscapes to the burgeoning Atlantic and world economies (Calloway 1997; Van Kirk 1983). In some cases, though, scholars have argued that Native women sought sexual relations with Europeans in order to increase their power (Gutiérrez 1991). On several frontiers, Native women sought marriage with European newcomers for a variety of economic, cultural, personal, and political reasons – as when Pocahontas married John Rolfe in part to further the interests of the Powhatan confederacy (Townsend 2004; Richter 2001).

European migrants wondered if American environments would profoundly alter their very bodies, and if their identities themselves – including their gender – would become unstable under the influence of New World climates (Perreault 2007). As Joyce Chaplin explains about the English, it was thought that New World "heat would enervate settlers and could threaten gender and reproduction" (2003: 133). Noting that contemporary scholars have privileged a constructivist notion of gender, Chaplin insists that we reckon with the English beliefs in "natural differences between the sexes" (119). Seeing men as warriors and conquerors, and women as "breeders of new colonists and nurturers of English constitutions in their children," the colonial project was pursued in deeply gendered terms and modes. English colonists "used nature to authorize unequal social roles in the colonies, an authorization in which gender was a subordinate part of larger interpretations of the creation" (119). Colonists constantly wondered about how nature would affect their bodies, and puzzled over the differences they saw in Indian men and women (including their apparent physical strength as well as susceptibility to disease). Rather than seeing them as "natural," they viewed both Indian men who trained to be warriors and women who worked hard in the field as creating "artificial bodies" at variance

with their own (243–79; see also Kupperman 2000: 41–76). Powerful ideas about gender, the body, and nature mediated colonial encounters and relations on the Anglo-Native frontier, and clearly warrant more attention by environmental historians interested in gender. English colonists pursued changes in the land not only to make a livelihood as incipient capitalists, but to create a more "'English' space" that would stabilize their gender and identity rather than open them to what they saw as the potentially gender-bending force of a foreign environment (Perreault 2003: 24).

Native Americans also worried about the impact of the newcomers on their identities and bodies. Following the Delaware prophet Neolin, Indians in the Northeast gave up the mixed-gender dancing Europeans had introduced and ingested a "black drink" that induced vomiting – purging them of European contamination. Conquistador Hernan de Soto had his priests baptize Native women before his men raped them (Richter 2001: 180, 22). In the Southwest in 1680, the Pueblo leader Popé instructed Indians to wade into streams and scrub themselves with yucca plants to de-baptize themselves, and reject Christian-sanctioned marriage practices and go back to their old ways of forming bonds between the sexes (Knaut 1997: 174). In Texas, as Juliana Barr (2007) shows, the Caddos' native categories of gender defined the political structuring of Indian-Spanish relations. Indian concepts prevailed with gender categories cutting across European perceptions of racial differences. Ideas about bodies and gender mediated and often expressed the political, cultural, and even environmental relations of power between Europeans and Indians.

Discovering American nature and making sexual conquests continued to be linked activities for colonial men. Paige Raibmon (2003) examined Southern planter William Byrd II. His journal from the early 1700s detailing his survey of the boundary between colonial Virginia and North Carolina appeared in print in 1841, as attitudes toward wild adventures grew more popular. This semi-official account of cataloging the resources of the eastern slopes of the Alleghenies was widely read and well respected, quickly becoming a classic wilderness narrative and natural history essay. Byrd had also kept a diary, which he shared with friends at night around the fire, detailing how in the course of the survey he had forced himself sexually on local women – including at least one man's wife, a "Dark Angel," and a lame "tallow-face wrench" (21). Before and after the diary came to public attention, the chronicle portrayed what was in fact a sexual romp as an iconic tale of discovering Eden. Together, the two accounts describe the relationship between "ecological imperialism and sexual subordination" (Scharff 2003b: 17). Raibmon argued that Byrd's "natural history" was in fact one that "naturalized the power structures of colonial domination" to justify "their New World domination of land and people" (21; see also Brown 1996).

If the exploration and conquest of lands and peoples in the Americas were intertwined with both ideas of nature and intimate, often violent

gender relations, the colonial societies established on the northern and southern Eastern seaboard, the lower Mississippi, along the St. Lawrence and Great Lakes, and in the Southwest were also places where gender and environmental relations were tightly woven together and explain much about colonial development. For slave societies, Mart Stewart (1996) provides valuable insights into how Africans' contact with the nature of the New World under slavery both structured their domination and also provided grounds for resistance. In *Laboring Women* (2004), Jennifer Morgan pays particular attention to women who were enslaved, their experience as agricultural laborers, and how their "reproductive identities … significantly influenced both the violence done to [them] in the Americas and their ability to survive it" (11; see also Unger 2006). For the Southwest and borderlands, Cynthia Radding's (1997) "social ecology" approach shows how social relations – including those of class, race, and gender – and ecological relations were reciprocally intertwined.

While most of the colonial frontiers await a fully developed gendered analysis of their environmental history, Carolyn Merchant has contributed a far-reaching examination of the role of gender as a set of ideas and structuring force in shaping environmental relations in New England, from the colonial period into the market revolution of the early nineteenth century. Merchant examines both perceptions of nature and women and the role of reproduction – both physical and cultural – in driving ecological and social change in the region. Initially conceiving of nature as an "animate mother," Merchant points out that colonial farmers in the eighteenth century performed rituals to encourage nature to be generous in her gifts. Almanacs instructed farmers to work with the cycles of the moon and taught them to view Nature as a "human writ large with whom the farmer had an intimate, personal relationship" (1989: 159). According to Merchant, the colonial family's contact with nature was relational and mythical; nature left its imprint on the family, even as the New England farm family displaced Indians and modified nature to support its own needs for production and reproduction (social and biological) in the New World.

Patriarchal family relations and a sexual division of labor defined this way of life. Fathers held title to land and exercised authority over this household mode of production's labor force – that is, his wife and six to eight children. The very space of the homestead was divided up into gendered zones of responsibility. Male "space radiated outward from the barn … [w]omen's domain radiated outward from the farmhouse kitchen" (167). Fathers were responsible for clearing fields, managing crops, and attending to livestock, as well as hunting and fishing. Girls helped with their mother's mountain of work. As Charles Sellers points out, "While constantly pregnant or nursing infants for fifteen or twenty years, wives were responsible for the domestic interior, cooking, extensive food preparation, gardens, poultry, dairy animals, and the endless textile processes of carding, spinning, weaving, fulling,

dying, quilting, sewing, and mending" (1994: 9–10). Labor itself – the work of bringing forth those astonishing numbers of babies – was an all-female affair. Midwives aided in these births, and many also served as the doctors of the countryside. To maintain a family's health, midwives (and wives) looked to nature, which "offered solutions to its own problems. Remedies for illness could be found in the earth, the animal world, and in the human body itself" (Ulrich 1990: 53).

But this homesteading life was anything but sustainable. Its lack of sustainability had everything to do with how the *family* functioned on the farm. Merchant identifies a contradiction between the requirements for production and those of reproduction on the family farm. Because family labor was so crucial, family sizes were large, but children would need land of their own when they matured. This family's driving desire was not infinite accumulation; rather, it was to set up the next generation's males as independent freeholders and patriarchs and females as good wives and mothers. The desire to reproduce the family farm required ever more land and led to the adoption of commercial practices and, ultimately, a capitalist ethos. Farmers increasingly turned to intensive methods of farm management and sought out sources of cash that could be used to purchase new lands. The ensuing world mechanized nature and split production along gender lines. Women became ensconced in a separate sphere of reproduction: they would be mothers and nurturers. According to Merchant, while New England was deforested, its soils eroded and watercourses altered to feed early textile mill factories, the relatively elevated place women previously enjoyed due to their reproductive importance in an organic society was also altered and eroded in the emergent market society. Young women forced into the industrial economies as factory workers at Lowell often expressed a longing for the close contact with nature they seemed to have left behind (Montrie 2008: 13–34).

While the market and industrial revolutions deeply transformed and often denuded American landscapes ("emasculated" them, as Henry David Thoreau put it [Cronon 1983: 4]), many Americans became committed to the need for economic progress and the heavy use of material resources. But the speed of the changes technologies brought to North America prompted attention, on both sides of the Atlantic, to the past and the future of the natural order. In 1865 the American diplomat and naturalist George Perkins Marsh published his lengthy treatise *Man and Nature: The Earth as Modified by Human Action* (1865); he had initially wanted to title it *Man, the Disturber of Nature's Harmonies.* He drew evidence from across centuries and continents of man's destruction of forests and the resulting soil erosion, looking at Italy during the Roman Empire and then at his home in New England. Marsh's thesis was chilling to those who were concerned about the economic future of forests and fields, as well as to those who loved, as Marsh did, familiar forested landscapes.

Waves of romantic idealizations were already sweeping western Europe and North America. Poets, philosophers, painters, and novelists found and encouraged others to locate aesthetic pleasures and spiritual catharsis not in churches but in nature. Although few contemporaries read his work, the transcendentalist Henry David Thoreau, whose *Walden* appeared in 1854, typifies the search for purpose in life through the experience of the cycles of nature rather than through organized religion or commerce; he also confounded the separated gendered roles of domestic and productive spheres by assuming both male and female roles. Five years after the publication of *Walden*, British naturalist Charles Darwin challenged, if only hesitantly, biblical and religious explanations of human history. His *On the Origins of Speci*es hypothesized the causal role of natural selection in the evolution of animals, locating explanations of what he blatantly called the "descent of man" within the material rather than the spiritual realm and the search for truth in scientific observation rather than religious authority. By the first years of the twentieth century, theories of speciation and evolution developed into ecology, a science that reflected what Marsh called "nature's harmonies."

Marsh introduced a discordant note to the nineteenth-century march of progress. But he shared the dominant culture's habit of gendering nature as female and culture as male; after all, his book is about the conflict between prodigal "man" and bounteous "nature," which he referred to as "our great mother" (1865: 8). That link has been both explicit and enduring: "Women and nature have an age-old association – an affiliation that has persisted throughout culture, language, and history" (Merchant 1990a: xix). This affiliation had once empowered women, Merchant argued, but the scientific revolution had changed the meaning of the natural world within Western culture. After 1700, the dominant metaphor for the cosmos was no longer the feminine and organic but rather the man-made, mechanical, and the scientific.

Nature had died by 1700, Merchant concluded, and with its death women had assumed a new, still "natural," but more degraded status. Her argument echoed writer and historian Henry Adams, who described American society in 1900 as now captivated and energized by the "dynamo" (electrical motors) rather than the Virgin of an earlier period. In America's mechanical age, the age-old power of the Virgin or Diana of the Ephesians ("She was Goddess because of her force; she was the animated dynamo; she was reproduction – the greatest and most mysterious of all energies; all she needed was to be fecund") seemed to be forgotten or downgraded (Adams 1918: 384). "The Woman had once been supreme" (384) Adams noted, but now next to the dynamo, the Virgin as well as "the planet itself seemed less impressive" (380). Everyone seemed to be taken by the machine, which was gendered as male. According to Merchant, the affinity of the feminine and the natural needed to be reinvoked (Merchant 1990a: 1, 288). However compromised, the identification between a devalued nature and women

intensified over the course of the nineteenth century – in ways that at once restricted and, later, enabled the agency of women.

In 1848, an influential minority of British and American women and men had questioned the place of women in society, declaring at Seneca Falls, New York, that women have political and legal rights equal to those of men. It is more fitting than ironic that they met at a community formed where river power had been turned into mill power – industrial power. Connected as well to the man-made Erie Canal, Seneca Falls was where women and men sought to reclaim rights for women in a liberal, industrialized society. The women met to redefine a sense of belonging to both community (and to some extent nature) that had been severed in part through the industrialization furthered through such water-driven mills (Montrie 2008); at the same time, they traveled the canal to appreciate nature as a sublime and spiritual landscape threatened by rampant commercialism (Sheriff 1997). Still, most English-speaking Americans did not support equal rights or restraints on development, just as most conflated Christianity with the march of Western civilization across presumably "savage" peoples and places. The passivity and malleability of the natural and the feminine realms were naturalized. Unexpectedly, however, women brought a new constituency into debates concerning the natural world. In addition, support for the protection of nature increased as both sexes strove to fulfill increasingly refined expectations of identity. Each gender claimed part of nature for themselves, in ways that led them to contest industrial claims to the same landscapes.

Assumptions of the fundamental difference between the sexes with the latter the more "natural" encapsulated Victorian culture. According to what historian Barbara Welter has labeled "the cult of true womanhood," ladies' magazines and other forms of popular literature described the ideal women as passive, pure, domestic, and pious. Her proper sphere was the home, where she was to devote herself to reproductivity and nurturance (1966: 151). Such men as the evolutionary naturalist who fought to save California's Yosemite Valley, Joseph LeConte, asserted that modern Western civilization rested upon the tensions generated by the differences between men and women – the masculine and the feminine (Schrepfer 2005: 49). Men preserved for themselves the avenues of upward mobility in the emerging capitalist world; they would work in the business world, and become the primary "breadwinners" of the family. While their menfolk advanced their family's interest in the grubby world of commerce, women were charged with raising children, attending to higher ideals, and making the home a "haven in a heartless world."

Though the separate spheres ideology and the cult of true womanhood were primarily artifacts of the middle class, society's dominant imagery increasingly disconnected women from productive work and etherealized womanhood. The "true woman" became light and purity. She was to stand above and apart from the grubby world of commerce and productive work in the soil. Yet, it was considered proper for a woman to have contact with

nature in a carefully cultivated garden (and in the kitchen). In the garden, according to contemporary authorities, she could express her feminine virtues and see society's ideas about gender roles confirmed in the character of plant and animal kingdom (Norwood 1993: 30). Women were encouraged to use nature as a model and a resource with which to nurture children, balm the market-wounds of their husbands, and build family harmony. Meanwhile, men in the workplace were expected to continue the drive to expand commerce, industrialize, and conquer nature.

These differences were reflected in the way men and women responded to nature along the overland trail. Scholars note that the journals of those who rolled or walked west betrayed the imprint of Victorian codes of deportment. Despite parallel lives, the ways in which women "saw" the western landscapes and the language they used to describe the vast new places they encountered diverged from those of men. One may be tempted to dismiss the differences as merely metaphoric, but in fact pioneers acted upon their dreams. Annette Kolodny's (1975, 1984) books contrasting the "fantasies" of men and women, illustrate that the former imagined a potentially difficult future of wrenching productivity from a recalcitrant land, even employing savage languages of aggressive sexuality, while the latter visualized future communities and gardens and the processes of blending into their new landscapes of home.

Women and men who were not heading west into landscapes of productivity or promise but instead into the department stores of the "land of desire" (Leach 1993) also enacted relationships with nature. Thorstein Veblen described the impact of the industrial revolutions of the late nineteenth century, denouncing what he called the "conspicuous leisure" and "conspicuous consumption" of the age. While critiquing men and women alike, he targeted upper- and middle-class women who demonstrated by their deportment and in their corseted and hobbled bodies their role as consumers. In their new world of emporiums and parlors, ladies played their role in the consumer revolution. They were adorned, juxtaposing the beauty and coloration of feathers against their faces and hair, thereby promoting the deaths of millions of birds netted by market hunters. A lady's presumed affinity for nature – that which had encouraged their wearing of feathers and furs – had worked against both, as women tottered around in French heels balancing large hats inhabited by dead birds. Assumptions as to the receptivity and passivity of both the female and the earth underscored a sense of the appropriateness and inevitability of conquest (Veblen 1912; see also Price 1999: 57–110).

Yet the presumed equation linking women to nature could also empower both. This was especially clear in the Progressive years between 1880 and 1920. Women and their formidable clubs lobbied vigorously to protect many forms of life, including those of plumage birds, and to protect habitats with parks, wildflower reserves, and wildlife refuges. The strong and organized

interest of women and men in wildflowers was perhaps the most distinctively feminine of progressive causes: interest in wildflowers capitalized on prescriptions for domesticity. At the same time, protecting wildflowers required sensitivity to fragile links between soils, slopes, wildlife, and plants so that the feminine perspective (whether demonstrated by men or women) proved particularly receptive to research in ecology. While visions of masculinity made rugged, unpeopled mountain tops the ideal wilderness, the feminine perspective made other men and more often women more interested in historic preservation and in protecting archeological sites that illustrated the human presence in nature. At least within the middle- and upper-class English speakers, feminine visions of the romantic sublime cast the scenic and wild lands as places of life (Schrepfer 2003).

The General Federation of Women's Clubs lobbied strenuously in the l880s for the establishment of the federal system of forest reserves, Yosemite National Park, and in the early 1900s for the saving of California's Hetch Hetchy Valley (Merchant 1984, 1995: 109–36). Historian Polly Kaufman (2006) demonstrates women's interest in national parks and work with the National Park Service. They laid claim to wild and scenic places by using the code word *home* to define them – wilderness was their home and that of the wildlife. Visions of femininity encouraged women to step out into the natural world, where they might nourish and be nourished. Women, too, found in their presumed affinity a right to advocacy. Claiming nature was a way of claiming greater social and political room for their selves.

Expanding in yet another way on prescribed roles as homemakers, wives, and mothers, women also moved into municipal reforms. They promoted the implementation of basic hygiene, workplace safety, animal rights, and civic improvements. They worked on anti-pollution and anti-smoke campaigns (Stradling 1999; Gugliotta 2000; Platt 2000; Gottlieb 1993). They used their "separate sphere" to provide a cultural space from which to speak out in protection of the health of their families and in pursuit of distinctively feminine agendas, such as clean streets. In the absence of the right to vote, they reached for power using prescribed sexual roles and nature's metaphoric femininity (Hoy 1995; Melosi 1982, 2008). Alice Hamilton pioneered industrial hygiene in America, fighting, with few real claims to authority, to protect the bodies of men and women from industrial diseases caused by the workplace (Sellers 1997).

The metaphoric femininity of nature and conventions of the new companionate marriage gave permission to some late Victorian men to love her and to speak at times in hushed tones of her beauty (Mintz and Kellog 1988; Coontz 1988). Byrd had raped women, but men in the late Victorian period, reflecting transatlantic cultural values, expressed adoration for the natural world much as they spoke of loving or even lusting after their wives. Both men and women found something to love in nature and wilderness, and materials with which to sculpt new versions of their gendered identities.

The Gender Trouble with Wilderness

In developing a language to express his adoration of nature, John Muir adapted romanticism and ideas of the sublime to create a voice that seemed to cross gender lines. As a young man, Muir embraced the life of a wanderer and came to California, becoming, as Donald Worster's (2008) biography shows, a worshipper of the Sierra Nevada. He had rejected formal education and the pursuit of mechanical engineering, though at one time he seemed on track to become an inventor or an efficiency expert like Frederick Winslow Taylor. Instead of becoming transfixed by the Dynamo like Adams, Muir in effect searched for the Virgin in nature. His life, Worster argues, crossed lines of gender, race, and class. He blurred Victorian sexual roles. Muir deliberately sought women's voices in support of his successful efforts to have Congress establish Yosemite National Park and his failed attempt to save from inundation Yosemite's Hetch Hetchy Valley. By his death in 1914, however, most of his friends and colleagues were slightly uncomfortable with his persona and sense of the feminine sublime that had underscored his appeal to women. Indeed, they seemed to prefer to split off this "feminine side": most men spoke of him in death as a manly man and a successful alpinist. As Adam Rome (2006) points out, Muir's crossing of gender lines opened him to being taunted as a "political hermaphrodite." To Rome, though, Muir in fact *was* a political hermaphrodite: embracing qualities thought to be feminine, Muir sought to redefine manhood, arguing that "manly men could love nature and feel compassion for other creatures" (Rome 2006: 446).

It is a standard trope in environmental history to pair Muir and Roosevelt, with the two iconic "nature men" standing, respectively, for a biocentric preservationism and a utilitarian conservationism. But on another level, they represented two ways that men seriously engaged with nature with respect to gender roles of their day – in particular, what might be called, following Welter, the "cult of true manhood." According to the rhetoric of Victorian and Edwardian English-speaking, middle- and upper-class Americans, the cultural and social requirements for manliness were spatially defined. True men inhabited the public sphere, which included everything outside of the home and family from the commercial market sector to the political arena, the fields of agriculture, and the now delightful world of the outdoors. Muir tweaked "true manhood" to include an eloquent appreciation of flowers and beauty; Roosevelt carried "true manhood" like a banner on his body to the top of San Juan Ridge, into the Rockies and Sierras, and onto the savannahs of Africa and the jungles of South America. Indeed, Roosevelt's "hyper-macho image … protected him against any charge of sentimentality" (Rome 2006: 449). Roosevelt's big game trophies were a shield against any charge of embracing a feminine embrace of nature (not unlike the way that, as Barbara Ehrenreich argued, Hugh Hefner used the

naked bodies of women in *Playboy* in part to shield the males who followed his call to rebel from family values and the breadwinner ideal of the 1950s from being jeered as maladjusted or "queer" [Ehrenreich 1983: 50]).

To understand Roosevelt's performances of true manhood in the outdoors they must be situated within the context of the late Victorian crisis of masculinity. In the late 1890s and the early 1900s, the anxieties raised by Turner's reflections on what we now see as the fictive closing of the frontier melded into fears for the nation's future and the future of manhood. Looking at the depression begun in 1893 and the populist uprising, Turner anguished later in the decade over what would happen to the country in the absence of "free" lands on the frontier. The prescriptive visions of manliness had morphed into what historian Roderick Nash called the "cult of the primitive" (1966: 517). Two men anxious about modernity publicly and sensationally heard the call of the wild, and each became known in the media as the "Nature Man." Joseph Knowles, a pudgy newspaperman in Boston, plunged naked into the wilderness of Maine, to prove that a modern man could go back to nature, survive, and be reinvigorated by it (when William Randolph Hearst questioned the authenticity of his month-long descent into primitiveness, Knowles reprised the feat in Oregon as a media-stunt for the Hearst newspapers). Ernest Darling, Nature Man number 2, had been on his deathbed, but regained his health by imitating birds and gorillas (beating his chest). After his recovery, he went around half-naked to promote the healing power of the sun – a practice that got him certified as insane, and prompted his move to Tahiti (Sackman 2010; Kasson 2002).

But no one typified more clearly this cult of the primitive or used it more effectively to his own political advantage than Roosevelt. Like the other "nature men," a sickly Roosevelt had experienced a reinvigoration of close contact with nature. In his political career, he was responsible for transferring over two hundred thousand acres out of the public domain and into public parks, national monuments, a wildlife refuge, and forest reserves, becoming, as biographer Douglas Brinkley (2009) puts it, the "wilderness warrior." He defended nature for itself, for himself, and for the nation. Roosevelt saw wilderness as the unknown, the unconquered, the not-yet killed. He feared he would miss the opportunity to kill a buffalo. Whether hunting in the West or in Africa, Roosevelt constructed "his manhood by reenacting the white man's evolutionary struggle with the primitive, thereby experiencing true masculinity in its purest, most powerful form … far from the enervating decadence of civilization" (Bederman 1995: 209). In this, as Donna Haraway notes, was a vision of rebirth – self-rebirthing, in an era in which men felt "threatened with the failure of manhood." "In the upside down world of Teddy Bear Patriarchy," Haraway argues, "it is in the craft of killing that that life is constructed, not in the accident of personal, material birth" (1989: 28–29). Roosevelt virulently condemned some of his contemporary nature writers, who did not see the world of plants and

animals as being red in tooth and claw (and whose views might question the morality of hunting), as "nature fakers." Their view of nature did not support the version of true manhood Roosevelt was constructing. Muir saw a different nature than Roosevelt, too, and tried to construct a different version of masculinity upon it. Mostly, Roosevelt claimed nature as trophies that verified a virility he felt was necessary for advancing life and progress in the mechanical age; Muir claimed nature as a set of aesthetic and spiritual wonders that would humble and reconnect men and women suffering from the nervous exhaustion of modern life to the well-spring of life.

Acknowledging the importance of women to conservation and preservation in this period, Rome suggests that the "story of the response of men to the gender anxieties of the decades around 1900 … offers a new way of seeing a formative period in the history of American environmentalism" (2006: 443). Indeed, an anxiousness and unease with prescribed or received gender roles both shaped and propelled environmentalism over the course of the twentieth century, as men and women sought nature – especially in the form of wilderness, but in other places as well, such as suburbs and parks – as both a refuge and a stage upon which to perform new masculine or feminine roles. "To understand the course of environmentalism throughout the twentieth century," Rome insists, "historians need to consider changes in ideas about gender, not simply changes in attitudes toward the environment" (443).

In *Nature's Altars: Mountains, Gender, and American Environmentalism* (2005), Susan Schrepfer shows how women too were reinventing femininity, often right alongside men, on mountains. Vertical space was liminal space for both genders. Female mountaineers could and did make their way into the out of doors on trips into the wilderness, rejecting the dominant command to women of the time to not lead a strenuous life; they often claimed that nature was but an extension of the home – the original home – thus making their presence on the steep slopes natural rather than an affront to men who might otherwise claim those spaces as exclusive domains for masculinity. Schrepfer documents the important role of women in the Sierra Club, the Mountaineers, and other alpine clubs that evolved into environmental organizations. She puts relatively unknown figures like Marion Randall Parsons (the first female member of the Sierra Club's board of directors) alongside the well-known male leaders. The book puts gender – as a set of ideas and expectations constantly being negotiated which were unevenly embraced or placed on male and female bodies – fully in dialogue with the evolving idea of wilderness.

"Protecting wilderness not only saves biological communities and evidence of earlier inhabitants," Schrepfer maintains, "but also preserves centuries of a multilayered, cultural history, of meanings imposed upon meanings, realities laid upon fantasies, and fantasies set against the force of very special places" (2005: 8). In so saying, Schrepfer wedges her own

work against William Cronon's substantial critique of American environmentalism, which he entitled "The Trouble with Wilderness; Or, Getting Back to the Wrong Nature" (1995). For Cronon, the trouble with wilderness had to do with the way that the idea, as a particular narrative told most consequentially by groups of men claiming the American landscape for their own purposes, not least of which was as a space to prove the mettle of their manhood, narrowed the way that environmentalists and Americans at large have imagined themselves in relation to nature. In addition to effectively dispossessing Native Americans, the wilderness idea shut out other stories about how people may value the places around them, even if those places bear human fingerprints. Cronon conceded that Yellowstone or Yosemite may be special places, but pointed out that they are hardly untouched, for they are landscapes forcefully shaped by competing individuals, cultures, and institutions. One thing the new approach has done is to put the State, as an agent that reinvented both nature and social relations with its efforts to manage the landscapes urban nature enthusiasts loved, back into the history of *National* Parks (Jacoby 2001).

Schrepfer, informed by the new historiography, ventures back into this nationalized wilderness that was frequented by the Sierra Club and fellow travelers from the late nineteenth century until 1964 (when the Wilderness Act became law). Everywhere she goes, she spreads a kind of fine chalk, looking for the fingerprints individuals, cultures, and institutions have left in the mountains – and then she looks for how the mountains reshaped gender. She begins with a discussion of place-naming in the Sierras, and shows how a particular form of toponymy toppled Native American place names and as the perspectives of male, Euro-American scientists and mountaineers gained ascendancy. Of 358 summits over 9,000 feet tall, 205 became affixed with the names of Euro-American scientists, climbers, officials, and artists. Schrepfer concludes: "These designations conveyed political and cultural authority, erased the history of the range itself, and decontextualized its topography" – and all in a manner that "celebrated taking possession as a manly act" (2005: 32). Schrepfer wants to understand how the culturally mediated encounters with wilderness reflected and shaped the identities of actual men and women.

In doing so, she does not create cardboard cutouts of men bent on conquest and women finding their feminine essences in the fields of alpine flowers. Instead, *Nature's Altars* documents a range of creative activity and actions in the mountains to reveal how men and women "enjoyed the mountains, and as they did so, constructed their own sense of self" (234). Men and women are depicted as full-bodied human beings performing identities in relation to culturally prescribed norms. Therein lies the gender trouble with wilderness. As the feminist theorist Judith Butler argued in her influential book *Gender Trouble* (1999), there is nothing natural about sex, about "men" or "women" as such. Instead, women are subjects created through

discourses produced in particular historical circumstances. For Butler, gender cannot be separated from the "political and cultural intersections in which it is produced and maintained" (7). Yet, feminism, Butler pointed out, had naturalized women, claiming that they shared an essential body that must be protected from the damaging impact of patriarchy, and ultimately liberated from it.

In "The Trouble with Wilderness," Cronon did essentially the same thing for environmental historians, showing how wilderness discourse created the object it claimed to simply represent. "Wilderness," he argued, "hides its unnaturalness behind a mask that is all the more beguiling because it seems so natural" (1995: 69). As Butler did with "women," Cronon wrote a genealogy of wilderness that revealed that this cultural construction had been naturalized. Not all feminists and scholars involved in gender studies were wild about Butler's social constructivism, but it certainly spread. Not all environmentalists and scholars involved in environmental studies were wild about Cronon's intervention (indeed, it generated forceful blowback), but it has certainly spread as well. Both interventions threatened something held as dear and natural as any origin myth: the essential difference of men and women, on one hand, and the purity and reality of wilderness, on the other. For historians of the environment as well as women, these interventions were at once threatening and liberating.

Out of Schrepfer's narrative comes a full and persuasive account of just how both gender and nature have been constructed. Moreover, she traces the ways the two phenomena have been entangled in generative ways – women and men formed and reformed their identities on the basis of the way they formed and reformed their relationship with nature. She shows how women and men performed gender in the mountains in relation to scripts Schrepfer usefully labels the masculine and feminine sublime. American men such as William O. Douglas, Clarence King, and David Brower "climbed and hiked and wrote of their adventures as ways to simultaneously fulfill and contest complex and contentious ideas of what it meant to be a man. What they sought – variously, the cultivation, the sublimation, the escape from, or the release of, strong emotions – sprang from society's expectations that they struggle with each other and with the natural world" (2005: 233). While men sought granite, women such as Alice Eastwood or Mary Austin tended to look at the life of the mountains, enacting a "feminine sublime [that] coalesced in moments of almost overpowering intimacy with place, moments of keen awareness of the life forces that flowed through the physical world and themselves, verifying the values of nurturance and reproduction that society expected of women" (233). But women also used the mountains to enact dramas asserting their equality with men. Miriam O'Brien, for example, became an accomplished mountain climber. Finding that if any men accompanied her on her ascents primary credit would go to the man, O'Brien helped pioneer manless climbing (118). O'Brien and

other women bagged summits not so much to conquer nature as to transcend society's containment of female power. As Schrepfer concludes, "feminine narratives [of ascents] … emphasized the sensuality of nature, the pleasures of equity, and the desire to escape social strictures" (121).

Nature's Altars goes on to trace how all-female climbing declined in the 1930s and how women lost power within the Sierra Club and other organizations. She shows how gendered expectations about wilderness were inculcated through the Boy Scouts and Camp Fire Girls, whose organizers "believed that gender was biologically determined, but their rhetoric betrayed the fear that gender might be socially constructed." Acting on this fear, the Camp Fire Girls made sure "girls learned domestic skills in the wild" (157). After World War II, American wilderness was reconstructed as an essential component of family life and a key to national identity. On family camping trips, fathers, mothers, and female and male children would learn their proper roles. Schrepfer notes that "philanthropist and eugenicist" Charles Goethe believed that "reenacting the frontier bolstered the family" and sponsored a Sierra Club essay contest to promote this idea (189). A racialist vision was mixed in with Goethe's efforts to bolster (some) families through contact and appreciation with nature. As Alexandra Stern (2005) shows, Goethe and other eugenicists were influential promoters of a whitewashed wilderness. More work needs to be done to show class and racial identities intersected with gendered identities in shaping experiences of and perspectives on wilderness – and nature more generally – in the twentieth century.

In the end, Schrepfer suggests that both masculine ways of regarding wilderness as a pristine and extreme landscape and feminine ways of seeing it in domestic terms as a garden or home coalesced to generate support for the Wilderness Act of 1964. While the Act portrayed wilderness as uninhabited by people, "the act also gave voice to the feminine and domestic sublimes by calling such places communities of life" (2005: 236). This point is crucial to Schrepfer's overall argument. Implicitly, she is arguing that Cronon's critique of wilderness is incomplete because it targets only the masculine version of wilderness. Women had created an alternative view of wilderness that accepted and respected the human history of these places, valued them for their biological as well as aesthetic qualities, and, refusing to draw a line between the human and the natural, saw them as a home. Schrepfer reconfigures Muir as a wilderness enthusiast who combined in his person and ideas the masculine and feminine and forged a "domestic vision of the sublime" (235) – advancing a two-spirited embrace of wilderness.

The fundamental purpose of "The Trouble with Wilderness" was to liberate American environmentalism from the constraining, and problematic, implications of what we may now, in light of *Nature's Altars*, identify as just the masculine myth of wilderness. That view "emphasized the emptiness of wilderness places" (235), holding that the nature that has been uncontaminated by humans is most valuable. The trouble with wilderness was not that it was a

construction of nature, but the particular form that structure had taken. Cronon wanted environmentalists to see the commonplace nature around them as a home; the masculine sublime stood in the way of such a vision, but the feminine sublime opened the door on it, linking in myriad ways the domestic sphere to mountains and wilderness. Muir himself had insisted that "going to the mountains is going home" (Muir 1997: 721).

Scholars working at the intersection of gender and environmental history need to continue to disentangle the strands of masculinity and femininity that have been wrought into the wilderness idea – and into all visions of nature over the course of American history. Each idea and vision became a kind of structure or fence demarcating boundaries between men and women, as well as between races and classes, as they all interacted with each other and the natural world. Men and women both respected at times and willfully transgressed these fences, which were the artifacts of the work gender has done – not, of course, things that nature (or God) had wrought.

Women and Nature into the Age of Ecology

In the postwar period, women and men continued to work to promote and protect wilderness places. Indeed, women were key proponents of the Wilderness Act of 1964. In the context of the Cold War, the Sierra Club, recreational groups, and public agencies suggested as new value wildernesses and parks: places of potential safety for the nuclear family in a nuclear war. This view of wilderness as the last resort for life mirrored views that saw it as an ideal site for weaving and reweaving the gendered strains of family life in less toxic circumstances. But environmentalists at first had little desire to add to the boldness of their own challenges to authorities by associating with other causes, including the feminism born of Betty Friedan's *The Feminine Mystique* (1963). Even mainstream groups well into the 1980s had a youthful, male, and class-based bias.

Women remained strongest when they voiced ecological and domestic concerns. Furthermore, Rome has argued that "the growing discontent of middle-class women" (2003: 527) was one of three key factors that explain why environmentalism took flight in the 1960s. Wilderness environmentalism involved women, but women also pushed for other forms of environmentalism – including concerns over the health of cities and people, the purity of food, and the dangers of pollution and of the fallout of nuclear testing – that harkened back to their earlier twentieth-century roles of municipal and ecological housekeepers. Their concerns and work also raised issues of environmental justice.

On the preservation front, women in the postwar period channeled most of women's efforts into local campaigns, particularly those in defense of families and wildlife, service in secondary rather than leadership roles, and

volunteer rather than compensated professionalism (Riley 1999). Their interests were epitomized by the Mountaineer's Pauline Dyer, a leading lobbyist for the North Cascades National Park (Schrepfer 2005: 223–5; Riley 1999: 186) and feminist, ecologist, and wildlife conservationist Rosalie Barrow Edge. Edge moved in the l930s from advancing women's rights to animal rights. The wildlife protection movement in the United States had since the l880s represented a potentially awkward amalgam of women and men interested in the rights of nature and sportsmen dedicated to protecting game animals and birds. Edge opposed the National Audubon Society's practices of predator control on its own wildlife refuges, a position that elicited sexist language of opposition. In response, she created in New York City her own organization to lobby for the protection of places such as California's Kings Canyon. Edge also established Pennsylvania's Hawk Mountain, the nation's first wildlife refuge for raptors, forcefully arguing for the value of all forms of life. Borrowing language from the future, she might be called one of the nation's first ecological feminists (Schrepfer 2005: 168–71).

While Rachel Carson avoided explicitly claiming a feminist identity (Lytle 2007: 177–8), she embodies the continued role of women and feminine traditions of ecological sensibilities in postwar America. Feminists, as environmentalists, have claimed *Silent Spring* as a benchmark in their own history. Biographer Linda Lear (1997) did not belabor the theoretically feminine nature of Carson's work, but the message was imbedded in her richly detailed narrative of Carson's life. Carson's writings about the sea – *Under the Sea-Winds* (1945), *The Sea Around Us* (1951), and *The Edge of the Sea* (1955) – established her reputation as a naturalist. She hoped that exposure to nature and the idea of ecology might slacken human aggression. Since ecology's etymological roots go back to *oikos*, or home, Carson often spoke of the niches and homes of undersea life in a way that appealed to "a generation of women raised to attach a great deal of importance to their homes as similar places of shelter" (Norwood 1993, quoted in Lytle 1997: 241).

Despite the popularity of her books and postgraduate training in the biological sciences, Carson spent most of her career as an editor with the US Fish and Wildlife Service. She moved from naturalist to social critic with the publication in 1962 of *Silent Spring*. *Silent Spring* questioned the technologies of warfare – from chemicals to aerial bombers – that were being used to fight what they called the "natural" enemies of the nation and traced the toxic poisons like DDT as they coursed through the chain of life – from soils, air, and water, through flora and fauna, to the human body. Familiar with these technologies as a federal biologist, she was sensitized to their impact through private communications from largely female observers of wildlife and gardeners. Poisoned insects brought death to birds, human cancer, and a birdless spring that Carson hauntingly imagined as silent.

With her ecological sensibilities, love of nature, and attention to human life, Carson epitomized the feminine sublime. Maril Hazlett has argued that Carson's work proved that man's control over nature was a dangerous illusion and implied that women and nature might well have the last word. Chemists, industrialists, and public officials accused her of emotional alarmism, hysteria, naïvety, and sentimentalism (Hazlett 2003; Smith 2001). Partly to avoid this trap, Carson did not limit her arguments about the dangers of dominating nature to aesthetic or moral ones. Still, in speaking to a sorority of women journalists, Carson said "I believe it is important for women to realize that the world of today threatens to destroy much of that beauty that has immense power to bring us a healing release from tension. Women have a greater intuitive understanding of such things" (quoted in Rome 2003: 536). Men and women alike believed her, but women – from wilderness trekkers to suburban housewives – found her message particularly telling. Carson "cultivated a network of women supporters, and women eagerly championed her work" (Rome 2003: 536–7). Some of them faced a backlash analogous to the sexist chiding Carson herself experienced; one woman activist opposing road construction was told "Get back in your kitchen, lady, and let me build my road!" (quoted in Rome 2003: 540). Such reactions, while stinging, were taken as invitations to women to further assert their views in the public sphere, now conceived of as an inextricably connected ecological community.

Sparked by evidence presented by Carson and Murray Bookchin (1962) indicting what President Eisenhower called the "military-industrial complex," the political climate of the l960s and 1970s encouraged attacks on the status quo and on authority. In 1967 and 1968 Americans began to speak variously of a "new conservation" or environmentalism. "Ecology" and "environmentalism" floated into popular consciousness as postwar pressures on the nation's forests soon grew to include broader social issues, a global perspective, and the survival of humans along with other species. Concerns about overpopulation, air and water quality, and open space vied with conservation and preservation. Fears about losses of soils and forests, expressed by Marsh, merged with issues of toxicity. The combined anxieties were concretized by space age satellite photographs, one used by David Brower in his 1968 advertisement for an Earth National Park and in analogies between spaceships and what many called Mother Earth.

Nuclear power and weapons were potent symbols of the man-made threat to life on earth. The anti-nuclear movement was propelled by women who also pioneered new forms of politics. Pushing baby carriages and holding pictures of children, Women Strike for Peace organized a protest against nuclear weapons in sixty cities in November of 1961 (Rome 2003: 536; Swerdlow 1993; Garrison 2006). As one participant explained, this movement is motivated by "mother's love of children" (quoted in Rome 2003: 536). Among the most dramatic attempts of men and women to move away from tightly organized and hierarchically ordered movement models

of reformism was the anti-nuclear protest movement that emerged in the 1970s. This direct action campaign adopted what historian Barbara Epstein (1993) views as a feminist model of organization – a grassroots network of volunteers who formed affinity groups that replaced formal hierarchies. Each of the affinity groups constituting the eastern Clam Shell Alliance and the western Abalone Alliances had a purpose, from those who were willing to go to jail to those who would provide legal representation or take care of children left at home.

While some women protested nuclear power because of potential contamination of milk (Wellock 1998: 47) – a food whose special symbolic value and prevalent consumption had long been an issue of particular interest to women (DuPuis 2002; Freidberg 2009) – Carson's exposé of the way that DDT and other pesticides persist on plants and get into the bodies of animals and humans empowered the movement for environmental justice spearheaded by the United Farm Workers. In their grape boycotts, the UFW bridged the gap between workers and consumers – as well as people of color and white middle-class environmentalists (Pulido 1996). In *Inescapable Ecologies* (2006), Linda Nash documents growers' massive postwar use of such pesticides as DDT and parathion in crops across the Central Valley. She compellingly traces the interplay between changing material circumstances and competing ideas of health and the body. Nash presents the voices of afflicted farmworkers and shows how laboratory generated knowledge of chemicals, risk, and health increasingly appeared to be in tension with local and embodied knowledge of the effects of pesticides on workers' health. Nash positions Rachel Carson's powerful challenge to the modern conception of the body as isolated from its environment. Carson's exposé instead presented human beings as porous and thus articulated what Nash calls the "ecological body" (212). While men came to embrace this view, it is also clear that Carson's ecological perspective on life as it was received by middle-class women and mothers, and farmworkers concerned with their own health and that of their children, critically changed the terms in which environmentalism was conceived in the postwar period. Working-class mother Lois Gibbs, in her fight to protect the children of her neighborhood from the toxic legacy of Hooker Chemical Company, furthered this version of environmentalism focused on the home and human health. As Robert Gottlieb (1993) has argued, Gibbs' Love Canal harkened back to early progressive women's activism in "municipal housekeeping," industrial hygiene, street cleaning, and waste disposal reforms. In one of the few works to pursue a full-scale gender, class, and race analysis jointly, Elizabeth Blum (2008) has revisited the Love Canal story to expose its multiple social and political dimensions and tensions.

Rome's point that tracing changing ideas of gender is a key to understanding twentieth-century environmentalism is borne out in other areas as well. For example, the gender dimensions of the radical environmentalism of Earth First! – including the schism in the group – involved tensions between

ecofeminism and the kind of strenuous, "wilderness warrior" identity some maintained in the group. In both activism and scholarship, ecofeminism – in both its essentialist (e.g., Griffin 1978) and more constructivist forms that held that men and women have related to nature differently, but not solely because of biological difference, but due also to social and historical circumstances – has closely linked the politics of gender to the politics of environmentalism. Drawing on an analysis of ecofeminism put forward by Val Plumwood dividing the field into "cultural" and "social" orientations, Elizabeth Blum notes that cultural ecofeminists (like Charlene Spretnak) present "essentialist argument[s]: because of the inherent nurturing capacity of females, goddess worship by women will improve humankind's relationship with nature." Social ecofeminists, like Carolyn Merchant, see "male domination of both women and nature as rooted in cultural and scientific perceptions, including concepts widely accepted as common sense. Changing man's domination of nature, according to Merchant, will involve fundamental cultural shifts in belief systems and patriarchal society" (Blum 2001).

Whether ecofeminist in orientation or not, scholarship putting together work on women's history and environmental history is still nascent. Still, the existing work has allowed us to trace many of the ways that changing ideas about women's place in American politics were crucial to the shaping of environmentalism in the age of ecology. But the scholarship has mostly focused on white and middle- and upper-class women. We are beginning to see more work focusing on women of color and the environment, such as Diane Glave (2006) on African-American women and gardening, Giovanna Di Chiro (2003) on the multiethnic coalition of Mexican, Latina, and Indian women working for environmental justice in the Santa Cruz River watershed, and Nancy Unger (2006), who argues that "the relationships among gender, race, class, and environmental justice activism prove to be … a pervasive force [in American history] from the pre-Columbian period to the present" (17). And while there is a growing literature on masculinity in American history (Bederman 1995; Kimmel 2005; Kasson 2002; Rotundo 1994; Hoganson 1998), much more work needs to be done to show how changing ideas of masculinity also shaped environmentalism if we are to see all of the work gender has done.

The Body Work of Gender

Late in the evening, a mother and daughter, visitors from the United States, watch as clusters of shrouded figures, chadors billowing, glide up the beach, silhouettes against the moonlight on the water. Little ones flitted about as some of the women settled into a seated circle while others swam in the Mediterranean. On that same seaside near the French city of Nice that afternoon, scantily clad Western women had religiously tanned their bodies. Night and day highlight not only what divides women but that which they

share. Most of the world's peoples today see women's dress, deportment, and their very bodies – whether flagrantly or secretively sexualized – as simple products of reproductive roles. Western scholars see such presentations of self as social and historical creations. Neither most people nor Western scholars can, however, deny that gendered differences determine much of the past, as well as the present.

The women of the sun and the women in the dark alike display a quiet affinity with the natural world. The shifting seaside panoramas also remind us that women do, more so than men, represent religious, ethnic, and cultural identities. Their bodies are encrusted with meaning. From endocrine systems to breasts, they are also, however, physically invested in conception, gestation, and nurturing. So too are the bodies of men. American historiography has done little to describe men in their reproductive roles. As the underrepresented role of men's and women's richly encoded presences at Nice suggests, however, women are more apt to be victimized by their bodies than are men. Biological differences and gendered expectations alike can reveal much that has been previously hidden in the historical record.

In his address before the American Society for Environmental History meeting in Baltimore in 1997, Christopher Sellers told scholars to turn their attention to the body in history. "More than ever," as he put it in his subsequent article, "our field requires a more searching and historicizing approach to this most paradigmatic site where our humanity entangles with a nature at once 'us' and 'other' from us" (1999: 486). Environmental historians have heard the call.

Virginia Scharff's (2003c) edited volume, *Seeing Nature Through Gender*, included some of the most distinguished work on gendering bodies in relation to nature. Mark Tebeau's (2003) essay analyzes how firefighters battled to save the buildings and the lives of America's rising and spreading cities. Fires not only shaped the built environment and techniques of firefighting, they fueled the gendering of the masculine identities and the bodies of firefighters. Bryant Simon's essay (2003) illustrates how the New Deal reformers of the Roosevelt administrations not only promoted the Civilian Conservation Corps in order to battle unemployment and rebuild America's infrastructures, but to reshape American manhood. The work constructed men suitable in "body and soul" to defend the nation. Neil Maher has also examined the way "corps bodies" were constructed in nature and in relation to the New Deal "body politic" (2007: 13). Public and private agencies have used environments to gender the bodies of American men and women and have used the resultant landscapes to tell a seemingly naturalized history of the United States. As Peter Boag (2003) cleverly explores, the ethnic and gendered landscape of Mount Rushmore inscribes a national history on the Black Hills, with men's faces carved into the land.

The "natural" body has also been shaped and gendered, physically and culturally, by the food we eat. Douglas Sackman (2003) examined the role of consumption by placing male and female bodies and identities within

daily acts of consumption that reflect their culture's ways of relating to the natural world. While his essay emphasizes the cultural over the biophysical aspects of diet and gendered identity, Sackman concludes by tweaking the constructivist position on gender. According to that view, "First, we have our bodies. Then, after our society toned up our bodies to match expectations, we have our selves." He suggests that "we should not simply conceive of our *bodies* as 'nature' and our *selves* as 'culture,' for nature has been consumed congenitally to form our gendered identities" (187–8).

Scholars of the body are now turning their attention not only to gender as a societal construction but as a designation of the body, ideally transexualized and embedded within systems: economic, cultural, and ecological. Future environmental history might well be informed by transgender theories. Sexuality is fluid and complexly configured, rather than occurring on a spectrum with fixed polarities. As those working in "queer theory" suggest, future historians might well visualize "a polysexual world" (Sullivan 1998). Canadian biologist Bruce Bagmihl demonstrates the males and females of thousands of wildlife species exhibit homosexual behaviors – throwing a monkey wrench into those theories that try to ground "natural" roles for men and women in evolution. Adaptive behaviors now include those that transcend simple visions of male and female roles (Bagmihl 1999: 1, 9).

Nancy Langston's (2003) essay in *Seeing Nature Through Gender*, describing how chemicals move through ecological systems, alarmingly shows how modern American impacts on nature are contributing to a kind of sexual fluidity. She looks at "some transformations in biological constructions of gender since the 1930s" (130) and gives evidence of the elevation of the "natural" levels of sex hormones in the bodies of women and the increased levels of industrial pollutants that mimic female sex hormones. Sex hormones in natural bodies and in industrial pollutants disrupt the endocrine systems that control the biological expressions of gender in animals (if not in humans). She targets the role of endocrine in natural history, and finds sexual changes in species (e.g., the masculinization of fish). Langston has further developed this line of research on chemicals and reproduction in her book *Toxic Bodies* (2010), which "examines the landscape of exposure which begins in our own bodies, and connects us inward and outward, across generations, across ecosystems, and across species." A new frontier of scholarship will look at reproduction in environmental terms, from natural childbirth to contraception as technologies that have environmental and cultural impacts (Burke 2008; Payne 2008; Seltz 2008). Nancy Unger (2004, 2006) has contributed far-reaching work relating sexuality, reproduction, and the fight for birth control to environmental justice.

Richard White's (1995a, 1995b) analyses of knowing nature through labor have also brought the environmental history of the human body into intimate relation to the traditional concerns of labor historians. White notes: "It is ultimately our own bodies and our labor that blur the boundaries

between the artificial and the natural" (1995a: 173). A slew of studies of labor and environmental history appeared in White's wake. Sackman (2000) looked at the work environment and the bodies of workers in the orchards of southern California; Chad Montrie (2008) used a number of case studies to show how labor and environmental history can illuminate one another. Among others, Blum (2008), Sackman (2005), and Montrie (2008), especially in his treatment of slavery and post-emancipation experiences of African Americans in the lower Mississippi, have tried to pay attention to both race and gender in their work, but clearly more attention is needed. Other historians have shown how race and gender have been inscribed on bodies (e.g., Carter 2007), but environmental historians have as of yet done little to illuminate the four-way intersection of race, class, gender, and nature. One promising lead has been developed by Alexandra Stern, who explored the deep involvement of Charles Goethe, a Sacramento businessman and indefatigable eugenicist with personal connections to Nazi scientists, and the Save-the-Redwoods-League. To Goethe, conservation of wilderness was intermingled with his plans to conserve, and improve, the white race. For him, "strict immigration quotas, involuntary sterilization, population planning, Nordic domination, and nature conservation were one and the same" (Stern 2005: 148; see also Unger 2004).

The poster for the interdisciplinary conference on "reinventing nature" held at the University of California at Santa Cruz in 1993 featured a David Robertson photograph of an open field, with an imported door in a frame standing strangely up in the middle. At one point in the conference, Carolyn Merchant reported that someone had wryly speculated that "there is a man behind that door." We will never know for sure, but there is also good reason to suspect that a woman might have been behind that door. As we have shown, women have often envisioned the natural world as a second (or primary) home. In any event, picturing the doorway to a home leading to a field is a fitting metaphor for the prospects of gendered environmental history. We need to open that door, find out who's behind it and who's gone through, and discover what work gender has done as we have crossed the threshold as men and women – and sometimes as married partners – into the rest of the natural world.

Notes

1 This essay has been collaboratively developed. As is often a convention in historiographic essays, we refer to our own works in the third person. In this case, though, the third person is not just a devise, as Sackman wrote about Schrepfer's important book in this field and Schrepfer wrote about Sackman's smaller contributions.

2 Phil Deloria (2009) has developed this comparison as a metaphor for the field of American studies.

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Chapter Eight

Class

Chad Montrie

Early in his long ordeal fighting dubious robbery and murder charges, guards took Italian anarchist Bartolomeo Vanzetti from the Charlestown prison to the Dedham jail and court, to be present at arguments for a new trial. On their route through 1920s Boston, the prison van went by "the Park," the name of which Vanzetti could not remember, but, he later wrote, "the beauty of it, I will never forget anymore." He was not a poet, he regretted, and he was not "so profane to disturb such splendor with my poor ink." Passing the Museum of Fine Arts, near Frederick Law Olmsted's Back Bay Fens, there was even more splendor to observe: "the trees, the bushes, the grass, the rocks, and the brook along the way, on which I was raptured." Drops of dew looked like pearls, the sky was reflected in the seemingly bottomless brook, and the whole scene provoke him to ponder the ancient forces that made the place.

Eventually, on the outskirts of the city, the view from the prison van's small window turned to "little, humble, odd, funny houses," and the people on the streets inspired Vanzetti with a more melancholy sentiment. He spied "two girls of the people going to work" and noted "the lines of sorrow and distress" on their faces as well as "the soberness and suffering" in their eyes. "Poor plebian girls," he lamented, "where are the roses of your springtime?" This observation, one of several of the kind Vanzetti made in letters to friends and other supporters, connected romantic musing about nature with a radical critique of capitalist exploitation. In his mind, the girls' drudgery robbed them of the chance to cultivate their full human potential, to bloom like flowers in their season of youth. Their toilsome jobs had stunted them, and they seemed untouched by the revivifying power of sky, trees, grass, birds, dew, and brook. Because they were wage workers, they were alienated from themselves, their labor, and nature (Frankfurter and Jackson 1997: 84–7).

The irony is that places like the Boston Common, Public Garden, and Back Bay Fens were very much human-made landscapes, molded and planted and maintained to have a certain appearance, in line with ideas closely identified with more privileged citizenry. Likewise, the designers of urban parks meant them to function as a salve to the cuts and scrapes of a brutalizing social order, to thwart rather than encourage those injuries giving rise to change. Perhaps Vanzetti did not know this, but in any case he loved the natural world with a great passion and he regarded that world, even when reshaped by contrary social motives, as the paragon of liberty and justice. The contemporary arrangement of wealth and power interposed various obstacles in the way of people to follow "their natural tendencies – and to fulfill their own virtues, qualities, and capacities," as water is wont to flow down and fire to expand. This, Vanzetti maintained, is why he was engaged in revolutionary struggle (Frankfurter and Jackson 1997: 135).

For environmental historians, examining the link between capitalism and nature, or more broadly speaking, economic change and environmental transformation, is nothing new. Since the founding of our field, many recognized books and articles have paid a good amount of attention to the theme, from Donald Worster's *Dust Bowl* (1979) and Carolyn Merchant's *Ecological Revolutions* (1989) to William Cronon's *Nature's Metropolis* (1991) and Mark Daniel Barringer's *Selling Yellowstone* (2002). Yet often this work has been burdened by a holistic perspective, lumping (as Alan Taylor and William Cronon might say) all of humankind into one undifferentiated group, ignoring the fact and implications of the class divisions so obvious to Bartolomeo Vanzetti (Taylor 1996; Cronon 1990). Recently, though, our scholarship has exhibited an arc of change, embracing class as both a fundamental component of people's experience with nature and a critical category of analysis.

To review that literature, it might be helpful first to attempt a basic definition. "Class" means different things to different people; some social scientists, as well as historians, dismiss the concept outright, as a figment of a misguided, ideological imagination. Others grant its existence yet insist on muddying the water by talking about "social classes," including the now almost meaningless, all-encompassing notion of a "middle class." There is such a thing as class, however, separate from any Weberian-type range of categories that we might invent to make sense of a seemingly fluid social order. And the most theoretically sound and useful understanding of the concept, particularly for anyone seeking out the link between society and nature, is grounded in historical materialism.

The "first premise of all human history," Karl Marx and Frederick Engels once explained, "is, of course, the existence of living human individuals," each of which must work toward satisfaction of needs by modifying the environment. "The first fact to be established," they continued, "is the physical organization of these individuals and their consequent relation to the rest of nature." As people feed, cloth, and shelter themselves, they

transform the physical and organic environment, their productive capacity expands, their social organization changes, their relationship to nature is altered, and they acquire new needs (Marx and Engels 2001: 42, 49). "In creating a nature which is adequate, in producing food which he can eat, clothes he can wear and houses he can live in," philosopher Bertell Ollman later clarified, "man is forever remolding nature, and with each alteration enabling his powers to achieve new kinds and degrees of fulfillment" (1976: 98–9). Concurrently, that productive engagement sustains change in the social life of human beings, which is entangled with it.

At some point in actual human history, knowable only as conjecture, people began to make claims of ownership to the means of production, including land, water, tools, and, in ways that differed over time, one another. This is what gave rise to an assorted set of classes, including master and slave, lord and serf, as well as capitalist and worker, although these were not the only classes of consequence in any one era. Claims of ownership and what that means for class can be complicated, as in the case of a brick mason who owns his own trowel and hod but must use them under the control of a capitalist, relying on him for mortar, bricks, and other materials to make his living. Also, because classes are part of a process of change, like nineteenth-century New England families sending their daughters off to textile mills in order to continue farming, it is not always easy to point to an archetypical example of any one class at a certain point in time or in a particular region or country. But it is possible. By the early twentieth century, when Bartolomeo Vanzetti was imprisoned (and later executed) for being an anti-capitalist immigrant, there were certainly plenty of Americans dispossessed of the means of production, forced to sell their labor power to a mill or factory owner to meet their human needs, and thereby part of a recognizable "working class."

To be sure, there is (or was) some disagreement even between historical materialists. In the introduction to his groundbreaking and highly influential book *The Making of an English Working Class* (1966), E. P. Thompson explained that "class experience" was largely determined by the "productive relations" into which people were born, or entered involuntarily. He stressed, in fact, that class was a "historical phenomenon" that happened in human relationships, "embodied in real people and in a real context." Yet Thompson also confused this definition, contradicting himself in the same two or three pages, causing no end of quibbling and rancor in the decades to follow, by suggesting that class was essentially the same as "class consciousness." Using the gender-specific language of the day, he wrote, "class happens when some men, as a result of common experiences (inherited or shared), feel and articulate the identity of their interests as between themselves, and as against other men whose interests are different from (and usually opposed to) theirs." Class was not a "thing," Thompson maintained – not a matter of "so many men who stand in a certain relation to the means of production" (1966: 9–10).

Responding to Thompson, G. A. Cohen claimed otherwise, stating that "a person's class is established by nothing but his objective place in the network of ownership relations, however difficult it may be to identify such places neatly." Consciousness, culture, and politics, he argued, did not enter into the definition of class position. "Is it not better," Cohen asked rhetorically, "to say that a class undergoes a process of cultural and political formation?" (2000: 73). This is, in fact, an important distinction to make for the American context, which is infamous as an exception to other industrial capitalist nations, for not having a working class that roundly recognized itself as such, supposedly failing to achieve the benchmarks that determine the existence of class consciousness. Even if "American exceptionalism" is true – a claim historians like Eric Foner might debate – Cohen's "structural" characterization insists that a working class still existed.

Drawing these finer theoretical distinctions, although tedious, provides a conceptual framework for better understanding the most germane articles and books by environmental historians and, just as importantly, determining their relevance for our field and other fields of historical study. Not surprisingly, the scholarship is uneven, and more often than not it incorporates class as a category of analysis only implicitly, rather than explicitly, demonstrating extreme subtlety or nibbling around the edges of a larger significance. Yet by addressing various, related subjects, the literature has moved us closer to an environmental narrative with class as a key element. These subjects include slavery and sharecropping, industrialization, wilderness protection and resource conservation, as well as labor environmentalism.

For slavery, the single most important book is Mart Stewart's *"What Nature Suffers to Groe"* (1996), which also happens to be one of the few works in American environmental history that actually treats class as central from the start. "A fundamental argument of this book," Stewart writes in the introduction, "is that planters used the environment and appropriated knowledge about it to reinforce their own class interests, and that slaves created counterstrategies to promote their own interests" (12). In great detail, Stewart explains agricultural and other uses of the Georgia seacoast region, from the end of the seventeenth century to the beginning of the early twentieth century, giving most of his attention to the work of slaves, which he views as an intertwined set of social and environmental relationships made manifest. "In labor on the land, in the development and maintenance of the plantation, and in the performance of the series of production tasks that made up the staple crop regimens," he writes, "the relationships between owner, manager, and slaves, and between all of them and the natural environment, were expressed in concrete terms" (126).

While no other historian has yet to produce a comparable, sustained meditation on slavery and nature for other parts of the American South, a number of scholars have followed Stewart's lead in the examination of slave labor beyond staple crop production. Sometimes with the sanction of their

masters, and sometimes on the margins of planter control, they point out, bondsmen and bondswomen gardened, raised livestock, gathered, hunted, and fished. These engagements with the natural world provided a supplement to otherwise meager diets, deepened ecological knowledge, promoted a spirit of resistance, and framed the landscape as socially contested terrain. Hunting and fishing in particular, Scott Giltner observes in a chapter of *To Love the Wind and the Rain*, were "two potent weapons in the battle of wills between master and slave" (2006: 36). Because they were primarily if not exclusively defined as "male" activities, Nicolas Proctor argues in *Bathed in Blood* (2002), they also enabled slave men to assert a version of "black masculinity," to live out aspects of a gender role that masters and other whites typically denied them as part of their subordination (144).

For sharecropping, the labor arrangement that replaced slavery in the postbellum era, the few scholarly studies with an environmental history bent continue to deal with the intersection of class, race, and gender as they conditioned work. "African American men produced cash crops to support their families after slavery was dismantled," Dianne Glave explains in *To Love the Wind and the Rain*, "while women expanded their roles by cultivating family vegetable patches and continuing to plant ornamental and flower gardens" (2006: 41). The women's activity, Glave's primary interest, was one half of complementary roles, meant to contribute to household productivity, for the family's survival as well as to create whatever opportunities might be made within the constraints of racial oppression and economic exploitation. Likewise, despite restrictive labor contracts and the passage of enclosure or "fence" laws, black men persistently absented themselves from cotton fields and encroached on white-owned property to hunt and fish. They did this, I argue in *Making a Living* (2008), to feed their families, prove their manhood, and carve out a space where they had some autonomy, separate from white landowners.

Of course, concurrent with agricultural transformation in the South and North during the nineteenth century, many Americans experienced dramatic industrial change as well, which altered their relationship to nature. It severed the connection people had to the land through farming and simultaneously stripped them of control over their labor and its products. By the tens of thousands, they left homesteads for urban mills and factories, to work for a wage at machines, under close supervision, through regimented days, turning out textiles, shoes, and other goods for customers they would never know. Increasingly, the native-born working class was joined by immigrants, most with an agricultural background. And so there is an "environmental" element of this dramatic rural-to-urban and farm-to-factory shift.

In *Nature Incorporated* (1991), Ted Steinberg combines the insights of various fields of history to explain New England mill owners' efforts to bring nature under control and create a legal framework to facilitate exploitation of the Merrimack River. This entails some attention to the way

fishermen and farmers were negatively affected by mill dams, as well as the direct action and lawsuits they used to resist the imposition, none of which adequately protected their interests. Mill owners and their representatives, Steinberg demonstrates, managed to alter riparian rights in their favor, including securing official sanction to pollute waterways with production waste, claiming that industry made a greater contribution to the public good. Yet even granting the nearly absolute dominion capital assumed over nature in law, justifying its prominent role in any historical interpretation, this is an incomplete narrative. It neglects to mention the experience of mill workers, most of whom were originally young women, from Massachusetts, New Hampshire, and Vermont, followed by waves of Irish, French-Canadian, and other immigrants.

In the first chapter of *Making a Living*, I attempt to recover the Lowell mill girls' story, particularly the contrast between their lives as part of farm families and their lives as textile operatives. As it turns out, when they began organizing and engaging in strikes, their grievances were not only about wage cuts, increased boardinghouse rates, and long hours, but also confinement within "the massey brick walls of a hateful factory" and a related longing for home. They regarded the landscape they left behind as comparatively more healthful, beautiful, and spiritually meaningful, and they wrote about this as working-class romantics, demonstrating that some industrial workers had an environmental sensibility from the beginning (Blewett 1984: 14).

Similarly, Douglas Sackman examines the way industrialization and class conditioned workers' experience with the environment in "Nature's Workshop" (2000) and *Orange Empire* (2005), both of which focus on California's citrus industry. "Nature's Workshop" makes the observation that human labor mediated between nature in partially mechanized citrus groves (Carey McWilliams' "factories in the fields") and a distant consumer market, turning oranges into commodities but leaving an imprint on workers' bodies. In the more wide-ranging *Orange Empire*, Sackman contests corporate growers' advertisements for their oranges as "pure products of nature," insisting that each carried an alienated part of the arduous labor that sent it from tree to train car to store. That process was facilitated by the creation and maintenance of a racial hierarchy among workers too, along with a wholesale reordering of nature. The Orange Empire hid behind an ideology, he writes, which covered up

> the poorly paid workers who harvested the crops and whose bodies were taxed deeply for this growth; the workers who were rendered "other," naturalized as outgrowths of the crops rather than members of a democracy; the fact that many growers had little or no contact with the soil; the fact that land was falling into fewer hands and being controlled by larger interests; the plunder of aquifers and the alienation from nature that accompanied the ever intensifying commodification of the land. (2005: 176)

Approaching the history of industrial capitalism this way, with class and nature front and center, offers a new perspective on modern environmental problems and the various movements organized to deal with them. In the past few decades a growing number of scholars have challenged or even rejected earlier accounts of these movements concerned almost exclusively or entirely with the likes of George Perkins Marsh, John Muir, Gifford Pinchot, and the rest of the pantheon. They have begun to create a narrative "from the bottom up," acknowledging the role of social stratification and economic exploitation, as well as racism and ethnic prejudice in the development, promotion, imposition, and occasional resistance to new environmental ethics.

Reframing preservation, for example, in "Made by Toile?" (2005), Thomas Andrews explains how work and workers were 'disappeared' from the Colorado landscape, in part if not largely through the invention of the "wilderness" concept. Beginning in the 1870s, he writes, railroad expansion made leisurely tourist travel immensely easier and technological as well as economic change stripped physical labor from its central place in the national identity. Meanwhile, new primitivist ideals about "rugged play" gained traction among the country's elite, who felt the need to prove their masculinity and "Anglo-Saxon vigor." Then, Andrews argues, a notion of the "romantic sublime erased the human presence from the land altogether," despite a long history of human manipulation and transformation (2005: 841; see also Andrews 2003).

Likewise, Paul Sutter's *Driven Wild* (2002) recovers some of the complexity of late nineteenth- and early twentieth-century wilderness protection efforts by linking the campaign to broader social and economic change in the United States. Sutter argues that as more and more Americans were drawn to the outdoors, prompted by the drudgery of factory work and the strains of modern, urban life – and aided by the creation of national and state parks, road building, increased leisure time, and affordable automobiles – the democratization of access to "natural areas" prompted some to push back. When forces conspired to put outdoor recreation "within the grasp of the rank and file of our people," as President Coolidge hoped, Robert Marshall, Aldo Leopold, and others felt compelled to campaign for a wilderness system – expansive stretches of roadless forest, which they came to see as the "new preservationist ideal" (41–2, 239). Modern wilderness advocacy did not arise because more and more Americans began to appreciate the value of outdoor recreation, Sutter suggests, but rather because a small cadre of scientists and conservation group leaders felt provoked and began to fear the consequences of growing interest (20).

In the new revisionist conservation history, elites and common people are also often at odds, which is not to say, however, that farmers and workers failed to understand the importance of husbanding natural resources. In *Common Lands, Common People* (1997), Richard Judd discounts the idea

of George Perkins Marsh as a nineteenth-century conservation pioneer and argues instead that the motives and methods for improving soil fertility, maintaining woodlots, and conserving fish and game were solidly grounded in the communitarian ethics and actual experience of New England's small farmers. Sharing a similar view of the past, in *Crimes Against Nature* (2001) Karl Jacoby gives primary attention to local, rural people who actually worked the land for a living, providing the basis for a "moral ecology" of their own yet setting them up for conflict with conservation laws imposed by the state. At times, they even resorted to what might be called "environmental banditry," covert acts of resistance, usually supported by their neighbors, meant to thwart the good intentions of state technicians and bureaucrats (2).

Yet, according Lawrence Lipin's *Workers and the Wild* (2007), by the early twentieth century the gap between common people and elites on conservation as well as preservation was beginning to close. This was not so much a matter of working people finally finding reason as it was a consequence of profound economic change and the shift from a "producerist" to "consumerist" mentality. During the interwar years, Lipin argues, urban industrial Oregon workers dropped their resistance to holding resources out of production in order to preserve that nature for tourists and sportsmen. They "took to the highways in search of leisure," he writes, "and many became avid sport fishermen and hunters as the purpose or spirit of plebian engagement in those activities was transformed from subsistence to recreation" (12). This new attraction of fishing and hunting for leisure is something I examine in *Making a Living*, focusing on Michigan autoworkers before and after World War II, as more and more of them sought escape from assembly lines and urban landscapes. Prompted by their recreational interests, the book contends, autoworkers began to use local and county chapters of sportsmen's clubs, state and national conservation organizations, and their relatively progressive union to confront the problem of pollution, laying the groundwork for modern environmentalism (see also Maher 2008; Fine 2000).

Another, perhaps indirect approach to examining workers' contribution to the environmental movement is the study of occupational health and safety, or "industrial hygiene," as it was known in the early twentieth century. Some of this literature, like David Rosner and Gerald Markowitz's *Deadly Dust* (1991), Alan Derickson's *Black Lung* (1998), and Linda Nash's "The Fruits of Ill-Health" (2004), simply engages the workplace as part of the environment and assesses the effects various hazards and toxins had on workers' bodies (see also Smith 1987). But in *Hazards of the Job* (1997), Christopher Sellers links industrial hygiene to the development of post-World War II environmental consciousness. "By providing firmer, more broadly legitimate shape to a few chemically induced maladies, through toxicological and epidemiological methods easily extrapolated to a host of

other hazards," he contends, "industrial hygiene investigators set this process in motion" (11). Sellers draws a line between the likes of Alice Hamilton, Wilhelm Hueper, and Rachel Carson, pointing out Hueper's early career studying "the afflictions of workers" and his debt to others with similar interests, as well as Carson's debt to Hueper, who had moved on to head the Environmental Cancer Section of the National Cancer Institute (2).

To be sure, Rachel Carson mostly ignored the concerns of workers in *Silent Spring* (1962), and she seemed to be unaware of the role working people were already playing in environmental campaigns. Environmental historians, however, have begun to recover this missing part of the past. Andrew Hurley's history of Gary, Indiana, *Environmental Inequalities* (1995), was the first to do this, investigating the way race, gender, and class informed "competing environmental agendas" of "specific social groups," including industrial laborers, members of the United Steel Workers Union (xiv). Likewise, in *Environmentalism and Economic Justice* (1996), Laura Pulido examines the United Farm Workers' efforts to organize Mexican and Mexican-American migrant labor, which made their exposure to toxic pesticides a union issue. Both accounts, in fact, insist that workers' environmental and economic concerns were often if not always inextricably linked, and had to be dealt with accordingly (see also Gottlieb 1993; Schwab 1994; Feurer 1997).

With an eye toward opening up a broader perspective on labor environmentalism, Scott Dewey's article "Working for the Environment" (1998) summed up the work of several unions over several decades, establishing the basis for his claim that some unions were "proto-environmentalist." Robert Gordon narrowed the focus again, but pushed forward in time, with separate accounts of the environmental activism of the United Farm Workers and Oil, Chemical, and Atomic Workers (OCAW) in the 1960s and 1970s, one published in *Environmental History* (1998) and the other in the *Pacific Historical Review* (1999; see also Gordon 2004). I then complicated matters with *To Save the Land and People* (2003), questioning the unqualified representation of organized labor as consistently righteous environmental advocates. The book outlines the way farmers as well as deep miners, who were members of the United Mine Workers (UMW), organized to ban strip mining, which not only ruined the land and poisoned waterways but also required many fewer miners per ton of coal mined. Under corrupt leadership during the 1950s and 1960s, the mineworkers' union was hardly a trustworthy and dependable defender of the environment, so its more militant and radicalized members had to organize outside, around, and sometimes against it. Even after 1972, I point out, when reformers took the reigns of leadership, the UMW was forced into compromise by the increasingly dominant surface mining rank and file. This compromise helped undermine the abolition movement and opened the way for weak regulatory legislation.

OCAW's long strike against BASF during the 1980s, which included concerted efforts to suture together an alliance of organized labor and environmental activists, has received a good amount of attention as well (Minchin 2003; Estabrook 2007; Leopold 2007). Leopold tells the life story of Tony Mazzochi, the architect of OCAW's capacity for that sort of coalition building. Although Leopold tends to portray Mazzochi as a lone, prescient visionary confronting resistance from the labor movement and silence from the New Left, neither of which were necessarily the case, his book does add measurably to our understanding of how American unions found and embraced environmentalism.

Part of what makes the class-conscious environmental historiography so significant, in fact, is the demand it makes on us to rethink our understanding of the origins, evolution, purpose, and impact of movements for wilderness protection, resource conservation, urban reform, public health, and environmental justice. Conceptually, there's an obvious need to integrate work or labor, since it was one of the most fundamental if not the most fundamental of ways Americans have known and experienced the natural world (White 1996). Similarly, we must include class as a factor conditioning common people's views of park creation, logging restrictions, fish and game laws, smoke ordinances, water pollution control laws, toxics regulation, and the like. In a sense, all environmental historians have to become social environmental historians, not only cognizant of race and gender (there is still much more to be done in those respects, as my co-authors will surely make clear) but also who controls labor and sets its terms, who owns the land and tools it requires, who has a claim to its products, and what are the consequent class relations in a certain time and place.

Practically speaking, more attention to both work and class leads us to particular revisions in the story we tell about the germination and maturation of environmental consciousness, compelling us to alter our standard periodization, expand our limited list of important historical actors, and modify widely accepted explanations of causation. Dates, names, and other content in the evolving "master narrative," that amorphous thing we are all contributing to constructing, have to change. One way to see this is through a comparison of "environmentalism" as it is now presented in a leading textbook and a popular source reader – Ted Steinberg's *Down to Earth* (2009) and Carolyn Merchant's *Major Problems in American Environmental History* (2005) – and as it might be in the future with the incorporation of insights and arguments in the new literature and other research in the scholarly pipeline.

Like the many other environmental historians he looks to for plotting and filling out *Down to Earth*, Steinberg presents the environmental movement as a phenomenon brought into being by David Brower's Sierra Club fight against a dam in Dinosaur National Monument, in the mid-1950s, and the publication of Rachel Carson's *Silent Spring*, in 1962. Together, the campaign and the book raised people's consciousness, and 1960s social

ferment, a drought, and several televised ecological disasters, as well as a picture of the earth from space, prompted an increasing number of Americans to action, or at least to become members of mainstream environmental groups. In the decade following, Steinberg continues, this constituency demanded and won legislation establishing good (however imperfect) regulatory controls on corporations, helping to lessen air and water pollution and to mitigate other adverse effects of the new consumer society. During the late 1970s and the early 1980s, two groups of "radicals," one at Love Canal and the other in Warren County, also pioneered more militant grassroots environmentalism as well (246–51).

In a different format, with a varied pedagogical purpose, Carolyn Merchant's *Major Problems* touches on aspects of the environmental movement in four separate chapters (one on cities, industry, and pollution, another on the emergence of ecology, a third on water, energy, and population, and a final one on globalization). Each chapter includes a set of primary sources germane to excerpts of secondary sources that follow, and these certainly show some influence of "bottom up" environmental history. Urban pollution, for example, is considered through the writings of Upton Sinclair, Jane Addams, Alice Hamilton, and Dwight Eisenhower, as well as a "black migrant." The examination of globalization, which is as much about environmental justice, is even more diversified, drawing on Ben Chavis, Carl Anthony, Winona LaDuke, and others. Yet Rachel Carson still figures most prominently as the catalyst for making a movement, suburbanization, and highway expansion appear to be the most important social changes prompting environmental enlightenment and activism, the voices of workers and labor leaders are absent, and "radicals" only come on the stage in the last act, talking exclusively about race and gender.

Updating Merchant's and Steinberg's histories with class in mind would, first of all, date the rise and development of environmentalism much earlier than the 1960s. Michigan autoworkers, for one, were already mobilizing through sportsmen's clubs and their union in the late 1940s to deal with municipal and industrial waste in rivers. Coal miners in eastern Kentucky, for another, became active in the 1950s to stop strip mining. And there are other such examples, all of which point to another modification of the narrative about who was responsible for starting and making the movement. Besides Leopold, Brower, and Carson, we also should include the likes of UAW president Walter Reuther, United Farm Workers leader César Chávez, and the head of the Black Lung Movement, Miners for Democracy leader, and reform president of the UMW, Arnold Miller. More importantly, we should recognize the many nameless working-class Americans who provided the basis for environmentalism to happen, by acquiring a grasp of ecological principles, linking those to local as well as national environmental problems, and often connecting the problems to economic troubles, well before 1962.

What motivated people and what they were concerned about is in need of reconsideration too. One of the notions that should receive less emphasis is the overly simple idea, first suggested by Samuel Hays, that environmentalism happened because postwar suburban dwellers finally had the opportunity to care about a bucolic "quality of life." Just as significant as the movement to the suburbs in changing Americans' views on the environment were migration and immigration from countryside to city, often to work on factory assembly lines, which profoundly altered workers' relationship to the natural world. Also, as Robert Gordon points out, working-class Americans did not need affluence and economic abundance, or a sense of ease, to develop an environmental sensibility; many had no other choice but to think a problem through and organize, if they wanted to save their lives (2004: 23).

As it turned out, regulatory legislation frequently failed to aid workers and their allies in dealing with environmental problems, because it was weakened by political compromises and because regulatory agencies were often captured by the industry they were supposed to watch over. So, for example, in the 1960s the UFW sought and won protection for migrant field hands who worked with agricultural chemicals by negotiating good union contracts, prohibiting the use of the most dangerous pesticides, establishing health and safety committees, setting field reentry guidelines, and mandating provision of safety equipment. When these contracts expired, and the union's ranks dwindled, no state or federal law ever protected farm workers as reliably.

This is not to say, however, that organized labor was uninvolved in pushing laws to control pollution and address other environmental problems. In 1965, the UAW hosted a "United Action for Clean Water Conference" toward this end, drawing more than one thousand union members and officials, conservationists, and community leaders. Setting the tone for the meeting, Walter Reuther proclaimed his hope that the conference might mark the "beginning of a massive mobilization of citizens … of a popular crusade not only for clean water, but also for cleaning up the atmosphere, the highways, the junkyards and the slums and for creating a total living environment worthy of free men" (Dewey 1998: 51–2). With the autoworkers union leading the way, during the 1970s, the United Steelworkers, UFW, International Association of Machinists, and the OCAW lent critical organizational muscle and support to a slew of federal regulatory legislation.

At the same time, it was workers who pioneered the perspective and tactics later associated with the "environmental justice" movement. They, not the Love Canal or Warren County activists, were the first environmental "radicals." When underground coal miners came together with fellow eastern Kentucky residents to form the Appalachian Group to Save the Land and People, in June 1965, their very name showed that they recognized the link between environmental and economic concerns. And their grassroots-driven

demand for a ban on stripping, as well as some of the confrontational and illegal methods they used, including blocking bulldozers, shooting at equipment operators, and blowing up mine machinery, put them at cross-purposes with organizations like the Sierra Club. Similarly, the UFW conjoined community organizing with militant tactics to address a racialized economic exploitation and exposure to environmental hazards, an organizing model and frame of understanding later adopted by poor and minority activists dealing with toxic waste.

Undoubtedly, there is much that environmental historians can and must do to bring class into the narrative explaining "environmentalism." That is true for a myriad of other subjects, topics, and themes. Thinking beyond our field, to an expansive history of the United States, we might consider what a class-conscious environmental history means for the stories we tell about politics, culture, and economy in general. Mart Stewart, for example, demonstrates that class conflict between masters and slaves in the antebellum South interfered with efforts to practice soil conservation and implement agricultural innovations, both of which undercut productivity on the region's plantations and heralded the Confederacy's Civil War defeat. Surely there are other observations like this to be made, from the pre-contact era to the present time, connecting class, the evolving human relationship with nature, and a whole host of other historical forces that shaped America and its people.

There are many new paths to go down, by drawing on old and new sources, asking new questions, and making different links between historical facts and interpretations. For starters, only a few environmental historians have spent any significant amount of time at labor archives, like the Archives of Labor and Urban Affairs at Wayne State University, which includes UAW, Teamsters, United Farm Workers, and Industrial Workers of the World collections. These contain official papers, such as meeting minutes, inter-office memos, and speeches, as well as correspondence to and from labor leaders, union officers, and rank-and-file, union journals, and newspaper and magazine clippings. The manuscript collections of politicians, namely members of state legislatures, Congress, and presidents, will yield a rich ore too, offering folders-full of correspondence from constituents (many if not most identifiable by occupation), published hearing testimony, government reports, and newspaper files. There is also a great deal to recover from existing oral history projects of all sorts (e.g., the Federal Writers' Project slave narratives), new oral history interviews, diaries and memoirs (e.g., those written by grassland pioneers), agricultural journals (e.g., *The New England Farmer*), sportsmen's journals (e.g., *The Genesee Sportsmen*), newsletters and popular magazines (e.g., *Time*), and video (e.g., home movies).

These familiar and unfamiliar sources enable us to try our hands at various research endeavors. Perhaps first and foremost in terms of priority, the labor archives, oral histories, correspondence, and other materials could be

the basis for a summary account of labor environmentalism, encompassing the full breadth of organized labor's involvement in environmental reform and environmental justice in the twentieth century. Second, they have the potential to sustain a string of biographies, most of them reinterpretations of people not currently recognized as instrumental to environmentalism – including Walter Reuther but also other leaders who are relatively unknown even among labor historians, like Olga Madar, the United Auto Workers' director of Conservation and Recreation. Third, the sources could be the basis for several focused studies of unions notable for their support or resistance to environmentalism, including the United Auto Workers, United Steel Workers, United Mine Workers, the United Farm Workers, and the Oil, Chemical, and Atomic Workers.

On another track, going to the archives with a new perspective and agenda will allow us to develop a more nuanced, fine-tuned understanding of moments of significant historical change, such as the Dust Bowl and suburbanization. For the most part, to the extent common people figure in existing accounts of these "events," they are lost in a disaggregated whole or serve as merely marginal players in stories that center on elites of some kind. This is not to say that elites do not matter in environmental history with an emphasis on class. Owners, growers, and managers "have" class too, and we would do well to find the sources, ask the questions, and craft the interpretations accordingly. This could change the way we think about nineteenth- and twentieth-century industrialization, for example, as well as the way we regard environmental legislation of the 1970s.

In doing all of this, we will encounter problems and find disagreements. Looming on the horizon, I suspect, is a debate about the salience of "alienation" as a concept for understanding the evolving relationship between humankind and the natural world. In a fairly recent article in *Environmental History*, Gunther Peck argues against it, primarily because it means different things to scholars in environmental and labor history, and therefore "represents an incomplete foundation for intellectual collaboration." Instead, he suggests, common ground is to be found in the "geography of labor," something that comprises "the spatial, material, and cultural connections between nature and labor" and which thereby elucidates "both class formations and changes in the land simultaneously" (2006: 214). It's not entirely clear what this means, but the prominent placement of Peck's essay portends serious engagement.

Another issue that needs to be and probably will be addressed is that environmental historians are far ahead of labor historians in dealing with work, unions, and class than labor historians are in incorporating nature and its significance for people into their interpretations. They have to be more receptive and begin to fill this gap. Labor history is incomplete without environmental history, just as it would be greatly diminished without social history, women's history, the history of race and ethnicity, immigration

history, and the history of technology. "Paying attention to workers' relationship with the natural world," I argue in *Making a Living*, "will alter the way we think about their experiences during industrialization, their changing identities, their varied and evolving culture and values, their efforts to create and maintain unions and other social organizations, as well as their role in politics" (2008: 6).

Despite gaps, difficulties, obstacles, and detours, it seems to me that the fruits of a hybrid history attentive to both class and people's relationship with nature will be worthy of the effort, for both labor and environmental historians. In our own field, drawing on the perspective, insights, and sources of labor history will help us to distinguish "environmental history" from "natural history," to recover the thousands and millions of people besides the luminaries who are part of the past's story, and to recognize the importance of social division and social conflict in the evolving relationship between Americans and the natural world. Once we have moved in that direction, at some point it will not seem so strange to see Bartolomeo Vanzetti and Nicola Sacco listed alongside John Muir and Teddy Roosevelt in a course reader, to mention the Appalachian Group to Save the Land and People in a lecture on the rise of modern environmentalism, or to hear environmental justice activists talk about 1960s United Farm Workers contracts with growers as among the first steps in the contemporary struggle.

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Chapter Nine

Body Counts: Tracking the Human Body Through Environmental History

Neil M. Maher

Introduction

The field of environmental history today is littered with bodies. Environmental historians have written about the bodies of Native Americans, colonists, Western settlers, and slaves. They have researched the history of working bodies and those at play in nature, of urban bodies and those residing instead in the countryside, and of bodies that have destroyed the natural environment and those that have tried to restore it. Male and female bodies have become of interest to the field, along with those that can reproduce offspring and those that cannot. More recently, scholars have explored healthy bodies as well as those that are sneezing, sick, and long past dead. Environmental historians have even made space for bodies in outer space.

Yet unlike cheap dime-store detective novels, which often open with a body, environmental history scholarship did not begin with a focus on the corporeal. During the field's early years, in the 1970s and 1980s, human bodies were often an afterthought, a sideshow for other historical processes taking place in the natural environment underfoot. Since that time, however, scholars in the field have employed human bodies in a variety of ways – as metaphors for larger historical processes, as sites of inscription for broader historical meaning, and as real, physical spaces that serve as categories of analysis for historical events, movements, and periods. Which raises several important questions: How did this gathering of bodies within the field of environmental history become so crowded? Why have human bodies come to embody such a wide swath of environmental history literature? Finally, what does an embodied environmental history mean for the future of the field as a whole?

Before trying to answer these questions, I would like to explain what I will *not* be doing in this essay. First, I have refrained from reviewing the

wonderfully rich and diverse literature on the human body from other academic disciplines that might be of interest to environmental historians; there is just too much interesting scholarship on the body within women's history, gender studies, literary studies, and feminist theory to cover in one short essay (for a good overview of the body as a methodology in other academic fields, see, for instance, Canning 1999). Instead, I have read selectively, focusing on works within the field of environmental history that include some sort of analysis of the human body. Second, this essay is not addressed directly to academics from other fields, though I hope they will find it helpful in better understanding recent developments within environmental history. Rather, my audience is fellow environmental historians who are interested in learning about the historiographical evolution of the human body as a category of historical analysis within our field. Finally, because no other similar essay has yet to be published, what follows is very much a first attempt at opening a dialogue on the body's place within environmental history research and writing.

While the literature on the human body within environmental history is currently diverse, in tracing its evolution since the birth of the field in the 1970s to the present I have identified five general phases, or historiographical eras. A groundbreaking publication inaugurated each of these eras, and in turn encouraged fellow environmental historians to study the human body and its relation to the environment in similar ways. Here I want to emphasize that these historiographical phases do not represent neatly defined schools of academics, each loyal to a specific framework. The literature on the body within environmental history is messier than that, with overlapping chronologies and modes of analysis. Instead, what follows is an admittedly rough roadmap, with intellectual bumps and detours, which categorizes environmental history literature on the human body across both time and historical approach.

Before guiding readers down this body-strewn path, however, it is first necessary to understand the early study of the body outside our field. In many respects, interest in the body as an analytical category in the humanities originated with Michel Foucault, whose work theorizes that the human body derives its meaning from competing powers discoursing upon it. To greatly simplify, Foucault (e.g., 1995) and his followers, including Judith Butler (1990, 1993), view the body as a cultural construct and are intellectually hostile to the idea that bodies can be objectively analyzed as material entities. Powerful social discourses about bodies – not real, physical bodies – matter. While such an approach appealed to scholars in a variety of academic disciplines, early on it posed serious problems for environmental historians, who since the birth of their field in the 1970s have focused much of their historical analysis on material changes in the physical environment. As we will see, environmental historians not only rose to the challenge by incorporating the ideas of Foucault and others into their scholarship.

Perhaps more importantly, the analytical skills and interests of environmental historians made them ideally suited to bringing the material body, slowly but surely, back into historical scholarship.

Bodies as Disease

In 1972 Alfred Crosby put the human body on the environmental history map with the publication of *The Columbian Exchange: The Biological and Cultural Consequences of 1492* (1972). Instead of focusing on the economic, political, or social implications of Europeans' arrival in the New World, as many historians from other historical subdisciplines had done, Crosby explores the biological repercussions of contact between two peoples. In particular, he traces the migration of European plants, domesticated animals, and diseases to the New World and analyzes their devastating impact on Native American societies. It is within his discussion of European diseases in the New World that Crosby introduces bodily history to environmental historians. Because they were physically isolated in North America for thousands of generations, Native Americans built up little resistance to European diseases such as smallpox and measles, with the result that in Central Mexico, for instance, the native population plummeted by approximately 33 percent during the first decade of contact (53). In his final chapter on syphilis, which appears to have been a New World disease that traveled back across the Atlantic to Europe, Crosby incorporates colonial bodies into his history as well.

The publication of *The Columbian Exchange* encouraged several environmental historians to include in their own work an examination of the bodily history of contact. William McNeill's *Plagues and Peoples* (1976), William Cronon's *Changes in the Land: Indians, Colonists, and the Ecology of New England* (1983), Richard White's *Roots of Dependency: Subsistence, Environment, and Social Change Among the Choctaws, Pawnees, and Navajos* (1983), and Crosby's own *Ecological Imperialism: The Biological Expansion of Europe, 900–1900* (1986) all explore the role that European diseases played in decreasing indigenous populations to the point where these native societies were unable to continue their land use practices and in turn became increasingly dependent on European trade. "The demographic collapse which diseases visited upon Indian populations was instrumental in disrupting the Indians' status system so as to encourage their participation in the fur trade," explains Cronon, with the result that "those diseases in turn helped promote European expansion" (1983: 161–2). Similar to Crosby, McNeill, Cronon, and White all rely heavily on anthropological and demographic source materials to gauge indigenous population estimates during the contact period (for an informative discussion of these demographic sources, see Cronon 1983: 226–7).

Carolyn Merchant joined this cohort with the publication of her book *Ecological Revolutions: Nature, Gender, and Science in New England* (1989). Similar to Crosby, Cronon, and White, Merchant examines the consequences of contact between Europeans and New World indigenes and argues that Old World diseases, which decimated Native-American populations, helped foster an "ecological revolution" that radically altered the economy, social life, and environment of New England. Yet Merchant's book pushes beyond these earlier works with respect to the human body. Expanding on the theory, first put forth by Arthur McEvoy (1987) and later elaborated on by Donald Worster (1990), which posits that ecological, economic, and ideological transformations throughout history occur in tandem, Merchant (1989, 1990) adds the fourth category of "reproduction" to this mix (for different variations of this interactive theory of nature, production, and cognition, see McEvoy 1987: 300; Worster 1990). For Merchant, reproduction includes not only what she calls "social reproduction," involving instruction to younger generations regarding daily practices, social norms, and legal-political structures, but also "biological reproduction" resulting in birth. By incorporating reproduction into her work, Merchant expanded the field's narrow use of human bodies as sites for disease to engage as well bodies that are biologically female and socially gendered.[1] Environmental historian Mart Stewart, in his 1991 article "Rice, Water, and Power" and later in his book *"What Nature Suffers to Groe"* (1996), similarly illustrates that diseased bodies moving through the environment are racialized as well.[2] Merchant and Stewart's work encouraged environmental historians to become more conscious about the specific types of bodies peopling their history.

This early research by environmental historians has recently sparked similar scholarship that also examines the body as a site for disease. Conevery Bolton Valenčius's *The Health of the Country: How American Settlers Understood Themselves and Their Land* (2002) examines the various ways antebellum settlers envisioned the landscape of present-day Arkansas and Missouri, and convincingly argues for the existence of a perceptual unity between the natural environment of the frontier and the human bodies settling it. In her chapter titled "Body," for instance, she illustrates how early settlers often viewed malodorous swamps, stagnant air, and unkempt land as not only the cause of bodily ailments but also as analogous to them. Settlers, in other words, viewed landscape features such as swollen rivers as both a cause of similar bodily ailments, such as swollen limbs, and also as signifiers that the land itself was unhealthy. David Igler (2004) similarly expands on this early literature by exploring the connections between bodies and the spread of diseases during the early nineteenth-century rise of international trade across the Pacific rim.

While this inaugural phase of environmental history research on the human body from the 1970s and 1980s narrates the tragic demographic, social, and environmental consequences occurring as Old World diseases

make their way to North American shores, there are, in fact, few real, physical human bodies populating the pages of these works. Alfred Crosby does include a careful analysis of Native American blood types in *The Columbian Exchange* to make the case for the genetic isolation of New World populations (22–30), Cronon (1983: 85–91) and White (1983) do discuss the susceptibility of indigenous bodies to European diseases, and Stewart (1996) thoroughly explores slaves' immunity to certain strains of malaria. Yet all of these works are more about bodily diseases than about diseased bodies. This early school of environmental historians refrains from exploring, for instance, how smallpox and malaria affect the physiology of Indian and colonial bodies and how these very physical changes in turn transform infected cultures. Even Carolyn Merchant's examination of "biological reproduction" is more an examination of gender differences in colonial American society than an exploration of women's physical bodies. Unlike Foucault and his followers, then, the environmental historians from this first historiographical era were not consciously engaging the human body as a category of analysis. Instead, bodies during contact became metaphorical substitutes for disease.

Bodies at Work

This emphasis on bodily diseases within the field of environmental history expanded during the mid-to-late 1990s to include an interest in bodily afflictions affecting the working class. Christopher Sellers was in large part responsible for this broadening from a narrow focus on contact and diseases to include as well the dangers faced by industrial laborers in the twentieth century. In his article "Factory as Environment" (1994), and in his subsequent book *Hazards of the Job: From Industrial Disease to Environmental Health Science* (1997), Sellers roots the rise of modern environmental science in the industrial hygiene movement of the early twentieth century. In both publications, Progressive-era engineers and health professionals such as Alice Hamilton use clinical examinations of workers' bodies to document environmental hazards from dust to noxious fumes to life-threatening chemicals, all in an effort to pass workplace safety regulations. Sellers employs the human body similarly in "Body, Place and the State" (1999b), which roots the rise of modern environmentalism in the legal history of pesticide exposure on postwar Long Island. More than an arena for analyzing disease, for Sellers the human body is a historical agent in its own right, influencing scientific understandings and public policy.

Andrew Hurley followed Sellers' lead by also examining industrial health hazards in his book *Environmental Inequalities* (1995). Yet while Hurley similarly explores workplace dangers, in his case occurring within a US Steel mill during the postwar era, *Environmental Inequalities* pushes beyond Sellers' work by following the factory's pollution out into the community

of Gary, Indiana, where it threatens all citizens' bodily health by fouling the city's air, water, and land resources. As one steel worker explained to a local newspaper, we "were sick and tired of working in pollution and having it follow us home" (Hurley 1995: 78). Tracing these hazards beyond factory walls allows Hurley to unearth competing sets of environmental concerns: white working-class anxiety about workplace health and safety; white middle-class awareness of the threat posed by the factory's pollution to suburban recreational amenities; and finally an African-American realization that dismal working conditions inside US Steel's plant as well as unhealthy living conditions in Gary's ghetto were both part of more endemic racial iniquities plaguing their city. During the 1970s, Gary's charismatic mayor was able to forge a powerful cross-class, multiracial coalition based on these competing environmental agendas, but the economic recession of the 1980s allowed US Steel to break this alliance by claiming that environmental regulations aimed at preserving worker and community health would cost jobs. Hurley's work shows that workers' bodies come in different races, as well as classes, and that environmental historians must pay close attention to these differences both within factories and without.

Arthur McEvoy also expands on Sellers' bodily history of industrial health in his article "Working Environments" (1995). Yet whereas Sellers focuses his research on exploring the factory as an environment, McEvoy instead argues that workplace hazards need to be studied ecologically. Factories, McEvoy insists, are analogous to chaotic uncontrollable ecosystems comprised of workers' bodies, technologies of production, and the legal ideologies that guide them, all of which must be studied holistically. "The key to the approach," McEvoy explains, "is to treat the workplace as an ecological system, of which the worker's body is the biological core" (149). McEvoy thus goes further than Sellers, or Carolyn Merchant for that matter, in promoting the material body, as opposed to social attitudes regarding bodies, as a category of historical analysis. "Thinking about the body in ecological rather than cultural terms," writes McEvoy, "would underscore not the plasticity of our attitudes but rather the constancy of the body's vulnerability to injury" (148–9). McEvoy thus implores environmental historians, for the very first time, to expand their analysis from cultural interpretations of human bodies to include as well more material analysis of corporeal history.

This second contingent of environmental historians writing in the mid-1990s thus broadened the study of bodies within the field from a narrow focus on diseases and contact to a broader interpretation that incorporated workplace dangers and workers' physical health. In many respects this focus on class, and in Hurley's case on race as well, coincided with the broad acceptance of social history as a historical method. Yet while these environmental historians pulled research on the body into the workplace, and then pushed it out again into the surrounding community, there were still few real, material bodies peopling these works. Instead, Arthur McEvoy took a

first step at promoting, on a theoretical level, the use of physical bodies as categories of historical analysis in an effort to historicize workplace injuries. Unfortunately, it would be almost a decade before fellow environmental historians heeded McEvoy's call for a more balanced environmental history of the body that incorporated both material and cultural interpretations.

Inscribed Bodies

In 1995 Richard White broadened environmental history's focus on bodies at work in factories to include as well working bodies in a much wider array of labor settings. In his seminal article "'Are You an Environmentalist or Do You Work for a Living?' (1995a), as well as in his book *The Organic Machine* (1995b), White laments that environmental historians have too often equated bodily work with the destruction of the natural environment. Instead, White argues that by digging, planting, harvesting, cutting, dragging, and even grazing livestock, farmers, loggers, and ranchers learn through their bodies about forests, fields, and plains. "We cannot come to terms with nature," White concludes, "without coming to terms with our own work, our own bodies, our own bodily knowledge" (1995a: 173). In *The Organic Machine*, White extends this argument regarding bodily knowledge to labor that is highly mediated by modern technology, such as much of the work undertaken more recently along the Columbia River with its many dams and power plants. Such a focus on bodily labor, White argues, helps environmental historians to understand better the blurred boundaries between nature and culture while placing humans squarely within the former.

White's work sparked an entire generation of scholarship that focused on bodily labor and the nature-culture question within environmental history. Douglas Sackman, in his article "Nature's Workshop" (2000), and in his book *Orange Empire* (2005), argues not only that orange pickers knew nature through labor, but also that orange groves, much like White's Columbia River, were hybridized landscapes comprised of both natural organisms and artificial technologies. Yet Sackman adds to White's work by incorporating gender and race into his analysis; while men and women handled fruit in different ways in separate spheres – with men in fields and women in packing houses – Chinese, Mexican, and Japanese migrant workers shaped, and were in turn shaped by, the Taylorization of the citrus industry at the outset of the twentieth century. Perhaps most important, Sackman undertakes an extensive analysis of the ways that workers' bodily labor mediated between the nature of citrus groves and the artificiality of the orange market. His work, Sackman concludes, "begins to map how the energy flows of human beings reached into those of the fruit-bearing organisms, melding into conduits of the global system known as 'the market'" (2000: 46).

My own work on the New Deal era focuses less on economic factors than on the political implications of workers' bodily labor. In "A New Deal Body Politic (2002) and *Nature's New Deal* (2007), I examine the bodily work not of those degrading nature, as often happened along White's Columbia River and throughout Sackman's citrus groves, but rather of laborers attempting to restore the natural environment through federal conservation projects. Planting trees, halting soil erosion, and developing parks for outdoor recreation built up the bodies of the more than three million young boys enrolling in the CCC during the Great Depression. While these working-class enrollees, many of whom were recent immigrants, often equated their bulging biceps and renewed bodily health with their development into manhood, the Roosevelt administration employed these same physical transformations for political ends. With criticism of the New Deal increasing during the later 1930s, Roosevelt responded by publicly promoting the Corps' manual labor in nature, and the physical changes such work engendered, as a means of transforming working-class Italian, Polish, and Jewish boys into full-bodied American men. Bodily labor in nature, in other words, helped Roosevelt promote the modern welfare state to the American public.

Other environmental historians continue to build on Richard White's call to examine bodily knowledge about nature. In a chapter titled "Knowing Nature Through Leisure" in his book *Driven Wild* (2004), Paul Sutter argues that the spread of the automobile during the interwar years not only democratized nature tourism by allowing more Americans to physically experience scenic environments, but also, quite ironically, fostered wilderness advocacy as car culture began destroying wild areas. Thomas Andrews explores similar themes across the Colorado Rockies. While Andrews analyzes the bodily experiences of coal miners in his award winning *Killing for Coal* (2008), his article "Made by Toile?" (2005) argues that these miners, along with their physical labor and its effect on the Colorado landscape, all became increasingly invisible as elite tourists flocked to the region by railroad in search of a healthful, scenic retreat far removed from the enervating workplace. These environmental historians have taken Richard White's argument regarding bodily knowledge and transferred it from the realm of labor to the experiences of leisure.

This third generation of environmental historians following Richard White's lead greatly expanded the field's approach to human bodies. Rather than analyzing bodies as sites for disease, or focusing narrowly on the environmental hazards of the factory floor, White and his followers incorporated a much wider array of bodily labor, and leisure, into their historic analysis. The physical experiences of salmon fishermen on the Columbia River, orange pickers in southern California, tree planters during the Great Depression, and even automobile and railroad tourists seeking leisure and health in the great outdoors, all became source material for environmental historians. Yet here again, it was the physical experiences of these bodies,

more than the bodies themselves, that served as categories of historical analysis; the bodies in White's history, and in those that followed his lead, became inscribed with new historical meanings related to class and ethnicity, economics and politics, and work and play. In doing so, these environmental histories nevertheless placed the human body at the very center of the field's longstanding juxtaposition of the cultural and the natural.

Cultured Bodies

While environmental historians have successfully followed Chris Sellers' lead by analyzing working-class bodies, and have also built upon Richard White's scholarship by inscribing laboring and playing bodies with various racial, ethnic, economic, and political meaning, the field as a whole has been less open to Carolyn Merchant's early arguments regarding the importance of exploring the relationship between gendered bodies and the natural environment. During the early 2000s, this gender gap within the field became increasingly obvious, and in response Virginia Scharff and Jenny Price conceptualized, organized, and publicized several panels on gender at two consecutive annual conferences of the American Society for Environmental History in 2001 and 2002. By placing the human body at the very center of their analysis, several presenters on these panels forced environmental historians attending the conference, and beyond, to rethink their approach to bodily history.

Scharff furthered these efforts in 2003 with the publication of an edited volume titled *Seeing Nature Through Gender* (2003b). In the introduction to her collection, she lamented the fact that "environmental historians have failed to see gender at work because they have told, almost exclusively, men's stories and have examined, nearly as exclusively, men's activities" (xv). The corrective, Scharff argued, was not simply to add women's stories and activities to environmental historians' methodology. Instead, environmental history must examine "the ways in which gender conditions historical relations between humans and nature, looking at the intertwined histories of women and men" (xv). Scharff does just this in *Seeing Nature Through Gender*, which includes thirteen essays divided into four parts covering the themes of "Representation," "Consumption," "Politics," and, most importantly for this essay, a section titled "Bodies" that includes four essays on a variety of topics. For the first time since the field's founding in the 1970s, an environmental history collection dedicated an entire thematic portion to the history of the human body.

Whereas Richard White and his followers used the body to explore the relationship between nature and culture, in *Seeing Nature Through Gender* Scharff inserts gender more self-consciously into this theoretical mix. "At a biological level, most human beings encounter the world through bodies

that are pretty much alike but differ according to sexual variation in certain organs that make us male and female," she reminds her readers. "But what those sexual difference *mean* to us – culturally, economically, historically – are questions we work out socially" (xiv). Thus, while being careful to make some room for physical bodies within its pages, it is the cultural meaning of human bodies that dominates *Seeing Nature Through Gender*; only one of the collection's essays, by Nancy Langston, investigates the biological history of the human body.

One of the best examples from *Seeing Nature Through Gender* of a cultural analysis of human bodies is Mark Tebeau's "Scaling New Heights" (2003). Tebeau links the physical changes affecting American cities during the late nineteenth century, which involved new construction materials resulting in much taller buildings, to a new fire ecology that made fighting blazes more dangerous. In response, firefighters not only improved their training techniques, organized their work routines, and added new technologies including longer ladders and special water pumps, but as important also began promoting to the urban public the notion that firefighting was an inherently masculine activity. "In the process," Tebeau concludes, firefighters "not only performed harrowing rescues and authored narratives of manhood in action, but also constructed the boundaries of their occupation as they became icons of safety" (66). As they became manly heroes that protected women and children, in other words, firefighters professionalized firefighting.

Whereas Tebeau's contribution to *Seeing Nature Through Gender* examines male firefighters climbing up ladders, Annie Gilbert Coleman's essay "From Snow Bunnies to Shred Betties" (2003) explores the cultural history of female bodies swooshing down ski slopes. According to Coleman, whereas women in the early postwar era were often stereotyped as so-called "Snow Bunnies" who flaunted their bodily femininity on the slopes during the day and in après ski bars at night, the women's movement of the 1970s, along with a ski industry desirous of selling more lift tickets to women, helped forge an alternative image of the snowboarding "Shred Betty," who embraced instead her athleticism, skill, and professionalism on the slopes. Coleman broadens this cultural analysis of the body in her book, *Ski Style: Sport and Culture in the Rockies* (2004), which traces the chronology of skiing in Colorado from its local origins as a transportation method in the mid-nineteenth century to its current incarnation as corporate industry. Part of this evolution, Coleman argues persuasively, involved the bodily history of imported Scandinavian ski instructors, whose good looks, masculine physiques, and physical athletic prowess on Colorado's mountains encouraged the growth of the ski industry.

Virginia Scharff thus helped foster a new era of scholarship that brought gendered bodies to the forefront of environmental history. Building on the earlier work of Carolyn Merchant, who urged environmental historians to include reproduction in their analysis, the contributors to *Seeing Nature Through Gender* successfully illustrate how human bodies remake

environments, whether deep within the city or high up in the mountains, and in turn how these altered natural environments refashion the social meaning of gender. This cultural turn is perhaps understandable, since the publication of Scharff's collection coincided with the maturation of cultural analysis within the broader history profession. Yet *Seeing Nature Through Gender* also suggests, quite forcefully, that the field of environmental history at the dawn of the twenty-first century had finally embraced the theoretical approach to bodies put forth decades earlier by the likes of Foucault and Butler.

Balanced Bodies

The editors of a special issue of the journal *Osiris* titled *Landscapes of Exposure: Knowledge and Illness in Modern Environments* (Mitman et al. 2004a) were also well aware of the cultural approach, initiated by the likes of Foucault, to studying the human body. Historians of medicine and health, explained the special issue's editors, had a long history of "historicizing scientific conceptions" rather than treating them as objective analytical frames (11). Yet the editors included in the issue, even emphasized, interdisciplinary scholarship by geographers, anthropologists, and historians that also embraced "many kinds of materialist approaches" (Mitman et al. 2004b: 11). The essays in *Landscapes of Exposure*, in other words, not only examine the various social meanings of diseases caused by toxic spaces in modern society, they also trace, for instance, how the biology of specific diseases, the concrete effects of industrial capitalism, and the local ecologies of unique environments physically impact real, material bodies. The resulting volume was thus both an interdisciplinary effort to rejoin the once-separate histories of health and the environment, as well as a conscious attempt to promote scholarship that balanced out the cultural approach found in Scharff's *Seeing Nature Through Gender* with more materialist analysis (Mitman et al. 2004b: 2).

In many respects, such efforts were first suggested, theoretically at least, by Chris Sellers, who served as one of the editors of *Landscapes of Exposure*. In his article titled "Thoreau's Body: Towards an Embodied Environmental History" (1999a), Sellers encouraged environmental historians to bridge the scholarly divide between biological understandings of the human body by scientists such as E. O. Wilson, who see human bodies as primarily natural, and the works of humanists including Michel Foucault who view the body as more culturally constructed through the unequal use of power. In his essay, Sellers attempts this sort of balancing act by undertaking several historical "readings" of Henry David Thoreau's body, concluding that environmental historians "need to open our doors to a holism different from the 'ecosystemic' one" in order to encompass "the full range of discursive registers by which our society comprehends a phenomenon like the body, as 'nature-culture' " (502). The editors of *Landscapes of Exposure*

put this theoretical idea into practice, publishing numerous articles that blended historical analysis of human bodies as both cultural and natural.

Several of the essays in this special issue of *Osiris* were portions of full-length books, later published by environmental historians, that also wove together cultural and material interpretations of the human body. Similar to Conevery Bolton Valenčius's *The Health of the Country*, Linda Nash's *Inescapable Ecologies: A History of Environment, Disease, and Knowledge* (2006) examines the perceptions of early settlers, in Nash's case to California's Central Valley; they, too, envisioned connections between the physical landscape they moved across and the health of their own bodies. Yet Nash traces the subsidence of this belief with the rise of the germ theory, which proved how agents inside bodies, rather than landscape features, miasmas, and humors without, caused disease. As a result of this scientific shift, Nash argues, people lost an important bodily connection to, and useful knowledge about, the natural world. That is until the mid-twentieth century, when the Central Valley transitioned towards industrial agriculture and new concerns about pesticides raised interest once again in links between specific toxic landscapes and bodily health. In the end, Nash argues for a blending of both beliefs – one scientific and the other cultural – in order to better understand the lived experiences of illness. "I do not hew to either a materialist or a cultural approach, nor have I tried to separate the two," she explains. Because understandings of environment and diseases are shaped simultaneously by culture and material realities, she concludes, "these stories need to be told together" (10).

Gregg Mitman also is determined to balance cultural interpretations of public health with material realities on the ground in both his *Osiris* article "Geographies of Hope" (2004) and in his pathbreaking book *Breathing Space: How Allergies Shape Our Lives and Landscapes* (2007). Starting from the assumption that diseases are relational and place-based, Mitman argues that allergies, along with other diseases, are "not separate from the complex of environmental relations – physical, social, economic – out of which [they] came into being" (2007: 253). Illnesses and bodies' reaction to them, in other words, are comprised of both specific, scientific pathogens as well as socially defined spaces. Mitman expertly traces this blend of cultural and material interpretations of allergies through a diverse set of environments from the hay fever retreats of rural New Hampshire to the ragweed-choked vacant lots of New York City. In the latter, scientific breakthroughs in immunology, including the development of vaccines, serum therapies, and pollen maps, tell only part of this history. "Ragweed's migration into the city, and particularly into city slums," explains Mitman, "made it, like certain other neighborhood transients, an 'undesirable citizen' " (69). The bodily experiences of these allergy sufferers, in other words, must be understood as a mixture of material science taking place in immunology labs and cultural assumptions playing out in the urban ghetto.

Michelle Murphy embraced a similar methodological approach to human bodies in her book *Sick Building Syndrome and the Problem of Uncertainty*

(2006). Understanding full well that sick building syndrome is a highly contested illness, Murphy, who co-edited and wrote an essay for the *Osiris* volume, explains that her's is not a history of an idea. "Such an analysis," she explains, "can too easily be interpreted as arguing that indoor chemical exposures were and are not 'real' "(7). Instead, Murphy juxtaposes expert interpretations of sick building syndrome by the likes of industrial hygienists and toxicologists with lay opinions by feminist labor activists and female workers suffering from the syndrome's symptoms in order to historicize how certain chemical exposures became, or failed to become, materialized. In the end, rather than taking sides on whether sick building syndrome is "real" or not, Murphy uses these competing interpretations of bodily illnesses to highlight the uncertainty at the center of the human bodies' very real relationship to both diseases and the environment.

The 2004 special issue of *Osiris* not only succeeded in joining together the history of health and the environment, as its editors intended, but it and the full-length monographs that sprang from its pages also encouraged other environmental historians to more consciously balance cultural and materialist analyses of the human body. Nancy Langston, for instance, who published the article "Gender Transformed: Endocrine Disruptors in the Environment" (2003) in Virginia Scharff's collection *Seeing Nature Through Gender*, completed a book titled *Toxic Bodies: Hormone Disruptors and the Legacy of DES* (2010), which traces the pathways of powerful synthetic chemicals from industrial and urban sites out into the natural environment and then back into our bodies with serious health effects. Ellen Stroud, who in 2003 published a "Reflections" essay in *Environmental History* titled "From Six Feet Under the Field: Dead Bodies in the Classroom," is also currently researching a book on corpses that will, in part, follow toxic substances within the deceased – from pacemakers to mercury teeth fillings – back out into the natural environment through burial and cremation.

Body Counts

The bodies in environmental history have aged quite well. Born in the 1970s and early 1980s as a site through which to study the diseases of contact, they grew up during the following decade as a means of also exploring the hazards of the industrial workplace. In the mid-1990s, environmental historians began inscribing working and playing bodies with economic and political meaning, and by the turn of the century the field embraced as well a wide variety of cultural meanings regarding gendered bodies. All of these different types of bodies crowding environmental history during its youth reflected, to a great extent, the early scholarship within the humanities by Foucault and his followers that interpreted human bodies as shaped by social discourse. It was not until recently that environmental history matured, and, guided by both an interest in analyzing physical changes in the natural world and

increased access to contemporary scientific source materials, began interweaving these earlier cultural interpretations of the human body with more materialistic approaches.

This wide variety of bodies has greatly benefited environmental history. Scholars in the field now have a plethora of bodies, along with a rich array of historic methodologies, to choose from. The result is an increasingly rich literature that examines wildly different bodies across enormously diverse environments. Such developments within environmental history have similarly benefited other academics; environmental historians' obsession with exploring the historic interaction of nature and culture, and the field's recent shift towards rejecting the intellectual dichotomy between the two, has made the field a pioneer in weaving together material and social interpretations of the human body. By incorporating the thinking of Foucault and others and then making it their own, environmental historians have become a model for other historic subdisciplines interested in bodily history.

With such opportunities, however, lurk dangers. Too often since the early days of environmental history its practitioners have been foot loose with their bodies. "People," "humans," "workers," "reproduction," "bodily labor," and "bodily diseases" are just a few of the terms used by environmental historians in their scholarship over the past thirty years to denote analysis focused on some aspect of the human body. Similar to the field's continual conundrum with the term "nature," the human body has become so many different things to so many different environmental historians that it risks becoming everything and nothing at all.

The answer to this problem, it seems, is quite simple. Environmental historians must be better at knowing their bodies. They must be much more precise when explaining what, exactly, they mean when analyzing the history of Native-American bodies in colonial America, or of workers' bodies in a US Steel plant, or women's bodies that are having trouble reproducing, or even when exploring astronaut bodies on the surface of the moon. Only by doing so will environmental historians continue the dialogue begun by Alfred Crosby in 1972 and truly succeed in making bodies count.

Notes

1 For a more recent exploration, outside the field of environmental history, of women's labor, see Morgan (2004). Here, Morgan focuses on both the physical work of female slaves as well as on their biological reproduction.

2 For a more recent study, outside the field of environmental history, of the interrelationship between race, bodies, and disease during the colonial era, see Chaplin (2003). There is also a rich literature on the medical history of slavery and slave-owning cultures in the US South that examines in detail diseased bodies. See, for instance, Curtin (1968) and Klepp (1994).

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Part III

The Nature of American Culture

Chapter Ten

From Wilderness to Hybrid Landscapes: The Cultural Turn in Environmental History

Richard White

There has always been a special relationship between western history and environmental history. The reasons are relatively clear and not very complicated. Some flow from the kind of environmental determinism basic to early versions of western history, from Frederick Jackson Turner through Walter Prescott Webb. Others came from the beginnings of environmental history as an intellectual history of attitudes toward nature and a political history of conservation policy. Nature with a capital N seemed quintessentially western, and because most public lands were in the West, studies of resource policy became, almost by definition, western. Environmental history broadened in the 1970s, 1980s, and 1990s both intellectually, as it concentrated more specifically on how human-induced changes in the physical environment had consequences for human societies, and geographically, as scholars looked beyond the West. There were precedents for both of these developments, of course, but even as this new scholarship developed, it was astonishing how western it remained and how much it still looked at wild and rural areas.

In the late 1990s and in the first years of the twenty-first century, changes in environmental history and in popular environmentalism increasingly influenced Western environmental history. Traditional western topics such as water remained strong as Donald Pisani (2002) published a major study of the early decades of the Bureau of Reclamation, an institution that quite literally remade the West, and so did histories of particular landscapes and places, as can be seen in Richard Francaviglia's *The Cast Iron Forest* (1998). Within both genres scholars continued to pursue questions vital to modern history and the modern West. Donald Worster's (2001) superb biography of John Wesley Powell has shown how much old topics investigated in fresh ways still had to reveal, and Drew Isenberg (2000) drove home the same lesson with his study of an iconic episode in the history of the West: the

near-extermination of the bison. Increasingly, however, newer kinds of studies have been changing the contours of western environmental history.

Some of these changes were obvious and I will only mention them here. The careful work of Martin Melosi and Joel Tarr on urban areas and the vast influence exerted by William Cronon's *Nature's Metropolis* (1991) shifted the focus of many newer studies, including those in the West, to cities, suburbs, urban infrastructure, and to the relationship between urban regions and their hinterlands. Rural studies, following Donald Worster's *Rivers of Empire* (1985), turned increasingly toward the rise of industrialized agriculture, or alternately, its failure to displace smaller farmers in certain places (Stoll 1998; Igler 2001). Another change was the attack, often implicit, on western environmental exceptionalism visible variously in works like Louis Warren's (1997) and Karl Jacoby's (2001) studies of conservation and poaching or Sarah Elkind's (1998) study of urban water systems and water politics in which Oakland and Boston occupied the same analytical space.

But some of these changes are less obvious, and they are the ones that concern me here. The most significant might be called a cultural turn, apparent even in the works of scholars deeply distrustful of cultural history, let alone cultural studies. The second is an emphasis on hybrid landscapes in a way that has created a certain amount of alienation from an environmental movement still fixed on preserving a rather unproblematic nature. The two most obvious manifestations of the cultural turn are an attention to discourse, story, and narrative that is missing in much earlier environmental history and a concentration on hybrid rather than pure landscapes.

When Nancy Langston (2003) summarizes her history of the Malheur Refuge, she begins with stories that various peoples have told of the place and their relation to it over the last two centuries. When Linda Nash (2000) analyzes the Skagit River in Washington, she unravels not a western discourse or a Native discourse about the river, but a tangle of discourses. The analytical insistence on stories and discourses as not only reflecting but also shaping human relations to nature and the idea that at any given time, rather than a single American view of nature, there are competing and complex discourses about nature at work, are fundamental to this cultural turn.

Pursuing the way that people thought about nature and the stories they told about it can yield rethinking of generalizations so common as to have become clichés. Conevery Bolton Valenčius's *The Health of the Country* (2002), for example, calls into question an American alienation from nature by looking at the connections American settlers made between settlement and health. What emerges from this fascinating book is a popular understanding of nature in which human beings, far from being seen as separate from nature, are so intimately attached to it that the qualities of the land show up as the qualities of their body. Their sickness and their health, indeed their very lives, depend on the nature of the country.

A second manifestation of this newer emphasis on culture is the attention given to consumption, or rather the insistence that production and consumption cannot be divorced and need to be analyzed together. This idea is at the core of books like Jenny Price's *Flight Maps* (2000). The birds that give rise to Price's book are natural species, but they are also culturally consumed in ways that affect their lives in nature. Jenny Price gives us cultural histories rather than morality tales that detail our connections with nature in surprising ways, but her birds are intimately tied to our lives largely through consumption.

This cultural turn is bringing modifications in some of the most influential framings of environmental history. In Samuel Hays's (1987) influential dichotomy the difference between postwar environmentalism and prewar conservation in the United States was that conservation was fundamentally about production and environmentalism was fundamentally about consumption. Hays's formulations, here and elsewhere, have been very productive for environmental history, but newer works, some implicitly and some explicitly, offer challenges. Kathryn Morse's book *The Nature of Gold* (2003), for example, never addresses Hays's political point, but it does complicate any easy division of economic activities into separate realms of production and consumption. This wry, funny, perceptive book not only examines the cultural as well as material roots of the Yukon Gold Rush, but also uses the dual nature of miners as producers and consumers to wonderful effect.

A more direct confrontation with Hays comes in Paul Sutter's *Driven Wild: How the Fight against Automobiles Launched the Modern Wilderness Movement* (2002). Sutter takes Hays's formulations as his starting point and treats them with the respect that they deserve, but he modifies them in important ways. First of all, he argues that there was more to early conservation than a concern with efficient production and Gifford Pinchot's maxim that "wilderness is waste." There was within the National Forest Service in particular a focus on social reform, and he puts both Aldo Leopold and Robert Marshall in this reformist camp. Second, he argues that locating the preservationist concern with wilderness in the work of John Muir and the battle over Hetch Hetchy misses the actual genesis of wilderness areas. Leopold and Marshall and others reacted not against production but against the wave of tourism that not only took to the roads but also spurred road building into the last roadless areas of the lower forty-eight states. It was the reaction against automobile tourism rather than the reaction against logging, or grazing, or dam building that produced the call for wilderness areas. Nor were these concerns initially ecological. They were much more social and cultural: the opportunity for a certain kind of experience was being lost. Such an argument leads to his third point, that the modern portrayal of environmentalism as a movement of largely middle-class consumers in opposition to working-class rural residents who depend on public lands

for their livelihood, whatever its truth in particular instances, misses the original concerns of wilderness preservation.

Sutter's formulation makes it clear that arguments about consumption and culture do not all lead in the same direction. Not only Louis Warren and Karl Jacoby, in their influential books *The Hunter's Game* (1997) and *Crimes Against Nature* (2001), but also Ted Catton's *Inhabited Wilderness* (1997) and Mark Spence's *Dispossessing the Wilderness* (1999), both studies of national parks, have emphasized how certain cultural views of nature vary with class and locale. Who gets to define nature is an issue of power with consequences for the lives of working people, Indian people, and residents of areas defined as wild.

The turn toward culture, class, and consumption has reinvigorated studies of wild areas and national parks. Richard Sellars' (1997) study of science in the parks has emphasized the huge role design has played in creating parks that most Americans understand as wild. And not only the work by Sutter, Jacoby, Catton, and Spence, but also David Louter's *Windshield Wilderness* (2006) has emphasized the ways in which a complicated set of social and economic forces goes towards shaping cultural experiences in nature. Recent scholarship emphasizes how, among other things, the western landscape is designed to be consumed by visitors. This consumption is not literal in the way that logging or mining literally extracts landscape elements and carts them away someplace else for use in the production process, but rather it is consumed in place as visitors drive, hike, backpack, catch and release, take pictures, and spend money.

Tourism has become one of the most fruitful sources of newer environmental histories. In very different ways and on different scales Hal Rothman's *Devil's Bargains* (1998) and Bonnie Christensen's *Red Lodge and the Mythic West* (2002) examine the evolution of a tourist West. Rothman emphasizes the pressures that drive this tourism into certain social molds and the costs imposed on residents, while Christensen emphasizes the internal roots of efforts to attract tourists and relatively benign, if funny and self-deceptive, results. Rothman's Las Vegas, which he sees as the great exception to the suckers' bet many western towns placed on tourism, and Christensen's Red Lodge might seem the opposite poles of the western tourist experience, but the two accounts are, I think, reconcilable and quite revealing when read together. Rothman and Christensen never see tourism as a purely cultural phenomenon; they locate it in the political economy of the West. Rothman, here and in his other work, is very much concerned with the labor economies that tourism produces, and Christensen's often very funny account is based on the connections, and the breaks, between modern tourism and earlier modes of production.

Perhaps the most single accomplished text of the cultural turn in environmental history is Ian Tyrrell's *True Gardens of the Gods* (1999). Its basic premise is cultural, and it plays upon two of the books that most informed

early environmental history, Henry Nash Smith's *Virgin Land* (1950) and Leo Marx's *The Machine in the Garden* (1964). It is a compelling transnational history, perhaps the best transnational environmental history, that moves easily and gracefully across the Pacific. The garden was not about discovering an Eden; it was something immigrants would have to construct, physically and culturally, in part by beginning an exchange of species with Australia that continues to this day. It was about balancing economic use and natural beauty. In Tyrrell's compelling analysis, it was the product of middle-class radicalism typified by Henry George, which had human relations with nature at its heart. George had aesthetic as well as economic sympathies with small farming, but it was the danger of the monopolization of land that drove his analysis.

The result, in Tyrrell's telling, was a series of racialized landscapes in which the perceived deficiencies of the early ranchos and later wheat farms and tenant farms of California were, for their critics, inseparable from the fact that Mexicans, Chinese, and Japanese provided their labor. The ideal garden landscape was white. Tyrrell manages quite brilliantly to locate race at the heart of the heart of the classic American agrarian vision, not just in its dispossession of Indian peoples but in the very landscapes that it created and rejected. All landscapes, he argues, are cultural, reflecting in his cases "the racial, class and gender aspirations of the groups that contended for power in California and Australia" (1999: 226).

This newer scholarship emphasizes not just cultural but also hybrid landscapes rather than the wild, rural, and urban landscapes that were once treated as pure types; this often puts these scholars, even those most sympathetic to the political goals of environmentalism, at odds with sections of the modern environmental movement. In a current environmental controversy such as the battle over wild salmon in the Pacific Northwest, for example, the lines are often drawn along a line dividing pure, natural, wild salmon from artificial hatchery-raised salmon. Wild salmon get to stand in for a wild river and hatchery salmon for an artificial river. But Joseph Taylor in *Making Salmon* (1999) explodes such easy distinctions by elucidating the long and tangled history of creating hatcheries on the Columbia, and the even longer history of altered landscapes within the river's watershed. His fish and his river do not fit into existing dichotomies. And it is impossible to distinguish the decline of Columbia salmon, and the hope of their return, from the human conflicts that have shaped the river. Such complicated hybrid landscapes show up repeatedly across the West. Mark Fiege's Idaho in *Irrigated Eden* (1999) and Nancy Langston's Malheur Refuge (2003) are neither conquered nor preserved landscapes. Wild nature constantly intersects with and interrupts the plans of Fiege's farmers, and much of the time Langston's conservationists might as well be farmers or engineers. And, as both Fiege and Langston emphasize, these seemingly isolated local landscapes have far-reaching implications for how we understand, treat,

and manage the world we have helped create. There is a hope in hybrid landscapes. Even a river as compromised as the Los Angeles River, a concrete ditch over much of its course, can return in a hybrid landscape (Gumprecht 1999).

Perhaps the best example of a hybrid landscape in all its complexity appears not in the work of the younger historians I have been discussing here, but in the work of one of the most experienced environmental historians: William deBuys. DeBuys's *Salt Dreams* (1999) is a history of the Salton Sea. The Salton Sea is currently an environmental disaster. It is both a toxic sump and a major stop on the Pacific flyway. It contains several hundred species of birds, the most of any site in North America. The Salton Sea is also an unintended by-product of capitalist development. It would be an almost predictable result of capitalist ambition, spectacularly bad engineering, and guys who had just enough money to attempt something big but did not have enough money or brains to carry it out, if it didn't depend on nature itself to provide the final ingredient. That critical ingredient was an unusually wet year with numerous high water events on the Colorado. In 1906 an irrigation company cut a hole in the bank of the Colorado, and, having miscalculated, was unable to control the cut. The Colorado diverted itself through the cut and for two years flowed into the California desert, creating the Salton Sea before the Southern Pacific Railroad Company succeeded in plugging the hole and diverting the Colorado back into its bed.

An unnatural event created an artificial sea, which, however, mimicked other prehistoric inland seas that had existed in the area. Like these seas, it will eventually evaporate and disappear. Until then it has filled with life, including migratory birds who got to the Salton Sea just in time because the same forces that created it – capitalist agriculture and the engineering that made it possible – were drying up the Colorado delta, which had previously swarmed with life. The Salton Sea, however, was not quite like prehistoric seas, because none of the earlier seas lay below rich agricultural areas and growing towns, which pumped them full of sewage and agricultural run-off. This waste mixed with naturally occurring salts and minerals of the area and created a toxic stew. DeBuys turns a very peculiar place into a wonderfully realized study that speaks to a larger condition.

Hybrid landscapes demonstrate that the sometimes hysterical arguments that a cultural turn will lead environmental history from its roots in material "nature" (itself a cultural concept) into more and more abstract and ethereal realms is unlikely to be true. The non-human world is not about to vanish into culture, as much as our understanding of it continues to be inevitably cultural. Hybrid landscapes strike many as dangerous because they speak to a loss of purity that informed Bill McKibben's bestselling *The End of Nature* (1989). But hybrid landscapes are where we spend our lives, and, as much to the point, where most wild creatures spend theirs.

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Chapter Eleven

American Indian Environmental Relations

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It's an iconic image. A lone Indian paddles a birch bark canoe downstream. The churning river passes through lush forestland and then empties into open water. Pounding drums give way to strings, woodwinds, and horns as the canoe bumps against floating trash and the landscape morphs into a steaming industrial landscape of smokestacks and rusting steel beneath a blood-red sky. The music reaches a hammering orchestral crescendo then fades as the canoe lands on a litter-strewn beach. The camera follows the lone Indian on to the side of a freeway teeming with cars. The music slowly rises as the narrator intones, "Some people have a deep abiding respect for the natural beauty that was once this country, and some people don't." A passenger flings a bag of garbage out a car window; it explodes in front of the Indian, splattering his beaded moccasins. The Indian looks up and slowly turns towards us as the camera zooms in on a single tear running down his cheek. The music swells to a sustained note as the narrator concludes, "People start pollution; people can stop it." The music dies, the screen fades to black, and the logos for the Ad Council and Keep America Beautiful campaign appear.

It all happened in 60 seconds, in an ephemeral television Public Service Announcement (PSA) launched on Earth Day 1971, but that final image – the "Crying Indian" – persists in our cultural memory forty years later. Like all images, this one was powerful in its symbolism and simple in its message. It personified nature and personalized pollution. Public response was overwhelming. The ad won two Clio Awards and spawned several other Keep America Beautiful PSAs, including one in 1974 starring the same Crying Indian, this time on horseback. As he rides through pristine and polluted landscapes the message unfolds: "The First American people loved the land. They held it in simple reverence. And in some Americans today that spirit is reborn.… But all around us are reminders of how far we still have to go,

so everyone must get involved now." And again the camera captures that Indian's single silent tear before fading to black. In 1998 KAB returned to that image in a PSA titled "Back by Popular Neglect," depicting how small thoughtless acts of litter accumulate in an urban setting. The camera follows trash swirling in the wind into the eddy of a bus shelter, then pans upward. There, trash piled at his metaphorical feet, is a poster of the Crying Indian, his photographic tear reminding us of our promise to "get involved now" (Keep America Beautiful, Inc. 2006; Ad Council 2009).

The Keep America Beautiful campaign made the Crying Indian a symbol of American environmentalism and "Indianness," but even that reality was more complicated. Actor Iron Eyes Cody claimed Cherokee and Cree heritage and lived most of his life as an Indian working in Hollywood films and fronting for Native causes. He did good things and believed in the justice of his actions. But Iron Eyes Cody was born Espera De Corti (1904–99), a second-generation Italian, an actor who found his role in life as something he wasn't, yet something he became in every way but birth.

Like Iron Eyes Cody, the Crying Indian image was a cultural product of its time. The image represented genuine public concern over the degradation of the environment, and it signaled the organizational florescence of grassroots and international environmental movements. In their critique of modern Western industrial society, environmentalists looked to indigenous peoples for models of belief and behavior to counteract greed, consumption, and waste, to reconnect people with a sacred, sentient nature. They talked about Mother Earth as indigenous, traditional, and authentic. The 1854 treaty speech of Chief Seattle (Seeathl) of the Pacific Northwest Suquamish and Duwamish peoples became a touchstone of native ecological wisdom for international environmentalism:

> How can you buy or sell the sky, the warmth of the land? The idea is strange to us.… Every part of the earth is sacred to my people.… We are part of the earth and it is part of us.… All things are connected.… Teach your children what we have taught our children, that the earth is our mother. Whatever befalls the earth, befalls the sons of the earth.

While Seeathl did speak about the problematic nature of land cessions and Indian-white relations, the speech popularly attributed to him was the fictional creation of Ted Perry, a writer producing a film script in the winter of 1970–1 for the Southern Baptist Convention. Using parts of Seeathl's speech as recorded by listeners in 1854, Perry crafted his own ecological sermon for the modern age (Kaiser 1987).

In a sense, the Crying Indian and ecological Seattle were born at the same moment for the same cultural purposes, which had little or nothing to do specifically (or exceptionally) with American Indians. In popular culture, image and words became fused with the idea of "Indianness" and "tradition,"

reflecting Western society's needs and ideas about Indians rather than any objective or complicated understanding of Indians or the past. What is equally instructive about the power of these images is how people continue to reference and believe them decades after the truth about each became widely known. Among scholars, environmentalists, policymakers, and native peoples, these images continue to surface as argument or evidence because of their positive associations and power to move people to action.

The Ecological Indian

The trope of the Ecological Indian didn't originate with the Crying Indian or ecological Seattle, but they certainly gave it a public face and mantra for the modern age. The idea of Indians as children of nature or ecological beings goes back to contact (Pearce 1967; Berkhofer 1978; Brandon 1986; Krech 1999). Europeans embraced North American peoples as "Noble Savages" living in a wild "sylvan" state. They idealized them as peaceful (mostly), wise yet innocent, living in harmony with nature and each other, free and simple and unconstrained by the problems (or benefits) of civilized society. Enlightenment thinkers like Michel de Montaigne and Jean-Jacques Rousseau propounded the virtues of peoples living in this egalitarian state according to "natural law" in contradistinction to the despotism of European monarchies and the misery of class and capital, cities and civilization. Theirs was a "pristine" landscape, a wilderness of vast communal resources as opposed to the enclosed and controlled environment of Europe. From the beginning, the image was a critique of what Europeans were not (or had lost), more than a representation of who and what Indians were.

Despite the coexisting "Ignoble Savage" image that always accompanied this intellectualized aura of natural freedom – indeed, that helped justify the very subjugation, removal, and extermination of native peoples time and again – European and then American writers embraced Indians as nature's children, then as nature's stewards. George Catlin's artwork, James Fennimore Cooper's Leatherstocking tales, and Francis Parkman's historical imagination solidified the Noble Indian for a nineteenth-century audience increasingly removed from Indians themselves. As the rapaciousness of conquest became clearer and more violent in the later nineteenth century, as wilderness and Indians appeared to be disappearing in lockstep, progressive reformers used the image to reorient Indian policy, the use of natural resources, and even the nation's youth. Ethnographer and conservation editor George Bird Grinnell, Boy Scouts co-founder Ernest Thompson Seton, conservationist President Theodore Roosevelt, and Dakota physician and pan-Indian activist Charles Eastman each helped transform the Noble Indian into the Indian conservationist. They portrayed "traditional" beliefs and relationships between Indians and their environments as worthy

of emulation by Western society, creating a new narrative about – and use for – Indians (Cornell 1985; Schwarz 1990).

The image of the Noble Indian as conservationist took a decided turn in the countercultural atmosphere of the 1960s and 1970s (Brand 1988; Milton 1996: 109–12). People searching for a new relationship with nature and a set of spiritual values to counter the individualism, political economy, and environmental impact of modern industrial society latched on to the image of the Ecological Indian. Ideals of Indian communalism and ecological relationships rooted in a spiritual harmony with Mother Earth attracted those looking for alternatives. As Sam Gill (1987) points out, the ancient belief in a Mother Earth was more the creation of modern scholars looking for religious universals than a pervasive pan-Indian concept, but it filled important rhetorical and emotional needs. Environmental organizations joined native groups in arguing for Indian rights and an Indian-centered environmental model, and Indians in turn internalized the rhetoric of Mother Earth and the Ecological Indian for their own political and intellectual purposes. Literature, magazines, films, TV, and advertisements cemented this image in the popular mind. Disney's animated *Pocahontas* (1995) and actor/director Kevin Costner's *Dances with Wolves* (1990), with its own version of the Crying Indian, became touchstones for recent generations. "Few visual or textual representations of the Native North American have been as persistent over time as this one has, in one form or another," writes Shepard Krech, "and few others are as embedded in native identity today" (1999: 22).

The Ecological Indian has been a tremendously positive and durable idea, but one that hides as much as it elucidates. Humanitarians, activists, New Age spiritualists, politicians, scholars, and Indians themselves have proclaimed indigenous peoples to be the original conservationists, environmentalists, or ecologists (Overholt 1979; Jacobs 1980; Callicott 1982; Hughes 1983; Booth and Jacobs 1990; Cornell 1990). They cast Indians as "age-old stewards of the environment whose ecological wisdom and spiritual connections to the land" could, if followed, "lead us off the path to environmental destruction." Indigenous people lived in perfect harmony with the Earth, their interactions premised on the spiritual rather than the material. They themselves were "more *of* nature than *in* it," making them "more environmental" than Euro-Americans – a universal trait that remains intact and unchanged. In this view, environmentalism and conservation are culturally inherent and timeless attributes, premodern and preindustrial, and therefore real Indians should be the natural allies of modern environmentalists and the indigenous mentors of ecological scientists (quotes from Nadasdy 2005: 292; see also Krech 1999: 22–3; Callicott 1990).

Despite its positive aspects, critics of the stereotype argue that in oversimplifying and universalizing relationships between any group of humans and their environments we end up flattening the complexity that makes us

all human – the diversity of our cultural beliefs, desires, and actions over time. Their point is not to deny the unique worldviews, spirituality, and positive ecosystem relationships indigenous peoples maintain, nor argue that Indians have nothing to contribute to our modern understandings or lifestyles, but rather that oversimplified stereotypes tell us little specific about Indians and how they actually understand and relate to their environments. Instead, the stereotype creates an idealized system of behavior that is impossible to defend against the record of the past (or present). Humans, like all creatures, have always altered our environments to meet both short- and long-term needs, even when those actions contradict idealized beliefs or experiential understandings of the practical consequences of our actions. At the same time, we adapt to environmental changes, reproduce old beliefs and relationships, and create new cultural explanations for biological processes. Denying human agency or asserting a static rather than reciprocal culture-nature relationship denies people their history, their biological human nature, and their humanity. Ecologists no longer think of ecosystems in terms of climax or stable equilibrium (with humans as intrusive agents), but rather in terms of intrinsic disequilibrium and long-term dynamic flux, with humans as one of those natural forces. Why, then, should we expect cultures to remain impervious to change? (Krech 1999: 23, 26–7; Cronon and White 1986; Martin 1981; Kallard 2000; Flores 2001; Milton 1996: 109–14, 222).

The Ecological Indian stereotype sets indigenous peoples up for extra harsh judgment based on their supposed failure to live up to an impossibly static ideal affixed to them (as well as to nature itself) by "others." Time and again in the modern world, "environmentalists and indigenous people have found themselves on opposing sides in particular environmental struggles" such as anti-sealing and fur campaigns, whaling and fishing rights disputes, and numerous reservation economic development plans (Nadasdy 2005: 292). In some cases, environmentalists have demonized individuals and groups as not being "real" or "traditional" Indians and dismissed their interests as the result of cultural loss and contamination. In this way, they undercut modern Indian authenticity, authority, and sovereignty without completely dissolving the larger (and at times politically useful) image of the Ecological Indian (Waller 1996; Schwarz 1987; Ellingson 2001: 342–70).

As scholars have pointed out, part of the stereotype's limitation (and hence the seemingly endless – perhaps pointless – debate about whether or not Indians were the original conservationists) resides in the problematic use of terms like *ecologist*, *environmentalism*, and *conservation*. While plentiful evidence exists that most Indians had complicated ecological understandings – that is, that they thought about and understood through practical observation the interrelationships between themselves and the various elements of their environments – it is less clear that practically or

spiritually derived beliefs and moral codes (environmentalism) springing from or related to that ecological understanding necessarily translated into either a conservationist (managed sustainable use) or a preservationist ethic, let alone conservation practice (Krech 1999: 23–6). The authors in Minnis and Elisens' *Biodiversity and Native America* (2000) make a strong case for active native intervention in their environments, informed by cultural experience and the desire for biodiversity in subsistence resources, but not necessarily for the conservation of all resources. While we might acknowledge a "spectrum of environmentalism," including the coexistence of complex and contradictory beliefs within native worldviews (Nadasdy 2005), we also would have to acknowledge a similar spectrum in conscious if contradictory actions. Indeed, recent meta-analyses of the ethnographic literature find little systematic evidence of pre-contact conservation by Native Americans, or find that such native resource sustainability was a side effect of low population, technology, or absent market forces rather than conscious management based on an overriding conservation ideology (Smith and Wishnie 2000; Hames 2007; Milton 1996: 112–14, 222).

On the other hand, advocates for Traditional Ecological Knowledge (TEK) make an excellent case for the deep understanding natives have of their local ecosystems and the value of biodiversity, and how that understanding has influenced the development of social and economic institutions (Williams and Baines 1993; LaDuke 1994). As Menzies and Butler argue, "local-level ecological knowledge held by people … rooted in an intimate and long-term involvement in local ecosystems, can be a crucial tool and source of knowledge for long-term sustainability and immediate resource conservation." But they also warn not to "accept unquestioningly" the content or context of that knowledge – that indeed it is local; that it "degrades, changes, and transforms" over time; that is it not science or even the opposite of science, but rather "knowledge and beliefs" handed between generations (Menzies and Butler 2006: 1, 6). A belief about the cause of change between a group and its environment might be culturally serviceable for a time, but it's not the same as understanding the causal ecological mechanisms themselves, especially where the goal (or the argument) is conservation, the conscious sustainable management of resources (Hames 2007). TEK is better at describing a society's knowledge or spiritual values than in demonstrating that society's consistent adherence. The contradictions between knowing and acting (the ideal and the practical) are inherent in all societies, past or present, traditional or modern, and are reflected in longstanding theoretical divides within the social sciences (Lewis 1994; Milton 1996: 37–68).

Whether or not Indians were ecologists, environmentalists, or conservationists is, as Richard White (1997) reminds us, a question fraught with formidable intellectual and methodological problems at best, and a bad question at worst. Among the pitfalls are universalizing an "Indian" worldview,

defining a static "traditional" state, understanding exactly what (and even if) Indians thought about nature, let alone what that nature actually was at any given moment. Most problematic is the tendency to apply modern culturally defined concepts like "environmentalism" or "conservation" (as well as loaded "good-bad" value judgments attached to them) to past native beliefs and actions. These problems become amplified by the vagaries of the interdisciplinary approaches, theories, and sources we use, as well as by the politics of language. For example, to say that Indians were (or are) not "ecological" or "environmentalist" is not to imply that they were (or are) wholly un-ecological or anti-environmentalist, but too often that becomes the simplified political reading, the interpretive bottom line.

Given the continued response to Krech's *The Ecological Indian* (1999), it seems unlikely that such debates will soon disappear (Krech 2007). In part this is driven by the persistent popularity of the Ecological Indian stereotype in the public mind, as well as by the political power that results from its use. But it is also driven by the longstanding distinctions people make between culture and nature (marking them as dichotomous instead of seeing their integration), as well as by the theoretical divide within the social sciences (particularly anthropology) between structuralist and functionalist analyses of culture that tend to privilege either ideology or action – what people think, believe, and imagine (ideational), or what people do in practice (cultural ecology). Both, of course, coexist in dynamic tension, but the relative weight accorded to one or the other analytical framework persists in the ethnographies and histories exploring relationships between native peoples and their environments. Ultimately, we need to recognize how both stereotypes and interpretive suppositions affect the way scholars have addressed the larger historiographic story of Indian environmental relations.

Indians and Environments

Richard White's "Native Americans and the Environment" (1984) is one of the early assessments of the field from an environmental history and ethnohistorical perspective. White identifies the analytical divide between "cultural ecologists" who concentrate on how Indians adapted to and modified their environments (actions), and "environmentalist" scholars interested in what Indians thought about nature (philosophies and beliefs). He acknowledges the reciprocal influences of culture and nature in his historiographic survey, but emphasizes the creative force of culture in mediating how Indians understood and exploited an ecologically defined world. White continued that discussion in two influential essays with William Cronon (Cronon and White 1986; White and Cronon 1988), emphasizing native agency and cultural creativity to counter environmentally deterministic

readings of Indians as passive beings who left no mark on the land. Two recent historiographic essays by Louis Warren (1996, 2002) give an excellent overview of interpretations emerging from environmental history in the last twenty years. There are also a number of useful historical bibliographies with sections on Indian environmental relations (Booth and Jacobs 1988; Prucha 1977, 1982; Miller et al. 1995), as well as online bibliographies (Forest History Society 2004; Dark 2005) to consult for more specific studies.

Textbook surveys reflect the difficulty of generalizing about such a diverse universe of native experiences. Early works by Vecsey and Venables (1980) and Hughes (1983) stressed the notion that Indians operated in an ideational world balanced by spiritual forces. Emphasizing the environmental nature of Indian religions, these works were important in countering the more deterministically functionalist views of cultural ecologists, but left unanswered the extent of native agency and action in environmental change. Survey chapters within broader environmental texts (Merchant 2002; Sowards 2007) do a better job of addressing the range of functional as well as ideational relationships, but are brief by necessity. The most influential of recent surveys is Krech's *The Ecological Indian* (1999), which synthesizes contemporary scholarship about Indian environmental relations, past and present. It has generated productive scholarly debate and sparked intense political backlash, but will remain the signal book in the field for years to come (see Harkin and Lewis 2007). Finally, Ubelaker's (2006) compilation of essays appraising research in archeology, ethnology, biology, human ecology, and history is an impressive survey of human environmental relations in North America, with a prodigious bibliography worthy of its interdisciplinary focus.

Arguments about Indian environmental relations typically begin with questions about Pleistocene Era extinctions and native activities in pre-Columbian North America. The paleontological and archeological records indicate a number of floral and faunal extinctions over the millennia, but those occurring in the late Pleistocene (13,000 years ago) are of particular interest since they coincide with the widespread dispersal of Paleoindians. Mega-fauna extinctions have elicited the most interest – mammoths and mastodons, giant sloths and beavers, camels, horses, and antelope species, as well as predators like the dire wolf and short-faced bear. Paul Martin's "overkill hypothesis" (1984) – that the arrival of efficient, rapacious hunters in an environment where mega fauna evolved without human predation easily explains their demise – has sparked extended debate over evidence of extinction sites, human and animal population numbers, and the political implications of that model for modern native peoples trying to assert their resource management credentials. Alternative explanations posit climate change as a more likely cause of faunal extinctions as a warmer and drier period altered flora habitats necessary for large grazing animals. Recent

scholarship suggests a third possibility – hypervirulent diseases making the leap from humans (or their dogs) to native game mammals, resulting in lowered reproduction rates and population declines (Kelly and Prasciunas 2007). Disease offers a tantalizing, if speculative, explanation that resonates today as flu strains cross species. While no consensus exists, most scholars acknowledge the interplay of factors with humans playing some role. Refining Martin's overkill model based on the ecology of modern prey herbivores, Charles Kay (2002, 1994) posits far smaller herd populations based on climate-limited forage and more natural predators with higher predation rates. In Kay's scenario, the arrival of Paleoindian "super-predators" merely tipped an already tenuous balance, setting off a cascading set of circumstances resulting in Pleistocene extinctions.

What North America looked like and how Indians related to their ecosystems on the eve of Columbian contact is difficult to know with any certainty (White 1997). While variations on the myth of the "New World" as "pristine wilderness" dominated early European descriptions, all evidence indicates that native peoples had been shaping that landscape in fundamental ways for centuries. William Denevan (1992), Charles Mann (2005), and others surveying the interdisciplinary literature suggest that Columbus "discovered" an extensively anthropogenic landscape, a series of domesticated native homelands. Consensus population estimates for the Americas range from 40 to 100 million inhabitants, with 4 to 10 million north of Mexico (Dobyns 1983; Thornton 1987; Krech 1999: 81–4). While mobility and population densities outside major urban complexes limited the intensity of environmental impacts, and cultural proscriptions arising from complex beliefs in reciprocal spiritual relationships elicited a certain environmental management ethos, native populations were large enough, and possessed technologies sophisticated enough, to leave a lasting impact (Warren 2002: 288–91).

Native peoples altered the distribution of plants and animals as they traveled through the landscape, reflecting both the ideational and functional desires of their respective groups. They pursued specific game animals, clearing out core regions and concentrating animals in border buffer zones (Hickerson 1965). In certain cases they overhunted desirable species – for example, seal and sea lion populations and shellfish along the Pacific Coast, or musk oxen and caribou in the Arctic – leading to temporal localized extinctions (Hildebrandt and Jones 2002; Sowards 2007: 19–32; Burch 2007). As fishermen, they could be deadly efficient in constructing weirs and dams. Given the impact on fish-stocks of natural climate events like El Niño, Pacific Coast natives unknowingly could exceed sustainable catches even while observing cultural conventions to let spawning fish pass (McEvoy 1986; Taylor 1999).

Across the continent, Indians consciously selected and relocated seeds and roots of desirable flora, domesticated plant and animal species, and managed complex resource "gardens" in their territories (Nabhan 1985,

1989; Blackburn and Anderson 1993; Anderson 2006). They constructed villages, vast cities, and ceremonial complexes like Cahokia and Chaco Canyon linked by trails and roads, creating extensive trade networks to redistribute natural resources. They terraced and irrigated field systems (like the Hohokam and Pueblos), and thinned eastern woodlands for domesticated crops of corn, beans, and squash (Krech 1999: 45–72; Hurt 1987). They shaped their lands with intentional fires, clearing forests and brush, creating mosaic prairies, and maintaining grasslands for game animals as well as for gathered plant materials and agricultural fields (Lewis 1977; Boyd 1999; Stewart 2002). While many argue that native resource management models were more sustainable than those that followed, Indians contributed directly to deforestation, soil depletion, and erosion; they used up local resources and they moved on, rotating settlements and subsistence activities within defined band territories or expanding into those of others. Rather than a wilderness, Europeans stumbled into an anthropogenic garden they made into wilderness, both rhetorically by denying Indian agency, and practically by biological dispossession (Mann 2005; Cronon 1996).

European colonization had tremendous social, political, economic, and ecological impacts on the Americas. Newcomers brought weapons and steel tools, new flora and fauna including domestic livestock that invaded native habitats, and new ways of seeing and using the land. They also brought diseases for which natives had no developed immunity (Crosby 1972, 1986). Millions died as both direct and indirect consequence. Entire cultures disappeared or reorganized as remnants; others persevered against all odds. Native political economies and resource management systems collapsed or were fundamentally transformed by the introduction of new crops, new animals, new cultural imperatives, and a market economy for native labor, resources, and land that paved the way for war, slavery, further disease, and social disruption (Thornton 1987; Stannard 1992; Verano and Ubelaker 1992; Kelton 2007). Settlements and trails disappeared, brush returned to once-cleared fields and forests, and game animal populations rebounded. Settlers moved in to this widowed landscape and commenced their own culturally defined transformation of the land with plows, livestock, fences, and warfare (Cronon 1983; Silver 1990; Gutiérrez and Orsi 1998; White 1980). But natives were not just victims of an environmentally deterministic biological invasion – their persistence belies that. In the Americas, Indians proactively used European biota, materials, and ideas, in their own ways and for their own cultural purposes, to remake their economic systems (Warren 2002: 292–8). They in turn transformed the world as indigenous resources reached Europe and Asia (Weatherford 1988). Indeed, the larger story of Indian-white relations is one of multilateral exchange and of peoples figuring out how to live and work in proximity to each other.

Indian participation in the fur and hide trade that followed contact has been of particular interest to those studying Indian environmental relations. Ethnographers have documented both practical and spiritual aspects of Indian-animal hunter-prey relations, including general beliefs in the power inherent in all objects, as well as more specific beliefs in the connection and reciprocal obligations between humans and sentient animal beings. Creation stories, hunting preparations and taboos, ritual observances surrounding the kill, consumption, and disposal all attest to native proscriptions against offending animals lest they withhold themselves, leading to human suffering (Vecsey 1980; Harrod 2000; Nelson 1983). How then does such a pervasive ideational conservation ethic square with historical evidence of Indian overhunting as part of the fur trade?

Recent fur trade histories affirm native agency in embracing this new socioeconomic activity – not just being run over by it – and in setting the terms of that labor and market exchange. They also emphasize how Indian participation and cultural choices shaped the environmental outcomes (Ray 1974; Bishop 1974; Tanner 1979; White 1983; Kay 1985). As a counter to functionalist market explanations, Calvin Martin (1978) proposed an ideational explanation for the discrepancy between conservation belief and practice, arguing that Indians came to blame animal spirits for epidemic diseases decimating their villages, and therefore felt justified in waging war on animals for breaching their reciprocal obligation. Martin's thesis met with evidentiary skepticism (Krech 1981), but Robert Brightman (1993) offered a more nuanced argument about how a world structured by spiritual relationships could affect decisions on hunting and conservation. Rock Cree hunters believe they must take all the bounty offered them by animals or risk offending those animal spirits. Fear of losing their favor, paired with a belief in the instant physical regeneration of those animals elsewhere after death, lead Rock Cree to see little rationality in Western notions of resource conservation. Such findings fuel the debate over whether an ecologically based understanding of conservation biology (not just beliefs) was indigenous, or whether it was introduced by Europeans through the fur trade (Krech 1999: 173–209; Feit 2007). Similar debates pervade studies of Northwest Coast Indian fisheries, where evidence for physical conservation practices runs counter to cultural beliefs in the spiritual regeneration of salmon that should render such conscious practices irrelevant (Langdon 2007; Harkin 2007; Sowards 2007: 26–32).

The adoption of horses, particularly by Indians of the Great Plains and Mountain West, is a story of biotic adaptation with extensive ecological and cultural repercussions. Indians domesticated, bred, and traded horses widely. Making room for horses meant altering landscapes to provide pasture, changing the seasonal timing of hunts, reducing or abandoning diversified agrarian pursuits, and placing a greater reliance on bison. Such changes influenced the social and gender organization of groups as well as the

political economy of the region, leading to increased conflict between tribes to control resources (Holder 1974; White 1983; West 1998; Binnema 2001; Hämäläinen 2008). Increased and targeted Indian hunting, combined with the environmental pressure excessively large horse herds put on grassland environments, contributed to the rapid decline of bison (and therefore to native power) well before markets or white hide hunters delivered the final blow. In turn, the disappearance of bison and the invasion of American farmers breaking buffalo grass plains had an overwhelming ecological impact on the region as well as profound consequences for native societies (Flores 1991; Isenberg 2000; Hämäläinen 2003).

By the late nineteenth century, as removal and concentration on reservations became the norm and native populations reached their nadir, American Indians faced the environmental realities of living in restricted spaces according to assimilationist policies. Reservations were isolated "island environments," often representing only a fraction of ancestral homelands. They frequently excluded visible natural resources and arable lands desired by non-Indian settlers, as well as spaces deemed sacred by native peoples. Indian landholdings declined even further with the breakup of reservations into individual allotments after 1887, part of the larger policy of assimilating Indians as independent yeoman farmers at the very moment American farmers were struggling in an industrializing and urbanizing nation (Carlson 1981; McDonnell 1991). Dividing, breaking, irrigating, fencing, and farming what were typically marginal lands in the arid West (lands often better suited to limited grazing) had profound cultural and environmental consequences. Some Indians embraced the new socioeconomic order and attendant ecological changes of farming and ranching. Other individuals and groups selected land allotments for ecological attributes other than farming – to continue hunting or fishing, tending livestock, or simply to evade the authority of the Indian agency – or else they struggled to reinstitute what had been successful indigenous farming methods and crops within a foreign system of monocrop field agriculture. Allotment sales and leasing alienated even more land from Indian control, even as poor irrigation and cultivation practices by Indian farmers and white leasees left soils alkaline or exposed to erosion (Lewis 1994; Iverson 1994; Greenwald 2002; Heaton 2005; Hurt 1987).

In the early twentieth century, dams and Indian irrigation projects moved water out of rivers and onto fields. As non-Indians came to control that water, Indian farms failed and larger reclamation projects and higher dams inundated native villages and fishing sites (DeJong 2009; Taylor 1999; Hunn 1990; Lawson 1982; McCool 1987). Indian and non-Indian owned livestock operations competed with each other and with wildlife for browse and water in forests and arid valleys across the West. Sheep, horses, and cattle altered the ecology of those lands, overgrazing watersheds, tramping riparian margins, speeding the introduction of exotic plant species, and

contributing to increased erosion. Federal livestock reduction programs in the Southwest did little to reverse those processes, but again undercut the ecological adaptations and understandings of Navajo, Tohono O'Odham, and Pueblo ranchers (White 1983; Parman 1976; Dobyns 1981; Fontana 1976). Fire suppression to conserve timber for industry altered Indian-manipulated forest ecologies, allowed dense brush to reinvade forest clearings, and choked out browse (Lewis 1977; Stewart 2002). Indians continued to hunt, fish, and gather both on and off-reservation to supplement meager wage labor economies, but increasingly ran into federal forest regulations and state game laws aimed at conserving wildlife and privileging recreational hunters and fishers over Indian treaty rights (Warren 1997; Jacoby 2001). Indians even ran afoul of conservationists who celebrated their spiritual environmentalism but advocated Indian removal from an expanding system of national parks in order to remake those spaces into uninhabited wildernesses (Spence 1999; Keller and Turek 1998; Catton 1997). These activities altered relationships between Indians and their accustomed environments and resources, including access to places of spiritual power (Basso 1996; Gordon-McCutchan 1995; Gulliford 2000).

Historical research is expanding into Indian environmental relations in the last century, particularly since 1945, and will begin offering more complicated cases against which to gauge both images and theoretical models juxtaposing belief and action. Increasingly, native relationships mirror (in part) the experiences of other rural and ethnic peoples trying to maintain a place and earn a living (Lewis 1995; Getches 1990). Most issues revolve around economic development, natural resource use, and environmental protection, with the distinction that for Indians each of these entails more complicated political, legal, and cultural discussions of treaty rights and religious freedoms, the corporate organization of tribal interests, and the extent of tribal sovereignty. While many of the same environmental issues remain, native relationships with the environment have also changed in fundamental ways. For example, in the twentieth century, Indian populations in the United States have rebounded from a quarter-million to over four million. At the same time, Indian land holdings shrank by 85 percent through allotment and sales before growing again through purchase and repatriation. Since 1950, limited reservation opportunities contributed to an out-migration of residents. Today, a majority of Indians live and work off-reservation, in border towns or regional urban centers. Their environmental relationships with reservation land and resources have grown more removed, but have not disappeared. The environmental realities they face every day are those of urban America – space, pollution, occupational and personal health and safety (Lewis 1995: 437–8; Weibel-Orlando 2008).

Native individuals and tribes continue to rely on the natural resources of their reservations, as well as their off-reservation treaty rights. Hunting and

fishing remain contested issues, from the Makah whale hunts that have so polarized environmentalists and Indians, to fishing rights in the Pacific Northwest and Great Lakes, to Shoshone use of lands claimed in Nevada, to religious freedom issues associated with taking protected species (Taylor 1999; Wilkinson 2000; Nesper 2002; Clemmer 1985). In the arid West, Indian water rights and the environmental impacts of moving water between watersheds are of critical importance as water begins to drive all other forms of economic and urban development and its use has a cascading ecological impact (McCool 2002; McGuire et al. 1993; Burton 1991). The growth of tribal timber industries, oil and gas drilling, and mining coal, uranium, and other minerals on reservations has created economic opportunities as well as environmental nightmares, raising questions of sustainability and trust responsibility (Ambler 1990; Hosmer 1999; Ali 2003). Environmental and recreational tourism on reservations – from resorts and casinos, to big game hunting, to historical sites and cultural experiences, to wilderness adventures – is an emerging industry taking advantage of tribal environments and knowledge (Lewis 1995: 430–3, 438). To balance these competing development approaches, tribes have begun establishing their own natural and cultural resource management programs, as well as environmental standards and oversight agencies, to protect resources and ensure sustainable and culturally sensitive development. That does not mean a resolution to the clash between idealized spiritual relationships and the practical necessitates of making a living from the land (Romero 1985; Lewis 2007; Willow 2009), or that all development will be environmentally responsible. But as Indians trained in such management techniques return to reservations to blend scientific with indigenous knowledge and values, tribes stand a better chance of defining their own working balance in contemporary and future environmental relations.

In the meantime, there are plenty of environmental threats posed to native peoples and lands from both on and off-reservation sources, from the self-interest of state and federal governments, multinational corporations, and even from the short-term interests of tribal governments. Indians confront environmental and health problems associated with mining residuals, landfills and toxic waste sites, air and water pollution, and the threat of radioactive contamination from uranium mining and milling or from nuclear weapons testing and waste storage (Gedricks 1993; Grinde and Johansen 1995; Fixico 1998; Eichstaedt 1994; Brugge et al. 2006; Lewis 1995: 433–7). Indigenous environmental organizations like Diné CARE and individual leaders like Winona LaDuke have emerged to fight from within, to remind native peoples that they have traditions and traditional knowledge to address environmental dangers and sustainable development (LaDuke 1992, 1999; Weaver 1996; Sherry 2002). From without, Indian and non-Indian environmental activists join forces to oppose what they see as the environmental racism of development on reservations and on

peoples unprepared for it. Environmental justice arguments become more complicated – and tangled in identity politics – when development happens to be tribally based and vetted for its cultural cost-benefits (Ishiyama 2003; Lewis 2007; Willow 2009; McGovern 1995). Future scholarship will have to grapple with the ambiguities and contradictions facing indigenous peoples trying to reconcile past and present, trying to define what it means to be "Indian" today and tomorrow.

It's unlikely the old images and theoretical divides will disappear overnight. Indeed, the Ecological Indian has persisted beyond all right and reason, and debates about the ideational or functional nature of Indian environmentalism seem to eclipse the possibility that contradictory beliefs and behaviors can and do coexist. We're still struggling with essentialist images and ideas created at contact, and from there trying to define what is culturally exceptional about Native America (past and present), what is biologically human, and what is both. Indeed, Indian and Euro-American relationships with the environment were (and are) different on both physical and spiritual levels, but that difference does not preclude the human agency and cultural imagination Indians demonstrated before and after contact. In reciprocal fashion they altered and were altered by their ecosystems. They created elaborate metaphysical landscapes and relationships within dynamic cultural and biological systems. They observed, experimented, likely failed at moments, but discovered what worked for them, and passed that wisdom along. Where we run into trouble is reading an unbroken past or "tradition" into the present, or trying to read the present into the past. From there, culturally valued judgments politicize the debate, leaving us with Ecological (or Unecological) Indians as the point of analysis rather than as a cultural artifact. In between we sometimes forget the variability and complexity that is the human (not to mention individual) experience, as well as the magnitude of historical and cultural changes we too-casually cross over with terms like *contact*, *invasion*, *settlement*, or *conquest*. Moving beyond the static images and binaries, carefully unwrapping evidence from theory and culture from nature based on ethnohistorical evidence, historians will continue uncovering that messy human middle, the part our discipline is best equipped to explore.

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Chapter Twelve

Cultures of Nature: To ca. 1810

Matthew Dennis

In the beginning all the world was America.

(John Locke 1690)

By the time that the English political philosopher John Locke wrote these words, in fact much of North America was no longer "America" – if what he meant was a pristine, untransformed state of nature. Permanent English settlement was nearly a century old, other Europeans had colonized the Americas even earlier, and Native people had lived on – and altered – the continent for thousands of years. If America qualified as a "New World" in the colonial period, it was only because colonization remade it into something as novel to Indians and to Africans as it was to Europeans. The landscape was, inextricably, both cultural and natural, the result of a varied and longstanding human dialogue with nature.[1]

Locke invoked the opening lines of Genesis here to theorize not about the Creation itself but about the origins of civil society. Others before and since – both those who imagined America as a Paradise and those who saw it as the Devil's Den – have seen the continent almost uniformly as a place demanding transformation. Citing a later passage in Genesis, the founding leader of Massachusetts Bay, John Winthrop, justified the Puritan colonial enterprise in 1629 by stating, "The whole earth is the lords Garden & he hath given it to the sonnes of men, wth a general Condition, Gen: 1, 28. Increase & multiply, replenish the earth & subdue it." Failing to acknowledge the environmental alterations or property claims of America's Native people, Winthrop compared the tired, scarce land of his native England with the rich, abundant land of New England. He asked, "why then should we stand hear striveing for places of habitation … and in ye mean tyme suffer [permit] a whole Continent, as fruitfull & convenient for the use of man to lie waste wthout any improvement?" (Winthrop 1864–5). Winthrop thus

imagined the land as primeval and essentially vacant, and he justified colonization by means of a mistaken view that it was not owned legitimately by its Native occupants because they had not altered – or "improved" – it. God's promise, Natives' alleged neglect, and Puritan diligent improvement authorized Puritan land claims and underwrote their Bible Commonwealth.

Americans would continue to see the continent as a magazine of resources and commodities and justify its expropriation through its exploitation and transformation. Simultaneously, they would ascribe religious and ideological value, and sometimes beauty, to that landscape, using it and their own status as legitimate possessors to craft an identity and assert their status as Christians and, later, United States citizens.

Over the past generation, scholars of early America have focused on the constructed quality of the North American landscape and linked their examinations of nature with the study of colonial and early national culture, society, politics, law, science, and economy. Often cited is the English literary critic Raymond Williams' point: "the idea of nature contains, though often unnoticed, an extraordinary amount of human history" (1980: 67). Early American historians have noticed. Williams writes, "*Nature* is perhaps the most complex word in the language"; "any full history of the uses of *nature* would be a history of a large part of human thought" (1976: 186). That clearly is beyond our capacity here. But we should acknowledge Williams' caution. Because *Nature* "is a word which carries, over a very long period, many of the major variations of human thought, often, in any particular use, only implicitly yet with powerful effect on the character of the argument, it is necessary to be especially aware of its difficulty" (1976: 189).[2] This essay is a partial exploration of that difficulty – for early Americans and the scholars who have studied them.

Mostly, historians have not set out to write directly about colonial American and early national conceptions of nature.[3] Those who consciously and directly confront the question tend to focus on "wilderness" (Nash 2001; Lewis 2007: esp. 15–72; Cronon 1995). While their insights are significant, their work is less than comprehensive in two significant ways. First, the identification of North America as wilderness is itself problematic, and an exclusive focus on the wild places of the continent leaves too much out. It risks a misrepresentation of Native landscapes, which looked wild to newcomers but which had been transformed purposefully for generations before the advent of European colonization. And it potentially misses analysis of those spaces altered and "improved" by white settlers as well, including farmsteads, towns, and cities, where nature remained despite substantial environmental modification. Second, the conventional sources of an older intellectual history often fail to yield insight into the worldviews, beliefs, and environmental practices of diverse common people, particularly those who left no written records. What did they think about wilderness? More

important, what did they think about the natural world around them, in burgeoning seaports, rural towns, piedmont farms, tidewater plantations, or backcountry settlements?

The answers to this difficult question are tentative and emerge from a disparate set of writings, some of which are consciously construed as environmental history, many of which are not. The larger picture that appears from these works suggests that American colonists and then citizens of the new United States saw nature most simply as the non-human material world, sometimes even when occupied (and altered) by other humans demeaned as savage or primitive. Nature was a space and force that exhibited patterns but that was also disordered and unstable; it was a realm of potency, danger, and opportunity. This world was natural not only because it was understood to be void of human transformation but also because it was filled with the supernatural – it was a world of wonders. White inhabitants saw it as their challenge – and main chance – to subdue, order, and exploit the natural world. They hoped to gain both materially and spiritually in the colonial period, and later in the early American republic their motivations were complicated by additional political, economic, scientific, and aesthetic objectives. Americans' transcendent goal was "improvement" – to tap the country's "natural resources," transform chaos into order, domesticate wilderness, remake it into a Promised Land, and subdue the continent's contested terrain and integrate it into a nation, an "empire for liberty."

"Discovery" and Invention of American Nature

We all know that "in 1492, Columbus sailed the ocean blue." But the admiral's mind mostly focused on green and gold. On October 12, he made landfall, and on the next day his journal described the terrain and natural world he had entered: "This island is fairly large and very flat. It has very green trees and much water. It has a very large lake in the middle and no mountains and all is delightfully green" (Columbus 1969: 57). Perhaps the tropical greenness of this new world thrilled Columbus, but his descriptions of nature are strikingly vague and unimaginative. More intent on identifying commodities – particularly gold – and envisioning a new, lucrative commerce, he spent little time sketching the islands' topography and natural communities. Columbus was a poor naturalist. He displayed little motivation for natural description and lacked the vocabulary to do the new world's ecology justice, even when he seemed genuinely moved by scenes of beauty. He resorted, repeatedly, only to the most bland descriptors, occasionally commenting on a plant's similarity to (or difference from) an old world species, and he could usually find no better way to elaborate or intensify his characterizations than to insert the adverb "very," usually following the color green: "very green trees" (October 12 and 13), islands

"very green and fertile" (October 15), "many trees, very green and tall," "everything … "so green and lovely" (October 19), and so forth (Columbus 1969: 53, 62, 68; Sale 1990: 74–122).

Tzvetan Todorov, the Bulgarian-French philosopher and literary theorist, in *The Conquest of America* (1984), is less dismissive of the admiral's descriptions of nature and his pleasure in the face of the islands' natural beauty. He credits Columbus with "the intransitive admiration of nature, experienced with such intensity that it is freed from any interpretation and from any function" (23). Indeed, he quotes a passage from Bartolomé de las Casas, *Historia de las Indias* (1527–63), recounting Columbus's third voyage, which even seemed to suggest the admiral's preference for pure beauty over utility: Columbus "said that even if there were no profits to be gained here, if it were only the beauty of these lands … they would be no less estimable" (Todorov 1984: 23). But Columbus himself recognized the inadequacy of his own description. He wrote, "in order to make unto the sovereigns an account of all that they were seeing, a thousand tongues would not suffice to express it, nor his hand to write it, for it appeared that it was enchanted" (November 27, 1492) (Todorov 1984: 24). Columbus's aesthetics of nature were ultimately conflicted and defeating and led nowhere. His observations could serve pragmatic purposes (navigation or colonial development), advance mystical, "finalist interpretation" (in which signs confirmed beliefs and prophesies), or, in contradictory fashion, express an "absolute submission to beauty, in which one loves a tree because it is lovely, because it *is*, not because one might make use of it as a mast for one's ship or because its presence promises wealth," according to Todorov (1984: 25).

In the end, Columbus's pragmatic, materialist purpose prevailed. As the Italian scholar Antonello Gerbi concluded, Columbus's interest in the natural world proved "strictly subordinate to his ambitions" (1985: 18). Despite the admiral's Christian mysticism and occasional captivation, his view of nature was predominantly instrumental, his approach utilitarian. Greenery enthralled him most when he believed it contained "many trees and plants grow there which will be highly valued in Spain for dyes and for medicinal spices" (October 19, 1492) (Columbus 1969: 69). Trees brought him "joy and pleasure" because "there could be built here as many ships as desired" (November 25, 1492) (Columbus 1987: 116). Even the people he encountered seemed most intriguing when they evidenced the presence of gold nearby: "San Salvador contains much gold, which they wear as bracelets on their arms and legs and in their ears and noses and round their necks," or so Columbus hoped (October 15, 1492) (Columbus 1969: 62). Eventually, he argued that the Natives themselves might become commodities, as slaves. "Should your Highnesses command it," he wrote to his rulers, "all the inhabitants could be taken away to Castile or held as slaves on the island, for with fifty men we could subjugate them all and make them do whatever we wish" (Columbus 1969: 59).

Columbus never believed that he had entered a truly new, unknown world. And he ultimately saw what he expected to see, discovered what he expected to find. As the historian Richard White has written, "No new land … is ever *terra incognita*. It always arrives to the eye fully stocked with expectations, fears, rumors, desires, and meanings." Such was Columbus's America; the admiral discovered only "the familiar within the exotic" (White 1992a: 874). Nearly fifty years ago the Mexican historian Edmundo O'Gorman developed such a view in his provocatively titled *The Invention of America* (1961). Echoing O'Gorman, Kirkpatrick Sale wrote on the eve of the 1992 quincentenary, "It wasn't so much that Europe discovered America as that it incorporated it and made it part of its own special, long-held and recently ratified view of nature" (1990: 75). In some cases, the invention of America was even more literal, as Europeans consciously or inadvertently reconstructed islands and parts of continents from the ground up, importing new populations, plants, animals, and microbes. With the near total destruction of the Native communities of some Caribbean islands through killing labor and epidemic disease, with the importation of Africans as slaves, with the introduction of invasive species and cash crops – such as sugar cane – and with the recontouring of the islands' soils and land forms through erosion, these places in fact became new worlds (Crosby 1972, 1986).

The realities of the New World landscape mattered. Columbus could see merchantable commodities – pepper, mastic, aloes, amaranth, or cinnamon, not to mention gold – but that did not actually transform the worthless ore and specimens he sent to Spain into valuable articles of trade. Nonetheless, European colonists would persistently view the North American landscape instrumentally, designing it to serve their material and spiritual economies. If indigenous animal, vegetable, or mineral products proved lacking, they would deploy old world ideas and capital on new world soil to produce commodities, communities, congregations, and a new country.

Roanoke and the Nature of English Reconnaissance

The English were latecomers to American colonization, unable to found a permanent settlement in North America until 1607, in Jamestown, Virginia. That colony emerged in the wake of a failed one – at Roanoke in the 1580s. Though unsuccessful as a settlement, Roanoke (in present-day coastal North Carolina) was the site for one of the most comprehensive natural historical surveys of the entire colonial period. Thomas Hariot's observations and John White's images offer an extensive, realistic portrait of the plants, animals, people, and topography of the "newfound land of Virginia" (a general term that at the time encompassed virtually the entire east coast of North America, from Cape Breton to Florida). Their stunning work continues to be reproduced and attract the attention of scholars, preeminently

the historian David Beers Quinn (1985; see also Quinn 1955; Kupperman 1984; Hulton and Quinn 1964; Hulton 1984; Mancall 1995, 2007). "Ecology as a concept," Quinn notes, "may belong only to the last century or so, but in their way the surveying pair were ecologists" (1985: 158). Perhaps. Hariot showed some concern for the interrelations of humans and the natural world, and White's drawings and paintings did depict, as Quinn writes, "a complex relationship between the plants of the seashore, the life of the littoral … the fish of the sounds, and the birds of the air – all comprehended inside a scene of communal human activity" (158). But their early modern natural history was largely innocent of modern ecological sensibilities, and the immediate purpose of their words and pictures was promotional. The title page of Hariot's 1588 account clearly expressed the colonial objectives of the settlement and their survey: *A briefe and true report of the new found land of Virginia; of the commodities there found and to be raysed, as well merchantable, as others for victual, building and other necessarie uses for those that are and shalbe the planters there.*

Thomas Hariot would grow into one of England's most important early modern scientists, and his descriptions of plants, animals, and people at Roanoke were often close, careful, and perceptive. White similarly rendered realistic, dispassionate images of scenes, objects, and people relatively free of distorting stylistic convention. While these texts and pictures suggest intellectual curiosity, disinterested scientific inquiry, and some aesthetic and humane appreciation of the place and its people, Hariot and White's descriptions were largely utilitarian – they described or illustrated primarily to serve colonial promotion.

Quinn's survey of the two men's survey is itself mostly descriptive, but his chapter in *Set Fair for Roanoke* suggests the "world of nature" not only in sixteenth-century Virginia but also among those Europeans who would subsequently colonize North America. Hariot detailed the things future settlers might "gather, grow, and sell" and discoursed about the new land's Native people. He considered the country's flora and fauna, both terrestrial and aquatic, and he addressed the practical problems of economic exploitation. He underestimated the challenges of English settlement and commercial colonization, and he overestimated the prospects that Native inhabitants would easily and willingly transform themselves according to colonial plans (Quinn 1985: 157–81).

Hariot ordered his account implicitly according to the Great Chain of Being. With God at the top and the basest of inanimate elements at the bottom, a great chain joined and ordered the parts of the universe. As Sir John Fortescue, the fifteenth-century jurist, wrote on the law of nature:

> In this order hot things are in harmony with cold, dry with moist, heavy with light, great with little, high with low. In this order angel is set over angel, rank upon rank in the kingdom of heaven; man is set over man, beast over

> beast, bird over bird, and fish over fish, on the earth in the air and in the sea: so that there is no worm that crawls upon the ground, no bird that flies on high, no fish that swims in the depths, which the chain of this order does not bind in most harmonious concord. Hell alone, inhabited by none but sinners, asserts its claim to escape the embraces of this order. (Tillyard 1943: 39; see also Thomas 1983: 17–25)

Such a worldview and cosmology provided the context for the creation and popular consumption of Hariot's account and White's images.

And this larger order allowed and encouraged the surveyors of Roanoke to dissect the elements of the landscape and present them as discrete items to readers and viewers. The naturalist and the artist focused largely on individual objects rather than on assemblages, in which flora and fauna are enmeshed in complicated natural or human relationships. The accounts often became catalogs of specimens, disentangled from contexts, like those ensconced in "cabinets of curiosity," the idiosyncratic collections of exotic objects that constituted the first natural history museums. Or, more important, they became lists or magazines of commodities that might be extracted or cultivated for sale. At times Hariot's focus wandered to discussion of plants or animals without any apparent commercial purpose, in passages that must have seemed like tangents. More than most accounts, the words of Hariot and the pictures of White exhibited fascination and some appreciation of the New World on its own terms, but they nonetheless emphasized less what the country was than what it might become through colonial transformation.

Beyond Hariot and White's vision lay a more complicated, unseen picture of nature and human society. In part, their inability to comprehend it stemmed from the short duration of their visit, which limited their opportunity to observe. But the naturalist and the artist were also constrained by their early modern European worldview, the colonial purpose of their mission, and the religious and environmental ideology and practice that undergirded it. Quinn calls Hariot's *Brief and True Report* "a great illustrated handbook on the natural resources of North America" (1985: 181) – justified praise that nonetheless expresses the work's limitation. For what is "natural" about "natural resources"? They are culturally defined objects within the natural world – not mere "trees," for example, but "timber," prospective masts, barrels, boards, or furniture – things to be exploited or extracted to serve human needs or desires, often indirectly through the cash they produce as commodities, without essential regard for ecological processes.[4]

Trafficking in Nature

As the Roanoke voyages ran their course, the rationale for British colonization of North America was most fully and systematically articulated by two men with one name: Richard Hakluyt. The elder Hakluyt, a prominent

lawyer in London, declared three goals in his "Inducements to the Liking of the Voyage Intended towards Virginian" in 1585: "1. To plant Christian religion. /2. To trafficke. /3. To conquer. Or, to doe all three" (Mancall 1995: 39). "To trafficke," or to carry on trade, was here appropriately sandwiched between the other objectives as the meat of Hakluyt's proposal. Much of the "Inducement" is an itemized (often unrealistic) list of the goods to be gained or cultivated in North America. Hakluyt's plan was designed to serve a complex set of goals – religious, strategic, social, and economic; the landscape of America became instrumental in achieving them. The influential tract of the younger and more famous Richard Hakluyt, the elder's cousin, a "Discourse on Western Planting" (1584), articulated the same goals, packaged in a more comprehensive argument and blueprint for English colonization. Its nationalist, mercantilist formula argued that these western lands "will yelde unto us all the commodities of Europe, Affrica, and Asia, as far as wee were wonte to travel, and supply the wantes of all our decayed trades"; and in such places, "her Majestie may be the benefete of … plentie of excellent trees for mastes, of goodly timber to builde shippes and to make … all thinges incident for a navie royall"; in turn, a robust maritime enterprise could "spoile Phillips Indian navye, and … deprive him of yerely passage of his Treasure into Europe, and consequently … abate the pride of Spain and … the supporter of … Rome" (Mancall 1995: 46, 50).

Such architects of early New World expansion, particularly those who never visited America, discounted the potential opposition of North America's Native inhabitants to their plans. Though the continent was peopled, they treated it as wilderness, a *tabula rasa*. Indians' failure to transform the natural world (of course a misguided, baseless charge) undermined Native claims to possess it exclusively, against the allegedly more legitimate claims of others. In a 1583 report, Sir George Peckham typically celebrated the benefits of English colonization, declaring that Native people would gain more than lose. "And if in respect of commodities they [Indians] can yeeld us (were they many mo[re]), … [and if] they should but receive this only benefite of christianity, they were more than fully recompensed," he claimed. Indians must acknowledge the superior English capacity "to put theyr land to some use," he wrote, "as they [Native people] have not." Peckham asked, "being brought from brutish ignorance, to civility and knowledge, and made … to understand how the tenth part of their land may be so manured [fertilized] and emploied, as it may yeeld more commodities to the necessary use of mans life, … [then] What just cause of complaint may they have?" Peckham concluded with a general principle that virtually every subsequent colonist could endorse: "I doo verily think that God did create lande, to the end that it shold by Culture and husbandrie, yeeld things necessary for mans lyfe" (Mancall 1995: 64; see also Quinn and Quinn 1979 III: 34–60).

Firsthand experience in the Chesapeake, New England, and other parts of North America would force colonists to alter some of their views and approaches, but they persisted in their commitment to "improvement" – in their collective view, a necessary and proper course of environmental alteration, bringing order, cultivating civility, and producing subsistence, economic competency, or greater profits. In some narratives, colonists depicted their landscape as a hellish place, or at least a chaotic scene where the Devil and his minions ran riot. Plymouth's William Bradford famously characterized the country as "a hideous & desolate wildernes, full of wild beasts & wild man" (Bradford 1962: 60). Massachusetts Bay colonist Michael Wigglesworth saw it as diabolical: "A Waste and howling wilderness,/Where none inhabited/ But hellish fiends, and brutish men/That devils worshipped" (Wigglesworth 1873: 83).

In other accounts, newcomers represented America as Paradise. Arthur Barlowe's 1584 *Discourse of the First Voyage* observed that in Virginia "the earth bringeth foorth all things in aboundance, as in the first creation, without toile or labour" (Quinn 1955: 108). In 1607, the Jamestown colonist George Percy's narrative sounded like Christopher Columbus. His reconnaissance of the Chesapeake Bay revealed "nothing worth the speaking of, but faire meddowes and goodly tall Trees; with such Fresh-waters running through the woods, as I was almost rauished [ravished] at the first sight thereof." A few days later, Percy's explorations drew him to an Edenic scene: "all the way as wee went, hauing the pleasantest Suckles, the ground all flowering ouer with faire flowers of sundry colours and kindes, as though it had beene in any Garden or Orchard in England. There are many Strawberries, and other fruits vnknowne. Wee saw the Woods full of Cedar and Cypresse trees, with other trees [out of] which issues our sweet Gummes like to Balsam. Wee kept on our way in this Paradise" (Mancall 1995: 117, 121). Thomas Morton wrote in similar terms in *New English Canaan* (1637) of his first encounters with the New England landscape in the 1620s. "Goodly groves of trees," "dainty" hillocks, "fair large plains," "sweet crystal fountains," "murmuring" streams, "fowls in abundance," "fish in multitude," "millions of turtledoves," and "lusty trees, whose fruitful load did cause the arms to bend": all this, Morton wrote, "made the land to mee seem a paradise. For in my eye t'was nature's Masterpiece; her cheifest magazine of all where lives her store: if this land be not rich, then is the whole world poor" (Morton 1972: 60; see also Sweet 1999).

Morton's paradise was also a mart, and unlike the Garden of Eden before the Fall, and despite its riches, it seemed to require improvement. "If art & industry should doe as much/As Nature hath for Canaan, not such/Another place, for benefit and rest, / In all the universe can be possest," wrote Morton in his poetic prologue. Morton sexually personified the land as a "faire virgin, longing to be sped, /and meete her lover in a Nuptiall bed." With colonization thus construed as willing consummation – not

rape – subsequent transformation of the landscape became natural and legitimate. Unless used, the land's "fruitfull wombe" would wither and die – "like a glorious tombe" (Morton 1972: 10).[5]

American colonists soon acknowledged that they did not live in Hell or Eden, neither of which was embraced in the order outlined in Fortescue's description of the Great Chain of Being. More commonly, like Morton, they invoked the Bible to describe their terrain as a new Canaan, a Promised Land – a place that required migration, conquest, and cultivation by chosen people in partnership, or covenant, with God. By the eighteenth century, the term would become merely metaphorical and referred to America's political as well as religious mission and destiny. But in seventeenth-century New England, it meant more, even if for men like William Bradford wilderness surrounded and dominated the pilgrims' Canaan, which lacked a vantage point for any latter-day Moses to see into their future land of milk and honey. Bradford fretted: "Neither could they, as it were, go up to the top of Pisgah, to view from this wilderness a more goodly country to feed their hopes.... [T]he whole country, full of woods & thickets, represented a wild & savage hue. If they looked behind them, there was a might ocean which they had passed, and was now as a main bar & gulf to separate them from all the civil parts of the world" (1962: 60).

Though promotional accounts stressed America's potential to produce various commodities and natural resources, Bradford and others focused on what the American landscape lacked – order, stability, security, civility, economic system. Colonists worked strenuously to remake it in their own particular religious, social, and economic image. Their biblically inflected discourse suggests a view of North America that sought to assimilate the landscape into a transatlantic world of Christianity and commerce. American nature provided the setting and opportunity, and there was much to do to transform it.

Improving Paradise

Virginians set about the task of making their landscape pay – contending for land and resources with the Powhatan Confederacy, ultimately succeeding in expropriating the landscape, dividing it into property, and remolding it into a producer of a cash crop, tobacco. Numerous scholars have ably analyzed the colonial history of the Chesapeake, indirectly assessing its environmental context and impact. The historian Edmund S. Morgan titled Book 1 of his classic study of *American Slavery, American Freedom: The Ordeal of Colonial Virginia* (1975) "The Promised Land." Morgan's larger purpose was to analyze the development of slavery in Virginia and explain the greatest paradox in American history – the emergence and persistence of slavery in a place central to the growth of an American republic publicly dedicated

to equality. Morgan considers the environmental thinking and practice of both Native people and colonial newcomers as a critical component of his story in the seventeenth century. For Englishmen, cultural experience and expectations made Indians appear to be idle and their land undeveloped. Native environmental transformations nonetheless proved advantageous to colonists, making the landscape open to their planting and husbandry. English elites similarly disparaged their own countrymen who practiced shifting, less intensive agriculture in the marginal landscapes of Britain, and these attitudes toward nature and its proper cultivation affected the exploitive labor and agricultural systems they developed in the Chesapeake, particularly after they discovered tobacco and inaugurated the first American economic boom (Morgan 1975: 44–70, 92–130).

Early Chesapeake colonists paid a steep demographic price for their eventual success, in large part due to their environmental ignorance and hubris. The historical geographer Carville V. Earle's innovative study of "Environment, Disease, and Mortality in Early Virginia" explains this devastation as a largely self-inflicted "natural disaster." Starvation, limited acclimation or "seasoning," even deadly Indian raids, fail to fully explain the shocking death rates among the settlers of Jamestown and its environs, which encompassed hundreds and could exceed 40 or 50 percent of the population during the worst times. Early Virginians located their fort and town in a remarkably unhealthy site – on an island in the James River that became a peninsula during the drier summer months. When the river's discharge was high, during the winter and spring, it flushed away the colonists' human waste; when the river's flow slackened, salt and sediment, the colonists' feces and urine (and the disease organisms they contained), collected in the stagnant waters that the settlers used as a drinking source. "Burning Fevers" (typhoid) and "bloudie Flixes" (dysentery) then ravaged the English population. The colonist George Percy had noticed, "Our drinke [was] cold water taken out of the River, which was at a floud verie salt [salty], [and] at low tide full of slime and filth, which was the destruction of many of our men." Compounding the colonists' problem, Earle argued, was Jamestown's particular location on the James River estuary, an ecological zone where freshwater from land mixes with encroaching saltwater from the sea. As Earle explained, the varying seasonal discharge of the James – as in other tidal rivers – affected the location of the saltwater-freshwater boundary zone. As winter run-off lessened and river flows tapered, seawater pushed farther upriver, not only turning settlers' drinking water brackish, increasing the incidence of "swellings" (salt poisoning), but also forming a "salt plug" that trapped pollutants and made a noxious soup of Jamestown's principal water source (Earle 1979: 102–3).[6]

The dissolution of the Virginia Company and the dispersion of settlement, made possible with the displacement of the Chesapeake's Native people, ultimately allowed colonists to overcome the problem, though not

before the death of hundreds. But in other ways they would continue to impose their own vision on the landscape and remake it, predominantly through agriculture, with serious environmental consequences.[7]

The agricultural transformation of North America was among the most important revolutions of early America. Tobacco came to dominate the culture and nature of the Chesapeake. The crop's cultivation remade the landscape, social system, and politics of the place. Examining Virginia ethnographically, the historian T. H. Breen has studied the colony's agrarian population as "a people bound by rules developed with a specific cultural and physical environment" (1984: 250). A "tobacco mentality" developed there, just as a sugar culture emerged in the West Indies (Breen 1985). Tobacco affected the cultivators' attitudes about land use and work habits, time and space, human character and status. Its culture shaped Virginians' sense of place, as it demanded dispersed settlement, fresh lands, and access to river transport. And it influenced colonists' sense of time, as a crop demanding attention throughout the year, not merely during shorter, intense periods of work. Here was a sustained, intense, and ramifying dialogue with nature that occurred in a settled agricultural space, within a natural world that had been severely ordered to produce commercial wealth, opportunity, and exploitation of both land and people, most notably the slave population that grew to some 40 percent of the population by the eve of the American Revolution. By then, however, many Virginia planters (such as George Washington) had given up on tobacco and become farmers of wheat.

In part that was because their dialogue with nature proved unsustainable. "There is no plant in the world that requires richer land, or more manure than tobacco," wrote an anonymous traveler in 1775. "It will grow on poorer fields, but not to yield crops that are sufficiently profitable to pay the expences of Negroes &c.… This makes the tobacco planters more solicitous for new land than any other people in America, they wanting it much more" (Anon. 1775 I: 229). As Avery O. Craven wrote in the 1920s, the whole life of the Chesapeake "was erected upon an exploitive agriculture.… Soil exhaustion and tobacco cultivation went hand in hand" (1926: 24). The tobacco plant was a heavy consumer of nitrogen and potash, decreasing available nutrients, and continued replanting encouraged toxicity and harmful soil fungi, root rots, and micro-organisms. The quality of tobacco crops quickly deteriorated after a second planting, and planters seldom got more than three or four crops before they were forced to turn the worn out fields over to corn or wheat, or to abandon it altogether as worthless "sour lands." At the end of the eighteenth century one observer described the eroded terrain of Albemarle County in the Virginia piedmont as "a scene of desolation that baffles description – farm after farm … worn out, washed and gullied, so that scarcely an acre could be found … fit for cultivation" (Craven 1926: 83).[8] This sort of destruction – even when less catastrophic – would

impel some agricultural innovation and reclamation in the early republic. But the perceived surfeit of land beckoned American planters and farmers west in their relentless search for new, fresh agricultural domains. The anonymous author of *American Husbandry* had commented in 1775, "In these colonies … land cost nothing.… But this circumstance, which is such an undoubted advantage, in fact turns out the contrary; and for this reason, they depend on this plenty of land as a substitute for all industry and good management; neglecting the efforts of good husbandry" (85). Scarcity in Europe had in part driven colonization; culturally produced scarcity of agricultural lands in America would continue to fuel continental postcolonial expansion through the early national period and beyond.

In other parts of the South, similar stories emerge of extraction, agricultural development, environmental alteration, exhaustion, and erosion. There and throughout the colonies – North, Middle, and South – the pursuit of subsistence or commercial agriculture required clearing of North America's vast forests. Ironically, early colonists who believed they were settling wilderness often benefitted from the cultural landscapes created by Native people, most of whom were horticultural in those areas first colonized by Europeans. In the 1640s, for example, a Native man told Dutch colonist Adriaen van der Donck in New Netherland (later New York), "I see that you are clearing that piece of land for cultivation. It is very good soil and bears corn abundantly – which I know because it is only 25 or 26 years ago that we planted corn there and now it has become wooded again" (Dennis 1993: 26–7). Settlers from Massachusetts Bay and Plymouth to Virginia and the Carolinas placed their first farms and plantations on lands cleared by Native farmers. While some expressed fear of deep Satanic forests, in fact in many places Indian clearing and burning had created open, park-like woodlands. Writing about Massachusetts Bay in 1634, William Wood observed, "Whereas it is generally conceived that the woods grow so thick that there is no more clear ground than is hewed out by labor of man, it is nothing so, in many places diverse acres being cleared so that one may ride ahunting" (Cronon 2003: 25). In other words, a man was not forced to hack and creep through dense thickets on foot. Likewise, southern settlers received a windfall profit when they appropriated former Indian village sites and surrounding agricultural fields as Native people succumbed to epidemic disease and colonial encroachment. Edward Williams, in his 1650 tract promoting Virginia, assured readers that the country is not "overgrowne with Woods" or "impenetrable for the Plough"; instead, he noted (with some exaggeration), "there are immense quantity of Indians fields cleared already to our hand, by the Natives, which till we grow over populous may every way be absolutely sufficient" (Silver 1990: 104).

Despite Williams' optimism, much land remained to be cleared if colonists sought to pursue agricultural production, either to feed their families or to grow and market cash crops. As the historian Timothy Silver notes, settlers

often consciously sought out densely wooded areas, believing that thick growths of trees signaled the richness of the soil. In the southern colonies, the use of slave labor considerably advanced the subsequent deforestation, and in places the production of timber, various wood products, and naval stores became a major economic endeavor, not merely a by-product of agricultural development or an adjunct enterprise. For local use and export to the Caribbean, colonists cut oak staves for barrels and hogsheads, white oaks for house framing and clapboards, hickory for hoops, cypress and cedar for shingles, and longleaf pine for planks, flooring, and paneling. Pines were valued for their resin or turpentine, for their tar and pitch – critical products to nautical enterprises. In the context of international war, declining European sources, and government bounties, this naval stores industry took off in the Carolinas. By 1715, American forests satisfied half of Britain's maritime need. Production levels soared, and by the mid-eighteenth century, North Carolina went through some 75,000 cords of pine per year, to produce thousands of barrels of tar and pitch. A colonist with ten slaves producing turpentine, tar, and pitch, Silver estimates, might exhaust a thousand acres of pines in as little as three years. With vast pine forests, largely seasonal production, and access limited by primitive transportation, southerners would not face the full consequences of their deforestation until the mid-nineteenth century. Nonetheless, localized consumption of wood for housing, outbuildings, fences, and fuel produced shortages in the developed tidewater sections of the colonial South by the late eighteenth century. Even earlier, in the late seventeenth century, forest depletion inspired the first conservation policies. Inaugurated by British imperial officials in the interest of national security, such regulations reached the colonial South by the 1720s, but as elsewhere American colonists violated them routinely (Silver 1990: 104–38; Cronon 2003: 108–26; see also Herndon 1981; Cowdrey 1983; Williams 1988; Grove 1995; Anderson 2004).

Nature in Black and White

Forest products, a trade in deerskins and Indian slaves, and extensive livestock grazing transformed the landscape and human geography of the lower South, but the intensive production of two other agricultural commodities – rice and indigo – had the greatest environmental impact. "No development had a greater impact upon the course of South Carolina history than the successful introduction of rice," wrote the historian Peter H. Wood (1974: 35). Though "now rare on the landscape it once dominated, … its historical place … is deep-seated and secure, hedged round by a tangle of tradition and lore almost as impenetrable as the wilderness swamps near which it was first grown for profit" (35). Rice became a significant cash crop in South Carolina in the early eighteenth century. To grow it effectively required increasingly greater

technological innovation and hydraulic transformation, as planters moved from inland-swamp to tidal production. Deploying large groups of slaves, they created an artificial landscape, one so complete, historian Joyce Chaplin argues, some post-Revolutionary planters, susceptible to new romantic ideas, even began to exhibit concern about its injurious impact on nature (Chaplin 1992; see also Stewart 1991; Silver 1990: 144–5, 168–9).

Rice planters, like others, saw nature as a "warehouse of commodities" and believed in using it – and transforming it – to produce wealth (Chaplin 1992: 35). During the late eighteenth century the most successful adopted a vision of the natural world that was scientific and rational, "characteristic of the … age of 'improvement' " (34). New techniques in tidal cultivation were complex and required substantial investment. Such innovations were thus class based; in their deployment we can see the entanglement of human and natural landscapes, as their advancement exacerbated inequality, not merely between masters and slaves, but among whites. As Chaplin writes, "Whites recognized their ability to reorder nature as a visible expression of their standing as members of a racial and economic elite" (50).

Slave masters, as grand engineers of nature, had a different view of the natural world than those literally mired in the trenches. Chaplin notes that at least some whites "recognized that slaves were sometimes more familiar with their property than they themselves were" (55). Slaves were critical in the development of rice culture, having acquired the skills to construct and maintain irrigation systems and cultivate the plant, as well as the intimate local knowledge of their natural and cultural world. "Slaves not only carved out small places *within* rice plantations, but also carved out these plantations *as* places for themselves," according to Chaplin (57). Less personally invested in the transatlantic agricultural system of commodity production, enslaved African Americans found importance and meaning in the "non-productive" landscape, places fundamental to their sense of identity and survival.[9]

Despite their success, tidal rice planters found it difficult to maintain their mastery over nature indefinitely; they suffered through cycles of "improvement and degeneration" as hydraulic modifications had unforeseen effects and required incessant fixes. Floods and other disruptions evoked concerns about their effects on planters' bottom lines. One Charleston engineer warned, "Nature in the formation of her works has acted for the general welfare of man. It therefore behoves [*sic*] us to consider well the consequences before we deviate from, or counteract her ways" (Chaplin 1992: 60). By the early nineteenth century, planters were conflicted: though still inspired by rationalist visions of environmental manipulation and "improvement," some expressed regret in the face of the more artificial world they had created and experienced pangs of romantic melancholy over the loss of an untouched, natural order. Some even acknowledged the inhumanity of slavery itself – instrumental in their own enrichment

through their homeland's environmental transformation and agricultural production. But such regret would not impede the rapid growth of slavery and its extension into new lands with the astonishing expansion of cotton through the antebellum period.[10]

Changes in the Land

In northern colonies, where slavery was less common though not absent, settlers shared similar assumptions about nature but pursued more prosaic economic endeavors, largely because they found no cash crops that might rival tobacco, rice, indigo, or later cotton. The environmental and cultural revolution they effected, however, was no less dramatic.

The foundation of New England is a familiar story, and we have already considered New Englanders' worldviews and perceptions of the natural world they initially encountered. In part the history of the region's environmental transformation is so well known because of the scholarly achievements of William Cronon's enduring classic, *Changes in the Land: Indians, Colonists, and the Ecology of New England*, first published in 1983. Cronon's work was exemplary of a new environmental history, setting the terms for many of its substantive and theoretical questions while providing a brilliant case study of southern New England in the colonial period. Though the details were different elsewhere, Cronon's interpretive template nonetheless allowed historians of other early American places to use his study as a blueprint from which to build their own historical accounts based on local materials (variant landscapes, social relations, economic systems, and the idiosyncrasies of historical actors).[11]

Like others before and since, Cronon began rhetorically with the Massachusetts naturalist and philosopher Henry David Thoreau, considering retrospectively a question Thoreau had posed to himself in a March 1856 journal entry: "Is it not a maimed and imperfect nature that I am conversant with?" (Cronon 2003: 4). Cronon in turn posed his own leading question: "How did the 'nature' of New England change with the coming of the Europeans, and can we reasonably speak of its changes in terms of maiming and imperfection?" (5). Of course, the natural world changed considerably, and colonial economic development was thoroughly implicated in that transformation, and yet the language of disfigurement or deficiency struck Cronon as simplistic. Without pulling its punches, *Changes in the Land* considered the environmental impact of colonialism in New England as a complex, natural, and cultural process – one in which "two human ways of living, two ways of belonging to an ecosystem," competed (12).

New England's Native people shaped the landscape as they lived within it, fashioning a rich life from an ecological diversity that was both cultural and natural. Newcomers apprehended the landscape in different ways,

understanding it to be the sole work of nature. They were intent on transforming it conceptually (imposing new definitions and laws of property, for example) and physically (through forest clearing, agriculture, especially herding, and commerce). Cronon describes and assesses the contrasting environmental ideas and practices of Indians and colonists. He analyzes the effects of their clashes with each other and on the landscape of New England, as English settlers claimed, bounded, disputed, "improved," degraded, and derived profit from it. Native species of animals and plants were diminished; new flora and fauna, new weeds and pests, and new microbes were introduced. And the landscape of New England was increasingly defined in terms of its commodities and linked to new markets that could demand more than a local landscape might produce. Cronon quotes the seventeenth-century historian Edward Johnson, who was astonished in 1653 "that this Wilderness should be turn a mart for Merchants in so short a space" (67). Cronon's history is much more than a classic declensionist narrative, and these general points cannot fully suggest the complexity of the ecological and economic "changes in the land" that he examines. As is usually the case in New England history, the devil is in the details.

Carolyn Merchant's *Ecological Revolutions* (1989) overlaps with Cronon's *Changes in the Land* in its consideration of colonial New England and extends the analysis well into the nineteenth century. It is an ambitious, detailed, and richly theorized ecological history that integrates gender, production, reproduction, and consciousness into a model of ecological change – or revolution – in New England. In a complicated, dialectical fashion, Merchant shows, colonization, and then industrialization, transformed not merely landscape and people but the meaning of "nature" itself. With the exception of this book and Timothy Silver's *New Face on the Countryside* (1990), focusing on the colonial South Atlantic colonies, no comparable works exist for other regions in this era. In those diverse physical, natural, and cultural places as well, no doubt, *el diablo*, *diable*, or *duivel* will be found in the environmental details of Spanish, French, or Dutch colonial landscapes. Some of these details have been treated in the early chapters of books set primarily in later periods of American history: by Ramón A. Gutiérrez (1991) and David J. Weber (1992) (on the Spanish borderlands), for example, or those by Richard White (1992b) and Robert Bunting (1997) (on the Pacific Northwest). Other scholars have contributed revealing treatments of nature and culture in smaller, more circumscribed places: Jack Temple Kirby's engaging history of the Great Dismal Swamp (1995; see also Kirby 2006), for example, or John Hanson Mitchell's intimate portrait of a single square mile over a fifteen-thousand-year span (1984). Still others have addressed the subject thematically: Virginia DeJohn Anderson (2004) on the impact of domestic animals on the human and natural ecology of colonial New England and the Chesapeake, for example, or Ann Vileisis (1997) on the history of America's wetland landscapes, or Kimberly

K. Smith on the foundations of *African American Environmental Thought* (2007). Still other scholars have much to offer us in their studies with a broader geographic and chronological reach: Ted Steinberg's comprehensive *Down to Earth* (2009), for example, or Gordon G. Whitney's *From Coastal Wilderness to Fruited Plain* (1994). This is a dynamic field.

With some notable exceptions, self-defined scholars of early America have been primarily interested in environmental history to the extent that it assists them as social, economic, cultural, or political historians. They have looked to environmental history for the ways that it might help them to explain the settlement, unsettlement, social and economic development, and the mixing of diverse peoples within the region. Much of the best work in environmental history – in this era and others – has focused particularly on North America's Native people, and their contest with colonists over the control and use of land and resources at the heart of their survival. But more remains to be done – particularly in the study of colonial newcomers, black and white, women and men, town dwellers as well as rural people, lower and middling sorts as well as elites. Environmental history has become mainstream, integrated into the standard narratives of early American history, but more focused attention on the environmental worldviews, practices, and landscapes of colonial and early national North America promises to contribute important new insight to this history and, more broadly, to our understanding of the long-term dialogue Americans have had with nature.[12]

Worlds of Wonder and Natural History

In his 2003 afterword to the twentieth-anniversary edition of *Changes in the Land*, William Cronon noted the relative absence of religion from his ecological history (2003: 184). The silence is surprising, his self-critique acknowledged, given the impressive work of generations of scholars of New England Puritanism, who have advanced our understanding of virtually every dimension of these colonists' religious existence – studying their religious worldview and behavior, the structure of their churches, communities, and families, and their economic and political lives. Some of these scholars have trained their attention on the Puritans' complicated, sometimes conflicted understanding of nature, examining how nature, culture, and religion mingled in New England.[13]

According to the historian of religion Catherine L. Albanese, "Nature did function as a significant religious symbol for Puritans, and it was against and in interaction with nature that they made sense of their spiritual – and material – venture in the New World" (1990: 34). Puritans acknowledged sacred power and a holy presence in daily life. But, for Puritans, nature functioned as part of a "sacred geography in which the supernatural essence

of the divine realm was strongly marked and in which sacred persons lived *above* and *apart* from nature" (34; emphasis added). If nature was sacred, Puritans nonetheless generally regarded wild nature negatively, "the territory of the devil and the powers of evil" (35). Yet drawing on deep Christian traditions, they could imagine positive spiritual meaning in nature as well. It could be a place of testing, spiritual purification, and sanctuary, particularly when juxtaposed with a corrupt old England and imbedded in a latter-day rehearsal of the Exodus myth, which Puritans imagined delivered them to a new Canaan. "In the end," Albanese writes, "they understood that the best wild country was subdued wild country, and they transformed … [it] from a sacred to an ordinary condition" (40; see also Carrol 1969; Cherry 1975).

Yet even ordinary landscape – ordered into a Bible Commonwealth – remained spiritually alive and unpredictable. As the historian of American Puritanism David D. Hall has written, "The people of seventeenth-century New England lived in an enchanted universe. Theirs was a world of wonders" (1989: 76). They understood that world through four main systems of ideas: apocalypticism, astrology, natural history, and the meteorology of the Greeks (encompassing everything occurring in the region between the earth and moon). New Englanders' "natural" history comprehended not merely "all the phaenomena of nature" but the "unnatural" as well. The providence of God, Hall writes, "was as manifest in the unexpected or surprising as in the 'constant' order of the world" (78). Wonder tales were filled with apparitions, devils, monsters, comets, storms, plagues, fires, eclipses, and earthquakes. Such marvels were prodigies and portents – a means through which God signaled his intentions (usually angry or dire).[14]

But as Albanese argues, some Puritans in the eighteenth century, like the prominent minister and scholar Cotton Mather, began to see more benign representations of the divine within their natural world. Mather called the world a "*Temple* of GOD, *built* and *fitted* by that Almighty *Architect*"; he saw, Albanese writes, "the wonders of God in the mineral, vegetable, and animal kingdoms" (1990: 41). The great eighteenth-century Puritan divine Jonathan Edwards developed such ideas further: "God's excellence, his wisdom, his purity and love, seemed to appear in every thing; in the sun, moon, and stars; in the clouds, and blue sky; in the grass, flowers, trees; in the water and all nature." "The book of Scripture," Edwards pronounced, "is the interpreter of the book of nature" (Albanese 1990: 43; see also Edwards 1948; Cherry 1980; Stoll 2007). Here we see the potential reconciliation of Christianity and the new scientific thinking of the Enlightenment. Even earlier, in the late seventeenth century, inspired by the splendor of a Massachusetts autumn to link God and nature, the Puritan poet Anne Bradstreet could write in her "Contemplations," "How excellent is He that dwells on high, / Whose power and beauty by his works we know?/Sure he is goodness, wisdom, glory, light, / That hath this under world so richly

dight./More heaven than earth was here, no winter and no night" (Bradstreet 1897: 249).

Such beliefs were not unlike those characteristic of the colonists' homeland, as the English historian Keith Thomas has shown, or of other adjacent colonies, as historian Sara S. Gronim demonstrates in *Everyday Nature* (2007) for colonial New York. The ethnically diverse settlers of New Netherland (later New York) lived intimately with and responded to the natural world they found, but colonization required only marginal adaptation because their New World environments were substantially similar to the European ones they left. They believed the natural world operated the same everywhere – "it was everywhere the text of God,… whose patterns could be understood by ordinary people" (4). They still sought to extract commodities and transform the landscape, as elsewhere in North America, ordering it, dividing it into property, and practicing agriculture. As in New England, they were attuned to nature, both its regular patterns and its wonders. "The template for understanding the natural world," Gronim writes, "was the human body itself, the microcosm that mirrored the macrocosm of the great world" (40). Bodies' intimate connections with the natural world suggested to colonists that the positions of the planets affected weather, which affected human health; nature, astrology, and wellbeing were intertwined. New Netherland was, like New England, a world of wonders, and colonists monitored their enchanted universe closely, particularly watchful of its anomalies – storms, floods, comets, epidemics, witches. As New Netherland became New York, it Anglicized, "improved" itself, acquired refinement, and increasingly participated in the new scientific currents of the Enlightenment. It also exhibited a popular skepticism about these ideas concerning the natural world, and challenged the motives or interestedness of elites. Gronim's achievement is considerable in reconstructing this natural and supernatural landscape in both its elite and vernacular registers, though she admits, "we simply know little about what those at the bottom – slaves, sailors, servants – knew and did regarding the natural world" (77). Gronim's complex story is not one "in which New Yorkers simply learned a truer knowledge of the natural world" over time (198); if some participated more fully than others in the Age of Reason, and some continued to inhabit a realm of wonders, all were entangled in a complex world that was both cultural and natural.

An eighteenth-century renaissance in natural history transformed the way we think about nature. In the wake of the revolutionary work of Sir Isaac Newton and others in physics and chemistry, European "scientists" (in fact the word itself would not appear until the 1840s) adopted new methods of observation and experimentation as the means to comprehend the world empirically. Impatient with metaphysics, they sought to understand the physical, natural, even the human world objectively, through human observation and experience rather than through revelation or sacred texts. They hoped to

discover scientific "laws." Instead of a history of human degeneration, they posited one of improvement – progress through the accumulation of knowledge and through humans' ability to understand, explain, engineer, and transform the world. The natural history that flowered in the mid-eighteenth century still included the now disparate disciplines of meteorology, geology, botany, zoology, and ethnology, embracing all of what was commonly understood as Creation. Scholars of natural history – in both Europe and America – were particularly drawn to such investigations of North America, a new place filled with natural objects poorly understood (Regis 1992).

Natural history provided a new way to consider American nature, methods to explore it, a vocabulary and rhetoric to describe it, and a means to integrate America and its nature into a larger world scheme. Critical in this process was the classification and naming system of the Swedish botanist and zoologist Carl Linnaeus, first published in his *Systema Naturae* in 1735, which disenchanted and rationalized the Great Chain of Being. The observations and descriptions of American naturalists such as the Pennsylvania naturalist William Bartram, using the Linnaean system, accounted for America's distinctive natural objects while rendering them familiar and assimilating them into one imperial, scientific world schema. As the literary scholar Pamela Regis notes, the Linnaean lingua franca was deliberately static, and it thus encouraged understanding of American nature – and of Native American inhabitants, caught up in the system and demeaned as less-than-civilized natural objects themselves – as ahistorical. America, in the writings of Bartram for example, "seems to be waiting for history to happen," Regis writes. "In his descriptions America is a vast, still garden, planted and denizened with species that have names but no one to use them. It is known, but not truly inhabited" (Regis 1992: 78). Natural history drew the conceptual line between nature and culture in a new way, and in the process it imagined North America as unpeopled, unclaimed, and unimproved, a natural site for a new nation to erect itself as Nature's Nation. And simultaneously, as Regis shows, this natural history – increasingly affected by the aesthetics and early romanticism of Edmund Burke (1958; see also Slaughter 1996) and others – constructed new ways of seeing and describing American nature.

Nature's Nation and Empire

Following the American Revolution, historian Paul Semonin writes, "natural history became a central metaphor for American nationalism" (1992: 6). Thomas Jefferson's Declaration of Independence spoke of the "laws of nature and nature's God" to justify the War of Independence and the creation of the United States, and his *Notes on the State of Virginia* (first published in 1785) was itself a sort of natural history that linked American nature and national identity. Jefferson employed nature to defend his country against

the slights of European natural historians, most prominently Georges Louis Le Clerc compte de Buffon, who had argued the inferiority of new world flora and fauna in his *Histoire Naturelle* (an epic work, extending to some thirty-five volumes, 1749–88). Jefferson, the painter and naturalist Charles Willson Peale, and others mobilized American nature to counter Buffon's degeneracy theories and bolster American nationalism. Peale exhumed and reassembled the bones of the American mastodon to make the case, and Jefferson hoped that these massive beasts still roamed the far West. Jefferson's dispatch of Lewis and Clark to find an overland route to the Pacific in 1803 served natural historic and nationalistic objectives as well as strategic, economic, and political ones.

More significantly, Jefferson and other political architects of the United States deployed their nationalist, scientific, and engineering mentality in transforming the continental landscape of North America, reconceptualizing its space, subduing and organizing it, and distributing it to white yeomen farmers in the interest of national expansion and, they believed, democracy. The Louisiana Purchase doubled the size of the country in 1803, enabling Americans' "pursuit of happiness" – not of pleasure so much as economic competence, or opportunity. In an agrarian republic opportunity meant access to the means of production – that is, land. With the Purchase, millions of acres of public land became available (in fact still occupied and claimed by Native Americans), which could undergird American virtue, political responsibility, and independence. Jefferson conceived of such expansion in the West as the antithesis of colonialism – America would become an "empire for liberty." But of course, such an empire perpetuated colonialism. It willfully excluded Native Americans, whose lands would be expropriated to underwrite the great democratic enterprise, and it often proved disastrous for African Americans as well. By the early nineteenth century most remained in chains and many entered the West not as free and independent farmers but as property, a human means of production serving exploitive planters (Onuf 1986, 1987, 2000; see also Hallock 2005).

A series of Northwest land ordinances beginning in the 1780s formally organized the nation's western territories, devised a system that would construct new states equal to the original thirteen, and created an efficient means of parceling and selling the public lands. A quadrangular survey spread a vast grid across the landscape, dividing it into townships of six square miles and subdividing these into thirty-six one-square mile lots, available for sale in public land offices. These in turn could be further split into smaller plots, sold, and resold. The survey represented one of the greatest impositions of an abstract ideological system on nature in human history; it was an astonishing act of political, social, and environmental engineering, one that set the terms for United States expansionism in the nineteenth century as it remade the American map and, ultimately, the American landscape (Onuf 1986, 1987, 2000; Stilgoe 1982: 99–107).

From a "state of nature" to Nature's Nation, America in the early nineteenth century continued to be viewed in instrumental, utilitarian terms – even when colonists and citizens imbued it with cosmic meaning or discovered beauty in it. Its white inhabitants understood it to be uniquely endowed with natural resources that might be extracted and with land that might be developed or "improved" to produce wealth, security, or power. Even before the advent of Europeans, America had long been a cultural as well as natural place. As colonists expropriated it from Native people, they changed the terms of that human dialogue with nature; they remade the landscape to serve their economic, social, and religious purposes, and they understood their actions to be natural, rational, and justified. In fact they were often exploitive – of landscapes and people – and unsustainable, but the astonishing extent and bounty of the continent seemed to encourage or enable an environmental practice that was often damaging.

White colonists and early citizens believed themselves above and apart from nature; their physical and natural world had been created by God for mankind, and humans were empowered to manipulate it to serve worldly ends. But most in this period also believed (and continued to believe) they lived in a larger, supernatural universe governed by God – an unpredictable world of wonders. From the beginning, the new world had challenged Europeans to determine America's cosmic place. Was it truly an *otre mundo* – another world – or was it part of the same, original world of Creation? In the British North American colonies, nature ultimately proved essential to America's integration into a larger Christian world (not to mention a world system of commerce), as New Englanders reenacted the Exodus story, Puritan scholars such as Cotton Mather misidentified mastodon bones as the mortal remains of biblically documented antediluvian giants, and as the landscape generally served Christians' economic and religious callings. In the eighteenth century, new transatlantic scientific thinking and discourse assimilated America into a grand natural historical universe. American nationalists revised Mather's paleontology and cited the mastodon and other astonishing fauna to celebrate the size and quality of the nation's endowments in order to construct a new national identity (Levin 1988).

In the first decade of the nineteenth century numerous changes were on the horizon. The beginnings of an industrial revolution were dawning in Rhode Island and Massachusetts (Steinberg 1991; Merchant 1989), new aesthetic conventions, sensibilities, and romantic ideas were beginning to affect the way some viewed and experienced the American landscape, and westward expansion – still fueled by the quest for exploitable resources – was about to enlarge, enrich, and trouble the United States in unprecedented fashion. Raymond Williams was right: *Nature* is a critical but difficult and slippery word. It refers both to physical reality and to mental constructs, naturally all of which change over time. In this regard the colonial and early national periods were a dynamic, shifting ground – a

world of wonders disturbed by portents like earthquakes – and during the nineteenth century and beyond, the United States would remain on an active seismic fault line.

Notes

1 Note additionally that Locke's claim that "America" represented a generic global past – a "state of nature" – implied that America, like other places, was inevitably on its way to becoming something else, something understood to be greater. It seemed to demand or at least anticipate that the improving hand of humans would create "civilization" there. Locke suggests an imperialist view of "discovered" lands and peoples that classified them as remote, not merely spatially, but temporally. Indigenous inhabitants of North America and other continents were understood to be "backward," literally mired in an earlier time or stage of human development – as savages or barbarians. This schema of "progress" represented a further, pseudoscientific refinement of an old ethnocentrism that regarded difference as inferiority.

2 The term *landscape*, which I use throughout this essay, embodies the essential entanglement of *nature* and *culture*. My understanding of the concept is informed by the work of the pathbreaking landscape historian John Brinkerhoff Jackson (see, for example, Jackson 1984). Jackson sees landscape as "a composition of man-made and man-modified spaces to serve as infrastructure or background for our collective existence." This landscape "underscores not only our identity and presence, but also our history" (8). Especially useful for the study of early America is John Stilgoe (1982). According to Stilgoe, landscape "means shaped land, land modified for permanent human occupation, for dwelling, agriculture, manufacturing, government, worship, and for pleasure. A landscape happens not by chance but by contrivance, by premeditation, by design" (3). Stilgoe contrasts landscape with wilderness – unordered or unshaped land – and with cityscape – where "men wholly dominate the land." "Landscape is essentially rural," he writes, "a product of traditional agriculture interrupted here and there by traditional artifice, a mix of natural and man-made form" (3). As Stilgoe would acknowledge, the dividing line between wilderness and human-shaped landscape was not always self-evident – to denizens of early America or to subsequent commentators and scholars.

3 Other essays in this volume focus directly on Native American environmental thought and practice. The ongoing presence of Native people is essential to understanding American history, but my discussion here will focus on colonial newcomers and the white and black inhabitants of the early United States, addressing Indian history less directly, emphasizing the impact of Native peoples on white representations and actions.

4 On the cultural and historical specificity of "natural resources," see Cronon (2003: 165–7). Cronon quotes the French anthropologist Maurice Godelier: "there are … no resources as such, but only possibilities of resources provided by nature in the context of a given society at a certain moment in its evolution." Cronon comments, "human communities label certain subsets of their surrounding ecosystems as resources, and so locate the meeting places between economies and ecology" (165).

5 Morton nonetheless was unorthodox and ambivalent about the ultimate value of his civilization and the relative quality of life it offered. "I cannot deny that a civilized Nation, hath the preheminence of an uncivilized, by meanes of those instruments that are found to be common amongst civile people, and the uncivile want [lack] the use of, to make themselves master of those ornaments, that make such a glorious shew." Yet, "since it is but foode and rayment that men that live needeth (though not all alike,) why should not the Natives of New England be sayd to live richly, having no want of either [?]" (56). Morton concluded, "They may be rather accompted to live richly, wanting nothing that is needeful; and to be commended for leading a contented life" (58).

6 On South Carolina, see Merrens and Terry (1984); on the demographic disaster, see Morgan (1975: 101–7). "Natural disasters" are, typically, as cultural as they are natural – a disaster is usually calculated in terms of its impact on humans, and its severity is usually affected by the extent to which humans have ignorantly or arrogantly subjected themselves to regular, sometimes predictable ecological disturbances, by – for example – building within floodplains, or as, Earle suggests, within an oligohaline zone.

7 The best comprehensive work in the environmental history of the colonial South remains Silver (1990). On the Chesapeake, see Miller (1986); other works, like Morgan (1975), consider the colonists' dialogue with nature tangentially or in the course of pursuing other scholarly agendas. See Rutman and Rutman 1984); Horn (1994); Isaac (1982); Main (1982); Carr, Menard, and Walsh (1991); Hofstra (2004). And see Breen (1980: 106–26), which analyzed the distinct cultural world that emerged in early Virginia – one based on the exploitation of both land and people: "Virginia's physical environment … powerfully reinforced values which the first settlers carried to America" (107).

8 Craven's work has been revised by, among others, Earle (1975: esp. 24–30) and Silver (1990: 163–7).

9 Philip D. Morgan has written, "No one [referring to enslaved African Americans] has written his signature more plainly across the countryside; but no one has left more scanty records of his achievements" (1982: 564). Scholarly assessments of the environmental thought and practice of African Americans enmeshed in slavery are limited, but one might start with Morgan (1998: esp. 27–57, 147–59, 159–64). See also Wood (1974), Berlin (1980), Upton (1985), and Carney (2001). Three important works have begun to fill the scholarly gap: Stewart (2003), Glave and Stoll (2005), and Smith (2007).

10 Cotton production skyrocketed in the nineteenth century, following the invention of the cotton gin in the 1790s that allowed more efficient processing of short staple cotton, which could be grown in upland environments. The spread of cotton into the Old Southwest was accompanied by the expansion of slavery – despite the radical egalitarian promises of the American Revolution – into the new territories of Mississippi and Alabama and beyond. By the time that the slave trade was banned in 1808, Lower South planters had imported a quarter million new slaves (as many as during the entire colonial period), and between the Revolution and 1820, the United States slave population grew from about 500,000 to 1.8 million. In 1793, the South produced about 10,000 bales of cotton annually; by 1835 it produced well over a million. Though largely beyond the scope of this essay, the rise of cotton began in this

period and would have a profound impact on the human and natural ecology of the United States. See especially Rothman (2005). The geography of this transformation is treated ably and concisely in Meinig (1993 I: 285–311).

11 A twentieth-anniversary (unrevised) edition of *Changes in the Land* was published in 2003, with a new foreword by John Demos and an informative and engaging afterword by the author.

12 The books cited below, for example, incorporate environmental history though they cannot be classified as ecological or environmental history, as modeled by Cronon's *Changes in the Land*. In addition to those works previously cited on New England, the Chesapeake, and the Lower South, see, on New Netherland-New York and Pennsylvania, Lemon (1972), Levy (1988), Merwick (1990), Burke (1991), Mancall (1991), and Dennis (1993). For a brilliant exemplary work of environmental history dealing with Native Americans and colonialism, see White (1981).

13 Modern New England Puritan studies were essentially launched by the pioneering work of Perry Miller; see especially his essay "Errand into the Wilderness" (1953), for example, which focuses more on the errand than the wilderness. A series of community studies, which inaugurated a "new social history" in the 1970s, helped to lay the groundwork for a real "history from the bottom up" (works like Cronon's) that would actually (not metaphorically) examine the natural and physical landscape within which Puritan towns were situated. See, for example, Demos (1970), Greven (1970), Lockridge (1970), and Zuckerman (1970).

14 Hall stresses that elites and common folk in New England shared a consensus on such matters: "the wonder stories" embodied a mentality "that united the learned and unlearned" (94). See also Thomas, *Man and the Natural World* (1983), who writes, "it does seem clear that the reason that many natural events were deemed ominous was that they seemed to blur those crucial categories of 'wild' and 'tame' around which so much popular thinking revolved. The encroachment of wild creatures into the human domain was always alarming" (77). An event was particularly alarming, according to Thomas, when it seemed to defy the regularities of nature (78).

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Chapter Thirteen

Cultures of Nature: Nineteenth Century

Aaron Sachs

The Nature of Thoreau's America

In *A Week on the Concord and Merrimack Rivers*, *Walden*'s less famous sibling, virtually all the metaphors and similes draw on natural imagery. The "higher regions of literature," Thoreau says, are like the summit of Saddle-back Mountain "above storm and darkness." "History," meanwhile, "fluctuates as the face of the landscape from morning to evening" (1998: 181, 123).

Thoreau was as independent-minded as they come, but he was also, like all of us, embedded in his historical moment. Though we often still think of him as a recluse and a nay-sayer, we might just as easily emphasize how representative he was of mid-nineteenth-century American culture – a culture whose defining characteristic, one could argue, was an active engagement with the environment. Think of the popular paintings of the Hudson River School; think of the "rural" cemetery movement, which gave the country its first urban parks in the 1830s and 1840s; think of the thriving horticultural societies and natural history clubs; think of works by William Cullen Bryant, Washington Irving, James Fennimore Cooper, Susan Fennimore Cooper, and Ralph Waldo Emerson.

Scholars will probably never cease arguing about the precise nature, as it were, of Americans' regard for nature in the nineteenth century. Were artists like Thomas Cole and Asher B. Durand, who passed much of their lives outdoors, understood by the public as endorsing Americans' steady transformation of the wilderness, or as questioning the very definitions of "progress" and "improvement"? Over the last thirty years or so, a scholarly consensus has tended to underscore the complicity of all Americans in an undeniable devastation of the nineteenth-century environment. But some very recent work has emphasized evidence of more cultural contestation, of

significant resistance to the straightforward pattern of resource development. The landscape of nineteenth-century history, in other words, may be in the midst of a fairly significant fluctuation.

Culture and Materialism

One of the most compelling summations of nineteenth-century culture I've ever come across (with regard to the Euro-American world) is in Robert Harrison's book, *Forests: The Shadow of Civilization*. Harrison called the 1800s "a century of nostalgia, to be sure, but also of visions of future alternatives which history for some reason never fulfilled." From his perspective, people like Thoreau, who worried about how industrialization would ultimately affect humanity's relationship with the natural world, also "dreamed of a truly radical and redeemed modernity." Writing in 1992, Harrison summed up his argument by deploying a natural simile of his own: "As the millennium comes to a close, the nineteenth century appears to us (at least to some of us) like brooding storm clouds drifting over a drought-stricken land without discharging their moisture" (1992: 133).

To most environmental historians, I think, the nineteenth century has generally appeared more like a railroad engine plowing across the prairie, burning wood or coal and spewing black smoke into the air. Outspoken nature lovers never gathered enough of their own steam to create trends or movements but rather remained lonely voices lamenting capitalist consolidation. "Until the 1890s," as Hal Rothman put it,

> only an occasional voice – Henry David Thoreau, George Perkins Marsh, or Ralph Waldo Emerson – had seen the American land as anything other than a source of unlimited wealth. For most Americans during the first three hundred years of the European experience in the New World, the response to the sight of a tree had been to cut it down and make it useful: into shelter, into transportation, into fuel, into an article for storing food. (2000: 5)

It makes sense that historians have resisted Harrison's more nuanced perspective. As Nancy Langston explained, referring to her experience using *Forests* in the classroom, "Harrison's arguments … aren't supported by the kinds of evidence that satisfy a historian…. Students found themselves provoked, confused, overwhelmed, and frustrated by his book" (2005: 24). I think Langston was justifiably pointing not only to the empirical orientation of history in general but to the materialist tendencies of environmental history in particular. If we can show that US deforestation was at its height at the end of the nineteenth century, then what does it matter if Thomas Cole grieved over "the ravages of the axe" in 1835? Of course, one might immediately posit that different cultural values might result in different

ways of treating the environment: without people like Thoreau and Cole, perhaps deforestation in America would have been even worse, and we would have had no "environmentalist" tradition to build on. But some environmental historians have worried that debates over values would simply be too distracting. "To my mind," wrote J. R. McNeill a few years ago, "none of this [analysis of "various religio-cultural traditions"] is terribly convincing, because environmental change and ruin [are] and long [have] been widely dispersed around the world" (2003: 7). If Rothman saw environmental attitudes as irrelevantly homogeneous until the 1890s, McNeill went so far as to assert that "what people thought specifically about the environment, nature, life, and such mattered only very marginally before 1970" (2000: 326). Or, as Ellen Stroud put it, while there might be "crucial insights" in the work of scholars who examine the ways in which different societies at different time periods have constructed different cultural versions of nature, nevertheless, "as environmental historians, we ultimately want to know how those constructions relate to material nature" (2003: 80).

Stroud is careful not to dismiss the analysis of environmental values and attitudes; but to her that is akin to doing traditional cultural or intellectual history, and thus is removed from what she thinks of as environmental history's potentially unique contribution to scholarship. Stroud's thinking about the field is thus very much in line with the approach endorsed by Donald Worster in two foundational essays published in the *Journal of American History* in 1990, one of which was called "Seeing Beyond Culture." For Stroud and Worster both, the key is to highlight "the world of nature as an active agent in shaping the past" and to prove that "there are and always have been physical limitations and ecological constraints on society" (Worster 1990a: 1142). Frankly, it is hard to argue with that. Most of us environmental historians started out as environmentalists; what could be more important to us than establishing the humbling power of nature? Yet this perspective seems to flout a fundamental belief that was taken for granted by earlier environmentally oriented historians like Samuel P. Hays and Roderick Nash (who, from Worster's perspective, had laid out the field "too intellectualistically, too homocentrically"), namely, that battles among human beings with different opinions about nature have *mattered* as much as the battle royal between nature and humanity as a whole (Worster 1990a: 1142).

Eighteen years after Worster's call for "an agroecological perspective" (1990b: 1087) and five years after Stroud's injunction to continue "following dirt through history" (2003: 75), materialism is alive and well, but so is the study, pioneered by Hays (1959) and Nash (2001), of how we have thought and argued about the natural world. Perhaps spurred by the well-documented "cultural turn" taken by the history profession as a whole in the 1990s, more environmental historians – including Worster and Stroud

themselves – have been seeking ways of integrating material and ideological analyses. As Richard White has asserted, many recent works have helped to "demonstrate that the sometimes hysterical arguments that a cultural turn will lead environmental history from its roots in material 'nature' (itself a cultural concept) into more and more abstract and ethereal realms is unlikely to be true" (2004: 564). We may not want to do environmental history exactly the way Hays and Nash did it, but our predecessors have at least been vindicated in their insistence that historians who care about the environment should not only dig in the dirt but also explore the airiness of the forest canopy – or overstory, one might say.

Perhaps foremost among the recent books opening up space for the creative combination of cultural and material environmental history is William Cronon's influential edited volume, *Uncommon Ground: Rethinking the Human Place in Nature* (1996a). The emphasis of Cronon and his colleagues on "nature as contested terrain" has inspired a new generation of scholars to dissect the ways in which different overarching discourses have informed our environmental practices (Cronon 1996b: 51). Yet Cronon's critique of our cultural construction of wilderness, in particular, raised the hackles of the materialists. As Carolyn Merchant explained, "numerous ecologists, environmental advocates, philosophers, and historians … differed with his interpretation on the grounds that nature was a real, evolved, ecological system rather than a historical construct" (2007: 37). Without question, though, Cronon broadened the conversation by asking environmental historians to consider various topics and categories of analysis that had often been erased in earlier work. Read holistically, *Uncommon Ground* insists that its readers ponder the interrelatedness of labor issues, forests, racism, urban parks, consumerism, and images of Paradise (to name just a few of the book's key concerns).

Specifically with regard to nineteenth-century history, Cronon and his collaborators remind us to pay attention not only to the destruction of nature but to the fading of useful environmental traditions that were formerly quite prominent in American culture. Anne Whitson Spirn (1996) and Kenneth R. Olwig (1996) both suggest that a little landscape architecture (in Central Park, for example, which dates to the late 1850s) can go a long way in constructing a nature meant to be understood as an accessible commons, reconciling attentive, respectful preservation with everyday use. And, at the end of *Uncommon Ground*, Robert Harrison contributes a crucial celebration of literature and culture, "the modes by which human beings organize their relation to nature" (1996: 426). He understands the difficulty of developing a truly caring ecological ethic, since the cycles and longevity of the natural world inevitably remind us of our own frustrating mortality: the more we use language to probe our connection to the earth, the more "we have an urge to take revenge on it." But that linguistic groping is also precisely what allows us at least the possibility of recognizing,

acknowledging, and accepting nature as an "insurmountable limit" (436). The rain may never fall exactly where we want it to, but through culture we can at least manufacture storm clouds, and nineteenth-century America was as good a place as any, and better than most, for what we might think of today as environmentally sensitive cultural production.

Environmental Heroes?

Social movements depend on history for ideas and inspiration, and in the case of American environmentalism the scholarly search for nineteenth-century roots began in earnest in the 1950s, when Hans Huth, a museum curator and art consultant to the National Park Service, produced his pioneering study, *Nature and the American: Three Centuries of Changing Attitudes* (1957). Written into the text is his basic assumption that attitudes and cultural values affect actions, that conservation owed its existence to "the mind and the way we have trained it to be receptive to the beauties and wonders of God's creation" (212). Of course, in the twenty-first century, many historians chafe against Huth's casual, John Muir-like appeal to divine beauty; his whiggish belief in the linear, step-by-step development of a conservation ethic; and, especially, his often hagiographic, decontextualized treatment of visionary figures who were devoted to recognizing the inherent rightness of creation. Yet, more than fifty years after its publication, Huth's book is still cited relatively frequently, because no other sweeping synthesis of American ideas about nature has been published, and because many scholars still agree that, in the words of the eco-critic Lawrence Buell, the "environmental crisis is not merely one of economic resources, public health, and political gridlock," but also one of "attitudes, feelings, images, narratives" (2001: 1). Huth gave us a pioneering narrative of passionate commitment.

A more layered, interpretive text arrived a few years later and quickly became a foundational work in American studies and nineteenth-century studies – and, in retrospect, a precursor to eco-criticism. Leo Marx's *The Machine in the Garden: Technology and the Pastoral Ideal in America* (1964) attempted to place humanity's fundamentally ambivalent relationship to nature at the very heart of the Euro-American experience, which, especially in the expansive nineteenth century, seemed to reconcile yearnings for both primitivism and progress – a reconciliation embodied by the "middle landscape." Most of the pastoral imagery in American discourse has been "popular and sentimental," Marx argued, though another brand, as practiced by writers like Thoreau, Hawthorne, Melville, and Twain, sometimes achieved a more complicated blending of environmental appreciation and social criticism (5). Overall, Marx saw the pastoral mode as being flexible enough to incorporate the machine, remarkably, as a symbol of compromise.

The railroad would knit together city and country through a network that, in "its vastness and magnificence," could achieve a "technological sublime" equivalent to the grandiosity of wilderness (195). Though some nineteenth-century writers insisted on noting the ways in which trains tended to disturb the bucolic peace of country towns in the Northeast, most Americans, according to Marx, chose to emphasize the balance afforded by the gradual development of a "virgin" land: the nation's highly mobile citizenry could pass easily between the refinement of the urban parlor and the mountain air of the Catskills or the refreshing spray of Niagara. While industrialization in England resulted in terrible pollution and social unrest, in the United States it would institutionalize an Enlightenment-style "golden mean" as the defining national feature, harmonizing Old Country gentility with the unique natural freshness of the New World.

Marx tended to gloss over any nineteenth-century writings that invoked pastoralism or the sublimity of wilderness to mount a direct opposition to industrialism. Such protests, for Marx, marked their authors not as environmental heroes but as members of "a small cult of literary dreamers beyond the fringe" (218). Indeed, Marx believed that by 1829 "there was not (nor would there be) any effective opposition to industrialization. This is not to deny that there were impulses to resist. But … they did not produce an alternative theory of society capable of enlisting effective political support" (180–1). A social critic like Thoreau, then, was not so much a defender of the environment, nor a visionary describing ways to live more sustainably, but a realistic tragedian, pointing out that any worthwhile way of interacting with nature was clearly "doomed" by the prevailing trends of the nineteenth century (254). "For Thoreau," Marx explained, "the realization of the golden age is, finally, a matter of private and, in fact, literary experience" (264). His two-year withdrawal from society was less a retreat to nature than a retreat to his own mind.

From Marx's perspective, Thoreau stood at the end of an era, philosophizing about the passage of a wilder America. For Roderick Nash, though, in *Wilderness and the American Mind* (first published in 1967), Thoreau symbolized the dawning of a brand-new sensibility: he "led the intellectual revolution that was beginning to invest wilderness with attractive rather than repulsive qualities" (2001: 95). We are back in the realm of heroism. But the key shift here – one that has had a massive impact on the field of environmental history – is from broadly conceived pastoral landscapes and a general engagement with nature to a specific fascination with wilderness. On one level, clearly, Americans repudiated nature in the nineteenth century, throwing their primary allegiance over to machines, technology, industrialization, urbanization. Yet it was also in the nineteenth century, as Nash argued, that Americans, with great eloquence and great evidence, decided to set aside large tracts of wild land to be preserved in perpetuity "for public use, resort, and recreation" (2001: 106).

Like Huth, and unlike Marx, Nash had an overt political agenda in writing his book: the first edition (it has gone through four) ended with a glowing celebration of the 1964 Wilderness Act. One of his basic goals was to show how American thought and culture had progressed to this high water mark of enlightened public policy (after starting from a Puritanical suspicion of the dark, savage forest). Yet, perhaps because Nash was a certified academic historian – or perhaps because his range of examples was so impressive and his prose so smooth – his very presentist work set historical research agendas to a much greater extent than that of Huth the amateur antiquarian or Marx the literary scholar. *Wilderness and the American Mind*, in the words of John Opie, soon became "a bona fide classic in American environmental history" (1998: 213). Some might even argue that it launched the field. In any case, it spurred numerous other scholars to explore the history of Americans' adoration of the wilderness (especially as embodied in the national parks) and to produce celebratory studies of people like John Muir, who cast himself explicitly as a wilderness advocate. And, perhaps in tandem with the environmental movement's emphasis on the preservation of wilderness (rather than, say, reducing the everyday consumption of natural resources), Nash's work led ecologically oriented scholars to worry that their books would not even be considered environmental history if they strayed from the wilderness and tackled issues relating directly to industrialization and middle landscapes – topics they generally left to economic and cultural historians, or geographers, or literary critics.

Every now and then, a scholar would intervene to argue that the defenders of wilderness and lovers of nature were not all that heroic. Alfred Runte, in *National Parks: The American Experience* (first published in 1979), famously proposed his "worthless lands" thesis to suggest not only that Americans would never have protected areas that could have been developed commercially, but also that the railroad companies had been the primary parties responsible for wilderness preservation, since they had quickly realized the potential of nature tourism (Runte 1997). Even icons like Thoreau were brought down to earth. Deploying a classically Foucauldian paradigm, but with a New England twist, Sacvan Bercovitch insisted that radicals in this country had always been subject to "rituals of consensus," that they were men of their time, and the dominant discourse of their time tended to co-opt their inclinations toward protest and resistance. Thoreau and his ilk did "march to different drummers, but along the same free and enterprising American Way [as their more mainstream compatriots].... *Walden* embodies the myth of American laissez-faire individualism" (1978: 187).

In general, though, environmental historians and eco-critics (especially since the real explosion of eco-criticism in the 1990s) have simply argued about what *kinds* of heroes nineteenth-century nature lovers were. Scholars committed to the historical study of thought about the environment, while

they carefully contextualize the figures they write about, also tend to feel comfortable searching the past for models of ecological integrity. If Donald Worster is far too precise a historian to call Thoreau an environmentalist, he is nevertheless eager to label him as "an active field ecologist and a philosopher of nature," not to mention "a remarkable source of inspiration and guidance for the subversive activism of the recent ecology movement" (1977: 58). Roderick Nash, meanwhile, partially bowing to Leo Marx's focus on pastoralism and middle grounds, suggested that Thoreau's ideal lay in "a combination of the good inherent in wildness with the benefits of cultural refinement" (2001: 92). But Marx himself once proclaimed that, during his last few years, Thoreau actually spoke "as an extreme primitivist-anarchist.… In the end Thoreau's doctrine of 'wildness' becomes indistinguishable from the shadowy bliss of infantile mindlessness" (1988: 82). More recently, Lawrence Buell used Thoreau's wilder streak to bolster his theory that Thoreau should be seen as America's most radical exemplar of a truly "environmental imagination," or even a worldview that could be dubbed "ecocentric" (1995: 1). But to Laura Dassow Walls, another scholar who has focused a sharp eco-critical lens on Transcendentalism, Thoreau's later period, which he devoted to "detailed observations of the specifics of nature," represents an attempt not to value the environment's putative perspective over humanity's, but to reconcile aesthetic and scientific ways of perceiving the environment, through what Walls labels an "empirical holism" that was based on the writings of the explorer Alexander von Humboldt. In other words, Thoreau laid the foundations not for a deep ecology but for a "social ecology … where man was not simply 'in' nature but where man and nature were at every level dependent on and expressive of each other" (1995: 115, 134, 144).

However we ultimately choose to view people like Thoreau, it seems clear that environmentally oriented scholars and activists owe a great debt to such forebears. So I find it fitting, in a way, that so much of the work on nature in nineteenth-century American culture has focused on just a few seemingly heroic figures. Yet I also worry that the heroism angle gives up too much ground to the materialists. Was it really only the people who sought immersion in wild nature who had something compelling to say about the way Americans were dealing with the environment during this period? Did everyone else just blithely embrace technology, industry, and the "free and enterprising American Way"? By focusing so much attention on a few exceptional figures, we have allowed them too easily to be seen as proving the rule, and by emphasizing the wildest environments, we have missed out on a lot of ecological action at the heart of American cities and suburbs. Why are there no chapters on environmental themes in the Blackwell Companions to Nineteenth-Century America (Barney 2001) and American Cultural History (Halttunen 2008)? Why is there no mention of the development of Central Park in the textbook I used for my course

in North American environmental history (Steinberg 2002)? Perhaps, in trying to fence off territory that could specifically be designated "environmental history," we have in effect marginalized our concerns. But the problem fades to some extent if we think of our field in more interdisciplinary terms and refocus on the broadly contested cultural politics of the nineteenth century.

A Landscape Tradition?

In retrospect, it seems that scholars in other disciplines – and especially the wonderfully amorphous field of "landscape studies" – have been trying for quite some time to show us other paths into and through the woods; they've even been questioning our assumptions about how we define "the woods" in the first place. Indeed, conflicting ideas about nature may have been at the heart of nineteenth-century cultural debates about everything from art to urbanization to religion to territorial expansion.

John Stilgoe, perhaps the most iconic practitioner of landscape studies, is almost never identified as an environmental historian, yet his work perfectly captures the significance of the environment in everyday life in America. If we are looking – as William Cronon said we must, in his notorious essay "The Trouble with Wilderness" – for ecological insights into "*home*, the place where we actually live" (1996a: 87), then we would be well served by Stilgoe's entire *oeuvre*, but especially classic books like *Common Landscape of America, 1580 to 1845* (1982) and *Borderland: Origins of the American Suburb, 1820–1939* (1988). Both of these works emphasize the extent to which Americans were committed to a conscientious shaping of common spaces, especially in the first half of the nineteenth century. The impetus toward urbanism and industrialism, in other words, had to compete with thriving practical and aesthetic traditions of "designing with nature." As Stilgoe points out, in the early republic, the preservation of old-growth, native woodlands and their incorporation into rural communities provided "evidences of public-spirited patriotism" (1988: 118). Of course, some environmental historians – and maybe Stilgoe himself – would see his work as falling outside the usual confines of the field, since he deals much more with "second nature" – or, as he puts it, "the built environment" – than with "first nature" (1988: xi). Yet it seems clear that environmental history is moving toward more examinations of "permanent or dialectical interchanges between the dynamics of nature and human intervention" (Mauch and Zeller 2008: 7).

Certainly, one of the most important interventions affecting the relationship of the human-made environment to the "natural" environment was the imposition of the grid system, starting with the Land Ordinance of 1785, in the surveying of frontier townships and the laying out of cities.

In Stilgoe's words, "settlers had long assumed that topography indicated the best outlines for future towns and lots, and most tracts conformed to soil types, elevations, and water frontage. Squareness mandated a departure from this so-called natural practice" (1982: 101). Instead of adapting to the land, Americans began adapting the land to the needs of speculators and the cash-poor government. Scholars like Paul Wallace Gates (1996) in the mid-twentieth century and Andro Linklater (2003) in the twenty-first century have argued that our land system was ultimately responsible for the development of American-style capitalism and of our peculiar scorn for environmental limitations. John Reps, meanwhile, has asserted that, despite a vast country full of topographical and ecological diversity, "the gridiron plan stamped an identical brand of uniformity and mediocrity on American cities from coast to coast" (1965: 314).

At the same time, though, other landscape scholars have sought to remind us that, especially in the nineteenth century, with the rise of landscape architecture as a legitimate profession, some Americans insisted on the importance of working more sensitively with the land and shaping cities and towns to reflect a deep environmental appreciation. For Reps, "picturesque planning" represented a brief, nostalgic interlude in the overall drive toward a ruthless, gridded appropriation of land. But for Thomas Bender (1975) and David Schuyler (1986), the rise of garden cemeteries and urban parks at mid-century reflected a "widespread concern for preserving a balance between nature and art, spontaneity and organization, romantic and utilitarian points of view" (Bender 1975: 189). Indeed, James L. Machor has argued that the fundamental ideal of American development, especially as expressed in the mid-nineteenth century, tapped into "the promise of open landscape and pastoral sensibilities" to invoke "a healthy, harmonious urban-pastoral society combining the best of both worlds" (1987: 5).

More broadly, Kent C. Ryden has suggested that historical meta-narratives about urban blight and ecological devastation imply a much too "strict, sharp" line between both city and country and between humanity and the environment. We should take renewed care, Ryden thinks, to tell more complicated, contingent stories about the past, painting the boundary as "vague and indistinct, blurred perhaps to the point of erasure; to see one side of the line as 'nature' and the other side as 'culture' is false, unfaithful to the history that the landscape … everywhere in the country has seen" (2001: 7). Instead of embracing a historical model that emphasizes the ever-expanding scope of our industrial impact on the environment – though there is clearly a certain amount of truth to this trajectory – we might try out a model of constant blending: our hands, or tools, or germs, or pollutants, have touched every part of nature, and nature continues to be present in every aspect of our civilization. As Gunther Barth has put it, "culture and nature often marked one another … in many ways and in various settings during the course of American history" (1990: xviii); if the interaction was often violent,

it was also sometimes gentle, and we must not miss "the significance of the brief interludes that find nature and culture in balance" (xix).

In Ryden's work, we get long meditations on the "many individuals and small communities … [who] do manage to live on the land in ways that are respectful, sustainable, and – crucially – directed and constrained by the cycles and capacities of the local environment. (Even nineteenth-century New England farmers, to be fair, were not the sworn agents of some vast cultural conspiracy)" (2001: 47). Indeed, it's worth considering the possibility that some nineteenth-century mill towns, and suburbs, and canals, and even factory-riddled cities, when operating on a corporeal rather than a corporate scale, could have represented useful compromises: "waterpowered mills occupied a sort of middle ground between the poles of nature and culture, both controlling and controlled by their rivers" (238–9). And, as Barth has noted, the observation of "growth and decay" in places like Mount Auburn Cemetery, which opened in 1831, and Golden Gate Park, built in the 1870s, "intensified the encounter with citified nature that gave city people a feeling for different forms of life" (1990: 180); "contact with grass, shrubs, and trees instilled in [Americans'] minds a concern for nature as a precious heritage" (188).

Art historians, meanwhile, have shown that this rise in environmental consciousness had its parallel in the antebellum shift away from history painting and toward landscape as the dominant genre. Ever since Barbara Novak's classic book, *Nature and Culture: American Landscape Painting, 1825–1875* (1980), it has been clear that the Hudson River School took the nation by storm, attracting massive crowds at galleries and commanding previously unheard-of prices for pictures not just of mountains and waterfalls but also of log cabins, harvesting scenes, and ships along shorelines. In both of the two modes Novak emphasizes – the "grand opera" of sublime wilderness paintings and the "still small voice" of more modest luminist works – she sees a conflation of art, science, and religion that seems unique to the moment of the Second Great Awakening. It was a time of liberal openness and possibility (if you were white) – a time to explore nature and the self simultaneously. Artists immersed themselves in various landscapes, studied their varied details, and then painted them holistically, often including themselves or at least hints of themselves in the finished work. "The unity of nature bespoke the unity of God," in Novak's words, and "the unity of man with nature assumed an optimistic attitude toward human perfectibility" (17). Yet, despite this optimism, the painters of the Hudson River School also demonstrated a pained awareness of environmental destruction, as in Thomas Cole's poem "The Complaint of the Forest" ("And dissonant – the axe – the unresting axe / Incessant smote our venerable ranks") and in any number of stump-filled paintings not only by Cole but also by Frederic Church, Asher Durand, Sanford Gifford, Jasper Cropsey, and George Inness (157).

More recent work in art history – perhaps most famously Angela Miller's *The Empire of the Eye: Landscape Representation and American Cultural Politics, 1825–1875* (1993) – has put a greater emphasis on the nationalist and even imperialist elements of nineteenth-century landscape paintings, reminding us that though this culture may have lamented such things as slavery, Indian Removal, and deforestation, it also, manifestly, supported them. As Miller put it, the works of the Hudson River School used a sweeping "language of visual mastery" to codify "many of the same assumptions that guided Americans as they established economic and social control over nature" (150). Stumps could be interpreted as positive markers of progress and conquest rather than as critiques of Yankee technology and rapacity. Indeed, while Barbara Novak found Asher Durand's picture of *Progress* (1853) to be "not fully convincing" in its "accommodation" of industrialization into the pastoral mode (172), Miller saw the painting essentially as an embodiment of complicity. To her, *Progress* reflects the culture's "proprietary gaze" over nature – as a typical attempt "to promote industry and development while naturalizing both their social processes and their results" (154, 157). Even Miller, though, acknowledged that many mid-century landscape paintings did reflect a deep ambivalence about American industrialism and technological development; the works' dark skies and deluge imagery suggested "a bleak prognosis for the future," or at least the anxiety and guilt many Americans felt when confronted with evidence of their own abuse of the environment (108). While Miller preferred to emphasize the broader cultural politics of landscape art rather than "its relationship to concepts of nature," her work nevertheless bolsters our understanding of this time period as one when Americans were obsessed with natural forces, natural scenery, and natural resources (2). Environmental historians may not have paid significant attention to any nineteenth-century landscape tradition, and such a tradition may well have unraveled somewhat by the Gilded Age, but its status as a cornerstone of antebellum culture seems to be a given among scholars who use the term "landscape" – rather than "environment" – to demarcate what they study.

Expanding Boundaries?

The field of landscape studies – at least the part of it outside art history – grew out of cultural geography, especially as practiced by scholars like J. B. Jackson and D. W. Meinig. And one of the key lessons of their scholarship is that we cannot understand nineteenth-century American history without considering the vast cultural impact of territorial expansion. Meinig's magisterial, multi-volume history, *The Shaping of America* (1993 and 1998), has done much to help us theorize spatiality as a cultural force and also to track both material transformations of space and cultural debates over those

transformations. Jackson, meanwhile, had already focused attention on both the geographical implications of the Civil War and the rise of a much more thorough modernity in the Gilded Age. His assertion that "during the postwar years, the relationship between Americans and their environment began to change" (Jackson 1972: 19), was just another way of saying that by the 1870s the landscape tradition was having a lot more trouble standing up to the machine and the corporation.

Again, that landscape tradition has often been lost in histories of the nineteenth century, which have tended to see the machine as easily and inevitably invading the garden starting in the 1830s, as the engines of American expansion started to rumble. But a new wave of spatially sophisticated history, appearing just in the past decade or so, has been putting a different spin on what, from a materialist ecological perspective, was clearly a time of steadily increasing damage. Environmental historians, looking beyond the fairly narrow boundaries of their field, have started to acknowledge that maybe the entire nineteenth century was marked by potentially useful debates about space, territory, land, and nature. As Anne Baker aptly put it, "the growth of the United States during this period – and the geographical uncertainty that it engendered – had a far more complicated, multifaceted impact on American culture than has been previously recognized" (2006: 1). There were a lot of storm clouds over the train tracks.

Without in any way denying the crimes and tragedies of the nineteenth century, revisionists in many fields have been redrawing the contours of American expansionism, as demonstrated by recent works like Stephanie LeMenager's *Manifest and Other Destinies: Territorial Fictions of the Nineteenth-Century United States* (2004) and Laura Mielke's *Moving Encounters: Sympathy and the Indian Question in Antebellum Literature* (2008). Though we must continue telling stories of violent conquest and destruction, we must also note, as Mielke does, that some white Americans in the antebellum period made genuine gestures toward mediation and tried to establish "the promise (however fleeting) of a sustained relationship between Natives and non-Natives" (Mielke 2008: 195). Similarly, it's worth realizing that the pioneer settlers famous for clearcutting and selling off old-growth forests and for washing away mountainsides in search of precious metals – for carelessly carving a winner-take-all civilization out of the wilderness – sometimes also paused and developed "an intimate understanding and closeness to the natural world," as Peter Boag noted (1992: 50). Indeed, as I have argued in my own work – for I must admit to being a stakeholder (or surfer, at least) in this particular fluctuation of historical understanding – sometimes even American explorers, who have generally been portrayed as agents of empire, might also be seen as committed artists and scientists who contributed to a radical tradition of environmental thought (Sachs 2006).

Perhaps Americans felt a penetrating ambivalence and uncertainty as commonly as they felt unbounded enthusiasm during this time period. Certainly, in *The Health of the Country: How American Settlers Understood Themselves and their Land* (2002), Conevery Bolton Valenčius was careful to emphasize "the anxieties associated with the process" of expansion. The specific freshness of her book lies in her conviction that the history of this expansion cannot be appreciated in all of its complexity unless it is integrated with both environmental history and the history of science and medicine. Because the pioneers assumed that their own bodily health was tied up with the health of nature – because they came "armed with a deep and abiding sense of union between themselves and the soils they tilled" (4) – they fretted over environments that might be too dry, or too hot, or too rocky, or too swampy. Many even observed their skin tone with dismay, convinced that particular climates would make them more like Indians or African Americans. In some cases, Valenčius's work suggests, the settlers' desire not to cause the kinds of disruptions that might result in new, incomprehensible ailments may have led them toward a more adaptive land ethic.

Steven Stoll (2002), meanwhile, has productively refocused attention on the farmers back East who never pulled up stakes and who actually started to develop various kinds of proto-ecological theories about the soil. The key to Stoll's important study is his convincing argument that the agronomists he writes about may have been as responsible as Thoreau, Emerson, and Marsh for launching a tradition of conservation in this country. Indeed, they attempted a total redefinition of the word "improvement," insisting that Americans turn away from canals and railroads and gridirons and simply go back home to their family's plot of land, whose soil had been wasted and was now in desperate need of *improving* – husbanding, restoring, refertilizing, scientifically enhancing the nutrient cycle – through a new commitment to loads and loads of manure. Their initial ideal was mixed farming for subsistence rather than cash cropping, and though many of them were social conservatives (some of Stoll's agronomists were actually slaveholders), and though their soil conservation program was more self-serving than sustainable, they do force us to consider the very different ways in which agricultural practices contributed to an overall environmental ethos.

The Shores of Environmental History

I could have written this entire essay just about the relevant scholarly works that have come out in the last six years, since Valenčius and Stoll published their boundary-blurring studies of expansion. I chose not to, simply because innovation loses its valence if one fails to take account of what has come before. Of course, no full accounting is ever possible: one always misses important contributions, as I'm certain I have. And the significance of various

contributions will continue to change as the tradition of environmental history evolves, as its edges get reshaped by its own shifting currents and sands, and by the tidal flows of the traditions on its borders.

In my opinion, the most intriguing of the new works have sought not to establish beachheads but to experiment with waterscapes; their authors walk along the coast wearing swimsuits and carrying snorkels – or paddle canoes through fens and bogs. Megan Kate Nelson (2005), for instance, drawing on her background in American studies, has shown how a liminal space like the Okefenokee Swamp might have taken on vastly different meanings for fugitive slaves, Seminole Indians, Confederate deserters, and capitalist developers. Eco-critics, meanwhile, like Dana Phillips (2003) and Andrew McMurry (2003), used not only literary analysis but insights from science studies and systems theory to continue probing the nature of Thoreau's environmental heroism. Philip Pauly (2007), coming from the history of science, demonstrated that nineteenth-century horticulturists powerfully transformed not only the discourse surrounding humanity's tangled relationship to nature but also American vegetation itself. And new directions in urban studies, in combination with geography and political economy, have spurred scholars like Matthew Gandy (2002), Richard Walker (2007), and David Stradling (2007) to examine elaborate and intricate connections between country and city in the nineteenth century, ranging from drinking-water systems to early forms of ecotourism.

Perhaps more predictably, other recent studies shedding new light on the interpenetration of culture and nature in nineteenth-century America have drawn their inspiration from trends within the field of history. Volumes edited by Virginia Scharff (2003) and by Dianne Glave and Mark Stoll (2006) have collected essays that, in a number of different ways, demonstrated just how limiting the humanity/nature binary has been, especially since many environmental historians have failed to divide "humanity" into male and female and white and black (though of course these binaries, too, are worth questioning). Meanwhile, Susan Schrepfer (2005) and Kimberly Smith (2007) have contributed monographs specifically trying to track, respectively, the gendered aspects of the history of environmental activism and certain traditions of "African-American environmental thought." Class remains less fashionable than gender and race in historical scholarship, but Kathryn Morse (2003) has at least shown how the laborers involved in the Klondike gold rush at the tail end of the nineteenth century engaged with and got to know nature in a sometimes surprising fashion. And Chad Montrie's important study called *Making a Living: Work and Environment in the United States* (2008), argues, among other things, that the girls working in the Lowell mills were pioneers not only in labor organizing but in environmental organizing, coming together "to express their estrangement from the natural world and criticize the factories and city they held responsible for this loss" (34).

As much of this new work suggests, there will never be any adequate way of making generalizations about "how Americans understood the environment" in the nineteenth century – or about how exactly that understanding changed over time. Yet it seems to me worthwhile to continue pressing the question. I think it matters a great deal whether we see an explorer like Clarence King as offering environmental narratives that "expressed aggressive imperial tropes of the sublime" (Schrepfer 2005: 5) or as developing a cosmopolitan ecology, a "science of humility" (Sachs 2006: 229). Of course, there's good evidence for both views, which suggests the necessity of emphasizing the deep environmental ambivalence of nineteenth-century Americans – and which makes me especially appreciative of a book like David Nye's *America as Second Creation: Technology and Narratives of New Beginnings* (2003). Nye, coming from the field of the history of technology, has depicted nineteenth-century American history as a cultural contest between, on the one hand, "foundation narratives" that validated expansion and development and the integration of the machine into the garden, and, on the other, "counter-narratives" that resisted technological change and often celebrated proto-ecological values. While I would probably argue for a more dialectical relationship between the two kinds of narratives – Nye sometimes writes as if the counter-narratives sprang up only in response to the mainstream discourse of progress and improvement – I think *America as Second Creation*, better than almost any other environmental history book I know, succeeds in demonstrating that Americans' relationship to nature in this time period was both fundamental to the development of national identity and also fundamentally tortured. By the end of the nineteenth century, Americans were proclaiming their ultimate conquest of nature and also starting to articulate a genuine environmental ethic.

Thoreau contributed to both kinds of discourse, sometimes in the same essay. Having gone downtown to see a panorama depicting the development of the Mississippi River valley, Thoreau found himself in awe as he "gazed at the steamboats wooding up [and] counted the rising cities"; he writes of his realization that "this was the heroic age itself." Then, on the next page, he insists that "in wildness is the preservation of the world," and, a few paragraphs on, he locates "hope and the future … not in towns and cities but in the impervious and quaking swamps." And that is ultimately where I like to picture him, and the whole vacillating century; for if history itself is an "unfathomable bog" (Thoreau 1991: 94–5, 98), Thoreau at least offers some inspiration for continuing to muck about in it.

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Chapter Fourteen

Cultures of Nature: Twentieth Century

Finis Dunaway

Throughout the twentieth century, nature figured prominently in a variety of cultural forms: from wildlife movies and Ansel Adams photographs to Sea World and Smokey Bear commercials. Given the widespread presence of nature in modern American culture, one might assume that the analysis of images, popular texts, and consumer items became central to the field of environmental history as it evolved over the years. Yet something quite different happened. To distinguish environmental history from traditional areas of scholarship, such as intellectual or political history, its practitioners tended to emphasize how human beings altered particular places or regions. Drawing on insights from the ecological sciences, they focused on the material changes generated, for example, by the arrival of European settlers in New England or by the spread of agriculture across the continent. By and large, the conceptual innovations in the field came from the work of scholars who sought to place people and their technologies in dialogue with soil and water, forests and fields, animals and micro-organisms. This emphasis on material relationships challenged the way historians narrated the past by urging scholars to consider nature not just as a backdrop, but rather as an active agent in historical change. Environmental history thus acquired a clear identity as a field committed to placing past human actions in a broader ecological context. While this focus on the human relationship to physical nature energized the field and signaled its bold departure from mainstream historiography's neglect of environmental factors, it also submerged, at least for a time, questions about the meanings of nature and the role of culture in shaping human perceptions of the natural world.

In recent years, a number of historians have questioned the neglect of culture in environmental history and have enriched the field through their investigations of topics ranging from tourism and consumer culture to visual imagery and countercultural environmental movements. This essay will

examine the cultural turn in environmental history through a focus on works that have explored the culture of nature in the twentieth century. I will begin by placing this cultural turn within broader developments in the humanities and social sciences, especially the concept of cultural construction. According to this formulation, ideas of nature, like those attached to race, gender, and other categories, do not originate in the supposedly timeless realm of nature and biology, but rather emerge out of a tangled history of human values and the ongoing contest over meaning in the cultural sphere. When brought into environmental historiography, this concept ignited a firestorm of controversy that revealed the resistance to cultural history felt by many of the field's practitioners. Even though the cultural turn, some environmental historians worried, threatened to undermine the field's foundational assumptions, I will argue instead that the methods of cultural history enable environmental historians to pose new questions about the place of nature in American life: How do Americans come to know the natural world? Why do certain ideas of nature emerge during particular historical moments? Who has the power to implement their ideas and visions of the environment?

The sections that follow this discussion of cultural constructions will identify three major themes that demonstrate the productive intersection between cultural and environmental history. The first – consumer culture, tourism, and environmental spectacles – will examine how Americans have come to know nature through consumption. From shopping malls and Sea World to ski slopes and national parks, spaces of leisure have provided consumers with a sense of escape through contact with nature. The next section – visual culture and the environment – will explore the role of images in communicating ideas about the natural world. Wildlife movies, coffee-table books, and mass magazines have played a crucial role in constructing and mediating popular understandings of the environment, often by representing certain scenes and ideas to the exclusion of others. The final section – the environment in public culture – will consider how various publics and counterpublics have organized themselves around shared values to express concern about environmental issues, assign meaning to the natural world, and try to influence American political culture. For each section, I will begin by situating the general topic within larger historiographical and interdisciplinary contexts – explaining how that subject first attracted the attention of cultural historians and other scholars and what concepts they deployed to interpret it. From there, I will trace how the issue found its way into environmental history and consider how selected works have interpreted the ways in which Americans have encountered, understood, and contested the meanings of nature in the twentieth century. Throughout the essay, I will explain how the study of representations of nature opens up new avenues of interpretation for environmental historians and also provides a way to connect the field to the broader landscapes of American historiography.

Cultural Constructions

The emergence of environmental history in the 1970s drew on a similar set of intellectual and political motivations that spawned such fields of social history as African-American history, women's history, and gay history. The historian Daniel Wickberg (2005), summarizing the impetus that led to these three fields, identified the following pattern: "An oppressed group, motivated by a broader social and political movement, seeks to uncover a hidden past, to recuperate an agency that has been rendered absent by the existing historiography, and to see itself as having a history of its own making" (137). For environmental historians, influenced by the contemporaneous rise in environmentalism, nature – rather than a subaltern group of people – became the entity to uncover in the past. Just as social historians argued that agency was not the exclusive provenance of the powerful, environmental historians claimed that it was also not confined to human society. The natural world, they insisted, has agency and sets limits on human actions. The recuperative role played by environmental history thus centered on finding a place for ecological factors in narratives of the human past. These accounts often emphasized both the relentless conquest of nature and the ability of the natural world to circumscribe human control.

But in the 1990s something happened to social history and, to a certain extent, to environmental history: a shift from recuperative narratives of subaltern agency toward critical analysis of identity categories. Wickberg pointed, in particular, to studies of whiteness, masculinity, and heterosexuality as part of this new emphasis on discourse rather than agency, on the power of culture to shape the categories that structure human experience and identity. This shift grew out of a number of intellectual developments, perhaps most notably the rise of the social constructionist critique. "Social-constructionist arguments," Wickberg explained, "are attempts to show how categories that are held to be natural or empirically derived or self-evident prior to society are constructed or constituted in society, for the various constituents who make up the social order – thus such categories tell us more about those who created them than about the objects they putatively denote" (146–7).

The 1995 publication of *Uncommon Ground*, a collection of essays edited by the distinguished environmental historian William Cronon (1995a), signaled the arrival of the social constructionist critique within environmental history. In his introduction, Cronon foregrounded a claim that would echo throughout the volume: " 'nature,' " he argued, "is not nearly so natural as it seems. Instead, it is a profoundly human construction" (1995b: 25). Cronon developed this argument in more depth in his now-legendary essay from *Uncommon Ground*, "The Trouble with Wilderness," which offered

a critical history of the wilderness ideal in the United States (1995c). While wild nature has often been viewed as a pure place apart from human society, Cronon emphasized its constructed qualities and demonstrated how the wilderness ideal emerged out of particular cultural and intellectual histories. In particular, he pointed to the legacies of romanticism and the sublime aesthetic, which engendered feelings of awe and wonder in the presence of wild nature, and the frontier myth, which located the true source of American identity in the open spaces of the West. Cronon combined this historical analysis with a critique of the dualism underlying the wilderness ideal. The celebration of wilderness, he argued, fostered a rigid separation between nature and society that delimited the vision of American environmentalism. By enshrining wild places as sacred and authentic, wilderness discourse worked to obscure the connections between human society and the natural world, distract attention from urban and rural environmental problems, and evade questions of social justice and environmental inequalities within human communities.

For many environmental historians as well as wilderness activists, Cronon's social constructionist argument constituted nothing less than an act of apostasy. Just as cultural historians had begun to make the analysis of category creation central to their work, demonstrating how race, gender, and sexuality were culturally constructed, now Cronon took what seemed to many environmental historians to be the quintessential natural entity – wild, untouched nature – and denaturalized it, showing that it bore the imprint of culture as much as biology and that its public appeal grew out of a distinct discursive history rather than its putative timelessness. According to the historian Thomas Dunlap, who was sympathetic to Cronon's approach, critics of "The Trouble with Wilderness" based their attack largely on "a fundamentalist understanding of wilderness. Like fundamentalist Christians refusing to see the Bible as a collection of texts produced at different times and within particular cultures, they put wilderness outside historical and cultural context, believing it could not be analyzed but had to be experienced" (2004: 89).

Indeed, Cronon's essay challenged previous scholarship on American attitudes toward the wilderness, especially Roderick Nash's *Wilderness and the American Mind* (1967), an essential text in the emergence of environmental history. Nash celebrated wilderness advocates in an uncritical fashion. Although he identified changing patterns and motifs in wilderness perception, Nash did not advance anything more than generic claims about why certain Americans began to value wild nature so highly. Because they lived in cities and were affluent, he implied, they simply desired to experience wilderness and had the means to do so.

Perhaps a more appropriate precursor to "The Trouble with Wilderness" can be found in the work of another *Uncommon Ground* author, Donna Haraway. Her article "Teddy Bear Patriarchy" (1989) – widely influential

in feminist and science studies (but less so within environmental history) – examined taxidermy at New York City's American Museum of Natural History during the early twentieth century. Paying particular attention to discourses of race, gender, and empire, Haraway linked the museum's collecting expeditions and visual displays to the eugenics movement, racial anxieties, and ideas of masculinity. Rather than an innocent realm, the natural history museum was permeated with the troubling racial, gender, and class politics of elite white men, who repeatedly appealed to nature to legitimate existing hierarchies. Just as the new cultural historians argued that discourse shapes and perpetuates power relations, Haraway revealed how museum dioramas, presented as artifacts of "jungle peace," were instead "maps of power" (38, 54).

While some critics of Cronon recoiled at the notion that wilderness was a cultural construction, Haraway's work had already demonstrated that this claim was merely a starting point for the rigorous study of nature's cultural history. The more significant historical analysis, Cronon and Haraway indicated, would come from asking the following questions: What human needs or desires do particular constructions of nature meet? Whose interests do they serve? What ideas of nature do dominant constructions exclude or obscure? How do these constructions reinforce or subvert power relations within American society? With the publication of *Uncommon Ground*, Cronon and the other essayists encouraged environmental historians to interrogate the cultural meanings of nature in modern America by asking these questions and by venturing into previously neglected spaces such as shopping malls, ski resorts, and Sea World.

Consumer Culture, Tourism, and Environmental Spectacles

As they moved into the fertile field of cultural history, many environmental historians sought to understand how meanings of nature have been created through acts of consumption and thus connected their work to the growing literature on the history of consumer culture. A key text that had positioned consumption as central to the field of cultural history was *The Culture of Consumption* (1983), edited by Richard Wightman Fox and T. J. Jackson Lears. In his essay for the volume, Lears explored the "therapeutic roots of the consumer culture." According to Lears, many affluent Americans at the end of the nineteenth century began to feel that modern life had become strangely "unreal." Their feelings of unease stemmed from a variety of factors, including urbanization and the rise of a corporate economy, the secularization of Protestantism, and the rationalization of culture. Feeling that they had lost autonomy at work, no longer searching for salvation through religion, and obsessed with their own sense of personal wellbeing, they now sought self-realization through consumer culture. "Many began to sense,"

Lears argued, "that their familiar sense of autonomy was being undermined, and that they had been cut off from intense physical, emotional, or spiritual experience. The therapeutic ethos promised to heal the wounds inflicted by rationalization, to release the cramped energies of a fretful bourgeoisie" (Lears 1983: 17). Although Lears' essay did not fully connect these issues to the cultural history of nature during this period, his argument about the therapeutic ethos would provide historians with a more analytical framework to understand such topics as the back-to-nature movement, described by Peter J. Schmitt (1969) as a widespread effort by middle- and upper-class city dwellers to seek solace in an Arcadian myth of nature. Moreover, Lears' analysis of the quest for reality and therapeutic relief through consumption, together with studies of authenticity by Miles Orvell (1989) and Philip J. Deloria (1998), made the question of reality versus artifice an ongoing concern of cultural and environmental historians.

In her 1999 *Flight Maps*, one of the most widely read and accessible cultural histories of nature, Jennifer Price focused largely on these tensions between reality and unreality in consumer culture's mediations of the natural world. Ranging from the late nineteenth century to the present, Price offered a playful look at such topics as the passenger pigeon extinction, the popularity of the plastic pink flamingo, and the buying and selling of nature products at the mall. She developed a nuanced portrait of consumer desire and examined the ways that commodities both connect people to nature and, at the same time, obscure these ties. Writing about the Nature Company, which boasted more than 100 stores in American malls during the 1990s, Price observed: "We've used Nature Company totems to tell meaningful stories about where we live and who we are – as all humans do in their encounters with nature – but these totems often tell us markedly little about the pieces of nature. And yet, the Nature Company's stated mission is to connect us to nature – not disconnect us" (1999: 187). Price also carefully distinguished between different groups of Americans and emphasized the class dimensions of various forms of nature consumerism, noting, for example, that many affluent Americans viewed "Nature as a place for Leisure" (175).

Likewise, other historians began to examine the landscapes of leisure and tourism that emerged in the West during the twentieth century, as many Americans expressed nostalgia for the closed frontier. In response to what Lears described as the sense of unreality, wilderness advocates glorified nature as a therapeutic resource and celebrated national parks as spaces of leisure where tourists could escape from the troubles of modernity. Marguerite S. Shaffer's *See America First* (2001) explained how many middle- and upper-class Americans believed that travel to the national parks would help assuage their anxieties and adjust to the conditions of modern life by regaining contact with therapeutic scenes of "nature's nation." Shaffer astutely described tourism as "a kind of virtuous consumption" that

"promised to reconcile" American mythology, "which celebrated nature, democracy, and liberty, with the realities of an urban-industrial nation-state dependent on extraction, consumption, and hierarchy" (5). Drawing on the work of Lears, she demonstrated how tourism was linked to the therapeutic ethos as it promised "authentic experience" and "self-fulfillment" (249).

Shaffer's book indicated the growing importance of automobile tourism in shaping views of the natural world, a theme also explored by Hal K. Rothman (1998) as part of his broad study of tourism in the West and by David Louter (2006) in his study of the "windshield wilderness" in the national parks of Washington State. Meanwhile, Paul S. Sutter's *Driven Wild* (2002) examined how the modern wilderness movement reacted to the increasing presence of automobiles in the national parks. Focusing on the interwar period, he explained how wilderness advocates began to realize that technologies of consumption could destroy natural beauty and thus emphasized the need to protect roadless areas. For interwar activists, true wilderness experience could only be found in places without automobiles. In their view, consumption might not be so virtuous after all.

Even as wilderness advocates enjoyed some success in protecting certain places from the incursion of roads, the tremendous expansion of tourism that accompanied the post-World War II economic boom meant that technology and consumerism would continue to structure perceptions of the natural world. Both Rothman in *Devil's Bargains* (1998) and Annie Gilbert Coleman in *Ski Style* (2004) examined the growth of ski resorts in the Rocky Mountain West and the tensions at work in these "highly developed landscapes that the industry defined as natural" (Coleman 2004: 10). Tapping into imagery of both the European Alps and the mythic frontier, the ski industry presented the Rocky Mountains as a landscape of leisure characterized by a mix of the Old World and the Wild West. Both images, Coleman argued in an earlier article (1996), reinforced the racial identity of the overwhelmingly white and affluent skiers at the resorts, places "that have remained as white as snow." "Skier-tourists," Coleman concluded, "are left with a choice ultimately of their own making: down one slippery slope, Bavarian villages; down the other, Billy the Kid. Both images quietly perpetuate the unbearable whiteness of skiing" (1996: 614).

Tourism, consumer culture, racial and class stratification, and the power of corporations to shape popular perceptions of the natural world all came together in Susan G. Davis's *Spectacular Nature* (1997), which examined the history and contemporary meanings of Sea World, a popular marine park that opened in San Diego, California, in 1964. Davis emphasized the central role played by Shamu the killer whale – the park's iconic animal – as both a symbol of wild nature and a commodity promoted by Sea World. A private park masquerading as public space, Sea World, Davis argued, presents its primarily white affluent audiences with reassuring, sentimental images of animals and packages consumption as a form of environmental

concern. She pointed to the contradictory meanings embedded in the entire structure of the park: as a form of "industrial magic," an entertainment venue devised out of modern technologies, driven by the corporate pursuit of profit, and devoted to the mass consumption of nature, Sea World nevertheless celebrates wild nature as a "world beyond the human" (1997: 30). Just as Cronon analyzed the dualism between nature and society encouraged by the wilderness ideal, Davis demonstrated how Sea World worked to separate itself from larger social and environmental contexts by upholding Shamu as an almost sacred image of the wild. Even as Sea World promises to bring marine creatures closer to its audiences, allowing them intimate contact with the formerly invisible, distant world of nature, it also ignores the environmental history of nearby Mission Bay and obscures the actual environmental threats facing the Pacific and other oceans around the world. Trafficking in therapeutic reassurance, Sea World acts as a form of public relations, telling audiences that multinational corporations – just as they deliver the magical spectacle of Shamu every day – will ensure global environmental protection for years to come.

Visual Culture and the Environment

Like other cultural studies of nature, Davis's book considered how the natural world was turned into a spectacle for the eye. Others scholars made this question of vision – how nature was seen by different Americans and represented through different visual media – the central focus of their analysis. Their effort to emphasize the role of images in environmental history could be understood as part of a broader visual turn across the humanities and social sciences beginning in the 1990s. Part of the impetus came from art historians who began to challenge the hierarchies of visual expression that venerated fine art and tended to relegate other visual forms – film, television, posters, and advertisements – outside the bounds of their discipline. Meanwhile, cultural historians, cultural geographers, and other scholars all began to widen their source base beyond traditional textual materials to include a diverse array of images and to examine the "cross-fertilization of visual forms" (Sturken and Cartwright 2001: 2). The confluence of these developments led to the interdisciplinary study of visual culture, a mode of inquiry defined by David Morgan as "what images, acts of seeing, and attendant intellectual, emotional, and perceptual sensibilities do to build, maintain, or transform the worlds in which people live" (2005: 33).

For historians, the visual turn called for a fundamentally different approach to images than the treatment they usually receive in historical writing. As Katherine Martinez (1995), Louis P. Masur (1998), and others pointed out, when historians incorporate visual images into their publications, they too often use these pictures merely as illustrations. They tend to

view images as translucent windows into the past and objective portrayals of external reality. In doing so, they imply that images speak for themselves, do not require the same scrutiny given to written sources, and thus, Masur argued, "reinforce the notion that pictures may illustrate but not shape historical events" (1410).

There is some evidence to suggest that environmental history, more than many other historical fields, has recently embraced the study of images. Although in its early years the journal *Environmental History*, like a number of books by environmental historians, included some pictures, these tended to appear only as illustrations and not be carefully analyzed or integrated into larger arguments. In 2003, though, the journal appointed, for the first time, a graphics editor to encourage authors to use more images and to oversee a new "Gallery" section, in which an individual picture (or a small set of pictures) would become the basis for a short essay connecting the image to broader themes in environmental history. Just as the leading journal in environmental history became more image-oriented, a small number of environmental historians, together with scholars in other fields, began to examine how images of the environment have been produced, circulated, and received by different audiences in twentieth-century America.

Gregg Mitman's *Reel Nature* (1999) offered a history of nature movies, specifically, documentary films about wild animals, across much of the twentieth century. Ranging from travelogue-expedition films in the early twentieth century to Walt Disney's True-Life Adventures and Marlin Perkins' *Wild Kingdom* television program in the postwar era, Mitman explored nature films on multiple levels: as art, science, and entertainment. Building on the work of Lears and Orvell, he focused on how the "camera embodied the tension between authenticity and artifice" (13). Building on the work of Cronon, he argued that film helped form modern perceptions of wild nature as "pristine" and "set apart from the hands of man" (206). Moreover, through careful visual analysis of the films themselves, Mitman revealed the changing aesthetics and visual strategies used by filmmakers to frame wild animals and their environments. In particular, he located a shift in the 1930s and 1940s from an emphasis on close-up shots that vividly recorded "the private lives of animals" (61) to a more ecological perspective, a "wide-angle view of the landscape" that helped audiences "discern the interrelationships among organisms and their environment" (86). Mitman also suggested that nature movies, "by eliciting an emotional relationship with wildlife on screen" (207), helped popularize the conservation movement.

The links among politics, aesthetics, and the emotions were central to Finis Dunaway's *Natural Visions* (2005), a study of environmental images during three periods of reform: the Progressive era, the New Deal era, and the 1960s. Dunaway focused on the "political uses of the sublime" (xix), examining how environmental artists and activists deployed this aesthetic in

a variety of ways to suit different political projects. While landscape photographers like Herbert Gleason relied on the romantic sublime to promote wilderness and national parks during the Progressive era, New Deal filmmakers like Pare Lorentz turned to the catastrophic sublime to portray floods, dust storms, and other ecological disasters. They melded this emphasis on nature's fury with a technological sublime that celebrated dams and other government efforts to control nature. In the postwar period, the Sierra Club questioned technological hubris through its series of lavish coffee-table books featuring the work of leading photographers. Published in conjunction with the club's wilderness campaigns, the books relied on both the dramatic, panoramic vistas of Ansel Adams and the more intimate, ecological sublime of Eliot Porter. Throughout the twentieth century, these different photographers and filmmakers paired images with texts to form narratives about the human place in nature, bring aesthetics into politics, and infuse public debate with emotion.

Scholars from other disciplines have also shed light on important themes in the history of the environment and visual culture. The cultural geographer Denis Cosgrove (1994, 2008) analyzed the cultural politics of photographs of the Earth taken from outer space and the role of images in modern environmentalism. Both the cultural geographer Scott Kirsch (1997) and the American studies scholar and art historian Peter Hales (1991) examined how visual images portrayed the atomic bomb to postwar audiences, often by aestheticizing the blast and making a spectacle of the bomb while obscuring the sinister environmental consequences of radioactive fallout. In addition to their work, scholars from the growing field of eco-criticism, a branch of literary study, also began to analyze environmental representations in film (Ivakhiv 2007), ranging from popular Hollywood movies (Ingram 2000) to experimental and independent cinema (MacDonald 2001). Finally, art historians are starting to bring eco-critical approaches to bear on the study of American art (Braddock and Irmscher 2009). All of this scholarship suggests the prospect of making environmental history more attuned to the visuality of nature and demonstrates the important cultural work performed by images in conveying environmental ideas to American publics.

The Environment in Public Culture

Thus far, cultural histories of nature have visited an eclectic mix of sites and images: spanning from national parks and shopping malls to coffee-table books and the pages of the *Whole Earth Catalog*. What unites these various studies is an emphasis upon the struggle by different publics to assign meaning to nature and, in turn, determine the fate of vast stretches of the American landscape. The emerging concept of public culture, described by

Marguerite S. Shaffer as "the process of negotiating shared meaning among a diverse group of individuals" (2008: xi), provides the best conceptual lens through which to view this scholarship.

The growing interest in the study of public culture stems, in part, from recent theoretical work that has attempted to revise the philosopher Jürgen Habermas's frequently discussed concept of the public sphere. Perhaps the most influential text in this effort has been the literary critic Michael Warner's *Publics and Counterpublics* (2002). Warner argued that a public "comes into being only in relation to texts and their circulation" (66). This text-based public, he explained, is constituted through two key features: being addressed and paying attention. By reaching strangers and bringing them into a shared world of discourse, a public is organized through the circulation of texts, around printed materials and "increasingly … around visual or audio texts" (67–8). Warner's theoretical claims raise some important questions for scholars interested in the cultural history of nature: What kinds of texts have helped create various environmental publics? How have these publics been addressed? How have the discourses and forms of circulation changed over time?

This emphasis on texts in the formation of publics offers potential for environmental historians to connect their work more closely to the literary field of eco-criticism. In addition to important studies by Lawrence Buell (1995, 2001) and others, Daniel J. Philippon's *Conserving Words* (2004) stands as one of the most historically grounded works in eco-criticism. In trying to understand the links between literature and environmental politics in the late nineteenth and twentieth centuries, Philippon traced the role of five writers, each of whom "was prominently involved in the formation and development of an environmental organization" (2). Ranging from Mabel Osgood Wright and the Audubon Society to Edward Abbey and Earth First!, Philippon situated these different authors within their historical contexts and offered close readings of key texts to identify crucial metaphors of nature they used to convey their values and galvanize support for environmental campaigns.

Like other work on the cultural history of nature, Philippon's book revealed the importance of aesthetics and emotions in the formation of environmental publics. This theme also resonates with the theoretical writings of Warner and other critics who challenged a key feature of the Habermasian public sphere: the notion of an idealized community based solely on the rational exchange of discourse, to the exclusion of aesthetic and affective modes of expression. To understand the environment's place in American public culture, we must also consider how texts use aesthetic forms and appeal to the emotions of audiences: to fears of losing particular landscapes, to anxieties about threats to human health, to nostalgia for imagined pasts, and to longings for better futures. While the desire for natural beauty has often animated the conservation movement, aesthetics

work in complex ways in American public culture. David Nye (1994) explained how the appeal of the technological sublime generated popular support for massive dams and other large-scale alterations of the landscape, while Mark Spence (1999) revealed how the embrace of the wilderness aesthetic resulted in the expulsion of Native Americans from several national parks. Both Nye and Spence demonstrated the importance of power relations and cultural authority in assigning meanings to nature and the consequences these meanings can have on actual landscapes and peoples.

In addition to the concept of a text-based public and the role of aesthetics and emotions, at least one more strand of public culture theory is pertinent to the cultural history of nature. Building on the work of the political theorist Nancy Fraser (1992), Warner highlighted the role of counterpublics, which he defined as groups "constituted through a conflictual relation to the dominant public" (2002: 118). These groups, Fraser argued, rely on "discursive arenas" to "invent and circulate counter-discourses to formulate oppositional interpretations of their identities, interests, and needs" (1992: 123). While the contested meanings of nature – the conflict between different groups over such issues as what is natural, who has the authority to control particular landscapes, and what counts as an environmental issue – surfaced in most of the works discussed in this essay, other works made the struggle of counterpublics to create new environmental discourses and oppose dominant meanings of nature the primary focus of their analysis.

Warren J. Belasco's *Appetite for Change* (1989), an important American studies book too often neglected by environmental historians, told the story of how the counterculture of the 1960s and 1970s challenged the food industry. Looking at a wide range of texts, including articles in the underground press, memoirs, and countercultural cookbooks, Belasco examined how this counterpublic opposed industrial agriculture to fashion what he called a countercuisine and also attempted to build an alternative infrastructure – organic farms, communes, and cooperatives – to supply food to its adherents. Andrew G. Kirk's *Counterculture Green* (2007) also explored the environmentalist dimension of the counterculture through a focus on the *Whole Earth Catalog* and other publishing ventures launched by Stewart Brand during the late 1960s and 1970s. Kirk explained how the alternative technology and ecological design movements came into being around the *Whole Earth Catalog*, thus demonstrating how counterpublics organize themselves through the production and circulation of texts.

The struggle of subaltern groups – racialized minorities and other oppressed peoples – to oppose the tenets of mainstream environmentalism coalesced into what has been called the environmental justice movement. By linking social justice to the environmental cause, environmental justice activists developed a form of politics that situated "environmental concerns within the context of inequality and attempts to alter dominant power arrangements" (Pulido 1996: xv). *The Environmental Justice Reader*

(Adamson et al. 2002) included several articles about the cultural politics of the movement – such as community art projects in the inner city of Baltimore and literary works by diverse authors – demonstrating the intersection of cultural texts and protest strategies in the formation of this counterpublic. Likewise, the geographer Jake Kosek, in his *Understories* (2006), showed how Chicano activists in northern New Mexico challenged the cultural, political, and visual hegemony of Smokey Bear, the icon of the US Forest Service. Extremely popular throughout much of the United States, Smokey Bear has circulated widely in images produced by the Advertising Council since World War II, voicing his familiar slogan, "Only you can prevent forest fires." Yet Kosek found that in this region, characterized by racial divisions and ongoing conflicts over land grants, Smokey became "the consummate representative of white colonial paternalism, unjust land dispossession, and state authority, and as such, the target of hatred from many northern New Mexicans" (2006: 225). As one activist succinctly put it: "Smokey Bear is a white racist pig" (183). Kosek's work demonstrated the prospect of connecting the original aim of social history – forming recuperative narratives of subaltern agency – to the agenda of cultural history – examining the creation and circulation of meaning through the study of visual images and other cultural texts – toward the larger purpose of understanding the struggle over material and symbolic natures in American public culture.

Conclusion: Toward Synthesis?

Cultural histories of nature have introduced a new set of themes into the field of environmental history: the cultural construction of nature; the role of leisure and consumption; the power of images to convey environmental ideas; and the place of the environment in public culture. Like all specialized scholarship, this new work runs the risk of becoming yet another subfield that generates original insights but fails to address broader concerns and thus exerts little impact on mainstream historiography. By way of conclusion, though, I want to argue that the cultural turn in fact represents a promising opportunity not only to reshape environmental history scholarship but also to integrate the field into a more synthetic portrait of modern American history.

Kosek's emphasis on the links between material and symbolic natures provides one way for environmental historians to rethink their standard stock in trade: a place- or region-based study of environmental change. Indeed, some notable works that might, on the surface, seem to focus primarily on material changes in a particular environment turned out to be much more. By linking environmental transformations to cultural change and viewing landscape history through a cultural lens, these works marked conceptual breakthroughs in the field. They showed that the study of cultural

constructions can be woven into a history of material transformations to create more complex narratives of environmental history. Douglas Cazaux Sackman's *Orange Empire* (2005a) analyzed the history of the orange industry in California while also examining the cultural meanings of the orange in a wide range of visual and textual sources, including billboards, grocery store displays, and advertisements produced by Sunkist. Other works, including Richard White's (1995) history of the Columbia River and Mike Davis's (1998) study of environmental disasters, real and imagined, in Los Angeles, demonstrated a similar concern with combining cultural and material histories to reframe our understanding of particular places and regions.

Sackman's *Orange Empire*, by following both the orange and Sunkist imagery as they journeyed across the United States, also cast new light on the history of consumer culture, suggesting the need for environmental historians to integrate three levels of analysis – culture, economy, and ecology – into a single narrative. "A strand of environmental history," Sackman explained in a later essay (2005b), "that looks again at consumerism, tracing the goods with which we surround ourselves – both back to nature and forward to human identity and social relations – would show just how the three realms interconnect" (88). In addition to Sackman's work, John Soluri's (2002) study of the marketing of bananas in America – through such figures as Miss Chiquita – and the social and ecological impact of the banana industry in Honduras demonstrated the potential for this approach, while Matthew W. Klingle's (2003) focus on "spaces of consumption" revealed how geographical theory and spatial analysis could yield new insights into the environmental history of consumption. These works all offer models for environmental historians who want to fuse the field's traditional emphasis on material changes with cultural history's attention to the changing meanings and representations of nature.

Likewise, the visual turn in environmental history could be linked to a broader assessment of the role of the senses – not just sight, but also smell, sound, taste, and touch – in the cultural and material history of nature. As Peter A. Coates (2005) and Connie Y. Chiang (2008) have explained, greater attention to the sensory dimensions of environmental history can offer new insight into "the complex relationship between materiality and culture" and reveal how "human interpretations" of sensory landscapes often "were cultural and stood for larger community conflicts" (Chiang 2008: 415). The sensory past thus provides another way to stitch together the analysis of cultural perceptions with recuperative narratives about nature's role in human history.

Yet the significance of cultural history extends beyond these efforts to produce a fuller, more synthetic approach to environmental history, one that successfully blends cultural construction with material change. Indeed, the concept of public culture provides the prospect of an even bolder agenda:

integrating environmental history into mainstream narratives of modern American history. All of the works mentioned in this essay point in this direction by resonating with Thomas Bender's discussion of public culture as a focus on the history of "power in the public realm" (1986: 126). Public culture, he argued, "embraces a wide range of manifestations of power in society – from the institutional power of the state through the more subtle power to assign meaning and significance to various cultural phenomena, including the power to establish categories of social analysis and understanding. The public culture of a society is a forum where power in its various forms, including meaning and aesthetics, is elaborated and made authoritative" (126). Cronon, Haraway, Davis, and others demonstrated how powerful groups can make their vision of nature dominant and marginalize other ways of interpreting the relationship between people and the environment. Meanwhile, Belasco, Kirk, Kosek, and others revealed the struggle of counterpublics to contest dominant meanings, organize in the public realm, and circulate alternative environmental ideas. Together, their works help us understand that public culture, as Bender explained, "is not a given but is, rather, a product of historical processes, one made and remade in time" (1986: 130). The notion of public culture, while certainly evident in these works, has not yet been foregrounded as a primary category of analysis for environmental historians. By making this issue more central to future scholarship, the field could emphasize how ideas and images of the environment have been interwoven with the making and unmaking of public culture in modern America.

An important part of this undertaking would be to complicate the idea of national culture through studies of how global and international contexts shaped environmental knowledge in the American public realm. Mitman's *Reel Nature*, for example, focused largely on American landscapes but also examined films about East Africa and other international settings and thus revealed the importance of tracking the global circulation of nature imagery. Other works, such as Philip J. Pauly's (1996) account of the importation of Japanese cherry trees, Ian Tyrrell's (1999) analysis of the exchange of organisms and ideas between Australia and California, Thomas R. Dunlap's (1999) investigation of environmental thought in four different nations, and Peter Coates' study of how invasive species encouraged more Americans to know "nature through nationality" (2006: 3), demonstrated the value of transnational history to understanding the contest over nature in public culture. While Pauly, Tyrrell, Dunlap, and Coates focused mostly on the interlocking histories of national and international natures during the late nineteenth and early twentieth centuries, Mitman and the eco-critic Ursula K. Heise (2008) placed post-World War II environmental concerns within a global perspective. These works opened a set of vistas on the public realm that revealed the international dimensions of the culture of nature.

Finally, environmental historians might want to follow the examples of Kirsch and Hales in devoting more attention to the role of the mass media in creating and sustaining environmental public culture. By examining the interplay between the media and environmental movements (Dunaway 2008), such scholarship could focus on how powerful media organizations define environmental problems to mass audiences and the interaction between multiple publics and counterpublics in reinforcing or contesting dominant meanings. In linking together cultural, political, and social dimensions, media history thus could allow environmental historians to develop a fuller understanding of the environment's place within broader narratives of power and public life in twentieth-century America.

Environmental history has long prided itself on being one of the most interdisciplinary historical fields – analyzing traditional documents as well as scientific data and applying ecological theories to reveal nature's role in the human past. As the historiography on the culture of nature continues to develop, scholars will push the field to adopt other models of interdisciplinarity – drawing on cultural texts and theoretical frameworks from American studies, visual culture studies, literary criticism, and other areas – to make environmental historians more self-reflexive about their use of such keywords as nature and wilderness, to develop more multi-layered analyses of the links between culture and materiality, and to bring the field into more fruitful dialogue with cultural, political, and social history. Rather than representing a threat to the field, this scholarship promises to enrich and invigorate environmental history and to make the concerns of our field more central to the historiography of twentieth-century America.

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Chapter Fifteen

From Wilderness Prophets to Tool Freaks: Post-World War II Environmentalism

Andrew Kirk

In 1975, Ernest Callenbach released his popular environmental science fiction novel *Ecotopia*. In the book, Callenbach envisioned a sustainable future society based on the countercultural political and social values of his day and, most significantly, new trends in appropriate technology (sustainable small-scale tools, products, and energy sources). When *Ecotopia* first appeared, Callenbach's fiction captured a very real convergence of wilderness passion and environmental pragmatism that was shaping American culture and politics. Then as now, a growing number of Americans were looking closely at culture and economy and realizing that a sustainable future required nature lovers to make a place for people and their products in any plan for a more environmentally friendly future. This recognition of the need to link human innovation and environmental awareness represented an important shift in the history of American environmentalism.

In *Ecotopia*, Callenbach provided readers, eventually numbering in the millions, with a compelling story about a west-coast breakaway republic led by tough, well-armed, hippie environmentalists, savvy feminists, and countercultural Ben Franklins fighting, tinkering, and innovating at the same time they hugged trees (literally), hunted for their food, and revered nature. Callenbach's story was wildly speculative but his ecotopians were not far removed from the self-described "tool freaks," "appropriate technologists," and "ecological designers" that Callenbach knew and worked with in a growing national community of ecopragmatists – including people like industrial designer J. Baldwin, urbanist Jane Jacobs, and an eclectic group of scientists, engineers, and innovators who shared a love of nature and concern for ecology but did not consider themselves environmentalists, preservationists, or conservationists.

Like other prominent ecologically minded science fiction writers of the late 1960s and early 1970s – most notably Frank Herbert in *Dune* (2005

[1965]) and Robert Heinlein in *The Moon is a Harsh Mistress* (1997 [1966]) – Callenbach looked as much to the past as the future. One of the central insights of *Ecotopia* was the recognition of how much good stuff had been forgotten: important things like tools, practices, and ideas that were enmeshed in capitalism and market economies but in tune with local and regional environments (think windmills, sod houses, bicycles, and cisterns). Callenbach was a careful student of the back-to-the-land movement and knew that in the 1960s communes there was much madness but also a gritty ecological pragmatism born of necessity that could offer important lessons about how to live with the land even if that land was deep in the heart of the city.

For those who found it, *Ecotopia* provided a breath of fresh air in a popular culture that was decidedly down on the future. In the 1970s, science fiction novels and movies exploited a current of technophobia that ran through postwar popular culture. These bleak stories often concluded with a hopeful journey away from the technologically demented city into a pristine countryside devoid of humans and their tainted technologies. The actor Charlton Heston, for example, dramatically fought technology gone wrong in films like *Planet of the Apes* (1968), *Omega Man* (1971), and *Soylent Green* (1973). Callenbach modeled his Ecotopians on the loosely organized group of optimistic ecological designers and tool freaks he knew who rejected the technophobia and apocalyptic fears of their day. He celebrated individuals and groups who lived mainly in and around cities and had neither the desire nor the means to flee to the woods. In a period known for cynicism and even despair about the future of America, the nascent ecological design and community was upbeat, producing hopeful literature and products aimed at providing practical solutions to real world problems.

Callenbach's novel is the best-remembered articulation of an emerging 1970s environmentalism that embraced technology and represented a distinctly different strand of environmental politics; this brand of environmentalism resonates with our twenty-first century discourse and practice of "sustainability." It was urbanist Jane Jacobs, however, who outlined a simple set of categories explaining how the philosophy of the tool freaks and ecological designers fit within the larger story of twentieth-century American environmentalism. Well known for her monumental study of postwar urban America originally published in 1961, *The Death and Life of Great American Cities* (1989), Jacobs was also an astute observer of environmental politics and provided a compelling model for analyzing environmental culture in articles and later a book-length study, *Systems of Survival* (1992). In that lesser-known book, Jacobs dissects environmental politics and explains why a more pragmatic approach was necessary for the coming century. She posited two competing futures for environmental activism: the path of commerce and the path of the guardian. The guardian path refers to the familiar

story of government environmental regulation and the agencies and organizations that exist to work on behalf of the public interest. This path is "slow and serious" and "meant to shun commerce" (McDonough and Braungart 2002: 59). The commerce path is the "day-to-day, instant exchange of value." Commerce is, Jacobs argued, "quick, highly creative, inventive, constantly seeking short and long-term advantage, and inherently honest" (1992: 23). This simple two-part model contrasts with the more traditional three-part grouping of conservation/preservation/environmentalism. Jacobs' model of different but complementary guardian and commerce paths highlighted possibilities for cooperation between "guardians" of wilderness and technological innovators hoping to achieve what Leo Marx (1964) called the "middle landscape" where tools, nature and commerce harmoniously unite.

Jacobs' and Callenbach's vision of ecologically minded commerce resembled the move toward "green" consumption and "natural capitalism" central to the global sustainability movement of the new millennium. Historian Samuel P. Hays dated the shift among environmental advocates from a primary concern with production to an emphasis on consumption to the early post-World War II years in his indispensable study of environmental politics, *Beauty, Health, and Permanence* (1987). Some of the most interesting environmental scholarship of the last twenty years has built on Hays' observation about the importance of consumption in the postwar period. Likewise, others have focused on how our human tools and technologies that caused much of the environmental degradation of the planet may also be used to save it, ultimately leading us toward a "post-scarcity" equilibrium.

This essay briefly outlines how the key figures and concerns of the tool freaks and their appropriate technology movement captured so compellingly by Callenbach and Jacobs intersected with and shaped major trends in postwar environmentalism and the field of environmental history. Through an investigation of the tool freaks and other ecopragmatists, we get to an understanding of the genealogy of an environmentalism that is about sustainability, where guardianship and preservationist concerns make up just one strand of a more encompassing movement. This understanding allows environmental historians to move beyond older approaches dominated by a focus on the tensions and interrelationships between conservation and preservation politics, enabling us to better appreciate both the cultural and social dimensions of environmentalism in all its manifestations.

Forks Along the Guardian Path

The field of environmental history has broadened dramatically since the early 1990s. The study of environmentalism in particular has benefited from new approaches that opened space for new stories previously marginalized

or missed. Scholars like Robert Gottlieb (1993) crafted landmark studies of grassroots environmentalism and environmental justice that had little to do with preservation or conservation *per se*. New biographies of conservative environmentalists offered a new cast of characters to the study of environmental politics and a cultural turn invited a focus on technology as a mediator between nature and culture. The March 1990 issue of the *Journal of American History* featured a thorough assessment of environmental history at a critical juncture. The round table of essays by founders of the field included a particularly thought-provoking essay by William Cronon taking on Raymond Williams' proposition that "the idea of nature contains, though often unnoticed, an extraordinary amount of human history" (1990: 1122). Cronon's essay, "Modes of Prophecy and Production: Placing Nature in History," suggested that uniting the different strains of environmental history would make room for human endeavor and help decrease the field's "bias toward the wild and the rural" (1131). Over the past two decades, environmental historians have answered Cronon's call to "move beyond mere labels" and "evaluate the many connections between people and nature" (1130).

It was Cronon's and other similar essays that inspired me to study tool freaks, ecological designers, and a whole universe of people who did not use historians' labels to define themselves and rarely appeared in existing histories of environmentalism. I was interested in people who love nature but also, to borrow a line from Barbra Streisand, "people who love people" and their toolmaking tendencies. Cronon's essay was followed by an important series of books from his own monumental study of Chicago, *Nature's Metropolis* (1992), to Robert Gottlieb's comprehensive reassessment of the environmental movement, *Forcing the Spring* (1993), to more focused studies of intersections of nature and culture like Richard White's *The Organic Machine* (1995), Jennifer Price's *Flight Maps* (1999), and Douglas Sackman's *Orange Empire* (2005), that completely reconfigured the way we look at environmentalism. Several collections of essays – Cronon's *Uncommon Ground* (1995a), Herron and Kirk's *Human/Nature* (1998), and Virginia Scharff's *Seeing Nature Through Gender* (2003) – explicitly focused on overlooked connections between people and nature, expanding the definition of the term *environmentalism* and adding a new cast of characters to the story of environmental advocacy. While they generated much controversy and debate within the field, these new studies all built on still critically important pioneering studies of environmental culture: Roderick Nash's *Wilderness and the American Mind* (1982) and Donald Worster's *Nature's Economy* (1994).

All of these diverse efforts shared a common desire to include everyday human experiences of work, recreation, consumption, health, and reproduction in their environmental histories of places and processes. This research resulted in an important series of studies of environmental justice

and gendered and racial relations with place and environment. Robert Bullard's *Dumping in Dixie* (2000) and Diane Glave and Mark Stoll's *To Love the Wind and the Rain: African Americans and Environmental History* (2006) are good examples. Insightful environmental histories of cities have helped achieve Cronon's call to move environmental history out of the woods. By looking to the city rather than the wilderness, Ari Kelman's *A River and Its City* (2003), Martin Melosi's *The Sanitary City* (2000), and Hal Rothman's *The New Urban Park* (2004), provided new understandings of the relationship between people and nature in the places where most of us live.

Recently, intriguing new biographies of environmentalists who don't fit the mold or reconsiderations of key figures have demonstrated the richness of the terrain still to be explored. Examples include Donald Worster's, *A River Running West: The Life of John Wesley Powell* (2001); Brooks Flippen's *Conservative Conservationist* (2006), on conservative environmentalist Russell E. Train; Michael Egan's *Barry Commoner and the Science of Survival* (2007); and my own study of iconoclastic environmental thinker Stewart Brand, *Counterculture Green* (2007). Brand's own *How Buildings Learn* (1994) importantly linked the historic preservation and environmental movements in an effort to show connections between environmental and cultural preservation, providing an example of the exciting disciplinary cross-pollination of the 1990s.

These works and others expanded the range of places for study and opened a new list of intriguing individuals for analysis – people who shaped an environmental sensibility that has ultimately transcended the term *environmentalism*. The bleak decade of the 1970s has been a touchstone for recent reevaluations of environmentalism. Something different was afoot during this period of cultural upheaval and national angst. In the 1970s, the century-long struggle to establish the state as guardian of nature was largely achieved. Environmental organizations opened offices in Washington, DC and grassroots movements were institutionalized. At the same time, a host of people who had little interest in conservation or preservation explored appropriate technologies, environmental justice, and new economic models aimed at ecological sustainability. These real-world ecotopians did not stage a violent revolution of the type Callenbach describes so vividly in his novel, but they did lay the foundation for a revolutionary everyday environmentalism of lasting significance.

Prior to the 1970s, most environmental advocacy was aimed at preserving American public lands, wildlife, natural resources, and parks from unchecked industrial development and urban encroachment. Whether they were wilderness preservationists or Progressive conservationists, twentieth-century environmental activists from John Muir to Howard Zahniser focused environmental debates on the problems of industrial capitalism and assumed a sharp dichotomy between nature and human civilization. In this

ideological tradition, wilderness became the ultimate symbol of environmental purity and abundance with the polluted modern technological city its antithesis.

The history of the preservation and conservation movements has been thoroughly studied by several generations of scholars. Stephen Fox's *The American Conservation Movement* (1981) remains an excellent detailed source on the debates between the two groups. More recently, Philip Shabecoff, *A Fierce Green Fire* (1993), Kirkpatrick Sale, *The Green Revolution* (1993), Hal Rothman, *Saving the Planet* (2000), and Ted Steinberg, *Down to Earth* (2002), provided new syntheses to explain how conservation and preservation evolved into environmentalism. Others have added new dimensions to the familiar story by focusing on lesser-known, but critical, turning points in American environmental awareness, including Mark Harvey, *A Symbol of Wilderness* (1994), Mark Barringer, *Selling Yellowstone* (2002), and Jon T. Coleman, *Vicious: Wolves and Men in America* (2004). The growing diversity of sources, subjects, and approaches has contributed to the wide appeal of environmental history as a field of study. Still, most studies of environmental thought continue to focus on the guardian path of resource protection.

This is not surprising, given the profound importance of the achievements of this mode of environmental politics. Establishing the state as guardian of natural resources was one of the most significant achievements in American history, resulting in the protection of vast tracts of land and ensuring the health of ecosystems threatened by industrial capitalism. The guardian path of conservation and preservation activists succeeded in fundamentally altering American perceptions of resource scarcity and the necessity for preservation of resources and regions in the first half of the twentieth century.

It was less effective, however, when applied to increasingly complex environmental and social politics after 1945. Moreover, by drawing a sharp line between the human and the natural, this model failed to take into account that American relations with nature during the twentieth century were always extensively mediated by the market through popular activities like automobile tourism, hiking, and camping. Bruce Braun and Noel Castree in *Remaking Reality: Nature at the Millennium* (1998), David Louter in *Windshield Wilderness* (2006), and Ethan Carr in *Mission 66: Modernism and the National Park Dilemma* (2007), among others, have shown that people involved in these activities are adept at reconciling the contradictory connections among consumption, leisure, technology, and nature.

In the 1950s, affluence, increased leisure time, and the development of the interstate highway system led to a dramatic increase in outdoor recreation and nature tourism, exposing more people to nature and raising awareness of the need to preserve and protect. Other postwar trends contributed to a broadening environmental awareness. As historian Adam

Rome persuasively argues in *The Bulldozer in the Countryside* (2001), suburban growth helped expand the support for environmental regulation. Suburbs, devouring an area the size of Rhode Island every year, proved that new technologies, when harnessed to economic prosperity, could completely reshape the natural world. As suburbanites watched the lands around them converted into concrete and strip malls, many of them also began to experience first hand the unintended environmental consequences of other aspects of American postwar prosperity. The soulless quality of "ticky-tacky" suburban development inspired a significant alternative shelter and design renaissance with innovative designers and architects melding new environmental insights with older craft traditions to create homes that nurtured the spirit and left a light footprint on the land in the coming decades.

New awareness of ecological problems created political support for significant expansions of the guardian system in the 1950s and 1960s, including the passage of the landmark 1964 Wilderness Act. The Wilderness Act represented the culmination of a century of activism. For many, the Wilderness Act signaled the beginning of a new age in American environmental culture. Others were less sure. Prominent wilderness advocates like Arthur Carhart worried about the implications of focusing a movement so sharply on places most people would never see. In his final book, *Planning for America's Wildlands* (1961), Carhart wondered if the guardian path model of protecting nature ceded too much of the environment where people lived and worked to save the places where the privileged played. A generation later, in his controversial 1995 essay, "The Trouble With Wilderness," William Cronon made the point even stronger. He argued that the distinction between the natural and the human inherent in the guardian model left little room for the multitudes of ways that people interacted with nature in their daily lives, making even the ultimate achievement of wilderness protection irrelevant for the majority of Americans (Cronon 1995b). Critics like Carhart and Cronon were not against wilderness or the guardian model of environmental protection; they just realized that this path alone would never achieve an everyday environmentalism of wide appeal. So what was the other option?

The story of the guardian path is well known but it has a corollary that has only recently received serious attention from environmental historians. While environmental activists ranging from conservative sportsmen and politicians to radical wilderness prophets like Edward Abbey formed a remarkable coalition to support the guardian path, another group of environmentally minded and technologically enthusiastic innovators worked to craft a very different path to environmental sustainability based on a "design science revolution" and a "post-scarcity" future. While they were often also wilderness users and supporters of guardian path conservation efforts, these environmentalists embraced the notion that an environmentally sustainable

future could only be achieved through a combination of guardian preservation and ecologically oriented technological innovation distributed through the market economy. For these commerce path environmentalists, ecologically designed products and services could help create a sustainable "moral economy" enabling individuals to provide themselves a "Right Livelihood" while leaving a smaller footprint on the Earth (Phillips 1978).

This recognition was not new: it was just the latest in a long tradition of pragmatic environmental thinking going back to Theodore Roosevelt and the Progressive conservation movement with its focus on wise use of resources, technologically facilitated efficiency, and market reform. Roosevelt and his fellow conservationists had a strong faith in progress and the ability of human ingenuity to resolve environmental problems while enjoying and promoting nature recreation. Many of the classic works of the field of environmental history explore this pragmatic tradition, notably Samuel Hays' classic, *Conservation and the Gospel of Efficiency* (1959). More recently, scholars like Char Miller, *Ground Work* (2007), and Neil M. Maher, *Nature's New Deal* (2008), have clearly shown the strong links among environmental politics, national economic policy, and emerging trends in business and industry during the first half of the twentieth century. Maher demonstrates how wilderness advocacy, technologically facilitated nature recreation, and pragmatic desires for efficiency in government and business were wedded from the beginning of the century and how the debates of the postwar period were forged in the tumult of the 1930s. Before American environmental advocates could accept the idea of an ecological moral economy, they had to come to terms with their technological angst.

Technological Angst and Post-Scarcity Hopes

In 1948, prominent ornithologist William Vogt penned a bleak bestselling book on the future of America and the human race entitled *Road to Survival*; the book sent a shockwave through the conservation community. Vogt's compelling narrative told a tale of misplaced faith in technology in the dawning atomic age and warned readers of the profound ecological consequences of the spread of industrial capitalism in the wake of World War II. Particularly concerned with the American obsession with progress, Vogt argued "the rising living standard, as material progress is called, is universally assumed to be to the advantage of the human race. Yet … what is the effect of our allegedly rising living standard on the natural resources that are the basis of our survival?" (1948: 37). This cautionary tale reflected the central concerns of the dominant groups of American conservationists of the 1940s and 1950s, such as the Audubon Society and the Sierra Club, and tapped into older Malthusian fears of resource depletion and scarcity. Conservationists predicated their environmental politics on the assumption

that inefficiency, waste, and abuse of resources had created a potentially crippling scarcity.

Conservation-minded critics of technology often found themselves swimming against a tide of reverence for science and industry. From 1945 through the 1950s, conservationists struggled to explain to the public why, during a period of apparent abundance, it was more important than ever to require limits on both production and consumption. Conservation advocates like Vogt framed the debate in stark terms as a war between industrial technology and the environment.

After Vogt's alarming account of the consequences of the ever-expanding world population, many other writers published popular books and articles on the issue of overpopulation. The statistics about world population growth and future prospects were alarming. In 1948, ecologist Fairfield Osborn worried that with a growth rate of 1 percent per year the world population might top three billion by the year 2000. His popular book, *Our Plundered Planet* (1948), was criticized for being alarmist. A decade later, Osborn's predictions seemed conservative, as world population increased far more rapidly than even the most pessimistic environmentalists had predicted.

Changing attitudes about technology and progress during the 1940s and 1950s were an expression of popular culture during a critical period in American history. The horrifying devastation caused by the use of the atomic bomb in Japan was a critical catalyst for this reevaluation. Once the patriotic fervor surrounding the end of the war subsided, many conservationists and intellectuals started discussing what it meant that humans had the power to destroy the world. Books like John Hersey's 1946 novel *Hiroshima* (1989) graphically depicted the awesome destructive power of nuclear weapons and their impact on human beings and inspired a growing segment of society to recognize the far-reaching implications of such technology. Likewise, after years of turning out pro-war propaganda films, Hollywood, along with a legion of science fiction writers in the 1950s, started producing a steady stream of books and films presenting horrifying visions of technology run amok. A generation of Americans born after World War II grew up watching giant nuclear ants or other such mutants of technology destroying humanity in movies like Gordon Douglas's *Them!* (1954). During the 1950s, a slew of creature-feature movies created a subgenre of sci-fi based on nuclear nightmares with normal creatures exposed to radiation mutating or growing to enormous size and then terrorizing cities. Godzilla, first appearing in 1954's *Gojira*, is the best-known example of this formula. Most of these films end with ingenuity or a more thoughtfully benign technology killing the creature or exposing its fatal weakness, but not before giving audiences a lesson in the dangers of technological hubris.

Within the conservation movement there was a growing ambivalence toward technology that for many quickly grew into full-fledged technophobia. Fear shaped much of the conservationist alienation from the postwar

world – fear that the prominence of the hard sciences, the expansion of the space race, and the explosion of consumer technology had de-emphasized contact with and respect for the non-human world. But even as their alienation from postwar technocracy grew, their Progressive faith in government agencies and protective federal laws continued to be staples of the movement. For most of its history, the conservation movement embraced organizational principles and actions based on the idea of linear progress through Progressive enlightenment. At the same time, conservation proponents tended to view the history of the twentieth century as a steady decline toward chaos and environmental collapse brought on by rampant population growth and unregulated technological expansion. Although these two ideals seemed to be irreconcilable, both shared the same roots as direct responses to concerns about the relationship between nature and technology in post-industrial America. By drawing on both traditions – sometimes consciously and sometimes not – postwar conservationists and critics of technology attempted to reconcile dreams for reform with competing fears that the system was beyond repair.

Other critics of postwar society, including a growing contingent of more radical environmental preservationists and a group of prominent European and American intellectuals, were less inclined to search for compromise and more willing to propose far reaching structural changes. The most stunning of these critiques came from biologist Rachel Carson, whose explosive *Silent Spring* (1962) explained in frightening detail the ecological consequences of humanity's attempt to control and regulate the environment. Carson became the first of many to warn of an impending environmental "crisis." During the 1960s a series of influential books appeared warning of an apocalyptic future if the present course was not altered. Carson has received renewed attention with a comprehensive biography by Linda Lear, *Rachel Carson: Witness for Nature* (1997). New books from Mark Hamilton Lytle, *The Gentle Subversive* (2007), and John Herron, *Science and the Social Good* (2010), explore her views on technology, culture, and the "social outcomes of science." Carson's fellow biologist, Barry Commoner, also the subject of a new biography (Egan 2007), produced several bestsellers, including *The Closing Circle* (1971), advocating the "science of survival" linking science with social reform.

Three other writers also provided inspiration for a new generation of Americans who were questioning the role of technology in the creation of social, economic, and environmental injustice in the late 1950s and early 1960s. In *The Technological Society* (1980), Jacques Ellul asserted that "all embracing technological systems had swallowed up the capitalistic and socialistic economies" and were the greatest threat to freedom in the modern world (Hughes 1989: 450). Ellul argued that the system was so corrupted that only a truly revolutionary reorientation could stop social and environmental decay. Like Ellul, Herbert Marcuse, in his popular *One*

Dimensional Man (1964), described a vast and repressive world technological structure that overshadowed national borders and traditional political ideologies. Together, Marcuse and Ellul provided a critical intellectual framework upon which Americans could construct alternatives to the scientific worldview.

Perhaps the most influential of the structural critics of the technological society was Lewis Mumford. Mumford began his career as a strong proponent of science and technology. His 1934 classic, *Technics and Civilization* – a central text in the American technocracy movement – influenced a generation and strengthened the popular belief that technology was moving human civilization toward a new golden age. Like most progressive thinkers of the industrial period, Mumford envisioned a modern world where technology helped correct the chaos of nature and brought balance to ecology. In *Technics*, Mumford extolled the virtues of the machine and painted a positive picture of how technology could reshape the world to eliminate drudgery and usher in an unprecedented period in history where machines and nature worked together for human benefit. But this prophet of the machine age began to rethink his position in the 1960s (Mumford 1970). Like Marcuse and Ellul, Mumford became increasingly alarmed about the power of large technological systems. As Mumford looked around at the world of the 1960s and 1970s, he worried that the ascendance of the "megamachine" boded ill for human society. The "machine," once the symbol of progress toward a more balanced world, began to emerge as a metaphor for describing a seemingly out-of-control capitalist system. Both Richard White, in *The Organic Machine* (1995), and Robert Gottlieb, in *Forcing the Spring* (1993), do an excellent job of placing Mumford in the context of twentieth-century environmentalism. Donald Miller's *Lewis Mumford: A Life* (1989) meticulously details the evolution of Mumford's thinking on technology.

There is a rich literature on the nexus of technology and nature in American culture, with Leo Marx's classic study *The Machine in the Garden* (1964) being the most notable. Marx elegantly depicted one of the central tensions in American culture: the desire to reconcile our technological prowess with our love of the extraordinary nature that characterizes North America and shaped our early conception of democracy and history. He pays special attention to the goal of several generations of American writers and thinkers who fostered hope for a "middle landscape" where tools and nature harmoniously united. Thomas Hughes provides the best overview of this history from the perspective of the history of science and technology in his monumental *American Genesis* (1989).

The preoccupation with technology and its consequences became one of the central features of 1960s social and environmental movements, and of the counterculture in particular. In 1968, Theodore Roszak released his influential study of the youth movement, *The Making of a Counter Culture*. Roszak maintained that the counterculture was a direct reaction to "technocracy,"

which he defined as a "society in which those who govern justify themselves by appeal to technical experts, who in turn justify themselves by appeals to scientific forms of knowledge" (1968: 8). The counterculture radicals of the 1960s, Roszak argued, were the only group in America capable of divorcing themselves from the stranglehold of 1950s technology and its insidious centralizing tendencies. Roszak's position on technocracy was similar to those of Ellul and Marcuse. For Roszak, the most appealing characteristic of the counterculture was its rejection of technology and the systems it spawned. Charles Reich, in his controversial bestseller *The Greening of America* (1970), also highlighted the youth movement's rejection of technology as a fundamental component of the counterculture ideology. Both Reich and Roszak cited technocracy's bureaucratic organization and complexity as the central evil. From the perspective of Roszak, Reich, and a growing number of the younger generation, the problem with America stemmed from the realization that seemingly nothing remained that was small, simple, and on a human scale.

This mind-boggling bigness and bureaucratization likewise concerned British economist E. F. Schumacher, whose popular book *Small Is Beautiful* (1973) became a model for decentralized humanistic economics "as if people mattered." Of all the structural critiques of technological systems, Schumacher's provided the best model for constructive action and was particularly influential in shaping an emerging counterculture environmentalism. Unlike more pessimistic critics of the modern technocracy, Schumacher provided assurance that by striving to regain individual control of economics and environments, "our landscapes [could] become healthy and beautiful again and our people … regain the dignity of man, who knows himself as higher than the animal but never forgets that *noblesse oblige*" (124). The key to Schumacher's vision was an enlightened adaptation of technology. In *Small Is Beautiful*, Schumacher highlighted what he called "intermediate technologies," those technical advances that stand "halfway between traditional and modern technology," as the solution to the dissonance between nature and technology in the modern world (Carr 1985: 6–11). These technologies could be as simple as using modern materials to construct better windmills or more efficient portable water turbines for developing nations. Schumacher's ideas were quickly picked up and expanded upon by a wide range of individuals and organizations, often with wildly different agendas, who came together under the banner of a loosely defined ideology known as appropriate technology (AT).

From Appropriate Technology to Sustainability

Appropriate technology emerged as a popular cause at a conference on technological needs for developing nations held in England in 1968. For individuals and organizations concerned with the plight of developing

nations, Schumacher's ideas about eco-technologies seemed to provide a possible solution to the problem of how to promote a more equitable distribution of wealth while avoiding the inherent environmental and social problems of industrialization. Appropriate technology quickly became a catchall for a wide spectrum of activities involving research into older technologies that had been lost after the industrial revolution and the development of new high- and low-tech small-scale innovations. The most striking thing about the move toward appropriate technology, according to Sam Hays, was "not so much the mechanical devices themselves as the kinds of knowledge and management they implied" (1987: 262). AT represented a move away from the Progressive faith in expertise and professionalization and toward an environmental philosophy predicated on self-education and individual experience. Appropriate technology also represented a viable corollary to the guardian path of environmental advocacy, hinting at a possible means of moving toward the commerce path Jane Jacobs proposed.

The notion of post-scarcity emerging from the New Left (1960s liberals who advocated social activism) bolstered this movement. Eco-anarchist Murray Bookchin's writings were particularly influential. Bookchin provided a critical political framework for appropriate technology by situating the quest for appropriate technologies within the framework of revolutionary New Left politics. In books such as *Our Synthetic Environment* (1962) and *Post-Scarcity Anarchism* (1971), he argued that highly industrialized nations possessed the potential to create a utopian "ecological society, with new ecotechnologies and ecocommunities" (Bookchin 1971: 22). From this perspective, the notion of scarcity – a defining fear of the conservation movement – was a ruse perpetuated by "hierarchical society" in an attempt to keep the majority from understanding the revolutionary potentialities of advanced technology. More than most New Left critics, Bookchin also clearly linked revolutionary politics with environmentalism and technology. "Whether now or in the future," he wrote, "human relationships with nature are always mediated by science, technology and knowledge" (1971: 21). From the perspective of the New Left, pollution and environmental destruction were not simply a matter of avoidable waste, but a symptom of a corrupt economic system that consistently stripped both the environment and the average citizen of rights and resources.

Although the utopian program of Bookchin and the New Left ultimately failed to capture the hearts of most environmentalists, it did help establish a permanent relationship for many between environmental and social politics. This linking of the social, political, and environmental in the 1970s paved the way for new trends of the 1980s such as the environmental justice movement. By connecting ecological thinking with urban social issues and radical politics, the New Left introduced environmentalism to a new and more ethnically and economically diverse group of urban Americans who had felt little connection to the wilderness and recreation based advocacy of the conservation and preservation movements.

By the early 1970s, a long series of environmental catastrophes – including polluted rivers catching fire, oil spills, pollution scares, and concerns about food supplies and health – led to the passage of critical guardian regulations like the Clean Air Acts and sweeping National Environmental Policy Act (NEPA), while broadening interest in appropriate technology. It was during this time that a coalition of countercultural thinkers, industrial designers, architects, scientists, and entrepreneurs started forging a movement that later became known as ecological design. The ecological designers focused on how decentralized small-scale technology distributed through the market might enable an everyday environmentalism. Varied and diffuse, there was much disagreement among AT adherents as to how to define their ideology. There was, however, general agreement that an "appropriate" technology had the following features: "low investment cost per work-place, low capital investment per unit of output, organizational simplicity, high adaptability to a particular social or cultural environment, sparing use of natural resources, low cost of final product or high potential for employment" (Carr 1985: 9). In other words, an AT was cheap, simple, and ecologically safe. The proponents of appropriate technology also agreed on the basic idea that eco-technologies could be used to correct the market economy, enabling a commerce path of activism to emerge.

The AT movement built on the ideas of Schumacher, Bookchin, Marcuse, and a new generation of designers, to craft a very different agenda from their predecessors in the conservation movement and peers in the wilderness movement of the 1960s. The best expression of this new agenda was in the pages of the *Whole Earth Catalog* (1968–80). *Whole Earth* and publications such as the appropriate technology periodicals *Mother Earth News* (1970), *Rainbook* (Editors of Rain 1977), and Lloyd Kahn's bestselling *Shelter* (1973), provided a forum for outsider scientists, architects, and designers whose work in the 1970s built the foundation for the sustainability movement of the early twenty-first century (Kirk 2007).

The post-scarcity pragmatism of the AT and nascent ecological design movements refashioned the pragmatic traditions of the Progressive conservation movement and provided a compelling new spin on the ideal of the "greatest good" mantra of that earlier effort. Working toward similar goals, post-scarcity environmentalists, with the support of sympathetic scientists and engineers, focused their efforts on advances in alternative energy, ecological design, recycling, and creative waste management. They believed that developing such innovations was the best way to subvert the large industrial structures they viewed as most damaging to the environment. Whether they were building solar water heaters in their garage, or designing composting toilets, the idea that technology could be directed toward shaping a brighter future became a driving force in environmental advocacy in the postwar years. But because it was so different from the very public wilderness and guardian path environmental movements, few recognized its significance or promise.

The stealthiness of the post-scarcity commerce path environmental advocacy was due in part to the dispersed, *ad hoc* nature of the venture. Well into the 1970s there was no clear program of thought or action and no Sierra Club equivalent. There were no critical pieces of legislation to rally round or anything resembling a unified philosophy to unite supporters of market driven eco-technological research under one banner. Nevertheless, by 1977, when Jimmy Carter took office, the shared desire to use environmental research, new technologies, ecological thinking, and environmental advocacy to push a post-scarcity revolution was shaping cultural, economic, and political trends.

In their manifesto for dialectical design, *Cradle to Cradle* (2002), authors and ecological designers William McDonough and Michael Braungart revisited Jane Jacobs' commerce and guardian model of environmental activism. They concluded that by the early years of the new century the two paths working in parallel had given us all we needed to achieve sustainability and the post-scarcity dreams of the previous generation. Even their book, which they called a "technical nutrient," was evidence of this success, they argued. It was printed on an infinitely recyclable synthetic material that could later be melted and turned into a plate or a warm winter jacket. By the early 2000s, sustainability had replaced environmentalism as the term that best represented the shared sensibility of those who advocated for the planet and the people on it.

The rich literature of the appropriate technologists/ecological designers provides new insights for those looking to understand the rise of the commerce path and sustainability movements. A trek over to the architecture library on university campuses reveals stacks loaded with books like Amory and Hunter Lovins and Paul Hawken's *Natural Capitalism* (1999) and David W. Orr's *The Nature of Design* (2002) that greatly expand the literature of the field of environmental history. Critical works include books such as J. Baldwin's *BuckyWorks* (1996), Chris Zelov's *Design Outlaws on the Ecological Frontier* (2001), and James Steele's beautiful *Ecological Architecture: A Critical History* (2005). Architectural scholars such as Chris Wilson in *The Myth of Santa Fe* (1997) and Jonathan Hughes and Simon Sadler in *Non-Plan* (2000) provide models for linking insights from urbanism, cultural studies, architecture, and environmental history. These multidisciplinary authors represent only a small sample of a growing cohort of researchers adding new dimensions to debates central to the field of environmental history and of great importance to anyone who wants to understand postwar environmentalism. Historians exploring the nexus of design, commerce, and ecology are currently pushing the boundaries of what we think of as environmental history. This interdisciplinary cross-pollenization should receive much attention in the future.

Thoughtful readers of this ever-expanding library of environmental culture will discover that humans are a part of nature but masters of their own

destinies, that creative innovators could use their talents for the good of the planet, that the state can be a good guardian, and that the market economy could become a valuable tool for solving the environmental crisis of the post-industrial world. In many ways, the gloomy first years of the twenty-first century seemed to have much in common with the bleak 1970s. Perhaps renewed fears of scarcity and potential catastrophe will produce the kind of pragmatic innovation that Callenbach dreamed of when he wrote of the coming century with hope. In any event, the increasingly global culture of consumption will determine human relations with nature in the future and must be studied carefully if one hopes to find a way to unite wilderness prophets and tool freaks in the common cause of sustainability.

For environmental historians, the opening of the field and extensive new research on environmental culture has at times raised again the old question of the relationship between scholarship and activism. By studying individuals and activities that don't fit older models of preservation and conservation we open a cultural terrain characterized by pragmatism, profit, human self-interest, compromise, and moral ambiguity that can be very uncomfortable for those drawn to the field by their love of nature. Oddly, one significant challenge that remains for students of environmentalism is to find new ways to respectfully study those who were optimistic about achieving an Ecotopia or a "middle landscape." One thing is certain: future scholarship will reveal complicated stories of individuals and groups who struggled to reconcile their highly evolved talents as agents of change and their desires to preserve the Earth from the consequences of their actions.

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Chapter Sixteen

The Black Box in the Garden: Consumers and the Environment

Tom McCarthy

We are all consumers. As living organisms, human beings must find the energy our cells require. We do so by eating the plants, animals, and fruits of modern chemistry that provide us with the nutrients that our bodies need. As mammals, we also must maintain a constant body temperature. So in cooler climates or seasons, we need the assistance of food, clothing, shelter, and heating to stay warm. These requirements make all humans consumers and connect all of us to the natural world. We take from the natural world to meet our needs, and we manipulate it to better serve our taking. Whether we are hunter-gatherers, farmers, or hedge fund managers, humans have always been consumers. And we will remain consumers, dependent on the natural world and, consequently, impacting it, so long as we survive as a species.

Economics is the study of how human beings organize their activities to feed, clothe, and shelter themselves. The solutions that the natural world offers to meet these needs are not normally at our fingertips. We must expend time and energy – work – to find them and to prepare them for use, if necessary. In all places and times most humans have had to work for most of their adult lives to meet their basic consumption needs. In modern developed economies that are based on the division of labor most of us have a specialized job that someone pays us a money salary or wage to do. We then exchange the money that we earn as producers for the things we need to consume to stay alive. We also do so for some things that we just plain want.

Production and consumption are the complementary halves of economic activity. Both produce unwanted, unneeded, or superfluous by-products in the form of gaseous, liquid, or solid wastes. Physical products eventually reach the end of their lives when they are no longer functional or desired. Whether in the form of human waste, midden heaps, or landfills, waste

materials that humans generate as producers and consumers are eventually returned to the natural world. Over millennia, humans have chosen to organize their economic behavior in different ways. They may ultimately choose to do so in new and hitherto unimagined ways. But humans will continue to be producers, consumers, and waste makers. Thus, human economic activity will have some set of impacts on the natural world. These facts are inescapable aspects of human life.

Environmental historians study relationships between human beings and the natural world and how these relationships change over time. We study nature's impact on us – as well as our impact on the world. In our work, the natural world generally shares the foreground with human beings. When we focus on human behavior, we usually focus on the consequences of the economic activities of people as producers, consumers, or waste makers that directly touch the natural world. We have been making this basic point for forty years now, and the leading world history textbooks have taken this perspective on board. Because the activities of producers cause much of the environmental impact, there has been a pronounced bias in environmental history toward examining these activities. Environmental historians have less often explored the *indirect* but often profound ways that consumers' thoughts and behavior impact the natural world. But it takes a buyer as well as a seller to make a market. Consumer decisions account for nearly 70 percent of all economic spending in the United States and for over 60 percent of economic activity globally. Cumulatively, consumer behavior causes more change than any other type of human activity. The environmental historian who wants a more complete answer to why an environmental impact has occurred is often confronted with the challenge of explaining, not just how a producer made money from the natural world, but why this opportunity existed in the first place. The answer is the consumer, a person who often had other things on his or her mind than the impact that his or her purchase had on the planet. That historians care and write about these connections is a recent development.

The Three Revolutions

The scientific, archeological, and historical record shows that from the beginning even small numbers of human beings had discernable impacts on the natural world. The artifacts unearthed by archeologists are themselves testimony to this fact. For example, the archeological record tells us that there is a correlation between the arrival of modern humans in a region and the extinction of its largest mammals, the mega fauna (Krech 1999: 29–43). Throughout the world there is evidence that humans used fire to alter their surrounding environments to encourage the proliferation of some desired plants and animals at the expense of others. So pervasive was this practice in

Australia that it led to the preponderance of a fire-tolerant family of trees – eucalypts (Lines 1991: 10). In the twentieth century the examination of thousands of years of polar ice layers revealed the global impact of human-caused air pollution by activities such as smelting lead that go back thousands of years (Patterson 1965). Everywhere that we look there is evidence that humans used – and, by some lights, abused – the natural world while trying to meet their needs and desires.

Modern history presents a similar picture. People continue to depend on the natural world to meet needs that are literally the difference between life and death. What is new is the variety and magnitude of the human impact, the result of three developments that have taken place in the last 300 years that rank with the handful of greatest in the entire 200–300 thousand year history of our species. The first development is the tenfold increase in human numbers from about 900 million in 1800 to a predicted nine billion in 2050 (United Nations 2006: vii). The planet is now charged with meeting the basic life needs of far more people. Indeed, the increase in human numbers has been so large and so sudden as to raise worrisome questions as to whether the planet has the carrying capacity for so many.

The second development is the "consumer revolution," a term coined by historians about thirty years ago to cover the widespread interest in buying and displaying material objects that suddenly developed in Western Europe in the seventeenth and eighteenth centuries (McKendrick 1982; see also Brewer and Porter 1993: 85–132; Stearns 2001). There people well down in the socioeconomic hierarchy began to spend more money for objects for reasons that went beyond necessity. Indeed, these people began replacing objects they already had with new ones before the old ones had broken or worn out – which is to say they began to participate in fashion. This behavior (and its continuing spread and elaboration) is what historians and social scientists mean by the term "consumerism." It was an important turning point in world history.

Historians used to think that consumerism was a more recent development caused by industrial-era manufacturers that needed to find more buyers for the great output of their factories. Thanks to the consumer historians, we now know that the consumer revolution came before the industrial revolution. Some consumer historians have claimed that the consumer revolution caused the industrial revolution. Economic historians vigorously reject claims of a direct causal link, but there is no question that the consumer revolution was an important part of the larger eighteenth-century economic context that gave rise to the industrial revolution (Mokyr 1977; de Vries 1993).

The final development is the extraordinary improvement in material standards of living made possible by the cheap liberation of vast amounts of additional energy stored in fossil fuels. These fuels – chiefly coal and petroleum – provided the energy that powered the machines of the industrial

revolution that made it possible for billions of people to have far more material things than any humans who lived before them. The key word is "cheap." Economists nowadays often measure the cost of energy, not in terms of money, but in terms of the energy that must be expended to create useable energy – energy returned on energy invested (EROI). For example, the EROI of crude oil from many US oil fields in the first half of the twentieth century was about 100:1 (Crosby 2006: 119–20). When we learned how to tap the energy in coal and oil we gained a windfall of cheap energy that made possible a revolution in material living standards. Americans pioneered the use of oil in particular, and, as measured by energy use per capita, have been the major beneficiaries of this energy windfall. However, when we burn these fuels we release carbon dioxide into the atmosphere, a major cause of global warming. But the greater impact of fossil fuels has been the work they have made possible to cheaply tap the natural world for other resources and transform them into other products that we consume. The low cost of carbon fuels encouraged people to create an entirely new economic order around their use, a choice that has proven problematic for the natural world and that may prove problematic for the viability of this economic order, given the finite supply of coal and petroleum.

Taken singly, any one of these three developments would have had major consequences for the natural world. By itself, the increase in human numbers means a greater impact on the planet by people who need to feed and shelter themselves. Similarly, if there had been no increase in population, but increases in consumer demand and material standards of living, there still would have been a greater environmental impact. But these three developments occurred together. In the twentieth century the human population tripled and global economic activity grew by a factor of fourteen (McNeill 2000: 16). The effect has been to dramatically multiply the impact of humans on the planet and to do so in a very short timeframe. And these trends have not finished their course. So we have not reached the apogee of their combined effect or seen whether the planet can support this number of people behaving in this way over a sustained period.

John P. Holdren and Paul R Ehrlich published an influential article in *American Scientist* (1974) in which they suggested that these basic connections could be represented by a simple equation where the environmental impact (I) of humanity on the planet was a function of population (P), affluence (A), and technology (T):

$$I = P \times A \times T$$

This equation appears with some frequency in the environmental literature, often implicitly. Much has been said about its validity. For example, should variable A stand for consumer desires and tastes – the consumer revolution – and variable T for the carbon-industrial revolution that meets

these desires? Or should A encompass both consumers and producers, all economic activity, and T simply stand for technology considered apart from economic activity? In either case, the population and economic activity variables have been increasing sharply. So if you don't want the environmental impact to get worse or to take on the daunting tasks of inducing radical changes to reproductive or economic behavior, T absolutely must become more of a divisor than a multiplier. The IPAT equation is useful because it reminds us of the basic connections involved in human environmental impact on the natural world.

In his 2000 book, *Something New under the Sun*, Georgetown historian John R. McNeill suggested that the intersection of these developments constituted "a gigantic uncontrolled experiment on the earth" (4). The experimental question at stake can be stated with simplicity. Can six-to-nine billion human beings find contentment through the unending acquisition of material goods without doing irreparable harm to the planet that they depend upon for life itself? The answer remains to be seen. Although historians do not yet speak in such terms, humanity has entered a new and different epoch. How it will unfold is not clear. What is clear is that consumer behavior and its impact on the planet have become central to humanity's destiny, and many more historians in years to come will ask how we chose – or stumbled down – this path.

Connecting Consumers and the Environment

As is often the case, historians came to appreciate these large connections belatedly, only after others had pointed out their importance. Mid-twentieth-century American environmentalists – to their credit – did much to publicize the problematic connections between consumer behavior and environmental impact. Not surprisingly, they tapped existing discourses about consumers and population growth to do so. It is not clear in the long run whether they have been well served by doing so. In 1968 Paul R. Ehrlich published the *Population Bomb*. "The battle to feed all of humanity is over," he wrote in his opening sentence. "In the 1970s and 1980s hundreds of millions of people will starve to death in spite of any crash program embarked upon now" (Ehrlich 1968: xi). This apocalyptic tone and message – combined with his witty, forceful persona – got people's attention. In a more systematic attempt to extend Ehrlich's Malthusian logic, Donella H. and Dennis L. Meadows produced computer-generated extrapolations of population growth, agricultural production, natural resource use, industrial production, and pollution trends. "We can … say with some confidence," they wrote, "that, under the assumption of no major change in the present system, population and industrial growth will certainly stop within the next century, at the latest" (Meadows and Meadows et al. 1972: 126). Their book *The Limits to Growth* also

received wide notice when it was published in 1972. When these views seemed to be confirmed by the energy crisis that developed the following year, policymakers and pundits in the developed world began to preach a new era of limits.

The doomsayers produced a reaction. Ehrlich began his book with an unflattering picture of the teeming crowds in Delhi that he tempered only with the platitude that "We must all learn to identify with the plight of our less fortunate fellows" (2). It is not clear that he recognized that arguments similar to his had been made earlier in the century by people who sometimes had (or were not far removed from those who had) anti-immigrant, eugenicist, and racist agendas. Certainly, when he helped to found the NGO Zero Population Growth in the wake his book's success, he and his co-founders were careful to limit the organization's focus to the United States. But there was an unavoidable element of first world condescension inherent in his argument. Not surprisingly, people in developing nations quickly perceived it as hypocrisy. They also saw where this line of logic was headed. From the 1972 Stockholm United Nations Conference on the Human Environment to this day, developing nations consistently asserted a national sovereignty-based right to development, including the freedom to set economic, population, and environmental policies subordinated to achieving the larger goal of first world material standards (United Nations 1972). The developing world firmly told the developed world and its NGOs to mind their own business unless they were willing to back their concern with monetary aid and free or subsidized environment-friendly technology.

These nations also told the developed world to examine its own house. Poor people in developing countries, although becoming more numerous, had only a comparatively light cumulative impact on the planet. Instead, these nations argued, it was the consumer appetites of the developed world and the demands that their consumers made on energy and natural resources that did the greatest harm. This critique already was being made by environmentalists in the US and elsewhere in the developed world.

Although the link to environmental impact was new, this critique of consumer behavior drew on older traditions. Almost no major traditional belief system condoned making money or materialism (Durning 1992: 142–5). Yet the consumer revolution of the eighteenth century, as commentators then noted, seemed to make virtues of what had formerly been vices – envy, lust, greed, gluttony. As a consequence, a great deal of hand-wringing and moralizing accompanied the consumer revolution and its further development across the nineteenth century. Like population alarmists and their attitude toward people in the developing world, critics treated consumers with condescension.

In early twentieth-century America, as Lendol Calder showed in *Financing the American Dream* (1999), consumer borrowing became the

lightning rod for this anxiety, guilt, and criticism. When a study commissioned and publicized by General Motors in the late 1920s showed that the rate of default on consumer automobile loans was much lower than people had imagined, and when the Great Depression bore out the study's substance in much harsher conditions and taught Americans the economic importance of consumer spending, much of the moralizing based on older values and beliefs stopped.

However, a new secular criticism of consumer behavior developed in the late 1950s. Cultural critics such as Vance Packard, in his books *The Hidden Persuaders* (1957), *The Status Seekers* (1959), and *The Waste Makers* (1960), and John Keats in *The Crack in the Picture Window* (1956) and *The Insolent Chariots* (1958), questioned the postwar consumer agenda. These new moralists argued that American consumers should stop engaging in such superficial, trivial, and silly behavior. Grown-up people, in their view, only bought things that met basic, minimum functional needs. Packard and Keats did not have much sympathy for American consumers and did not delve very deeply into their motivations. By the late 1960s, many argued in addition that the health of the planet depended on consumers shaping up. Amid the energy crisis, the multiple recessions, and the high inflation of the 1970s, this argument resonated with many Americans. A conservation ethic swept the American middle class in the mid-1970s. Few people asked whether the much maligned consumer behavior of Americans deserved close attention, understanding, or respect. When the economic climate improved again after 1982, consumers drifted back to their pre-limits behavior.

The dire predictions of the alarmists did not pan out – at least not within the timeframes of the authors' predictions. And they have not played out in the nearly forty years since. One important reason was the huge increase in global food production made possible by the "green revolution," pioneered by scientists like Norman Borlaug who specialized in plant breeding and other techniques to optimize the yield from cereal crops like wheat, rice, and corn (Easterbrook 1997). Food was not the only item that failed to prove scarce. In 1990 Paul Ehrlich famously lost and paid off his $1,000 bet with economist Julian Simon that the price of a designated basket of natural resources would increase over time as they became scarcer (Tierney 1990). Consequently, the doomsayers generally have been discredited. But the experiment is not over. It remains to be seen whether the burden of a much larger human population will challenge global food production, exhaust critical natural resources, or make their purchase prohibitively expensive at some point in the twenty-first century.

By the late 1990s, it was clear, too, that most nations of the world had entered the *demographic transition* (i.e., had falling birth rates). United Nations demographers predict that the human population will peak somewhere just over nine billion in the middle of this century (United Nations 2006: ix). So the end of the remarkable 250 year rise in human numbers is

in sight. Indeed, in recent years, articles have called attention to developed nations where the birth rate has fallen below the replacement rate (2.11 children per woman), which means that eventually these nations will experience population decline – in some cases dramatically so, if there is not an offset from immigration. In IPAT terms, the peak magnitude of the P variable (9 billion) now seems to be known.

Economic growth presented an entirely different perspective. Almost no one wanted slow or flat economic growth, and only a handful of economists like E. F. Schumacher (1973), Herman Daly, and Robert Costanza actually took the subject seriously. Indeed, the worldwide embrace of free markets and economic growth evident in Thatcher-Reaganomics, the Chinese turn to the market, the collapse of the Soviet Union, and the rapid economic development of the East Asian Tigers, all seemed to augur far higher rates of economic growth in the twenty-first century. In moving beyond the "doom and gloom" perspective of the 1970s, many people asked whether it was possible to have continued economic growth without doing further harm to the environment. The result was the World Commission on Environment and Development's *Our Common Future* (The Brundtland Report), which popularized the term "sustainable development" – or economic growth without further environmental harm (World Commission 1987: 8–9). The late 1980s and 1990s became the proclaimed era of sustainable development. Everyone agreed on this goal, but few did anything in particular to achieve it. No government relished telling its people to stop doing things that made them money as producers or gave them pleasure as consumers.

Although sustainability has been largely an exercise in euphemism, the idea nonetheless reminded people of the importance of the connections among population growth, economic growth, and environmental impact that might otherwise have remained separate and compartmentalized. Late-twentieth-century environmentalists were not the first to urge people to pay attention to connections. Two famous nineteenth-century authors made similar points. Nature writer and Sierra Club founder John Muir observed that "when we try to pick out anything by itself, we find it hitched to everything else in the universe" (1911: 211). Muir articulated the core idea in the field of ecology, and millions more Americans grasped it in the second half of the twentieth century.

Similarly, Karl Marx in *Capital* drew attention to missed connections involving consumers when he discussed what he called "commodity fetishism" (1977: 163–77). The term is wonderfully evocative, suggesting both perversion as well as an unnaturally intense but ultimately misplaced fondness for something. The term is, of course, deeply unfair to consumers. But Marx wanted to hold consumers (his readers) accountable for the problems connected to their behavior, especially the harm done to laborers through exploitative labor systems that produced the products that consumers wanted.

Marx put his finger on an important problem. By acquiescing in ever more minute divisions of labor in exchange for a cash wage, we are promised an ever greater variety of goods on which to spend our earnings. We do not have to worry about being able to produce all the goods we desire, only earning the cash (or having the credit) to buy them. For most people, this trade-off has been beneficial, leading to higher living standards. But for those who are concerned about the environment (as well as labor and other social problems), it has also been the root of a great evil. The division of labor and the proliferation of consumer goods made it increasingly difficult, if not impossible, for us to fully understand the social and environmental implications of our behavior as either producers or consumers. The economy was simply too large, too complex for an individual to comprehend all of the connections.

The resulting ignorance had the unfortunate effect of lowering our sense of responsibility toward the people and ecosystems touched by our production and consumption. In short, through our participation in the creation, elaboration, and maintenance of capitalist markets, we granted ourselves a license to exploit people and environments that we did not know about and toward which we felt no sense of responsibility. This mystification and the resulting diminishment of responsibility – by-products of the division of labor that makes possible the technological sophistication to manufacture products that "dazzle" us with their complexity, functionality, styling, quality, affordability, and symbolic import – is a major problem of developed economies and mass consumer capitalism. Mystification makes it exceedingly difficult to link production and consumption acts to environmental consequences, a fact which has, does, and will continue to handicap efforts toward reforms that serve the long-term interests of the planet and the species. So why not dispel the mystery?

The Big Connections of Little Things

The sustainability question and the desire to address the mystification that Marx identified by calling attention to big, but often overlooked, connections spawned a noteworthy literature that remains the place to begin for those interested in the impact of consumer behavior on the environment. Sidney W. Mintz pioneered the "big connections" genre with his book *Sweetness and Power* (1985). A food anthropologist, Mintz showed how the European desire for sugar – their insatiable "sweet tooth" – gave rise to Caribbean sugar plantations and the plantation owners' need for millions of enslaved West Africans to work them. Mintz devoted considerable attention to tracing the growing appeal of sugar to Europeans in the centuries before 1800, and the book amounts to a consumer history of sugar. But its real strength was showing the connection between a popular consumer

item and labor systems, especially Caribbean slavery. Thus, *Sweetness and Power* addressed the exact problem that Karl Marx had in mind with "commodity fetishism." Mintz also discussed sugar as a crop, its first domestication by humans in New Guinea, and its slow journey half way across the world to the Caribbean, so environmental historians have found much to admire in this book.

But *Sweetness and Power* had little immediate impact on the nascent field of environmental history still finding its legs in the 1980s. The major exception was William Cronon's *Nature's Metropolis* (1991), a *tour de force* in the big connections genre. Cronon's book about the growth of Chicago as a city and its economic connections to the growth and environmental exploitation of the US West was equal parts urban history, business history, transportation history, and environmental history. But Cronon said little about how consumer demand factored into Chicago's development. Consumers were not entirely absent, however. He drew attention to Plains farmers sitting around their kitchens with the mail order catalogs of Chicago-based retailers Montgomery Ward and Sears, Roebuck, contemplating what they would purchase with the money they had earned exploiting the natural world. "Follow the buyer," Cronon admonished his readers, while leaving this task to others (310). By 1991, Cronon was calling attention to the "hole in the donut." Many readers already understood that it takes a buyer and a seller to make a market – and an environmental problem. Cronon's book, for all its great virtues, left many with the sense that something important had been left out.

If academic historians proved slow to explore the connections between consumer behavior and environmental impact, popular authors did not. Two well-received works of non-fiction arrived almost simultaneously in 1997 and together started a literary fad for making a consumer product (or two) the subject of entire books. Both authors reveled in throwing light on the "who knew?" connections. Leah Hager Cohen's *Glass, Paper, Beans* (1997) was not history, although there was plenty of history in it, but a rumination on the connections involved in making and consuming everyday things, in her case a newspaper, a glass, and the coffee in it. Cohen introduced her readers to Basilio, a coffee farmer near Pluma Hidalgo, Mexico, who grew the coffee she drank, Ruth Lamp, a supervisor at the plant that made the glass tumblers from which she drank, and Brent, a modern lumberjack who cut the spruce forest near Plumweseep, New Brunswick, to make the newsprint on which her *Boston Globe* was printed. Cohen had Marx and commodity fetishism very much in mind. "The truth beyond the fetish's glimmering mirage," she wrote, "is the relationship of laborer to product; it is the social account of how that object came to be. In this view every commodity, beneath the mantle of its price tag, is a hieroglyph ripe for deciphering, a riddle whose solution lies in the story of the worker who made it and the conditions under which it was made" (209).

But she also had quite a number of other connections in mind. Indeed, the great pleasure in Cohen's book is following a thoughtful, curious mind making and sharing the connections, and seeing just how far the big connections envelope could be pushed.

In *Cod* (1997) Mark Kurlansky wrote a quirky bestseller about a fish and what was once the most important fishery in the world, the Grand Banks off the southeast coast of Newfoundland. The book was an excellent environmental history of the changes in cod fishing on the Grand Banks over the past five hundred years and that fishery's apparently final demise in 1992. But it was also a loving cultural history of cod as a food of some significance to Western Europeans. With cod recipes taken from history scattered throughout it, the book reflected Kurlansky's background as a food history columnist. It was a book about the fishing industry that made you hungry for the fish, while also understanding and lamenting its demise. Producers and consumers, desire and loss – Kurlansky deftly wove them together under the spell of "who knew?"

More recently, author and *Economist* technology editor Tom Standage published *A History of the World in 6 Glasses* (2005). As Mintz, Cohen, and Kurlansky had before him, he took food, or, more precisely in this case, drink as his subject, but instead of focusing on just one, he examined the impact of six drinks on world history: beer, wine, spirits, coffee, tea, and Coca-Cola. The book moves chronologically through the six drinks in order of their rise to importance in the Western world. Beer and wine are treated in the context of ancient history. Spirits, coffee, and tea speak to the premodern world. Coca-Cola takes the reader from the industrial revolution to globalization. Standage's book was not scholarly history, but it made a satisfying read because it continually answered the unrecognized, un-verbalized curiosity that people have about the origins of commonplace things in their lives. These popular authors all showed that shedding light on a consumer good could be pleasurable, fascinating, and edifying.

With the new century, environmental historians began to weigh in with books that connected consumers to environmental impacts. Although Jennifer Price's *Flight Maps* (1999) had been a Yale dissertation, it was the very antithesis of a doctoral thesis and was published as a trade book almost right away. Disavowing intentions to be a "Thoreau of the mall," Price became exactly that, examining the strange connections among modern American consumer culture, ideas about nature, and the natural world itself. Exploring an eclectic range of topics, including the roles of eastern diners and market hunters in the demise of the passenger pigeon, the weird turn-of-the-century fashion for dead, stuffed birds on women's hats, the postwar fetish for plastic pink flamingoes, nature at the American mall, and the greening of television, her book was idiosyncratic, but deeply thoughtful. "We want to save our souls from consumerism, and from the sins and costs of modernity, but at the very same time, we want to enjoy all of life's

social and economic benefits fully. These exacting desires, and messy contradictions, stay mostly undercover" (xix). Price ought to be read with Cohen by readers who want to grasp the full range of possible connections between consumer products and the larger world.

Most environmental historians who have used consumer products to explore the larger connections have not tried to match the creative insights of Cohen or Price. They have aimed instead for organically complete stories that encompass the major connections. This approach reached a new level of mature scholarly realization with two books published in 2005, Douglas Cazaux Sackman's *Orange Empire* and John Soluri's *Banana Cultures*. Sackman focused on the "growth machine," the southern California growers, corporations, trade associations, railroads, newspapers, real estate agents, and chambers of commerce "that turned the land into factories of fruit" (5). The creation of southern California as the land of sunshine, oranges, and health was perhaps the greatest real estate marketing triumph in American history. Oranges could be grown in southern California, but they still had to be sold to predominantly Anglo palates back East. The growers did so with a cooperative marketing blitz that tapped the very myth of southern California. With the Sunkist advertising campaign, growers convinced American consumers that they were purchasing the healthy sunshine of southern California each time they bought a Sunkist orange.

The underside of this world was less the harm done in manipulating nature but that done to the workers who picked and packed the oranges. The growers carefully shielded consumers from this reality, suggesting instead that oranges came directly to market from nature. In the Depression of the 1930s, angry reformers like Upton Sinclair, John Steinbeck, Paul Taylor, Dorothea Lange, and Carey McWilliams ripped aside this veneer to expose the exploitation behind the oranges. Sackman carefully explored the connections among the fruit, the growers, the workers, and the consumers, so that his book refuses simple classification as environmental, business, or labor history. Like the actual world that he described, his book is all these things at once.

In *Banana Cultures* Soluri also struck a good triple balance between consumers, cultural meaning, and evolving consumer tastes, on the one hand, and small independent producers, laborers, companies, transportation, and business history, on the other, while keeping environmental history, including the plant and its varieties, agricultural practices, and a constant war against its pathogens in the foreground as well. Soluri showed that each of these elements provided important and particular elements to the improbable popularity of bananas. Soluri's close attention to place – the north coast of Honduras – and the transnational relationship with banana companies and consumers in the United States provided the reader a satisfactory sense that the author has framed his subject as a whole. More importantly, he approached each factor with respect. No one factor dominated

the development of late nineteenth-century and twentieth-century banana culture. The actors – including the banana trees – existed in a dynamic, contingent relationship with one another, a state of affairs that required constant improvisation from the human actors involved.

The attention that both popular authors and environmental historians have focused on food is remarkable, given that those concerned about the problematic connections between consumer goods and the environment normally focused on things more substantive and durable than food. At the core of the twentieth-century middle-class American lifestyle was the single family detached home with an automobile or two or three in the driveway. Kenneth Jackson showed in *Crabgrass Frontier* (1985), his cultural and social history of American suburbia and the suburban ideal, that Americans desired single family detached homes located somewhere between the benefits of the city and the virtues of the countryside long before the twentieth century and the automobile. After the widespread adoption of the automobile in the 1910s and 1920s, Americans spent a good portion of the remainder of the twentieth century remaking their built environment around the assumption of automobile ownership. The consequences for the natural landscape from suburban home-building and the larger automobile makeover, as Owen D. Gutfreund showed in *Twentieth-Century Sprawl* (2005), were profound.

Automobiles and suburban development had been compatible from the beginning, but with the return of prosperity after World War II, middle-class Americans embraced new mass produced, low cost developments like Levittown, New York. Between 1941 and 1956, the rate of US homeownership jumped from about 40 to 60 percent. The postwar suburban boom satisfied a powerful American desire, but it also brought environmental impacts, the subject of Adam Rome's *Bulldozer in the Countryside* (2001). These problems went beyond the loss of undeveloped land to "cookie-cutter" tract housing, malls, industrial parks, and highways. Developers built postwar homes on the assumption that the energy to heat and power them was cheap. Little thought went into minimizing energy use. Indeed, consumers filled their homes with energy-consuming appliances, including air conditioners, and the energy use of the average American family skyrocketed.

Yet Rome showed that suburbanization was far from an unmitigated evil for the environment. Suburbia, as a place and an experience, also produced an army of grassroots environmentalists who in the 1960s and 1970s launched the modern American environmental movement. Beneficiaries of the new suburbs, they watched the remaining green spaces close to their new homes fall to development. This upwelling of concern led to a powerful desire for better land use planning that culminated in attempts to pass the National Land Use Planning Act, an effort that ran into the buzz-saw of environmental backlash that developed in 1973. Property owners, including

other homeowners, worried that land use laws might limit what they could do with their own property. One consumer agenda, backed by homeowners and developers, clashed with another backed by homeowners and planners. Homeowners wanted the freedom to do whatever they pleased with their own property, while regulating what others did with theirs. Forced to choose, homeowners leaned toward the former, even before developers decisively tipped the balance against regulation. This outcome, Rome concluded, has generally continued to be bad news for the environment.

The only book-length historical examination of automobile consumers and environmental impact is my own *Auto Mania* (2007), which is about the twentieth-century relationship between Americans and automobiles, some of the impacts that the automobile had on the environment, and how these changed across the century. Using the idea of a product life cycle, I showed that the environmental problems were more varied than the familiar tailpipe emissions that cause smog or global warming. There were issues with raw material extraction and processing. Manufacturing and assembly produced air, water, and solid waste pollution. Abandoned automobiles and overflowing junkyards brought problems after the end of a car's useful life. Contrary to popular belief, many of the automobile's environmental problems were recognized at the outset. Often, there were viable solutions. The problem was implementing them.

The second half of *Auto Mania* looked at how consumers and the automakers made it difficult to address the problems through the US political system, even after the problems became reasonably well known. After the national media spotlighted pollution as an environmental problem, consumers provided powerful support for the passage of the Clean Air Act amendments of 1970 and the Clean Water Act amendments of 1972. More than any other steps, these two Acts forced the automakers to clean up their cars and factories. But consumers drew the line at regulation directed at themselves, and the automakers quickly learned how to enlist them on their side to fight regulators to a stalemate. So, as the twenty-first century began, American automobile consumers and producers still had considerable freedom to find common ground, even when this ground brought environmental harm.

A Word for Psychology

As illuminating as the connections genre has been, there is a problem with it. It involves an assumption that underlies the entire enterprise from Ehrlich's IPAT equation to the most thoughtful and comprehensive authors and environmental historians: if you show people a problem associated with their behavior, they will change their behavior. This assumption is questionable, if not false. Education may be a necessary condition for change, but it

is not a sufficient condition. I made this point about American automobile consumers in *Auto Mania*. After the safety crusading of Ralph Nader, the fight against smog, and the energy crisis, how do we explain the fact that so many Americans who certainly understood at some level the problems that large vehicles posed in all three of these areas went out and bought pick-up trucks and SUVs in the 1980s and 1990s?

The same assumption is held by the modern environmental movement. Late twentieth-century environmentalists, somewhat like nineteenth-century abolitionists, believed that simply showing people the connection between their behavior and an evil outcome ought to be sufficient to convince people to stop "sinning." When this did not happen they attributed the fact to obduracy and selfishness. These factors were at work – as well as simple contrarianism. But the more important, and ultimately unavoidable, conclusion is that consumers had more personally important issues in play that trumped knowledge of any problematic environmental connections.

Whether we consider consumers and environmental impact from the standpoint of history or from the standpoint of contemporary policy, we are eventually confronted with the question why. But when we look at the connections genre more closely, we realize that consumers often appear only to be on the receiving end of successful marketing campaigns by producers. Or the authors merely describe their behavior in adopting a product. Far less attention is paid to why they bought the product. The challenge for people who want to explain environmental impact from consumer behavior is identifying the motives or agendas at work when a person made a decision and purchased a product.

If the motives behind consumer behavior could be reduced to a single word – and, of course, they can't – that word would be *respectability*. More than any other idea, respectability defines the target at which people aim as consumers. Woodruff D. Smith made this point in *Consumption and the Making of Respectability* (2002). Smith's book represents as well as any the distinguished historical scholarship on consumer behavior undertaken by cultural historians over the last quarter century. Consumer products "were attractive," Smith writes,

> because adopting the practices in which they were used allowed large numbers of people of varied social standing to manipulate the social and cultural realities with which they were confronted, in many cases to participate in broader, more prestigious patterns of community life than their forebears had been able to do, and, ultimately, to see themselves as respectable persons. (239)

Smith wrote about eighteenth-century Britons, but his sentence also described twentieth-century Americans pursuing the American Dream. Indeed, it summarized much of the demand side of US economic history.

Cultural historians like Smith, rather than environmental historians, have done the most probing for the reasons behind consumer behavior. In the main, they have been content largely to find and explain patterns of meaning rather than linking them to negative consequences – say, to exploitative labor systems or environmental harm. The patterns they have identified, exploring the webs of meaning that people spin for themselves, have been compelling. Perhaps it is too much to expect cultural historians to link the patterns to social or environmental problems.

The hesitancy of environmental historians to explore the patterns of meaning in which consumer behavior occurs is less defensible, all the more so since the leading practitioners have insisted that environmental history is not intelligible unless it is set in the appropriate human cultural context (Cronon 1993). Yet environmental historians have remained focused largely on humans as producers – on farmers, businessmen, businesses, and corporations – and the impact that these economic activities have had on the natural world. These relationships arguably comprise most of the direct ways that humans harm the environment, and environmental historians are to be commended for the even-handed manner in which they explored this behavior and its consequences. But they are still missing or ducking an important opportunity. The number of historians who have explored the link between consumer behavior and environmental impact is still too small.

One reason why historians pause at this point is that they ask themselves, where do I find the evidence for these motives or agendas? They look for evidence where consumers confided their innermost thoughts to a diary just before they bought that Model T or SUV, and they find that very few did. They look for evidence where someone asked people why they bought the product they did, but they recognize that these answers can be distorted by the questions asked or the presence of the interviewer. Such evidence needs to be treated with caution. In short, they decide that evidence that meets the exacting standards of their profession is lacking. They are left to make inferences about motives from behavior. Lacking the direct evidence that they desire, historians view these inferences as speculation, and they hate to make them. Better just to describe behavior and let readers draw their own inferences about motives. Yet in doing so, historians often leave the most important question – why – unanswered.

However, there is an opportunity to sharpen the work of cultural historians while at the same time reducing the hesitancy of more cautious historians to work with the types of evidence left by consumers. In his 1862 essay "Walking," Henry David Thoreau told his audience that he wished to speak a word for nature (1964: 592). I'd like to speak a word for psychology, specifically the body of work produced by cognitive psychologists since the 1970s. If historians want to do a better job of understanding the human impact on nature, they need to be better students of human psychology. The same can be said of any historian who wants to better explain human behavior.

Psychology, or at least psychohistory, has a bad name among historians. Most of us were trained after a brief flirtation with psychology by historians in the US forty years ago that ended largely in ridicule – in part because those historians chose an interpretive approach – psychoanalysis – that psychologists already had abandoned (Pietikainen and Ihanus 2003; Stearns and Stearns 1988). The other part of the reason why historians did not embrace psychohistory certainly had to do with evidence and interpreting it. The psychohistorians beckoned their colleagues to explore a place that made us fearful, the "black box" between the ears of our historical subjects. We could hear peer reviewers saying "where's the evidence?" Few followed. Instead, we closed ranks around the idea that it was folly to make the attempt. That conclusion was unfortunate. Finding and interpreting evidence that speaks to the reasons for human behavior is certainly difficult, but it is not impossible. And the why-questions about human behavior remain important. Cultural historians have edged us closer in recent years. Not surprisingly, psychologists proved less reticent (and a good deal more innovative) than historians when it came to exploring what goes on inside the human mind. They, too, had to overcome a disciplinary bias against making the attempt – behaviorism. But they persevered successfully. As a result, the historian's reluctance to pursue why-questions into the human mind is no longer as tenable as it once was.

What the cognitive psychologists have found is highly relevant to historians who study consumers and those who study the human impact on the natural world (Rabin 1998). Most of us are familiar with some of these findings from the articles and books on behavioral economics and cognitive psychology that have made it to the mainstream in recent years. They have titles like *Strangers to Ourselves* (Wilson 2002), *Stumbling on Happiness* (Gilbert 2006), and *Predictably Irrational* (Ariely 2008). For our purposes here, a whirlwind summary will have to do.

There is a growing body of evidence that considerable processing takes place in parts of the brain to which consciousness has no direct access (Wilson 2002). These parts of the brain influence conscious thought and behavior. As psychologist Timothy D. Wilson put it, "People have limited access to their own personalities, the reasons for their [actions], their own feelings, and how they will feel in the future" (158). Most of the time, people are irrational, emotion-driven, susceptible to outside influence, and largely oblivious to what's going on. Even when we fathom something of what's going on, we find it difficult to change our behavior. Nonetheless, we behave in predictable ways – and are thus vulnerable to calculated manipulation by others. That's great news for advertisers and campaign managers, but not necessarily for society or the environment – because it means that we are less the captains of our own ships than we imagine. It also poses problems for the liberal individualist assumptions that underpin democratic and free market systems.

Insights from cognitive psychology relevant to environmental historians may be limitless. Let me discuss several by way of illustration. It is difficult to discuss consumer behavior and the environment without considering the role played by advertising. When advertising comes up, there is a tendency to simply blame corporate marketers and their ad agencies for the resulting behavior, conveniently forgetting that consumers and producers have a co-dependent relationship. We think of the way that the automakers marketed SUVs by placing them in the great outdoors (Price 1999: 235–6; Rollins 2006; McCarthy 2007: 231–6). Yet this recognition leads to a paradox. If so much advertising seems to be a laughably obvious and inept attempt to get us to buy something, how can it possibly influence anyone? One answer is that there are two groups: me and my sophisticated friends who are immune to the blandishments of the hidden persuaders, and everyone else who are not. Satisfying as such a conclusion may be, we recognize that there is something suspect in this reasoning.

Insights from cognitive psychology help to explain the seeming paradox. The best place to start is an article published by Timothy Wilson and Nancy Brekke called "Mental Contamination and Mental Correction" (1994), which Wilson elaborated on in his book *Strangers to Ourselves* (2002). "Everyday advertisements are more likely to influence us without our fully recognizing that we are being influenced," he writes. "Even when we consciously see and hear something such as an advertisement, we can be unaware of the way in which it influences us.… The failure to recognize the power of advertising makes us more susceptible to it, though, because we are likely to lower our guard while watching commercials or fail to avoid them altogether" (187). The idea of "mental pollution" is intriguing (and not just for an environmental historian!). It raises the question whether advertising is like second-hand smoke and whether we ought to have the right – if we so wish – to be free from its unwanted influence and possible harm. Jennifer Price reproduced a bumper sticker in *Flight Maps* that makes the same point: "TV-Free America! The Environmental Movement of the Mind …" (253).

One of the most important distortions explored by cognitive psychologists is our tendency to mis-predict the future (Gilbert 2006). There are a number of distinct reasons why we do this. Moreover, when we think something about the future will be good, we tend to over-exaggerate how good it will be. When we think that something will be negative, we over-exaggerate how bad it will be even more than we over-exaggerate the positive. In both cases we expect the future to be this way for far longer than will actually be the case. Psychologists are not saying that we cannot predict the future with accuracy, just that unless we make a conscious effort to counteract these biases, we will make poor decisions based on poor predictions. The same is true for societies.

A great example of this problem was the fight to put the two-way catalytic converter on American automobiles in the early 1970s in order to

meet the emissions standards mandated under the Clean Air Act amendments of 1970. Technical people knew that the catalytic converter was the only technology that substantially reduced emissions available to US automakers in the timeframe required by the law. Led by its president, Ed Cole, GM took the lead in bringing the industry to accept this inevitability. Ford president Lee Iacocca (not yet a corporate hero) took the lead in bad-mouthing the converter. Chrysler wanted more time to explore an alternative approach pioneered by Honda (not then a major player in the US market) and also criticized the converter.

Previous efforts by the automakers to reduce smog-causing emissions had involved de-tuning the engine. A by-product of this step was a loss of fuel economy. Thanks to the bad-mouthing and this previous experience, consumers expected catalytic converters to substantially further reduce fuel economy and awaited its arrival with dread. Although Ford and Chrysler engineers knew otherwise, only the EPA and GM (and especially Cole) worked to publicly dispel this myth. Since the converters were attached to a vehicle's exhaust system, they pointed out that the engines could be re-tuned for efficiency and thus fuel economy would actually go up. Consumers paid no attention. When the converters went on the 1975 models Cole, GM, and the EPA were proven right – fuel economy improved. Yet to this day millions of American automobile consumers believe that catalytic converters reduce fuel efficiency.

Conclusion

Barring a lethal pandemic, the basic relationship among human numbers, consumer behavior, and environmental impact is not likely to become less important any time soon. However, pointing out the negative ramifications for the environment associated with consumers is not enough to change human behavior. Environmentalists, concerned citizens, historians, and policymakers all must make a better effort to understand the reasons why consumers behave as they do, even after problematic connections are brought to their attention. In the last quarter century, cultural historians and cognitive psychologists have shown the way. If consumer behavior is ever to be modified for the sake of the planet, it will start with understanding and respecting the "black box" in the garden, the all too human mind of the consumer.

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Part IV

Contact Zones
Americans Conjoining the Natural World

Chapter Seventeen

Flora

Frieda Knobloch

Groundwork

An account of North American flora by common understanding refers to known American plants, native and otherwise, drawing on recorded or remembered information about American plants in addition to their names or locations. Truly comprehensive information about American flora (or the people who have studied it, or lived knowledgably with it in local settings) does not exist; the subject is too vast. That said, American plants are fascinating in their regional and local variety, their histories, their uses and meanings, their names, and the many ways they have always (and for the most part by necessity) captured the attention of people – the same factors that make a comprehensive understanding of American plants elusive.

The most ambitious botanical survey to date, comprising botanical information on some 20,000 identified North American species collected over the last 500 years, offers an occasion to consider the difficulty of understanding American flora. The Flora of North America North of Mexico project (FNA 1993–; FNA 2008) is a collaborative effort among hundreds of plant specialists that began in the 1960s, and fewer than half of its thirty projected volumes are complete. It includes native and introduced species as well as extinct species. It explicitly excludes Mexico. Brief information on indigenous expertise comes from ethnobotanical records, which are also not comprehensive, and can't ever be: many American tribes and their languages no longer exist, as a direct result of the same 500 years that gave us American botany. *The Flora of North America North of Mexico*'s first volume has excellent introductory essays on the history of plant collections and botanical books, weeds, indigenous relationships with plants, and conservation of plants, but the flora itself is foremost a list of plants organized taxonomically. Still, the editors are aware that people's interest in plants is

broader than that, cautioning, "The Flora of North America Editorial Committee does not encourage, recommend, promote, or endorse any of the folk remedies, culinary practices, or various utilizations of any plant described within these volumes. Information about medicinal practices and/or ingestion of plants, or of any part or preparation thereof, has been included only for historical background and as a matter of interest" (FNA 2008; FNA 1993–, III: xxii–xxiii).

The knowledge tradition that gave rise to this large and necessarily limited project gave us "plants" and their Latin binomial names as we usually understand them today, as well as the ideas of ecosystems and ecoregions, and indeed "North America" itself – the physical and biological contexts in which North American plants are understood to grow. Plants also grow in cultural and spiritual contexts. They partially constitute us in many ways: they feed, heal, comfort and confound us; they are potent sources and repositories of images, metaphors, symbols, and stories of human experience and values. A plant is always more than just a plant; it is a manifestation in living tissue of relationships and histories of all kinds.

Because assumptions and practices of European botany and related natural sciences have come to dominate ordinary language about seemingly concrete objects – plants and the places where they grow – part of the work of understanding American plants is understanding the cultural and intellectual ground that gave rise to our assumptions about them in the first place.

Taken from the name of the Roman goddess of flowers, according to the *Oxford English Dictionary* (OED), "flora" came to mean "A descriptive catalogue of the plants of any geographical area, geological period, etc." in 1647, with the publication of Simon Paulli's *Flora Danica*; by 1776 the word referred as well to "The plants or plant life of any particular region or epoch," that is, the plants themselves. The name of a kind of book became the name of the objects those books catalogued. By the eighteenth century such catalogues were the province of botanists, whose practice arose in the scientific traditions of Europe after the fifteenth century in areas subject to European exploration, conquest, settlement, and educational institutions, including, of course, North America.

Scholars interested in the healing qualities of plants had been producing lists of plants (often illustrated, offering plants' medical and magical properties) for a long time in the Classical world, and in Europe when Classical texts were studied anew. These books, known as "herbals," drew on long-standing vernacular healing traditions. The discrepancy between medicinal plants available in the Mediterranean (to which Classical works referred) and those available in Europe contributed on one hand to the production of distinctly European herbals (like John Gerard's *The Herball, or Generall Historie of Plants*, published in 1597 and still in print) and, on the other hand, to the study of plants of specific regions which were called floras, not

herbals. European floras were common by the end of the sixteenth century; in the seventeenth century, floras like Simon Paulli's *Flora Danica* began to indicate national identities (Frodin 2001). European exploration and conquest contributed to both processes, but modern botany emerged from the study of plants in the context of distinct geographic and political areas, including the "new world," emphasizing the perceived need to name and catalogue plants by their observable structures. Herbals gave way to floras as scholars abandoned vernacular plant-based and *materia medica* traditions in the creation of European botanical science. Whatever innumerable common names or local uses plants may have had, in Europe and abroad, any hope of compiling all available information about plants in the world was eclipsed by the scope of colonial contact and the social and intellectual transformations that accompanied it in Europe.

American specimens began arriving in Europe with the return of Columbus's voyage in 1493. A few American medicinal plants appeared in European herbals by the end of the sixteenth century, though European herbalists were not sanguine about the value of American plants for medical use. American specimens primarily fueled attention to the classification of plants and efforts to collect or display them. The Tradescants (father and son, both John) amassed a collection of plant and animal specimens – known as Tradescant's Ark – brought back by the younger John from numerous collecting trips in Virginia after 1637. Samuel de Champlain sent specimens to Europe and established a botanical garden in Nova Scotia in the seventeenth century as well. Landholders in American colonies interested in natural history maintained correspondence with friends in Europe, sending specimens, drawings, and live plants (Reveal and Pringle 1993).

One of these, John Clayton, a planter in Virginia, sent specimens and his completed botanical manuscript about them to his friend Jan Gronovius in the Netherlands; to Clayton's dismay, Gronovius published under his own name what was the first attempt at a colonial flora in 1739, *Flora Virginica* (Frodin 2001). Clayton's flora was typical of its era in that it focused on a politically defined entity (Virginia), was written in Latin, confined information about the plants to describing them physically, and catalogued them with the long Latin names that were common before the simpler system of binomial plant names had become standard. This simpler system was developed largely through the work of Swedish botanist Carolus Linnaeus (or Carl von Linné, 1707–78). Linnaeus reviewed Clayton's text and naming system before its publication and consulted Clayton's collection in his own study (Reveal and Pringle 1993).

Botanists' understandings of plants as regionally specific, and their practices of studying them through long exploratory commitment, collaboration, and correspondence with other experts (including the potential for intrigue and disappointment), were well established by the end of the eighteenth century and determined the botanical approach to North American flora ever since. In the nineteenth century, compilations of information

about American plants were in the hands primarily of botanists working and living in America, notably Frederick Pursh (1774–1820), John Torrey (1796–1873), and Asa Gray (1810–88), among a great many others. Pursh's *Flora Americae Septentrionalis* (addressing North American flora north of Mexico) was the first comprehensive effort of its kind and appeared in 1814; beginning in 1832, Gray and Torrey collaborated on the *Flora of North America*, a project overwhelmed and prolonged by the volume of specimens that became available with nineteenth-century exploration and settlement. They took exploratory collecting trips themselves and received material from collaborators in the field and from botanists accompanying boundary surveys, military expeditions, and geologic surveys (see, for example, Dupree 1959; Evans 1993; Reveal and Pringle 1993; Goetzmann 1966). Collecting and classifying a North American flora was almost exclusively in the hands of English-speaking botanists – British and Canadians, botanists from the US, and amateurs in the field, primarily north of Mexico. Still, the monumental scale of such a project was clear in the nineteenth century; now in the hands of dozens of institutions and hundreds of contributors, a flora of North America is still under construction.

Names

Botanists defined their focus as a specific kind of object. Though the word "plant" in English is very old, deriving from Latin meaning sprout, slip, or cutting, what we have come to call a plant is what botanists learned to study by the sixteenth century: "A member of the lower of two series of living beings, i.e., of the vegetable kingdom; generally distinguished from an animal by the absence of locomotion and of special organs of sensation and digestion, and by the power of feeding wholly on inorganic substances" (OED). People all over the world and in all eras have known what botanists would call "plants," but they have not known them *this way*.

Ordinary people, even in Europe (including remaining herbalists), had an alternative approach at hand based in old words and practices that predated scientific botany and "plants": the green world could be named as grass, herbs, shrubs, and trees, many of which were useful – even vital – to sustenance, health, and spiritual orientation in the world. The most useless or annoying of these were weeds; a plant was what had been cultivated and planted. Every known plant had a story. This tradition of healers and scholarly herbalists more resembled vernacular and indigenous traditions of plant knowledge worldwide than it did scientific botany (see, for example, Arber 1953).

A rose is not a rose in this context. An object as defined and culled from its habitat and human history to be called a "plant" is real, but calling it a plant, and embedding it in the practice of botany (or any other science), brings it into the world with a very particular status. It is largely stripped of

any cultural, historical, or spiritual value which constituted it (except in some cases what remains captured in its scientific name); it is a name and physical description to which might be added associations of food, fiber, medicinal or ceremonial value, poisonous or pest qualities, or importance in plant-animal ecological relationships, if it is recognized by botanists in the first place. Only species known and named by scientists have any status at all with other scientists, or with government agencies that now might be entrusted with protecting their habitat or human uses. The assumptions of conquest – that there are new worlds to be discovered, acquired, catalogued, and controlled in certain ways, as collections of discrete objects (and peoples) – benefit some forms of land use and endanger others, including the people who may depend on those other land uses. Understood through botany, plants and floras partially constitute the scientifically inclined settler societies in America that gave plants their botanical names and catalogued them.

Nevertheless, any study of American plants benefits from attention to the conventions of scientific botanical knowledge about them. In spite of its limitations and history in the intellectual traditions of Europe, the advantage of scientific plant discourse is that it gives people all over the world a potentially shared language, beginning with the convention of Latin binomial plant names recognized by scientists and lay people who choose to learn them. Botanical names facilitate historical study and comparison, when they are available, alongside the welter of common names for plants that vary across and within languages.

Botanical plant names and the convention of crediting their first and subsequent publication reveal clues about plant histories and the botanists who have studied them, though complications and discrepancies in historical accounts are common. It is always recommended to know something about plants firsthand in the field, or from photographs, drawings, or written descriptions. Current botanical lists can help keep track of plants named in historical or popular sources whose species designations may have changed. Herbaria are valuable resources in plant identification, too. A herbarium is an institution dedicated to the collection of plant specimens, sometimes from all over the world (such as the Gray Herbarium at Harvard University), or with more regional specialization (such as the Rocky Mountain Herbarium at the University of Wyoming). Herbaria remain the central reference "libraries" in botanical practice, where specimens can be compared to determine or verify a plant's scientific identity.

A plant's two-part botanical name is its species name, including its genus, which is the first part of the name. A plant is placed in a taxonomy of increasingly general categories of shared characteristics. For example, *Taraxacum officinale* indicates a plant of the genus *Taraxacum*. This genus is a subset of the aster family and aster order, which are members of the class of plants known as "dicots" or "dicotyledons" (flowering plants with two seed leaves), themselves a subset of the division of flowering plants, in the kingdom of plants, distinct from animals and other organisms.

This particular *Taraxacum* was named for its long medicinal use in the apothecary's "office" (often as a diuretic) and refers to the plant vernacularly known in English as the dandelion. Linnaeus chose the name for this common plant in the eighteenth century; imported from Europe, it has become widely naturalized in North America. Known now mostly as weed, it is still a diuretic, not to mention a favorite wishing flower of children.

Though botanical species names can be daunting to the lay person, it is useful to remember that they are names like any other that can be read and understood in their composition. It is interesting to note that a binomial system of plant names arose in a (human) family that developed an interest in another binomial: the adoption of a formal surname. Linnaeus's father, Nils Ingemarsson, was named as most Swedes, identifying him as the son of Ingemar. Nils created the name Linnaeus for himself when he had to provide a surname upon entering university. He derived "Linnaeus" from "linn," Swedish for the linden tree in his local dialect, for a tree that had long grown on the family's property (Stearn and Bridson 1978). His son Carl would not be known as Nilsson; Carolus Linnaeus, the "father" of binomial taxonomy, carried a two-part name that referred to an individual tree he likely knew.

Plant names are sometimes descriptive: *Ribes aureum*, golden currant, describes the color of the flowers of this shrub; *Solidago Canadensis*, Canada goldenrod, describes this plant as growing in Canada; *Streptopus amplexifolius*, twisted stalk, describes the twisting pattern of the positions of the leaves on the stem. Plant names can also be commemorative, like *Penstemon rydbergii*, a beardtongue, named by botanist Aven Nelson (1859–1952) for his contemporary Per Axel Rydberg (1860–1931), or *Penstemon whippleanus*, named by Asa Gray for *his* contemporary, Amiel Weeks Whipple (1816–63).

Complete botanical names include the name of the botanist who first identified a plant, often as an abbreviation, which provides information about the history of encounter and collection of plants. Botanical plant names can change, and whole histories of botanists' engagement with the species and each other lie in those attributions and abbreviations. Linnaeus's original determinations were so important in the history of botany, and so numerous (even of American species), that his determinations are marked only by "L." Scarlet gilia was first botanically named *Gilia aggregata* by Frederick Pursh (mentioned above); the plant was designated more recently as belonging to a different genus, and renamed *Ipomopsis aggregata* by V. E. Grant. Both botanists' names appear with the new plant name in current official lists as "*Ipomopsis aggregata* (Pursh) V. E. Grant."

The history of naming this particular plant – a beautiful plume of scarlet trumpets growing from Mexico to British Columbia, a favorite of hummingbirds – is a good illustration of how densely complex and confusing a single name and its attributions can be. Doubtless the hummingbirds have had other concerns. One intrepid researcher (Schneider 2001–9) unearthed

a hidden history of the genus name *Gilia* that allegedly honors a Spanish botanist, "Felipe Luis Gil" (see Earle and Reveal 2003: 181). Schneider claims there was no such botanist. Pursh named this American plant using a genus name established by Spanish botanists working in South America commemorating their friend, Fillippo Luigi Gilii (1756–1821), an Italian in Rome, as Schneider found on a scanned page of the original work in Spanish. In a multilingual, Latin-literate European scientific community – where a man named Nilsson to his neighbors was also Linné and Linnaeus – it is safe to say that Felipe may have recognized his "own" name transliterated any number of ways, as it is on Internet sites today. Historical accounts of scientific botany inescapably repeat other accounts of what are now very old and relatively inaccessible texts. More importantly, names (of botanists and plants) are variable, and names do not encompass the whole of things.

Roots and Branches: Traditions of Plant Knowledge

Plants of any era or region are known and significant to us through specific knowledge practices because they partially constitute those knowledge practices. Any practice describing the world of American plants is an expression of its time and place. This is always easier to see in past expressions of scientific findings, or in knowledge practices unfamiliar to ourselves, than in practices of the present that give rise to the world as we experience it unself-consciously every day. Any knowledge about plants draws on and contributes to the social contexts in which that knowledge is produced.

Evidence of the social milieu of scientists concerned with American plants is not difficult to find, and careful reading adds a layer of information to historical accounts of American flora. For example, we learn something about plant ecology (however qualified by later ecologists) when we understand Frederick Clements' (1874–1945) account of plant succession – from pioneer species growing in bare ground through a series of transitions to a relatively permanent "climax" community distinct to a given soil type and climate (Clements 1916). But we also learn something about how a prewar American ecologist understood and naturalized change over time in terms of progressive human conquest and settlement, conflating different plant species with eras of a single (human) species. Francis Ramaley (1870–1942), a contemporary of Clements, wrote:

> In all our large cities there are Caucasians and Mongolians. Both seem suited to the general conditions. Their geographic range is the same, yet they do not occur together. They live their lives apart. The same condition exists with whites and negroes in many places. In the study of plants, one comes again and again into contact with the principles of sociology, – but so dehumanized that they can be viewed without prejudice. (1927: 12)

Ramaley produced technical papers about montane ecology as well as the handbook from which this statement was drawn. "Races" stand in for "species" in a naturalized image of segregation presented sincerely to the lay reader. To understand Ramaley or Clements or any other scientist as marked by time, place, or background is neither to discredit their science, nor separate "objective" scientific knowledge from their "subjective" social assumptions. Scientific knowledge about plants is simply the product of human scientists; we know more, not less, by recognizing the fact that what we learn from plant specialists is not exclusively about plants. Scientists may reveal (themselves) more in narrative than in the lists characteristic of botany as a profession, but even a list can be deeply telling.

Of course, botany and its related sciences have not been the only discourses naming and finding meaning in the American flora. Every immigrant and indigenous community in America understood its local flora as useful for food, medicine, fiber, or ceremonial purposes. A glimpse at the King James Bible demonstrates how firmly rooted, so to speak, and how widely available an alternative botanical discourse was even for English-speaking people of the seventeenth century. Genesis 1:11 describes part of the creation of the world: "God said, Let the earth bring forth grass, the herb yielding seed, and the fruit tree yielding fruit after his kind, whose seed is in itself, upon the earth: and it was so." Upon the creation of man and woman, "God said, Behold, I have given you every herb bearing seed, which is upon the face of all the earth, and every tree, in the which is the fruit of a tree yielding seed; to you it shall be for meat" (1:29). When the story begins again, God had made "every plant of the field before it was in the earth, and every herb of the field before it grew," and caused a mist to come up from the earth to water it; then he planted a garden, including beautiful trees, and trees with good fruit to eat, as well as the fateful trees of Life and of Knowledge of Good and Evil (2:5–9). The translators worked from the Latin Vulgate text, where the word they chose to translate in Genesis 2:5 as "plant" had been translated from Hebrew as *virgultum* – meaning thicket, copse, or brushwood, but also a slip for planting. The Hebrew word meant bush (Koehler and Baumgartner 2001). The word "plant" here is the old plant, the slip or cutting, and the planter of herbs, grass, shrubs, and trees is God.

Every group of people attentive to their plants and their history has its own common names, meanings, and uses for plants, which is why the "same" plant can acquire half a dozen common names, confounding precise scientific identification, but capturing a lively history over time. Folk and oral history information, ethnography, and written records can reveal the green world as it has been created and inhabited by ordinary people. Unlike botanical practice focusing on politically defined areas, accounts of folk healing that include herbalist traditions tend to focus on ethnically defined communities within specific regions. Floral information appears as

part of a story of healers, farmers, gardeners, gatherers, or worshippers, within and across lines of ethnicity and culture. The complexity of these traditions in America cannot be overstated. Immigrant communities brought traditions (as well as plants in some cases) from abroad; the histories of slavery and settlement moved people into and through the continent with varying degrees of autonomy, shaping both the possibility of continuing and opportunities for sharing plant-based traditions; and immigrants and migrants alike developed new relationships with plants they had not known. How complex the story becomes is a matter only of the limits of the researcher, not the plants.

Some recent studies that at least in part include vernacular herbalists' traditions are ethnographer Elizabeth De La Portilla's *They All Want Magic: Curanderas and Folk Healing*, about San Antonio curanderas (2009), historian Sharla Fett's *Working Cures: Healing, Health, and Power on Southern Slave Plantations* (2002), and professor of Norwegian Kathleen Stokker's *Remedies and Rituals: Folk Medicine in Norway and the New Land* (2007). The recent anthology *To Love the Wind and the Rain: African Americans and the Environment* (Glave and Stoll 2005) demonstrates how rich historical sources can be regarding African-American landscape experience, including spiritual and healing herbal traditions.

Because of its historical relationship to anthropology, the field of ethnobotany has primarily documented the plant uses of indigenous people rather than those of African Americans, Asian Americans, Mexican Americans, or rural Americans of any non-indigenous background. A comprehensive ethnobotany of America does not exist. There is arguably no reason to wish it could, comprehensive knowledge being one of the chimeras of a particular intellectual tradition. But sustained efforts at comparative ethnobotany would likely reveal formative cultural roles of complex networks of botanical knowledge and plants circulating between and among groups, including in the present. The historical forces challenging the continuity and development of vernacular plant-based traditions – including healing, but also agriculture and spiritual practice – are notably the same forces that have profoundly challenged indigenous relationships with plants. It is common to find vernacular healing traditions bound up with spiritual ones, qualities that have long made folk herbalism suspect to anyone inclined to science or committed to uplifting allegedly backward traditions through education and conversion. Vernacular traditions of worship, magic, and healing were precisely those that non-vernacular Christianity, botany, and medicine intended to replace in Europe and in America. But they have not done so completely, and their traces remain in people's everyday lives and in available records, including in indigenous communities.

The historical range of indigenous American plant knowledge is impossible to know completely because some of the plants and many of the people and their languages are gone. But some cautious generalizations

regarding historical and contemporary indigenous understandings of plants can be offered. Plants are among the gifts of the Creator to the people; plants are known through story, memory, and use, as part of a web of relationships that include the land, and the spirit and the bodies of the people; plants do not exist as objects separate from the land or the people. The plants and the land survive as the people survive.

Biodiversity flourishes with cultural diversity, including the survival of local languages (Maffi 2001); where indigenous peoples and their languages, land uses, and spiritual practices persist in North America, native biodiversity flourishes as well. What indigenous communities know of their traditional flora is maintained in surviving languages, in the knowledge of tribal elders, and given to children in the language, cultural memory, land use, and spiritual practices of their people. Tribal efforts to revitalize language fluency are central in maintaining tribal knowledge of flora. As in any tradition, without a name and a context, a plant loses significance; it ceases to be an active or even visible part of meaning making and might easily disappear from people's lives and traditions as well as a landscape.

Tribal botanical traditions are included in what has come to be called Traditional Ecological Knowledge (TEK) in efforts to describe and legitimate this knowledge by recognizing and valuing its practices in specific communities and landscapes. European-derived science has been an overwhelming epistemological and ideological force in native people's lives and history; with twentieth-century pan-Indian education and politics, TEK has emerged as a way of naming and claiming indigenous epistemologies that link people directly to their land and their histories. Though all vernacular plant-based traditions connect people to their identities and histories in particular places, TEK is in part an expression of indigenous sovereignty.

An ambitious effort by the Blackfoot in Alberta, Canada to combine Blackfoot language instruction with Blackfoot botany, available for exploration online (Kainai Community 2005), can serve as an example of one group's botanical and ecological understandings. In this community, plants do not exist apart from the land or the people. They exist in relationships – in the people's stories, in the people's care for them, with the animals, with the Creator, and with the land and the weather. The Creator, the people, and the plants are mutually constitutive. In surveying the plants of the Alberta Blackfoot homeland, this ethnobotanical educational project provides Blackfoot common names (and some English and French translations) as well as scientific names. Lupine (*Lupinus sp.*) is Aisattsikohtako, wolf turnip; Wild Rose (*Rosa sp.*) is Kiníí, or tomato flower, wild tomatoes, or "disposed of gut." Each plant listed includes its traditional uses. The website orients the visitor to Blackfoot cosmology and Traditional Ecological Knowledge, as tribal elders describe plants, purposes and methods of collecting them, and the need to preserve them. But plants are not merely

listed or described. One woman recommends daybreak as the best time to collect plants without referring to the plants themselves at all: daybreak is best because the spirits hear the people's prayers better early in the morning, and someone gathering plants should pray that the plants will help the people the gatherer intends to help; there are no mosquitoes out at daybreak; and learning to be an early riser will help a person become responsible. What this elder and others describe is a relationship to and through the plants, to the people, the spirits, and one's own character. The "identity" of a plant is found in that network of relationships, not just its specific name or uses.

Similar catalogues are increasingly available for many communities. These are not salvage projects for the sake of accumulating knowledge for outsiders; these are community efforts to pool and disseminate tribal knowledge for the future of the community, its language, people, and landscapes. Much instruction and dissemination of this kind takes place in non-tribal languages. Indigenous knowledges have inhabited their own and non-indigenous languages and sciences simultaneously. The purpose is future-oriented to sustain the people and the land, including its flora.

The interest in non-scientific plant-based traditions is currently widespread. It includes reinventions of traditional European herbal and spiritual practice, in books like *Cunningham's Encyclopedia of Magical Herbs* (1992). As mentioned previously, even Gerard's sixteenth-century herbal is still in print. People of many backgrounds have revisited plant traditions through their interests in alternative medicine, local foods, and alternative agricultures, in efforts to practice new approaches to what they hope are physically, spiritually, and environmentally more sustainable futures. Every identifiable ethnic group would have such a tradition, as complex and mixed as it likely is after 1492, bringing habits and knowledge (and sometimes plants) from elsewhere to plants and circumstances of America.

Scientific names, and descriptions of histories and uses in European languages, remain the lingua franca of botanical knowledge that can be shared beyond tribal or community cultural and linguistic boundaries. The Internet is making this information more widely available. Daniel Moerman, an ethnobotanist at the University of Michigan, has spent over 25 years creating a catalogue of American plants useful to indigenous Americans. Available only in print (and by virtue of its size and expense, primarily in libraries) in its first edition 15 years ago, this catalogue of over 80,000 plants is available online; it is searchable by plant, by use, and by tribe, and it includes all the historical and contemporary references Moerman (1998, 2003) used to compile it. It is the only work of its scope and type available. Available to anyone with Internet access, it will no doubt serve as a reference in tribal as well as non-tribal ethnobotanical research.

The Internet has also dramatically changed how botanical knowledge of all kinds can be linked. Moerman's (2003) database is linked to an important

US Department of Agriculture site, PLANTS (2009), another massive database effort of the last 20 years, which is intended to be a comprehensive floral database of all plants of the United States, and which includes a section on culturally significant plants. The Flora of North America project online (2008) has links to both Moerman's and the USDA's. While these compendia can never be fully comprehensive, many worlds of knowledge are indicated by what often begins, online or anywhere else, as a long list of plant names.

In Full Flower: Images of Plants

Visual representations of American plants appear in indigenous and pre-Columbian arts, in non-native folk arts, in European exploratory records, on the Mexican and Canadian national flags, in scientific manuals, in painting and drawing of European fine-art traditions, in commercial décor, and in popular culture. They may be stylized and iconic, as motifs in needlework, jewelry, carving, or pottery; they may be simplified or embellished, as in fabric design; they may be schematic, as in botanical illustration; they may appear as realistic representations in still-life painting or photography. Trees, flowers, and grass are common motifs of children's drawings. Faux plants of plastic or fabric decorate homes and offices as well as gravesites. The very idea of "plant" – without any particularity other than being a green thing indicating the possibility of life on Earth – features prominently in the popular 2008 Disney-Pixar film *WALL-E*. Visual representations of plants are as ubiquitous as plants themselves.

Images of American plants capture symbolic meanings drawn from traditions where plants embody themes such as origins (as in indigenous American stories of corn, or the Judeo-Christian Eden); fecundity and plenty (as in garden images and cornucopia); decay and mortality (as in still-life scenes); property (in portraiture); comprehensibility (in scientific illustration); or beauty (in twining or floral decorative motifs). Artificial plants representing no living species can indicate the desire for perfection or immortality. Some images of American plants have broad and longstanding cultural significance. Corn provides motifs for arts and artifacts from before European contact through the present throughout the continent. The fleur-de-lis is a common symbol in areas settled by the French. The American visual arts flora is replete with common plants and trees, native and otherwise, from roses to briars, from sturdy oaks to windblown grass. Visual images of plants deserve attention to the traditions that produced them, including visual arts traditions. Broad attention to the plants of an area or a community would include a search for visual images of those plants in any arts within that area.

The American literary flora is equally rich. Plants and their landscapes are common features of many narratives. Literary landscapes are deeply

thematically articulate; they draw on and add to common associations people maintain with floral landscapes. Literary flora is as variable as its authors. Nathaniel Hawthorn's New England forest does not mean the same thing as Louise Erdrich's forest of the Upper Midwest; one is a menacing reservoir of uncertainty, the other is an intimately familiar source of sustenance. Ole Rolvaag's prairie can be maddeningly vast; Willa Cather's can be reassuringly yielding. A garden can offer beauty and self-assurance to Alice Walker's character Celie in *The Color Purple* (originally published in 1982). Margaret Atwood's unnamed protagonist flees all forms of domestication in *Surfacing* (originally published in 1972). A tree in the Catskills can shelter Washington Irving's sleeping hero for 20 years in "Rip Van Winkle" (originally published in 1819); a spruce drops its snow in a moment on the ill-fated protagonist of Jack London's "To Build a Fire" (originally published in 1908). Themes of abundance, longing, safety, beauty, menace, or indifference collect around literary flora from Corn Mother origin stories, through biblical traditions of Eden and allegories of Darwinian survival, expressing broad concerns of people in relation to the non-human world.

Narrative and graphic images bring plants into conscious relation to people, making knowledge of plants possible. The mere fact of recognizing (or not recognizing) a plant is meaningful only in the ways it is imagined and represented. Narrative and visual images, and the stories that accompany them, make a plant significant in a context, whether that context is scientifically understood as a taxonomy or an ecosystem, an oral, written, artistic, or scholarly tradition emerging from a specific community, or a personal history. Plant narratives describe and express the character of myriad relationships among plants and people. In all their forms, images of plants fire imagination or memory in particular directions – to history, science, food, ceremony, pleasure, or education, and even to fantasy.

Sowing Green Worlds

There are many approaches to the historical study of American plants, as well as a wealth of information available about individual plants. While a comprehensive flora of any kind remains elusive, American plants have become central players in book-length historical works, as the evident interest in single-commodity histories – like oranges, bananas, and tobacco – has brought studies of ordinary and large-scale crop plants to an interested public within and beyond the academy (Sackman 2005; Koeppel 2008; Gately 2003).

Any American plant of recognized historical significance can yield large-scale, even continental, human and ecological histories. Corn has received focused attention in this way, for example in Betty Fussell's *The Story of Corn* (2004). The work of Roberto Rodriguez, including his dissertation (2008),

includes cartographical, visual, and oral history information. Beginning with the Disturnell Map attached to the Treaty of Guadalupe Hidalgo in 1847, Rodriguez has studied maps indicating possible sources of pre-Columbian Mexican migration, as well as pre-Columbian codices and colonial documents, oral histories and vernacular practices of corn as food, sacred plant, and symbolic design element. His goal is to offer maps and narrative accounts of pre- and post-Columbian Mexican migrations as a continuous history linking indigenous and Mestizo people, and their corn, throughout the Americas.

Michael Pollan's work is distinctive in its sustained exploration of the histories of common food plants, notably *The Botany of Desire* (2002) and *The Omnivore's Dilemma* (2007). Lesser-known commodities can yield similarly rich histories, like Sterling Evans' *Bound in Twine* (2007), about a fiber-yielding agave native to Mexico which sustained the grain harvesting binder twine industry, connecting workers, landscapes, and industries from Mexico to Canada.

Ethnoecologist Gary Paul Nabhan is known for his involvement with the organization Native Seeds/SEARCH and for his regional studies of culturally and ecologically significant plants of the Sonoran desert of Arizona and Mexico (his research includes other regions as well). His work – including *Gathering the Desert* (1986), *Cultures of Habitat* (1998), *Enduring Seeds* (2002), and *Coming Home to Eat* (2009) – presents edible, medicinal, and ceremonial plants in broadly ecological contexts. Other local food proponents, ecological narratives, and conservation movements have emerged in other regions, but Nabhan's work is unique in its sustained breadth. He is able to work in both English and Spanish (and to some extent in indigenous languages), as well as "bilingually" in ecological science and non-fiction prose for a wide public. Work like Nabhan's could emerge from any region, and his example might encourage study of indigenous language as a component of botanical historical interest.

When American environmental scholars include scientific, folkloric, and historical information in their research, their work is often designated as "interdisciplinary," and on that basis alone their contributions to disciplines like ecology and history tend to be recognized as innovative (if also scrutinized for method). Any American environmental history will account for plant life in some way. *How* a historian includes plants is a better indication of whether the work is "innovative," not just the fact that plants appear as parts of human histories. If they appear as objects – even as important ecological objects, in relation to soils, pests, local communities, cultivation, and so on – they are objects in the scientific sense. Even assembled in increasingly sophisticated arrangements, they may not be understood as essentially constitutive of people or landscapes. Plants and human experience are not (or not only) disciplinary objects; life is "interdisciplinary." It may not be ecological information added to human historical information

that distinguishes a new or different practice of historiography but the form of a narrative that does so.

Plants lend themselves to shaping or reshaping narrative practices because they are ordinary and ubiquitous parts of everyday life, including our food, our forms of healing, and our landscapes. They are among other things occasions for thinking and being. They give us ideas like roots, trees, branches, and flowers, the underground expansion of rhizomes, and the windborne flight of seeds. The moment a plant captures someone's attention is a beginning of mindfully enacting and embodying the long human cohabitation and mutual constitution with plants that can shape narrative and historical understanding. It happens maybe when a weed shoots up out of a sidewalk margin, or the taste of a fruit is vivid, or a cutting roots in a glass on the windowsill; when a tree is crushed in a freak storm; when the fiber texture of paper is sensible through the pen in your fingers; when a bouquet drops its petals; when an arc of shade and the pattern of drifting snow offer habitat for one thing instead of something else; when a plant you knew once can no longer be found where it grew. Plants can move us – to longing, memory, curiosity, use, pleasure and disgust, and to study – because they are physically sensible to us, essential parts of the world we immediately inhabit. Plants are often regarded as things apart from us, in which one might or might not have developed an "interest." Recognizing their role in constituting us and what we know is a beginning in shaping how we might study and write about them, and us. Having an interest in the scientifically understood process of respiration does not affect whether we breathe, or the significance of breathing in our immediate experience. The plants that sustain us are as intimately important as the air we breathe. This is not a matter of cultivating private sentimentalities; how people understand plants can affect how their scholarly or other activity contributes to efforts to live together in a world that includes the plants we need to be who we are.

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Chapter Eighteen

Fauna: A Prospectus for Evolutionary History

Edmund Russell

It was, evolutionary biologist Theodosius Dobzhansky wrote in 1937, "probably the best proof of the effectiveness of natural selection yet obtained" (1937: 161). If we were guessing what Dobzhansky had in mind, we might nominate some of the classic examples from evolutionary biology and paleontology. Charles Darwin's tortoises in the Galapagos Islands? Rise and extinction of the dinosaurs? Fossils from the Burgess shale? The answer to all these suggestions is no. Dobzhansky's proof was the evolution of insects resistant to insecticides.

In the early twentieth century, fruit growers in the western United States noticed that, over time, some insecticides "lost" their ability to kill scale insects in orchards. Most entomologists blamed people. Manufacturers produced defective insecticides, they reasoned, or farmers applied legitimate products incorrectly. A few entomologists, however, noticed that their data contradicted this explanation. Insecticides lost their potency in areas where farmers bought the most reliable insecticides and sprayed them most carefully, rather than the reverse. Perhaps, these scientists ventured, some insects carried Mendelian genes for resistance to sprays. But the reason why resistant individuals should be common in heavily sprayed areas remained a mystery for the next two decades (Brown 1961; Melander 1914; Quayle 1922, 1938; Hough 1934; Cunningham 1935; Moore 1933).

In the 1930s, Dobzhansky solved this puzzle by discarding an unspoken assumption. Entomologists had assumed that insect species stayed constant (or evolved so little that change was trivial) in historical time. Dobzhansky suggested the opposite. Spraying was a form of natural selection, he argued. By chance, a few individuals within a species carried genes conferring resistance to insecticides. Insecticides killed off susceptible individuals and left the resistant ones behind to reproduce. Resistant individuals

passed on their genes for resistance to their offspring. Every time farmers sprayed, they increased the ratio of resistant to susceptible insects in their orchards. Eventually, so few susceptible individuals remained that insecticides appeared to have lost their potency. This deceptively simple explanation solved a pair of biological puzzles: why genes for resistance should become more common over time, and why resistance should be most common in areas sprayed most heavily. It also solved an economic puzzle: why crop losses to insects should rise despite ever-greater doses of insecticides. Further, it provided the paradigmatic example for a new approach to biology, the modern (neo-Darwinian) synthesis that united evolutionary theory with genetics (Dobzhansky 1937: 161; Quayle 1938: 183–4; Russell 2001; Kettlewell 1955: 323; 1956; Askew et al. 1971; Mosley 2001: 45; Hooper 2002).

Dobzhansky's findings challenged several ideas about evolution that remain common today. Many of us think of evolution as something that happened in the distant past, took eons to occur, and was done by nature. Resistant insects, however, evolved recently rather than long ago, quickly rather than over eons, and under the influence of humans rather than nature alone. Many of us think of evolution as speciation, but populations of insects evolved resistance without budding into new species. Many of us think of a species' genes as fixed in historical time and space, or as varying so little that differences are trivial. But members of insect species carried different versions of genes before insecticides arrived, and spraying increased the proportion of genes for resistance in certain parts of species' ranges enough that resistance became an economic problem. Many of us think of evolutionary ideas as tools for biologists, not humanists. But humans have shaped the evolution of countless species for millennia, reshaping human experience as well as the genes of other species.

Few historians, however, have incorporated evolution into their work. Until we do, the historicism project will remain incomplete. A signal contribution of environmental history has been to historicize ways of thinking about and interacting with other species. The most visible sciences of this effort have been ecology and public health, which have helped us understand changes in the distribution, abundance, and health of organisms. We have largely ignored, however, the impact of ecological changes and public health measures on the constitutions of other species. By changing the environments in which organisms live, we have changed the selective regimes in which they evolve. In some cases, the resulting evolution has forced humans to interact with versions of those species in very different ways. The 1950 versions of orchard insects differed from 1900 versions of the same species, which forced farmers to use a new generation of technology to control them. To reach a full understanding of the history of life on earth, then, we must join hands with evolutionary biologists and paleontologists to historicize organisms themselves.

In making the case for an evolutionary historiography, this essay focuses on genetic evolution in non-human species. For the most part, it sets aside the role of human evolution. One reason is to emphasize the value of evolution for understanding the distinctive concern of environmental history, nature. Organisms have changed in historical time; those changes have mattered to human beings; and evolution offers the only cogent explanation for such change. The second reason is to emphasize that one can practice evolutionary history with a limited agenda. Studying human evolution is not necessary (or even sufficient) for evolutionary history. The third reason is to encourage a focus on aspects of evolution sometimes obscured by controversial issues, such as sociobiology and evolutionary psychology. This essay is not a brief for those fields or for biological determinism. Humans and other species have engaged in a complex dance in which genes in non-human species, along with a variety of other human and natural forces, have played roles. Nor is evolutionary history an effort to make history a subdiscipline of evolutionary biology. It is an effort to tap some of the most powerful ideas of the past 150 years to create a fuller understanding of history.

This essay begins by briefly summarizing the role of animals in the environmental history literature. Then it makes a case for the importance of anthropogenic evolution. A review of the literature documents the limited role of evolution in environmental history, hypothesizes reasons for its low profile, and surveys uses of evolution in other disciplines in the humanities and social sciences. Drawing on existing works, the next section demonstrates the potential for evolutionary history to revise accounts of events as disparate as international relations, industrialization, and collapse of natural resources. Finally, the essay suggests that evolutionary history has the potential to inform not just our understanding of the past, but a future in which biotechnology plays an increasingly important role.

Animals and Environmental History

Environmental history defines itself as the field concerned with the interaction between people and nature (or their environment) over time. Animals have always made up part of the world surrounding human beings, so it is not surprising that they have figured in environmental histories since the beginning of the field. The animal kingdom includes much more than the mammals and birds that often leap to mind when one hears the word "animal." Insects, worms, and corals are also animals. Human beings are animals, too, though for the sake of simplicity this essay will follow the convention of using "animal" to refer to non-human animals. Many of the early works in environmental history described ways in which people changed entire ecosystems, including animal populations.[1] Environmental histories have continued to discuss animals as parts of larger ecosystems up to the present.[2]

Environmental historians have also focused more narrowly on human-animal interactions. A number of scholars have studied the impact of hunting and fishing (for sport and for subsistence) on mammals, birds, and fish, as well as the conservation movement that arose in the Progressive era as a response.[3] Others have looked at other ways in which people have interacted with wildlife, including through the literal lens of the camera and the metaphorical lens of science (Mitman 2009; Barrow 1998). Several scholars have emphasized the importance of animals in agricultural systems.[4] As interest in urban environments has increased in environmental history, we have seen an increasing number of books focused on urban animals (Ritvo 1987; Greene 2008; McShane and Tarr 2007).

Interest in human-animal interactions has surged enough recently for a field to cohere known as animal studies. This interdisciplinary endeavor draws on history as well as a variety of other fields in the social sciences and humanities, including philosophy, anthropology, veterinary science, and literature (among others). A dedicated book series at Johns Hopkins University Press provides a home for scholarship on this topic. Though only some identify themselves as environmental historians, scholars in animal studies are producing a variety of work of interest to our field (Ritvo 2004; Henninger-Voss 2002; Derry 2003; Creager and Jordan 2002; Jones 2003; Thomas 1983).

Anthropogenic Evolution

Anthropogenic evolution has played a venerable role in the development of evolutionary theory. Although better known for his travels in the Galapagos Islands than for his trips to English farms, Darwin drew on domestication to understand and explain evolution in the wild. The first chapter of *On the Origin of Species* is about variation and selection under domestication. Only after putting that framework in place does Darwin turn in chapter two to natural selection, which he introduces as "applying the principles arrived at in the last chapter to organic beings in a state of Nature" (1872: 64). Darwin described another of his books, the two-volume *Variation of Animals and Plants under Domestication*, as providing "facts on which the conclusions in [*Origin*] were founded" (1998, I: 2, fn. 1).[5]

Today's understanding of Darwinian evolution is, at heart, simple. It requires three things: variation, inheritance, and selection. *Variation* means that individuals in a population differ in some trait. It could be any trait, visible or invisible to the eye: speed, size, tolerance of drought, metabolic efficiency, and so on. *Inheritance* means that these traits pass from parent to child. Today, evolutionary biologists focus on genes as the units of inheritance. *Selection* means that variation in traits enables some individuals to contribute more offspring to the next generation than do others (Futuyma 1998; Williams 1992; Mayr and Provine 1980; Jones 2000).

The term for which Darwin is most famous, natural selection, derived from domestication. Darwin believed the term was less than ideal because it implied "conscious choice" on the part of nature. But the advantages outweighed the disadvantages, for "it brings into connection the production of domestic races by man's power of selection, and the natural preservation of varieties and species in a state of nature" (Darwin 1998, I: 6). In Darwin's day, "selection" referred to what breeders did. Darwin needed a modifier to create the new meaning, the analogous process in nature – hence, "natural" selection (Sebright 1809; Youatt 1834; Wood and Ore 2001).

Today, the meaning has all but reversed. Evolutionary biologists often use "selection" and "natural selection" synonymously, and they use "artificial selection" (Darwin's occasional phrase) to refer to what people do. This essay uses "selection" to include natural and artificial selection and attaches an adjective when necessary to draw a distinction. Artificial selection – and thus anthropogenic evolution – has been unintentional and intentional. Evolution of resistance to insecticides was unintentional. Recent plant and animal breeding has been intentional. Breeders have worked on species whose individuals varied in some inherited traits. They selected some individuals to mate and prevented others from doing so. If all went well, the next generation included relatively more individuals with the desired trait and fewer individuals lacking it. The new generation had evolved from the generation before (Futuyma 1998; Darwin 1872: 55).

Artificial selection could not change frogs into princesses, but it transformed animals so radically that it seemed magical. Working hard on the heels of a revolution in animal breeding, Darwin learned that breeders imagined a perfect animal and then set out to create it. William Youatt, whom Darwin quoted approvingly, said the breeder's "principle of selection" was "that which enables the agriculturists, not only to modify the character of his flock, but to change it altogether. It is the magician's wand, by means of which he may summon into life whatever form and mould he pleases." Even farmers without such imagination, Darwin believed, transformed their stock as radically (if more slowly) simply by picking the best animals to breed over long periods (Darwin 1872: 53–6).

This conception of evolution allows evolution to happen quickly, to result from human actions, and to result in changes short of speciation. Breeders have not exaggerated, then, when they have described themselves as "helping evolution." One such breeder took advantage of a mutant, featherless strain of chicken. ("We call them naked chickens," he said, "just because they are naked.") This strain, the breeder thought, might solve a problem arising from the spread of enclosed, mass-production chicken-raising to tropical countries at the end of the twentieth century. Conventional feathered chickens often died of heat in such enclosures. Naked chickens might dissipate heat more efficiently than their feathered cousins did. As in most

evolution, however, there was a trade-off. Naked chickens might thrive in hot, enclosed spaces, but a stroll in the sun knocked them into a stupor (Bennet 2002).

The contrast between sheds and the open air, and between chickens suited to each, illustrates the inseparability of selection from environment. Organisms have not evolved toward some universally better (much less best) state. Natural selection, as Darwin put it, "acts exclusively by the preservation and accumulation of variations, which are beneficial under the organic and inorganic conditions to which each creature is exposed at all periods of life" (1872: 134). "Better" makes sense only in the context of specific environments, and then it only means that some individuals are more likely to reproduce than are others.

We can measure the significance of anthropogenic evolution in several ways. To lead with the trump card: without it, our profession would not exist. Jared Diamond's *Guns, Germs, and Steel* (1998) argues that humans directed the evolution of nearly all domesticated species. Archeological and genetic evidence suggest that humans have been domesticating organisms since the Neolithic revolution, about 12,000 years ago. Intentionally and unintentionally, humans selected for sweeter fruit, non-shattering seed pods, less aggressive animals, and fatter cows. These modifications in turn created the agricultural surplus necessary for settled societies; social hierarchies, bureaucracies, armies, contagious diseases, complicated technology, international conquest, and writing (thus our profession) have depended on domestication. More seriously, the point is not that our profession would not exist; it is that nearly everything historians study, which by definition we consider significant, would not have occurred without domestication.

Another way to measure the significance of anthropogenic evolution is to tally the taxonomic range of species that humans have domesticated. This number suggests the enormous effort humans have poured into this endeavor for thousands of years. The animals have included mammals (dog, ass, horse, cow, sheep, goat, reindeer, camel, buffalo, rabbit, elephant, ferret, mongoose, yak), birds (chicken, turkey, pheasant, quail, pigeon, falcon, goose, duck, pelican, cormorant, crane, canary, ostrich), insects (silkworm, honeybee), and fish (eel, carp, goldfish, paradise fish) (Hyams 1972; Epstein 1971; Zeuner 1963; Bokonyi 1974; Clutton-Brock 1989). The list of domesticated plants is even longer. The plants thought to have originated in the Near East alone include cereals (oats, barley, rye, wheat), pulses (chickpea, lentil, fava), tubers (beet, turnip, carrot, radish), oil crops (rapeseed, mustard, safflower, olive, flax), fruits and nuts (hazelnut, melon, fig, walnut, palm, almond, apricot, cherry, pear, apple, grape), vegetables and spices (onion, garlic, leek, cabbage, coriander, cucumber, cumin, anise, purselane), fiber plants (hemp, flax), forage crops (bentgrass, rye, clover, vetch), and drug sources (belladonna, digitalis, codeine). Making use of some of these animals and plants has depended in turn on domesticating

micro-organisms. Bacteria turn milk into yogurt, and yeast is essential for making leavened bread, wine, and beer (Harlan 1975: 69–70; Brouk 1975; Chrispeels and Sadava 1977).

A third way to judge the importance of anthropogenic evolution is to estimate economic effects. One expensive arena is agriculture. The process Dobzhansky analyzed – the rise of resistance to pesticides – has led American farmers to spend $1.6 billion per year to apply extra insecticide. This cost has risen each year as the number of resistant species has grown. By 1986, some 450 species of insects and mites, 100 species of plant pathogens, and 48 species of weeds had evolved resistance to pesticides. In some cases, resistance has forced the abandonment of enterprises altogether. In the 1960s, farmers had to stop growing cotton on 700,000 acres because insecticides no longer controlled a major pest, the tobacco budworm (Palumbi 2001: 139–40; National Research Council 1986: 16–17; Mallet 1989).

Another expensive arena is medicine. By 2000, tuberculosis infected one-third of humanity and caused two million deaths each year. Strains of tuberculosis resistant to the major drugs infected 11 percent of the new cases. (Like insects treated with insecticides, pathogens treated with antibiotics have evolved resistance as susceptible individuals died off and resistant individuals survived to reproduce.) Fallback medicines were more expensive than the drugs of first choice. Overall, antibiotic resistance cost Americans $30 billion each year (Brown 2000; Levy 1992; Palumbi 2001: 85).

A fourth way is to measure the cost in lives. The United States Centers for Disease Control and Prevention estimated in 1995 that sixty thousand people died each year in the United States from hospital-acquired infections. Pathogens resistant to antibiotics caused a large percentage of those deaths. The combination of insect resistance to pesticides and pathogen resistance to medications fueled distressing increases in malaria mortality in the late twentieth century. After World War II, a worldwide effort to eradicate malaria relied on insecticides (such as DDT, which killed the mosquitoes that carried the malaria plasmodium) and anti-malarial drugs (such as atabrine and quinine, which stopped the plasmodium from reproducing inside human bodies). The project saved an estimated 15–25 million lives but foundered when, among other things, mosquitoes and plasmodia evolved resistance to their respective poisons. Unable to reach its goal, the World Health Organization halted the program by 1972. By 2000, malaria killed roughly two million people each year (Phillips 2001; Trape 2001; Najera 2001; Palumbi 2001: 137–8).

A fifth way is to look at the geographical scale of anthropogenic change. The increase of temperatures around the globe, apparently due partly to human production of greenhouse gases, has changed the evolutionary environment for species large and small. Pitcher plant mosquitoes in North America, to pick one example, hibernate (more precisely, enter diapause) on a schedule controlled by genes. Between 1972 and 1996, pitcher plant

mosquitoes across a broad swath of the continent shifted their hibernation later in the year in response to warmer weather. On a regional level, humans seem to be changing sea levels, increasing ultraviolet radiation, transferring species across continents, and contributing pollutants to air and water, and changing the pH of rain through additions of sulfur dioxide and nitrogen oxides (Bradshaw and Holzapfel 2001; Thomas and Kingsolver 2002).

Most of these examples illustrate that anthropogenic evolution is a two way street. Not only do humans shape other species (which is important for those species); their evolution in turn has a significant impact on humans. The exception in these examples is the pitcher plant mosquito, whose evolution is important for scientists but has little direct influence on most humans. Indirectly, though, its evolution may be significant. If the earth continues to warm, we may look back on it as a harbinger of massive evolution yet to come.

Evolution in Historiography

Of all historical fields, environmental history seems the most likely to have used evolution analytically. It studies ways in which humans have shaped nature, and it has drawn on scientific ideas to understand those processes. A search of over 33,000 entries in the Environmental History Bibliography at the Forest History Society, however, produced just eight entries in which authors used evolution as an analytical tool. Authors from fields other than environmental history wrote many of those eight. (We will look at exceptions to this pattern in the section below on evolutionary history.) The Research Register of the Documenting Environmental Change database at Cambridge University lists only one individual working on what may be termed biological evolution (Budiansky 1999; Eldredge 1998; Flores 1999: 11–30; Kellert 1997; Margulis et al. 2000; Potts 1997; Shepard 1998, 1996.)

Many factors may have contributed to this pattern, but three seem likely. First, historians may have lacked familiarity with evolution in general and anthropogenic evolution in particular. Few graduate or undergraduate programs in history require courses in science, much less in evolutionary biology. Even scholars who have taken courses in evolutionary biology may have learned little about anthropogenic evolution. Some of the most popular textbooks have omitted discussion of the topic. Eric Pianka, author of the textbook *Evolutionary Ecology*, wrote that he had "always tried to present evolutionary ecology as a 'pure' science" (Pianka 2000: xiv).[6] Small wonder, then, if historians have seen evolution as something that has happened outside historical time and separate from human activity.

Recent publications in evolutionary biology may help correct this problem. Pianka, who devoted previous editions of his textbook to "pure" science, wrote in the introduction of the sixth (2000) edition of *Evolutionary Ecology*,

"Humans now dominate ecosystems to such an extent that pure ecology has all but vanished from the face of the earth! Hence, in this edition, multitudinous anthropogenic effects are interwoven into every chapter." Pianka used loss of genetic variability, extinction, and evolution of microbes as examples of these effects (Pianka 2000: xiv, 10). Evolutionary biologist Stephen R. Palumbi brought anthropogenic evolution to the center of his 2001 book, *The Evolution Explosion: How Humans Cause Rapid Evolutionary Change*. He describes humans as "the planet's most potent evolutionary force" and points to antibiotic resistance, HIV, and shrinking fish as examples of that force (10).

Second, historians may have seen evolution as less useful or important than other sciences in their work. The workhorse sciences of modern environmentalism – ecology and public health – have held pride of place in environmental history as well.[7] A search for "ecology" and its variants in the Environmental History Bibliography turned up 1,747 entries. "Health" appeared 503 times. Their preeminence is not surprising. Environmental concerns have drawn many scholars into environmental history, influenced their choice of research projects, and probably shaped their selection of intellectual tools (Worster 2001).

More precisely, historians may have seen some fields of ecology as more valuable than others. Two – evolutionary ecology and ecological genetics – have offered environmental historians bridges from ecology to evolution all along (Ford 1964; Pianka 1974). But environmental historians have tended to focus on community, ecosystem, and population ecology. Perhaps these fields (and public health) have appeared more useful in understanding problems of concern to environmentalists and environmental historians alike, such as wilderness, national parks and forests, wildlife, human disturbance, plant and animal invasions, and pollution.[8] This essay suggests that adding evolutionary ecology and genetics to the list enhances, rather than replaces, the fields already of greatest interest.

Third, historians may have opposed the use of evolutionary ideas for intellectual reasons. Sociobiologists and evolutionary psychologists have sought to attribute much of human behavior to genes and natural selection, a direct challenge to territory humanists and social scientists have thought their own. Any use of evolutionary ideas might seem to open the door to disciplinary takeover. More broadly, the field of science and technology studies has encouraged a skepticism about truth claims by science. A related concern is political. We know that social Darwinists and eugenicists in the past have drawn on, and perhaps been inspired by, evolutionary biology. It is all too easy to read human ideas into nature, read them back out again, and justify the original ideas on the grounds that they are natural. If historians use evolutionary ideas, might they find themselves justifying biological determinism?[9]

These concerns have merit but pose no insurmountable barriers. Evolutionary biology has not subsumed any discipline with which it overlaps,

even among the sciences. There is no reason to believe history is any more vulnerable than, say, ecology. Although sociobiologists and evolutionary psychologists have grabbed their share of headlines, we should not mistake them for evolutionary biologists as a whole. On the contrary, evolutionary biologists have marched among the shock troops against biological and genetic determinism. Their persuasiveness grows not out of rejecting evolution, but the opposite – mastering evolutionary theory and evidence. Paul Ehrlich (2000), Stephen Jay Gould (1996), Luca Cavalli-Sforza (2000), and Richard Lewontin (2000; Lewontin et al. 1984) have pointed out that humans carry nowhere near enough genes to encode every human trait, that applications of evolutionary biology in the past have been based on bad science, that race is a cultural rather than a biological construct, and that the environment deeply influences the expression of genetic as well as cultural traits (see also Margulis 1998). Imagine how much more powerful their arguments might be when joined with those from historians able to speak knowledgeably about the dimensions of human experience in which genes have or have not played important roles.

Similarly, we should not let skepticism necessarily lead to rejection. Scholars in science and technology studies have made enormous contributions by historicizing ideas and demonstrating the social dimensions of what had been seen as "objective" endeavors. The outcome of this process should be to make us skeptical about all the analytical tools we use – whether from humanities, social sciences, or natural sciences – and at the same time welcoming of useful ideas whatever their source. Finally, we must combat political misuses of any ideas, including those from evolution. My own conviction is that deeper knowledge makes citizens more, rather than less, politically effective.

Although various disciplines outside of biology have created evolutionary fields, none is identical to evolutionary history. Nearly all of the existing fields focus on human evolution, whether genetic or cultural, to the exclusion of non-human species. One exception is evolutionary (or Darwinian) medicine. Proponents of evolutionary medicine have argued that most physicians see the human body as a machine designed by a careless engineer. The task of the doctor is to fix broken machinery. Evolutionary physicians, on the other hand, see the body as an organism that has evolved methods to meet challenges. Faced with an infection, ordinary physicians might seek to control fever because it appears to be a problem caused by a pathogen. Evolutionary physicians agree that fever might be a problem caused by a pathogen – but, on the other hand, fever might be the body's means of killing off the pathogen by heating it to death. (Evolutionary physicians would keep the idea of coevolution front and center. They expect that humans have evolved defenses against a certain pathogen, the pathogen may have evolved a way to circumvent the defenses, which might have led to further evolution in humans.) Keeping the fever down, then, might slow recovery.

For our purposes, the important point is that human experience, in this case of disease, is the outcome of a long history of reciprocal evolution. The body has evolved defenses, and organisms have evolved ways to circumvent those defenses. (The rapid evolution of the AIDS virus is an excellent example.) An ahistorical understanding of the biology of humans and other species leads to misperceptions about causes and effects of ailments, which in turn leads to suboptimal treatments. Effective medicine demands historicizing the biology of humans and the organisms with which they coexist (Williams and Nesse 1991; Ewald 1994; Nesse and Williams 1994; Bull and Wichman 2001; Freeman and Herron 1998; Crandall 1999).

Evolutionary history as described here also differs from efforts across the social sciences to develop evolutionary models of culture, behavior, and institutions. Unlike sociobiology and evolutionary psychology, these efforts do not ground their analyses in genes. Rather, they treat genetic evolution as the source of useful analogies. Evolutionary economists have studied firms as analogues of organisms, markets as analogues of natural selection, and routines (repeated ways of doing things, e.g., marketing) as analogues of genes. Anthropologists (and biologists) have treated genes and culture as parallel and interacting systems of information subject to selection. The two systems resemble each other in being heritable, shaping human behavior, and transmitting information imperfectly. They differ from each other in that genes pass information only from parents to children, while culture passes among non-relatives, skips generations, and enables individuals to inherit acquired characteristics from others.[10] Although different from each other in several ways, and although evolutionary historians need not adopt their ideas, these fields illustrate the value of defining a research program as a field. Attaching "evolutionary" to the names of disciplines has helped scholars define their approaches, find others with similar interests (including people in other fields), and develop coherent literatures. Several of these fields have grown large enough to merit their own subject headings in the Library of Congress catalogue.

Evolutionary History

Until now, "evolutionary history" has meant the object of study for evolutionary biologists. (Charles Darwin studied the evolutionary history of tortoises in the Galapagos.) Here we add a new meaning: evolutionary history is the field concerned with the role of evolution in human history. Attaching "evolutionary" to the name of our discipline should bring many of the same advantages we have just seen for other fields: self-definition, ideas for research, identification of common ground with other scholars, and development of a coherent literature. Ultimately, the field's value will lie in new or revised interpretations of history and biology.

Evolutionary history embraces a dynamic view of humans, nature, and their interaction. It sees:

- Humans, and a variety of social variables, as evolutionary forces.
- Organisms as plastic and adaptive rather than static or passive.
- Anthropogenic evolution as beneficial, harmful, or neutral for humans and other species.
- Genes as parts of the environment and as historical actors.

This approach complements existing emphases in environmental history. Environmental historians have long argued that other historical fields overlook the importance of nature in history. Evolutionary history extends this insight by emphasizing the importance of organismal plasticity. Ecological history has focused on ways humans have changed environments; evolutionary history adds interest in the ways environmental changes have changed species. Ecological history has described ways in which humans have increased and decreased the populations of certain species; evolutionary historians add an interest in the ways humans have increased and decreased populations of genes. Public health history has emphasized the importance of efforts to control pathogens; evolutionary history adds an interest in the ways pathogens evolve to circumvent control measures.

Evolutionary history builds on foundations laid by historians, biologists, and members of other disciplines. Several examples follow. A phrase at the beginning of each example emphasizes the link between a topic of interest to evolutionary biologists, on the one hand, and a topic of interest to historians, on the other. The examples illustrate the kinds of research questions evolutionary history can prompt, show the range of fields from which evolutionary historians may come and draw, begin to create a literature in evolutionary history, and suggest potential evolutionary revisions of common interpretations of the past.

Western Civilization as a by-product of Artificial Selection

The best-known prototype of evolutionary history, physiologist Jared Diamond's *Guns, Germs, and Steel* (1998), makes the case that adopting agriculture was the most revolutionary act in human history. As we have seen above, artificial selection – unintentional as well as intentional – was essential to that process. Other scholars, too, have found evolution a friendly framework for explaining the development of agriculture. In *Like Engend'ring Like*, Nicholas Russell challenges the idea that pre-nineteenth century breeders practiced methodical breeding. He found that "accidental, domestic-environmental selection," more than breeding for specific traits, drove increases in productivity of meat, wool, and other animal

products. Domestication and controlled breeding selected for rapid growth and sexual maturation, Russell argues, simply because growers bred domestic animals as soon as they were ready (Russell 1986: 216–18; Peacock and Williams 1993). If Diamond and Russell are right, accidental selection has played a surprisingly large role in Western history.

In recent centuries, science and industry have played increasingly important roles in evolution. Deborah Fitzgerald (a historian of science, technology, and the environment) has traced the rise of methodical selection in corn breeding in the United States (1990). In the nineteenth century, farmers improved their corn by saving the best seed to plant the next year. The arrival of government and industrial scientists shifted the locus of control from farmers to scientists. Responding to their own agendas as well as those of farmers, these scientists shifted from traditional, open-pollinated breeding methods to new, hybrid methods. Because hybrids did not "breed true," farmers now had to buy new commercial seed each year. The result was a massive change in the nature of corn. In 1933, hybrids grew on 0.4 percent of the corn acreage in the United States. By 1945, the share of land devoted to hybrids had soared to 90 percent.

Genes as Agents of Geopolitics

"Geopolitics" usually brings to mind national leaders, armies, alliances, and strategic resources. Few would include "plant breeding" in the list. John Perkins, an environmental historian with a background in genetics, has challenged this view. Wealthy and poor nations alike, Perkins argues, saw increased food production as critical to their self-interest in the Cold War. Leaders of poor countries feared that insufficient food for growing populations could lead to loss of hard currency (to pay for imports) and create fertile ground for revolutions against the government in power. Leaders of wealthy nations feared political and economic instability, the spread of hostile ideologies, and weakening of alliances against the Soviet Union. Using wheat as his case study, Perkins shows how these fears motivated rich and poor countries to fund programs designed to boost wheat productivity rapidly through locating and transferring germplasm. Green revolution would counter red revolution (Perkins 1997).

If the green revolution enlisted genetic change as ally in geopolitical struggles, evolution also has posed a threat to national security. Through most of history, disease posed bigger threats to armies than did enemy soldiers. In the Pacific theater of World War II, malaria felled eight times more Americans than did Japan. Louse-borne typhus threatened to waylay the Allied conquest of Italy. The arrival of the insecticide DDT, which was effective against malaria-carrying mosquitoes and typhus-bearing lice, seemed to be a miracle. So momentous was DDT's promise that its developer received

the Nobel Prize in 1948. In the late 1940s, however, insects began showing resistance to DDT. Although this development threatened agriculture as much as public health, the United States Army led efforts to understand and counter resistance. In the 1950s, the Army organized conferences, commissioned reviews, and funded research. The result was a rapid growth in the number of publications on resistance, but researchers failed to find a way to stop this form of evolution. They could only suggest developing a stream of new chemicals, a chemical arms race that one could run but never win (Russell 2001; Perkins 1978, 1982; Dunlap 1981).

Genes as Economic Agents

For rural sociologist Jack Kloppenburg, the most important force driving evolution in agriculture has been capitalism. In *First the Seed* (1988), he highlights three processes that facilitated capitalistic penetration of plant biotechnology between 1492 and 2000: political economy – commodification, institutions – division of labor, and world economy – germ plasm transfer. Kloppenburg notes that humans shaped the evolution of plants through dispersing, breeding, and eventually patenting life forms. Traditional plant breeding was "applied evolutionary science." With new biotechnology, such as genetic engineering, humans started "outdoing evolution" by moving genes across species. The result was that genes became a form a property, further facilitating commodification and accumulation of wealth (2–3, 9).

In *The Animal Estate* (1987), cultural and environmental historian Harriet Ritvo argues that Victorians used animal breeding to resolve class anxieties. As industrialization twisted and strained the English class structure, breeders created elaborate class systems, replete with Blue Books and pedigrees patterned after those of the nobility, for horses and dogs. Published breed standards and show rings created islands of control and predictability in a turbulent world. At the same time, though, shows offered breeders from lower rungs on the social ladder a rare and treasured chance to compete against and defeat social "betters."

Industrialization as Evolution

At first blush, the story of industrialization might seem to be one of the poorer candidates for revision. Industrialization is, after all, the replacement of organisms (where evolution occurs) with machinery. Farm mechanization offers a classic example of the standard argument. Productivity on American wheat farms increased in the late nineteenth and early twentieth centuries. Because yields per acre remained roughly constant while yield per worker increased, economic historians have credited this increase to new

machinery. This view is consistent with the large literature showing that extending or replacing human labor with machinery increased productivity in a variety of occupations (Cochrane 1979: 200; Hayami and Ruttan 1985: 209; Atack et al. 2000: 259; Olmstead and Rhode 2002a, b).

Economists Alan Olmstead and Paul Rhode have shown, however, that the received view is only about half right. The flaw lies in the assumption that organisms in wheat fields stayed constant. They did not. Farmers knew that wheat varieties "wore out" after several years, forcing them to plant new varieties to maintain yields. Wearing out resulted not from change in the wheat, but from change in the wheat's enemies. Insects, diseases, and weeds evolved to overcome a wheat variety's defenses, so breeders had to produce a stream of new varieties to keep pace (Olmstead and Rhode 2002a, b; Rausher 2001).

Without breeding, yields would have plummeted and productivity gains attributed to machinery would have been far smaller. Evolutionary biologists call this phenomenon, in which an organism evolves just to stay in place, the Red Queen hypothesis. Olmstead and Rhode estimate that wheat breeding accounted for about 40 percent of the increase in wheat productivity in 1880–1940 (2002b: 581).

The importance of plant breeding may seem obvious in retrospect, but a number of distinguished economic historians missed it. Contrast this oversight with the way we think about technology. Imagine we learned that a wheat farmer bought one tractor, never changed the oil or repaired broken parts, and never bought new machinery over the next fifty years. Without a second thought, we would predict a drop in productivity. We are not trained to predict the same pattern with organisms. "Continual innovation" is a phrase we usually associate with technology, but organisms are past masters at this process.

Wheat is not unique. A 2002 conference at Rutgers on "Industrializing Organisms" focused on the role of organisms in industrialization. The papers revealed that industrialization has often relied on organic evolution. Along with Olmstead and Rhode's work, examples include the breeding of hogs and chickens suited to "factories in the field," hemophiliac dogs suited to scientific laboratories, and trees adapted to industrial silviculture. Might future historians see mechanization as the first wave of industrialization, with biotechnology as the second wave that supplemented and replaced machines (Russell 2004; Schrepfer and Scranton 2004; Basalla 1988)?

Resource Collapse as Size Selection

Common explanations for the collapse of live natural resources (fish, birds, and trees) are anthropogenic mortality and habitat destruction. A 1996 report from the United Nations Food and Agriculture Organization on

worldwide fisheries propounded this view. It concluded that 35 percent of the world's fisheries were declining. Another 25 percent were "mature," meaning that catches had leveled and probably would drop. The report blamed overfishing and damage to breeding grounds. Its policy recommendations, mainly limits on the numbers of boats and tonnage, grew out of this interpretation (United Nations Food and Agriculture Organization 2002).

Evolutionary history can revise this interpretation by demonstrating the effect of humans on fish genes as well as numbers. In his study of salmon in the American Pacific Northwest, environmental historian Joseph Taylor argues that fish hatcheries pushed salmon into "new evolutionary paths." Hatchery fish clumped together, carried less genetic variation, and were smaller than wild fish. These factors combined to increase mortality. Fishways in dams reinforced these trends. By causing more damage to large than small salmon, fishways selected for smaller and faster-maturing fish (1999: 203–4, 206, 233, 236).

Taylor's study emphasizes the impact of humans on fish in streams and rivers. We can push his analysis further by drawing on fisheries biologists to show that anthropogenic selection at sea also reduced catches. Between 1950 and 1990, the size of spawning salmon declined 30 percent. Absent humans, conditions favored big fish. Salmon hatched, went to sea, returned to their natal stream, and either laid or fertilized eggs. Big fish were better than small fish at fighting their way upstream and at competing for spawning sites. Ocean nets changed the odds. By snaring up to 80 percent of returning fish, the nets selected against large fish and for those small enough to slip through. Small fish produced fewer and smaller offspring than large fish, driving the number and size of salmon in the next generation even smaller. Smaller fish meant smaller tonnage (the usual measure of commercial fishery harvests) even if the number of fish caught remained the same (Ricker 1981, cited in Palumbi 2001: 187–8).

Size selection drove catches down in another way: by selecting for and against certain behaviors. Traditionally, going to sea for eighteen months was a good strategy because it made salmon bigger than if they stayed home. A few salmon (called jack) came back a year earlier than normal, and some (called parr) never went to sea at all. Traditionally, jack and parr competed poorly against big fish for spawning sites and mates. By catching ocean-going salmon, however, fishers altered the odds. Ocean nets selected for small fish that returned early or stayed home altogether, and against fish that went to sea to get big (and be caught). Now jack and parr had as much chance at reproducing as the traditionalists who ventured out to sea, although they produced fewer and smaller offspring than did large fish. The number and size of ocean-going salmon declined (Gross 1991).

Our revision of the received view becomes more persuasive when we find similar patterns elsewhere. Whitefish in North American freshwater lakes once supported commercial fishing. The average size of whitefish declined

between 1941 and 1965, when the fishery collapsed. In the 1940s, the average nine-year-old whitefish weighed 2 kilograms. By the 1970s, the average had declined to 1 kilogram. Observers blamed the size reduction on removal of older, bigger fish, but it also resulted from changing whitefish genetics. Young fish grew as rapidly in 1970 as they did in 1940, but adults grew more slowly. In the 1950s, nets caught fish aged two years and up. In the 1970s, nets caught fish aged seven years and up. The 5.5-inch holes in nets had created a size threshold, beyond which fish grew at their peril (Handford et al. 1977, cited in Palumbi 2001: 189–90).

Domestication of Humans

Most of the literature on domestication implies that humans have sat in the driver's seat while other species rode in the back of the truck. The first word in the title of anthropologist Yi Fu-Tuan's analysis of pets, *Dominance and Affection* (1984), reflects this view. For Perkins, who described the green revolution as one stage in a long evolutionary process, this unidirectional view is inadequate. "Wheat and people *coevolved* in ways that left neither much ability to prosper without the other," he argues (Perkins 1997: 19).

This bi-directional view opens the possibility that organisms domesticated humans as well as vice versa. Biologist Raymond P. Coppinger and English professor Charles Kay Smith have argued that since the last ice age, some 10,000 years ago, much of the most important evolution has taken place within the arena of human activity. Teaming up with humans was a good strategy for organisms faced with a rapidly changing environment (Coppinger and Smith 1983).

Popular writer Stephen Budiansky has made this argument in two books. In *Covenant of the Wild* (1992), he suggests that domestic animals have "chosen" to become domesticates because this path offered more chances of survival than did living in the wild. The wolves that became dogs have thrived and now number in the millions in the United States. The wolves that remained wild find themselves all but exterminated in the lower forty-eight states. Budiansky expands on this theme in *The Truth About Dogs* (2000).

Another popular writer, Michael Pollan, argues a similar thesis about plants. In *The Botany of Desire* (2001), he points out that bees probably "see" plants as doing work for them by supplying pollen and nectar, just as Pollan had seen his plants as doing work for him by producing vegetables. But the plants could just as well "see" the bee *and* Pollan doing work for them. Wild varieties of plants had to compete for resources with other species, protect themselves against herbivores, and hope for rain. Their domesticated relatives "got" Pollan to do that work for them, which enabled their genes to become much more common than the genes of wild versions.

These examples illustrate the potential of evolutionary history to suggest unconventional hypotheses about the past. The arguments are not necessarily correct. If history is our guide, we would expect future research to support some ideas and falsify others. No matter what the outcome, though, finding out whether such hypotheses are correct would be useful and exciting.

Conclusion

Humans have been shaping the evolution of so many other species, for so long, in so many ways, and for so many reasons, that this process often has hidden in plain sight. In one morning, even before making it out the door, we might wake in bed sheets made of cotton, dress in clothes made of wool, put on shoes made of leather, eat a breakfast made of wheat, butter, oranges, and eggs, read a newspaper made of wood pulp and soy ink, pat a dog, and admire flowers on the table. Every one of these materials and creatures bears the mark of anthropogenic selection, from cotton bred for large bolls to flowers selected for their showy display. Every one of them has a history. Every one of these histories has resulted from social and biological forces. And every one of these histories tells us about ourselves as well as other species.

The time has come for us to understand such histories in a coherent way. Scholars in a variety of disciplines and fields have built the foundation for such an inquiry, with biology and history leading the way along parallel, but too rarely intersecting, paths. Evolutionary history offers a way to link these endeavors. To biology, history offers understanding of the social forces that create selective pressures. To history, biology offers understanding of the ways organisms respond to such pressures. Together, as evolutionary history, they offer understanding of the ever-changing dance between humans and nature. The resulting synthesis just might lead us to new understanding of historical episodes as disparate as state building, capital accumulation, geopolitics, industrialization, and domestication.

The significance of such an understanding will grow as climate change and biotechnology expand the scale of anthropogenic evolution. Humans have long changed regional environments and thus the evolution of species in those environments. Climate change means these experiments have become global. Biotechnology, in its root sense of living technology, is nothing new. But genetic engineering has introduced a novel ability to move genes across very different taxonomic groups and accelerated the rate of evolutionary change. By 1999, genetically engineered plants accounted for about 55 percent of the soybeans, 60 percent of the cotton, and 36 percent of the corn grown in the United States (Council for Biotechnology Information 2001; Palumbi 2001; *Washington Post* 2000a, 2000b, 2000c, 2002; Specter 2000).

If we are to understand how genetic engineering shapes human experience today and in the future, it behooves us to examine ways in which anthropogenic evolution has shaped us in the past.

Notes

1 Examples of early works that examined the interactions of humans and animal populations include Cronon (1983); Crosby (1986); Merchant (1980); White (1980); and Worster (1977).
2 See Dovers et al. (2002); Beinart and Hughes (2007); Merchant (1989); Jacobs (2003); Simmons (2001); White (1995); Griffiths and Robin (1997); Tyrrell (1999); Redman (1999); McNeill (2000); Radkau (2008); and Webb (2009).
3 See Taylor (1999); McEvoy (1986); Isenberg (2000); Cartmill (1993); Dunlap (1988); Reiger (2001); Judd (1997); and Jacoby (2001).
4 See Dunlap (1981); Perkins (1982); Melville (1994); Russell (2001); Stewart (1996); and Diamond (1998).
5 See also Barlow (1969: 119–20); Ruse (1975, 1999, 2000); Cornell (1984); Evans (1984); Bowler (1993, 1990); Browne (1996); Desmond and Moore (1992); Hull (1983); Himmelfarb (1962); Young (1985); Mayr (1991, 1982); Dennett (1995).
6 See also Mayr (1982); Lupton (1987); Mayo (1987: 175); Axford et al. (2000: ix); Warwick and Legates (1979: 5–7); Grandin (1998: 21, 146, 204); and Stevens (1991).
7 Ecology and public health are represented in, among others, Cronon (1983); Worster (1977); Merchant (1980, 1989, 1993: 1); Crosby (1986); Hughes (1975); Bilsky (1980); McEvoy (1986); Melosi (1980); Tarr (1996).
8 For work in these fields, see Odum (1971, 1983); Odum and Odum (1959); MacArthur (1972); MacArthur and Connell (1966); Elton (1958); Ricklefs (1973, 1996); and Ehrlich et al. (1977, 1973).
9 A vast literature engages issues surrounding sociobiology and the relationship between evolutionary theory and society, including: Wilson (1975, 1998); Barash (1982); Dawkins (1976); Koslowski (1999); Gregory et al. (1978); Breur (1982); Rosenberg (1980); Bell and Bell (1989); Caplan (1978); Montagu (1980); Ruse (1984); Ridley (1993); Darwin (1859); Wilson (1975); Thompson (1995); Twesigye (2001); Ruse (1993); Dennett (2003, 1995); Plotkin (1997); Blackmore (1999); Crawford and Krebs (1998); Barrett et al. (2002); Pinker (2002, 1997); Bjorklund and Pellegrini (2002); Clamp (2001); Buss (1999); Wright (1994); Barkow et al. (1992); Rose and Rose (2000); Taylor (1999); Fuller (1993); Latour (1987); Latour and Woolgar (1979); Jasanoff et al. (1995); Cowan (1983); Fischer (1992); Haraway (1991); Hughes (1983); Mackenzie (1990); Oldenziel (1999); Schiebinger (1993); Bijker et al. (1987); Adorno and Horkheimer (1997: 4, 6); Ellul (1973); Noble (1977); Winner (1986); Norwood (1999: 49–62); Scharff (1999); Kevles (1985); Gillham (2001); Degler (1991); Rosenberg (2000); Numbers and Stenhouse (1999); and Hawkins (1997).

10 See Laurent and Nightingale (2001); Nelson and Winter (1982); Vromen (1995); Gowdy (1994); Durham (1991); Dawkins (1976); Cavalli-Sforza and Feldman (1981); Boyd and Richerson (1985); Lumsden and Wilson (1981); Murmann (2002); Vincenti (1990); Richards (1987); Clark (2000); Back (1996); and Patel et al. (2001).

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Chapter Nineteen

Water Development: The Plot Thickens[1]

Patty Limerick

The history of Western water development follows a simple plot: for a spell, the regional characteristic of aridity defied the demands of conventional American settlement, but that defiance was then followed by submission and surrender. A conglomeration of organizations – private companies, ditch cooperatives, water conservancy districts, municipal utilities, the Bureau of Reclamation, and the Corps of Engineers – overpowered the West's constraints of precipitation. By storing spring run-off in reservoirs and releasing stored water in response to demands, engineers made it possible for a substantial population to live in a region that once seemed so unaccommodating. Putting into force the specifications of the vision of a properly vegetated landscape held by the great majority of Americans, an extraordinary investment of capital and hard work turned the West green.

Comprehending and appraising this ostensibly simple plot, however, has proven to be another matter, a recognition that has badgered me as I write a history of the Denver Water Department. And yet there is nothing better for the minds of historians than a bout of exactly such badgering.

In processes of migration and colonization, people traveled heavily laden with cultural baggage. In the rush of activity, they rarely had occasion to look through this baggage and assess its fit to their new circumstances. When it comes to attitudes and assumptions about water, the early twenty-first century is proving to be one of those occasions of "baggage reassessment." With the flow of rivers allocated or over-allocated, and with the great uncertainty of climate change's impact on precipitation, there is good reason, at long last, to look critically at the collection of assumptions that distinguish needs for water from desires for water. Environmental historians can play – and should play – a major role in this reassessment. In this undertaking, as my own wrestling with the history of

Denver's water has revealed, historians themselves have the opportunity to set an example by vigorously reconsidering their own assumptions and habits of mind.

Habits of mind are astonishingly tricky in their capacity to sneak around just below consciousness and thus escape inspection. To take one striking example, many of the advocates who support measures to avoid waste and conserve water hold to the habit of using the adjective "green" to characterize their principles, movements, and causes. In the context of the American West, this habit of mind presents considerable comedy. In the arid and semi-arid West, the color green is frequently the color of disturbance. When you come upon a bright green landscape, there is a good chance that the Bureau of Reclamation or some other such organization has been at work, diverting water to support non-native plants and keeping the water flowing through the dry and hot summers that attempt to toast the vegetation. Environmentalists in the Interior West who want to associate their cause with undisturbed nature might more accurately declare their allegiance to a "tan movement" or, at the least, to an "olive-green movement." But the habits of mind that were carried into the West over the last two centuries remain very powerful, and "green" continues to serve as an unchallenged synonym for "natural," even for people who make a cause of lamenting the disturbance of the West's landscape.

Leave the universities and venture out into the enterprise known as "applied history," and your habits of mind will soon be profoundly and productively rattled. The number of assumptions that you can take for granted will plummet. Every time you think you have succeeded in crisply categorizing the world, the world is likely to respond with a surprise. Consider the unexpected turn of events that knocked my categories for a loop in Boise, Idaho, in 2006. I had been invited to speak to a conference of the Idaho Division of Natural Resources, an agency with a jurisdiction that includes water. I took with me to Boise a habit of mind predicting that the majority of the members of my audience would be farmers or officials who worked with farmers. Thus, I decided I was in a perfect setting for expressing, without restraint, my feelings about urban and suburban lawns, secure in the assumption that my audience would share my sense that lawn watering was an entirely silly use of water in dry places. So I spoke about the burden that having a lawn had been to me in the summer after I was widowed. Not having an automatic sprinkler system, I had to get up very early or leave pleasant and consoling evening social gatherings, so that I could water before sunrise or after dusk. Even with my best efforts, the lawn still looked dry, desperate, and reproachful. When I became engaged to an old friend with two young children, I had to leave their company in order to go home and tend to my lawn. From this experience, I was able to see new benefits that giving up our servitude to lawns would deliver. If we could stop watering, fertilizing, mowing, and trimming

our lawns, I now had the opportunity to realize, we would receive a big dividend in time that we could then invest in our children.

In Boise, I had a very fine time telling my audience how I felt about lawns. But then, for the next session, I joined three new acquaintances on a panel. The first panelist told me that he was a farmer. I expected him to tell me how heartily he had agreed with my tirade on lawns. Instead he said, "You really hit me where I live." How could that be? What crop did he grow and sell? As alert readers have guessed, he grew bluegrass and sold turf. My certainty that farmers would be my comrades in ridiculing the water use of suburbanites needed some fine-tuning.

As this experience demonstrated, our usual, familiar categories of opposition often prove to be a poor match to our intertwined and interdependent world. As the work of environmental historians in recent years has made clear, hybridity rules.[2] Anthropogenic change (a.k.a. history!) is everywhere we look in terrain that we once understood to be natural, and even pristine. Phenomena that seem to be separate and distinct prove to have the same root system. People who carry the flag of "preservationist" in public turn out to be thoroughly utilitarian in their day-to-day lives. Raccoons, deer, foxes, and other "wildlife" have become well-adapted urbanites. And water may be the most category-transgressing substance of all. As a mobile and almost animate fluid, water is indiscriminate and unprincipled, equally susceptible to serving enterprises that we find reprehensible and undertakings that we find noble. The scrambling of categories makes for challenging conditions for choosing present-day and future conduct. History has endowed Westerners with abundant reasons to cooperate in our management of water, as well as abundant reasons to sue each other silly. This presents, by every measure, an auspicious time to appraise the validity and the value of our habits of mind.

Taking up a project on the history of the Denver Water Department, I was awarded a prime opportunity to rethink my own premises.[3] In the next pages, I will take up several areas in which my preconceptions have been reconfigured:

- The proposition that a centralized power structure presided (and presides) over the infrastructure that transformed the distribution of Western water.
- The assumption that it is an easy matter to recognize the concrete meaning of "the public good," to make moral distinctions among the claims of individuals and groups, and thus to determine who most deserved or deserves access to water.
- The doubtful but somehow always tempting thought that the "real West" is the rural West.
- The belief that the scarcity of water is the bedrock of regional distinctiveness or even uniqueness, and has even determined a "carrying capacity" for human population.

- The notion that academics have acquired an exemption from the paradox of living lives very much dependent on the practices of resource extraction we are often tempted to condemn.

I apologize for the self-indulgence involved in casting myself as an artifact or specimen or data set that permits the study of changing historical interpretations. For better or worse (or for some combination thereof), I have rarely kept my historical interpretations and opinions to myself, and my ideas, of varying quality and durability, form a trail in time behind me, rather in the manner of the bread crumbs that Hansel and Gretel used to mark their path.

As American attitudes toward nature changed directions in the second half of the twentieth century, attitudes toward the history of Western water underwent a parallel shift. The publication of two very influential books, Donald Worster's *Rivers of Empire* (1985) and Marc Reisner's *Cadillac Desert* (1993), represented that shift.[4] The close timing of these publications, while not a matter of orchestration (and certainly not a matter of conspiracy!), still seems far from coincidence. To both Worster and Reisner, the history of the development of water in the West followed a plot (to a degree, in both senses of the word) that led to the centralization of power in the hands of a small, inflexible, undemocratic, entirely self-interested elite. "The hydraulic society of the West," Worster asserts in a widely quoted statement, "is increasingly a coercive, monolithic, and hierarchical system, ruled by a power elite based on the ownership of capital and expertise" (1985: 7). For critics of the hydraulic society, the prime example of centralized, coercive, and secretive power appeared in the case study of the City of Los Angeles' acquisition of water from the Owens River Valley. The movie *Chinatown* (1974) was the cinematic presentation of this school of historical judgment. Figuring out why the director Roman Polanski got such a chronological jump on the historians is a task I will yield to more adept cultural historians.

In the last two decades, scholars – though not movie directors – have changed the plot. In 2006, Steven Erie found significant flaws in the conventional telling of the story of the Owens Valley. The famed engineer for Los Angeles, William Mulholland, Erie argued, did not pursue personal profit, and even if individual land developers in the San Fernando Valley later profited from the delivery of water from the Owens Valley, they were not themselves the initiators or arrangers of the original plan for the diversion. Rather than the *Chinatown* version, in which "unscrupulous developers in league with conniving water officials secretly orchestrated water megaprojects for private financial gain," Erie declared that he would "retell much of the region's twentieth-century water and development saga as an innovative public venture rather than a sordid secretive affair" (2006: 14) – an idea that has (so far!) failed to inspire filmmakers to produce an answer to *Chinatown* that would feature Erie's factually accurate, comparatively colorless version of the Owens Valley tale.[5]

When even William Mulholland undergoes rehabilitation and a makeover, and emerges spruced up, a paradigm is clearly shifting. And, as a former student of mine once memorably wrote: "When shifting paradigms, it is important to remember to put in the clutch." The two historians who have led in deploying the clutch are Donald Pisani, who vigorously questioned the ostensible consolidation of power over water in the hands of a coordinated and even conspiratorial few, and Norris Hundley, who put forward a version of California water history powered much more by contesting groups than by a power-hoarding elite.

In an effective challenge to the image of a coherent and cohesive empire of control over water, Pisani noted the lack of coordination and centralization that characterized the many undertakings to claim and develop water. "Fragmentation," Pisani wrote, "resulted from a pervasive mercantilism that pitted community against community and state against state, from intense competition between regions within the West … and a decentralized system of government" (1992: xvi). Water policy thus arose from a political and cultural atmosphere of "persistent suspicions and irreconcilable differences" (xvii), an inauspicious foundation for the imposition of monolithic power. Reading Pisani's work recently, I was so taken with his argument that I turned to the related footnote in his book, *To Reclaim a Divided West*, so I would not miss a word. In this footnote, Pisani cited examples of scholars who had been egregiously inattentive to the fragmentation, and who had instead inaccurately described the centralization of power. It was an interesting sensation, then, to come upon this preeminent example of misguided opinion: "Patricia Nelson Limerick, *The Legacy of Conquest: The Unbroken Past of the American West* (New York, 1987), p. 87, claims that 'the Reclamation Act of 1902 put the national government in the center of the control and development of water' " (433).

Oops.

In his tracking of water development in California, Norris Hundley did make a step of rapprochement with the Worster and Reisner approach, noting "the appearance of a new kind of social imperialist whose goal was to acquire the water of others and grow at their expense" (1992: xv). While also noting the "monumental conflicts and social costs" brought into being by these hyperactive "social imperialists," Hundley declared that "at the same time, this is a story of extraordinary feats of fulfilling basic social needs when communities mobilized and focused their political energies on providing abundant clean water to multitudes of people who clearly wished that to be done" (xvi). Rather than a centralized, purposeful undertaking by a narrowly self-interested elite, Hundley described "the activities of a wider and often confused and crosscutting range of interest groups and bureaucrats, both public and private, who accomplish what they do as a result of shifting alliances and despite frequent disputes among themselves" (xvi).

What was at stake in this recognition of fragmentation? "Too many environmental historians," Pisani wrote, "have looked at the past as a morality

play in which the champions of the 'public good' battled against the 'plunderers of nature.' On reexamination, we should not be surprised to find that many heroes of the past were far more complicated, and interesting, than they [the environmental historians] wanted us to believe" (1996: 198). In a prime example of the actual hybridity of categories once cast in opposition, in the origins of many urban water systems, "champions of the 'public good'" and "plunderers of nature" would have been hard put to "battle against" each other since they were the same people rechanneling, in Norris Hundley's just-quoted words, "abundant clean water to multitudes of people who clearly wished that to be done."

If elites attempting to exercise concentrated and conspiratorial power had to operate in a world tangled with competing and contesting interests, the proliferation of aspiring users in the twentieth century only added to the difficulty of concentrating and centralizing authority over water. On the contrary, there was no end to the emergence of political demands and economic pressures on the institutions that seemed to have won the race to claim and develop water rights. Here, again, history records improbable, implausible, and unforeseeable trends and patterns. From a comparatively simple world in which agricultural water users competed with urban water users, by the last decades of the twentieth century, many more contestants had entered the fray: Indian tribes asserting the rights guaranteed to them under the Winters Doctrine of 1908; recreational water users, ranging from operators of rafting companies to managers of urban water parks; sports fishermen/women; staffers from state and federal Fish and Wildlife agencies seeking to protect the habitats of endangered species; National Park Service, Forest Service, and Bureau of Land Management employees concerned about the water supply, especially to support aquatic wildlife, in their domains; varieties of energy companies with plans, from solar energy to oil shale, that would require water for cooling or processing. The existing legal and governance structures have been put through a vigorous dance in adapting to this sharp increase in the cast of characters gazing longingly at Western rivers and streams. And yet, as more groups entered the contest for water, the possibility for unexpected alliances also grew proportionately. To take one of many examples, ranchers and farmers on the Western Slope of Colorado had long considered the Denver Water Board to be their opponent, but when the possibility of major diversions of water to the oil shale industry entered the picture, Western Slope agrarians and Denver Water urbanites seemed to be reading from the same script of discontent and dismay.

Where does legitimacy lie – in the claims of Western Slope ranchers, or Front Range urbanites, or developers of a vast energy supply in a time of nervous national dependence on foreign oil? Where might "the public good" or "the public interest" be found in a contest like this one, or hundreds of others like it? Here is where the plot really thickens for the

earnest historian. Can our profession harvest any wisdom from history to offer as guidance? A decade ago, in an essay on the management of the public lands, Richard White took an important step in that direction by putting a spotlight on the word "public." "The concept of the public has rarely been at a lower ebb than today," he noted. "Among politicians and activists, 'public' is a word in considerable disrepute." In a remark with equal bearing on the public resource of water, White concluded his line of thought with this trenchant remark on the public lands: "Americans can hardly hope to get a clear idea of what to do with the public lands when we are abandoning the very concept of public" (2000: 194).

Historians do know this with certainty: in many dimensions of public policy, the Progressive era was the point of origin for much of our thinking about "the public good" and for the institutions responsible for the management of natural resources. The rise of the engineering profession coincided with the Progressive era, and to this day, the values and principles of civil engineers – the crucial figures in the creation and maintenance of the water infrastructure – echo the ideas of the Progressives. But the Progressive impact goes well beyond the confident application of reason and ingenuity to management and technology. Creating new institutions and reforming old ones, Progressives installed the appealing belief that identifying "the public good" would be surprisingly easy, since a quantitative answer was the most credible and convincing one.[6]

Drawn into the controversy over the city of Los Angeles' appropriation of the Owens River, that archetypal Progressive Theodore Roosevelt deliberated between the claims of the city dwellers and the claims of the farmers and small-town businessmen of the Owens Valley. He landed on the side of the city dwellers because of their advantage in numbers. "It is a hundred or a thousandfold more important to the State and more valuable to the people as a whole," he said, "if [this water is] used by the city than if used by the people of the Owens Valley" (quoted in Hundley 1992: 153). In the dispute over San Francisco's damming of the Hetch Hetchy Valley, President Roosevelt and his Chief Forester Gifford Pinchot reached a similar decision, steering by the Progressive mantra, "the greatest good for the greatest number for the longest time."

With the enshrining of that phrase, the Progressives endowed us with a lasting conundrum, an unending brainteaser or Rubik's cube of resource allocation. This is a place for intense, consequential, and historically grounded consideration. Is "the greatest good for the greatest number" still the best steering system we have to guide us in the allocation of a crucial natural resource? Are there occasions when the interests of a medium-sized group, or even a small minority, are of such economic, political, or cultural importance that they should outweigh the interests of the majority? Has the Progressive era calculation of the greatest good outlived its usefulness and become a burdensome anachronism? Is it time to turn it in

for a better policy model? Or can we keep it around and jerry-rig it to accommodate the environmental concerns that have acquired such force since the Progressives left this world?

The most vexing dimension of the conundrum left to us by the Progressives is also the oldest one, the one that captured Roosevelt's attention as he considered the Owens Valley. When a farming and ranching community and a city struggle for control of a single water source, what principles or standards or values are we to use in appraising such a contest? Who has the greater moral claim on the water?

Driving the *Chinatown* school of interpretation, of episodes of acquisition of agricultural water by cities, is a hardwired set of ideas that at first make the answer to the question seem easy: farmers live close to the land, work very hard, and thereby feed and clothe and sustain all the rest of us, while city dwellers, who may be individually pleasant but who are collectively parasites, work primarily in offices, pushing paper and emailing each other, and depending for their sustenance on the grounded rural folk. The implication of this well-entrenched imagery is that agriculture's claim on water holds the moral high ground.

But consider the results when historians look more closely at these assumptions in an example like Los Angeles and the Owens Valley. In a lively passage worth quoting at length, the historian of the urban West, Carl Abbott, put the conventional appraisals of Los Angeles' appropriation of Owens Valley water through a spirited appraisal:

> There are, of course, some problems with the [usual] moral understanding [of this historical episode]. Los Angeles water officials were sneaky and arrogant, but several leaders of the local resistance [in the Owens Valley] were crooks. Los Angeles may have been shrewd in buying water rights, but it purchased something that Owens Valley residents had themselves transformed into a commodity. Owens Valley people had already manipulated the water through irrigation systems, so Los Angeles did not acquire and pervert something that was purely "natural." Left unanswered is the question of how far water can legitimately be diverted: One mile? Ten miles? 200 miles? The story also assumes that some agricultural products (cattle) are more virtuous than others (oranges) and that production of market commodities is superior to aesthetic uses like flower gardens. There is a strong assumption that it is "unnatural" to live in Los Angeles, but is it any more natural to impose Euro-American agriculture on a semi-arid landscape only a mountain range away from Death Valley? (2008: 154)

In other words, under examination, any quick response that instantly bestows greater legitimacy on agricultural water use reveals its dependence on a very arbitrary and often doubtful set of lightly considered assumptions. Certainly the same would be true of the opposite response: any immediate assumption of urban moral preeminence would be equally

doubtful. It is an interesting feature of both *Rivers of Empire* and *Cadillac Desert* that their authors wrote critically of agrarian idealism and unmasked the centralized power of agribusiness, without finding in agriculture's failings the reason to say a kind word or two on behalf of Western urbanism. However ownership of exalted principle and greater moral legitimacy might be distributed among the human population, rural or urban residence shows no signs of being the primary determinant.

In recent times, ardent critics of the re-engineering of the West's water have wielded a persuasive and convincing phrasing: why, they ask, did we fall into a custom of moving water to where people are, rather than moving people to where the water is? As a critic of the Central Arizona Project told Marc Reisner, the farmers and the city dwellers in Arizona "didn't want to move. And so we're going to move the river to them" (quoted in Reisner 1993: 305). Would not good sense support the opposite arrangement, of moving the people to the river? Colorado seems to present a prime example of this question, with the Western Slope holding the lion's share of the water and the lamb's share of the population, and the Front Range reversing those proportions. But the idea – that the world would be better off if the location of people and the location of water could coincide – is far from self-evident, unless one accepts an ethical system that awards water the unassailable right to be put to use in proximity to the stream beds where it originally flowed, and unless one finds the prospect of two million people settling into the open spaces of Western Slope to be a cheering one. Transporting resources and products from place to place has, moreover, been a great enthusiasm of the human species for millennia. A blanket condemnation of this practice seems an empty exercise of ineffective hindsight.

Given the fact that the doctrine of prior appropriation, the well-established system of senior and junior rights resting on that doctrine, and the transfer of rights in market transactions have set the terms of allocation, drawing a moral distinction between right and wrong in the distribution of water may seem to be an idle and irrelevant exercise of the mind. But exploring this distinction is nonetheless important for the minds and souls of Westerners today. The trend toward agricultural water transfers, in which urban and suburban areas purchase senior rights from farmers and ranchers, could prove to be a major force in reshaping the rural landscape that, for so many, represents the "real West." Moreover, a realistic look at the motives and values of Western Slope interests and Front Range interests reveals at least as many similarities as differences. Despite the widespread inclination to cast them as opposites, most "hearty agrarians" and "urban power-mongers" match each other in loyalty to an economic ideology of market capitalism and a desire to develop natural resources for the benefit of human communities. Of course, this agreement generates little in the way of harmony, unity, and shared enterprise, and quite a bit more in the way of heightened competition, rivalry, and resentment.

One historical legacy in particular muddles thought in this terrain. Thanks to the mental habit we can call "urban denial," it is taking a very long time for Americans (and residents of other countries, for that matter) to give up on a dream of the West as essentially rural, and to face up to the central significance of cities in the region. In part, this urban denial stems from a national pattern of ambivalence toward – or, often enough, simply distrust of – cities. President Thomas Jefferson did not advance the cause of national self-understanding with his quotable and persuasive characterizations of rural virtue and urban wickedness. "Those who labor in the earth are the chosen people of God," Jefferson declaimed, "if ever He had a chosen people, whose breast He has made His peculiar deposit for substantial and genuine virtue." Meanwhile, things looked bad for the cities, where workers depended on wages for the purchase of their subsistence: "Dependence begets subservience and venality, suffocates the germs of virtue, and prepares fit tools for the designs of ambition." And then Jefferson arrived at the peak of anti-urban rhetoric: "The mobs of great cities add just so much to the support of pure government, as sores do to the strength of the human body." As a "canker which soon eats to the hearts of [a republic's] laws and constitution," the American city had a few strikes against it after the most articulate of the nation's Founding Fathers characterized it as a symptom of a very icky disease (Jefferson 1964: 157–8).

On the even more consequential front of popular culture, the rural areas also trounced the urban areas. The mythic appeal of the West has simply been better situated, and shown to better advantage, in open space. Cowboys riding freely on handsome horses through open space were objects of envy, while there was something considerably less appealing in the circumstances of cowboys walking down dusty town streets and into claustrophobic saloons, tearing their hair over their obligation to protect townspeople who were usually rendered weak and witless and thereby not particularly fun to protect, when they were caught in cross-fires between bad guys and good guys. Countless novels and movies thus continued, with a different kind of intellectual ammunition, Jefferson's anti-urbanist campaign.

Disapproval of urban concentrations of population brought very ironic outcomes when embraced by lovers of nature. People who wanted nature left undisturbed and wildlife protected from human encroachment were unlikely to be enthusiasts and cheerleaders for the massive rearrangement of resources that created cities. And yet, with the characterization of cities as places with qualities that were the opposite of the beauty, appeal, and power to uplift the human soul delivered by open spaces, anti-urban sentiment eroded the wellbeing of those open spaces. The popularizing of an ardent affection for nature carried the corollary that a life lived close to nature was a better, more grounded, more uplifting life. The material outcome of that belief was the rejection of city life, and a vast increase in the number of homes built with picture windows with views reminding the homeowners that they were indeed close to nature. The proliferation of suburban and

exurban residences meant a disruption of open landscapes and compromising of wildlife habitat. In fact, concentrating human populations in dense urban settings is a very effective method, probably the most effective method, for reducing the impacts of human settlements on the landscapes and waterscapes of the West. If Henry David Thoreau had written more about the charms of Boston than the appeal of Walden, if John Muir had featured the attractions of San Francisco over the beauty of the Sierras (though this might have posed some trouble for his crusading against the Hetch Hetchy Dam), if Edward Abbey had written more about good times in Hoboken, New Jersey, than the entrancing qualities of the Four Corners canyonlands, the persuasive strategies of preservationists and environmentalists would have been dramatically better aligned with their goals. A society that felt better about urban density would be a society better positioned to support and sustain healthy ecosystems in the great outdoors.

In this way and in many others, the mental model by which rural interests are pitted against and defined in opposition to urban interests proves not to be a very useful one. In lived reality, the pair of interests are more intertwined than they are distinct or reciprocally injurious. A thriving rural world is an asset for a neighboring city; the proximity to open spaces is, after all, a principal reason why people want to live in a city like Denver (see Power 1996).

Western historians, present company included, have displayed their own symptoms of attention deficit disorder when it comes to reckoning with Western cities. In *Legacy of Conquest* (1987), despite my earnest effort to correct misapprehensions about Western history, I, too, slid deep into urban denial. It was an occasion of self-reproach to read a review of my book by the urban historian John Findlay, in which he offered the entirely just criticism that I had managed to write an overview of Western American history that said almost nothing about cities and instead reinforced the tired old notion that the real West was the rural West. When it came to the history of water, the powerful role of the Bureau of Reclamation in the West understandably led historians to focus on the storage and diversion of water for agriculture. The assumption that "the history of water development in the West" is a synonym for "the history of irrigated agriculture in the West" is far from expired; in a recent overview of Western history, the strategy for indexing puts all the cards on the table with this entry: "Water supply. See irrigation" (Pomeroy 2008: 569).

Incorporating Western suburbs into this story further complicates the plot. Suburb and metropolis can easily be characterized as opposed interests in a tug-of-war over scarce resources. And yet, in many cases, the well-being of core cities and the wellbeing of their suburbs have been interdependent. Historians may not be flocking to write studies of regionalized metropolitan water districts that bring suburbs and cities into the same jurisdiction and service areas, but the topic has unexpected powers to stimulate the mind and reward effort, with case studies of citizens and public officials manifesting great devotion to the most arbitrary municipal

borders, while also struggling to figure out when common cause might make it worth their while to cooperate in spite of those borders. The author of *Legacy of Conquest* would have perished from anticipatory boredom if told to investigate a topic that seemed so dreary, but the structure, operations, and laying out of jurisdictions of utilities now strike that author as providing spectacular, rubber-meets-the-road case studies in the shaping of human conduct toward natural resources. In the twenty-first-century search for arrangements that might prove to be more sustainable and productive than contests between and among separate communities, groups, entities, and organizations, region-wide approaches as well as state-wide approaches seemed to qualify for a second (or fifth or sixth) chance. Historical perspective will surely be of value in this quest.

For the ardent regionalist who wrote *Legacy*, one of the most unsettling and valuable effects of paying attention to urban water history turned out to be a blow landing directly on the presumed uniqueness of the West. To many commentators, the limited supply of water has been the principal feature of regional distinctiveness. Every map of national precipitation patterns seems to make the case for the uniqueness of the West, revealing much lower rates of snowfall and rainfall and a much higher rate of solar-driven evaporation-transpiration. And yet exploring the history of urban water systems leads directly to the recognition of unexpected similarities between the Eastern United States and the Western United States.

Very much like Western systems, the infrastructures delivering water to cities like New York and Boston reach far into the rural hinterland, tapping into waters that are not by any definition "riparian" (that is, the cities draw on diversions from rivers that do not flow by the land occupied by the cities). The island of Manhattan, for instance, was almost "Western" in its scarcity of water, with a few streams and a number of springs at the time of European settlement. By the 1840s, the city of Manhattan undertook a precedent-setting trans-basin diversion, diverting water from the Croton River, and this reach extended further and further into the state of New York over the next century. Boston traced a similar pattern, with the construction of the Cochituate Reservoir in the 1830s significantly enhancing the city's capacity for population growth. The urban reach toward rural water resources, and a corresponding local resentment of this intrusion, is a pattern that the American West shares with the American East and, indeed, much of the planet (Koeppel 2000; Elkind 1998).

What explains this similarity? However generous nature might be with snow and rain, if you pile a bunch of people in a dense urban settlement, they will in pretty short order express a need for more water than the immediate area offers. A newly settled city, moreover, whatever region it has been plunked into, will follow a strikingly similar pattern. First, residents will take water from adjoining streams and/or dig their own wells. Soon, troubles of sanitation arising from the absence of sewage systems will make

those sources of water unappealing or even dangerous. Private companies will then come into being to respond to citizen demand for water that is neither distasteful nor disease-bearing. The companies will make promises of reliable service which they will, most likely, be unable to deliver on. Citizen frustration with the companies will lead to a mounting demand for the intervention of the city's government, on the premise that water supply is simply too important to the city's wellbeing to be left to private enterprise. An episode of worrying over how the city will come up with the money to finance the acquisition of a municipal system, and then an episode of dithering over the price charged to acquire the existing company or companies, will follow. And, then, after this long and trying chain of events, the city will assume responsibility for water and create a municipal water utility. Curiously, the fact that this process had run its course repeatedly in Eastern and Midwestern cities did not have much impact on the thinking and conduct of Western settlers, who repeated the whole sequence without taking the opportunity to abbreviate and sharpen the process by skipping a step or two.

Watching Westerners replicate every stage and step in this indirect and even wandering route to municipal responsibility for water supply, the observer can feel a twinge or two of fatalism. The lesson of history can begin to seem to be that human beings will choose a replicated and repeated muddle over the thoughtful and deliberative designing of a more reasonable and efficient sequence of actions. A community grows, and the increased number of residents then feel they need a bigger water supply. An individual or group steps forward to supply it. The enhanced supply makes it possible for the community to continue growing. But the quantity that seemed momentarily sufficient soon begins to register as inadequate, and another round in the cycle starts up.

In her impressive and illuminating comparison of water development in Boston and California's East Bay cities, historian Sarah Elkind sums up this pattern as it has appeared in the past: The "better services a municipality provided, the greater the demand for public works they inspired. In some cases, the lower prices, abundance, or convenience of city services prompted greater use of those services than anticipated. Ready access to running water, for example, nearly always led to a surge in water use that far exceeded projections" (1998: 42). Elkind is surely accurate in noting the historical reality of this sequence: growth; demand for more water; enhancement of the supply; continued growth; resurgent demand for more water; another enhancement of the supply.

Nothing in the basic operating laws of the universe requires or mandates that we continue in this loop. Human choice and human action direct, push, and maintain this cycle, and can also interrupt it. To use my local example, the Denver Water Board has been remarkable for its success in increasing the supply of water for residents, but it has also been remarkable

in its effort to ask for conservation and efficiency in the use of water. With early calls for conservation in the Dust Bowl years of the 1930s, with the effort in the 1950s to define a Blue Line to restrict its domain of service, with the invention of the term "xeriscaping" and the promotion of more sensible forms of landscaping, and with very successful efforts at reducing the waste of water during the 2002 drought, the Denver Water Department has accumulated an impressive track record of exploring alternatives to the cycle that ostensibly requires repeated increases in water supply. One of the most interesting questions in the twenty-first-century West is this: what strategies, tools, and methods have municipal water agencies acquired to direct the behavior of their citizens, clients, and consumers in the directions of a sustainable relationship with water? Can an agency ask citizens to distinguish their desires and whims from their actual needs, and then to act on the distinctions they identify, insisting on their needs, and yielding on their desires and whims? Can metropolitan agencies like Denver Water, well positioned by virtue of having looked ahead and secured water rights early on, design and follow a policy of "tough love" in urging their neighboring communities to keep their ambitions and plans within their water budgets?

When it comes to the project of identifying historical lessons, there is a distinction, rather like that between good cholesterol and bad cholesterol, that divides good hindsight from bad hindsight. There are three easy tests to tell bad hindsight from good hindsight: (1) bad hindsight finds simple patterns and offers simple lessons, while good hindsight reveals complex patterns and offers complex lessons; (2) bad hindsight says that "history repeats itself" and occurs in "cycles," while good hindsight pays close attention to the very different circumstances that must be taken into account even when – especially when – similar issues and themes reappear; and (3) bad hindsight leads to fatalism and resignation, and good hindsight keeps the door open to choice and the exercise of free will.

Telling good hindsight from bad hindsight will be a crucial skill as people everywhere on the planet squint into the future to learn what global climate change will mean for resources. For the American West, global climate change means that historic trends of rainfall, snowpack depth, and spring run-off are now of diminished relevance. Even the capacity to declare when an area is in a "drought" becomes shaky when the term "average year" loses its meaning.

Under these circumstances, the decisions made about water development will require even more in the way of ingenuity and determination than Westerners mobilized in the past. This fact argues for a temperate and tranquil consideration of the history of water development, in which we foreswear simple condemnations of the arrogant and aggressive manipulation of water in the past. Western water is now bound up in a vast net of rights and priorities; rivers are over-allocated; the best sites for reservoirs

already have dams; the contest among agricultural, urban, suburban, industrial, and recreational users of water approaches a zero-sum game. Early explorers of the Interior West, describing what they saw as the Great American Desert, thought that aridity in itself would carry the power of requiring and enforcing change in American customs. On the contrary, thanks to human engineering skills, that power was transferred to the institutions and organizations that acquired rights to Western water and then reconfigured its distribution. Despite persistent hopes that the limits of water will set the carrying capacity for human settlement, with the natural supply of water acting as legislator and enforcer to regulate human conduct, the responsibility for assessing and regulating our water use has always remained with us.

When future historians look back at the United States in the twentieth century, they will christen this unusual historical interlude as "The Era of Improbable Comfort Made Possible by a Taken-for-Granted but Truly Astonishing Infrastructure." In a manner unparalleled in most of human history, millions of people lived in a condition of extraordinary material ease, supplied with an abundance of food, energy, and water by institutions and organizations to which most of the beneficiaries never paid an ounce of attention. The degree of good fortune achieved by Americans in this era was exactly equivalent to the degree of their obliviousness of its sources. When people flipped a switch and summoned light or heat, or turned a faucet and conjured up a flow of clean water, normal human curiosity – "Where did this come from? Who made this happen? What consequences will come from this?" – went dead.

Environmental historians occupy a prime position for reawakening that curiosity, and by the same measure, reactivating a sense of responsibility. Alienation from nature and disconnection between the sites of production and the sites of consumption have been much noted in scholarly study. We are still in search of methods and strategies for persuading citizens to recognize the links between their comfort and the disturbance of distant landscapes. In truth, critics of consumer ignorance and irresponsibility have not always been leaders themselves when it comes to facing up to their own complicity as beneficiaries of the infrastructures that have taken a toll on natural systems.

Summoned to jury duty, an acquaintance once had an instructive experience with bearing on this matter of acknowledged complicity. It was a hot day, and when the prospective juror got to the courthouse, he discovered that the air conditioning wasn't working. When he tried to take the elevator, he discovered that the elevator wasn't working. When he went to a drinking fountain, he discovered that the fountain wasn't working. He then turned to a fellow standing near the fountain and said, "The way they treat us, you'd think we were the criminals," and he was surprised to hear the fellow respond, "But I am a criminal."

A few minutes later, in the courtroom, the fellow by the drinking fountain turned out to be the defendant, and when the judge asked if anyone had had any prior contact with the defendant, the prospective juror then found himself in a pickle. He said he had a conversation with the defendant, and when the judge insisted that he recount the nature of their conversation, everyone in the room then heard a confession of criminality, which led to an early dismissal for that particular pool of jurors.

When we speak or write of the injuries committed against intact landscapes and aquatic ecosystems by the enormous process of water development in the West, it is time to imitate the honest defendant's frankness and admit when we are ourselves "criminals," or at least something quite different from "innocent bystanders." To carry any credibility in asking the public to sort through their own habits of mind, it is the path of wisdom to acknowledge our own lawn-watering, garden-irrigating, water-drinking, and shower-taking complicity. If we would like to accelerate the withering of the mental habit that welcomes and relishes natural resources as long as they originate in places and processes that are out of sight and out of mind, forswearing hypocrisy will measurably enhance our credibility.

Indeed, the early twenty-first century is an auspicious time to make that attempt. For many reasons, it is getting harder to maintain the stance of alienation and disconnection from natural resources. A variety of wake-up calls have interrupted the American public's long and pleasant nap. Typically, a response to alarms that end naps will be an upsurge in grumpiness. When the sites of production are no longer concealed, and the connection between our material comfort and a giant network of coal mines, natural gas wells, electrical generating plants, transmission lines, dams, aqueducts, trans-basin tunnels, and treatment plants stands revealed, a common first response has been the condemnation of the individuals and groups who created this network and kept it in operation. It is time to examine that understandable impulse to blame and condemn the organizations that rearranged the West's resources, and then to move past that impulse to a fuller reckoning with the benefits and gains, as well as the losses and injuries, that figure in the creation of the infrastructure that supports and supplies American communities today. Introducing his history of the Colorado-Big Thompson Project and the Northern Colorado Water Conservancy District, the historian Daniel Tyler extends a useful and forceful invitation:

> With all due respect to those who view water projects as the work of evil megalomaniacs, I would ask readers to give some thought to the conditions that fostered the need for supplemental water … and the vision of [the] men who believed they were taking risks for the betterment of their families, friends, homes and businesses. (1992: 5)

Those of us who live in the United States today are dependent on, complicit with, and indebted to the organizations and institutions that disrupted the ecosystems and disturbed the landscapes that we have now come to treasure. This is a paradox that is not going to go away, and it is a source of much mischief if denied and evaded. But, handled with honesty, the paradox provides traction and solid footing for moving toward a more productive and honorable relationship to natural resources and the managers and engineers, bureaucrats and technocrats, to whom, for so long, we delegated the responsibility for keeping us in comfort.

My adventures beyond the borders of the university have permitted me to come to know many of these bureaucrats and technocrats, and to have the opportunity to talk to and with them about the historical legacy they carry. These encounters have gone a long ways toward making untenable the smug disapproval with which I once viewed their work and forcing me to think in more complex and (I think this is the only viable term) forgiving ways. This sounds like a solemn and sober process of learning, and it has indeed been punctuated by many serious moments. But life as an applied historian also has elements of such implausibility that solemnity and sobriety often must yield to almost cinematic scales of hilarity.

Back in Boise, on my day with the Idaho Division of Natural Resources staff, in my morning speech, I presented a "Wish List," springing from historical examples, of changes I would like to see in public thinking about Western water. (Obviously, a diminished enthusiasm for lawns figured high on that list.) In the afternoon, when I was off duty, I decided to hang around with these hard-pressed public servants and see if I could get a better understanding of their world. But then the first session after lunch turned out to feature a hypnotherapist who was going to help the bureaucrats and engineers find more creative ways to manage the stress of their jobs. In no time at all, two-hundred-and-fifty state employees and I had our eyes closed, and in another few minutes, we were all in something close to a trance. With the hypnotherapist's guidance, we entered an elevator that went on a long descent, and then, when the doors opened, we walked out on a beach of white sand next to a lake of turquoise waters. Nearly an hour later, the hypnotherapist finally told us to open our eyes, and the technocrats and I sat there befuddled. We had been equals in cynicism when we started on this improbable activity, and we were surprised to find we had participated so unguardedly and wholeheartedly, and we were thereby deeply embarrassed to tell each other that we had lost our grips on our skepticism.

The title of this essay, borrowed from a speech by Denver's leading advocate for water development in the mid-twentieth century, sums up the story: "Water Development: The Plot Thickens." Having taken an imagined stroll, accompanied by the water managers for the state of Idaho, along a beach of white sand as turquoise waves lapped at the shore, I can testify that the plot has gotten a lot thicker than I ever saw coming.

Notes

1 Title of a speech given on February 2, 1939, by Glenn Saunders, the legendarily forceful attorney for the Denver Water Board.

2 In my judgment, the best study in the history of water, for making the case for this hybridity, is Mark Fiege (1999); readers short on time should go straight to the extraordinary chapter 2, "Habitat: The Irrigated Landscape and Its Biota" (42–80).

3 The book, *A Ditch in Time: The City, the West, and Water*, is nearing completion.

4 My overview of Western American history came out in 1987; in its critical perspective on Western economic development, it obviously bore some kinship to *Rivers of Empire* and *Cadillac Desert*. But I reviewed the two books with both criticism and appreciation, so Worster, Reisner, and Limerick were apparently not entirely intellectual peas in a pod. My review of *Rivers of Empire* appeared in *Business History Review* (1986) and my review of *Cadillac Desert* appeared in the *Times Literary Supplement* (1990).

5 Robert W. Righter's (2005) innovative study of the damming of the famous Hetch Hetchy Valley matches the reconsideration of the Owens Valley tale, especially in rejecting the usual attribution of good and evil in characterizing the major figures. The San Franciscans who supported the building of the dam, Righter wrote, "were not from the kingdom of Hades, but rather honorable men committed to doing what they believed was right" (10). Righter also made the valuable conclusion that the idea of wilderness preservation did not figure in the debate, since "the defenders of the valley consistently advocated development, including roads, hotels, winter sports amenities, and the infrastructure to support legions of visitors. The land use battle joined over one question: Would the valley be used for water storage or nature tourism?" (6).

6 Donald Pisani rarely finds an orthodoxy deserving of exemption from challenge, and so he has questioned well-established assumptions about the impact and meaning of Progressivism. In *To Reclaim a Divided West* (1992) he doubted the omnipresent allegiance to "rationality and bureaucratic order" in reform movements in the late nineteenth and early twentieth centuries: "In fact, virtually all water law reforms were undertaken not in the name of rationality and bureaucratic order, but rather, because one group of water users sought dominance over another, or one community, region, or state sought to gain a competitive advantage over another" (334). In *Water and American Government* (2002) he made a similar point: "Neither 'science,' nor 'efficiency,' as we understand those terms today, did much to shape federal reclamation" (287). And so I make the claim – that most Progressives thought they had identified a clear and identifiable goal in the idea of "the greatest good for the greatest number" – with appropriate trepidation, figuring that as soon as Don Pisani reads this, he will perform his usual valuable service in pointing out my error.

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Chapter Twenty

Rich Crevices of Inquiry: Mining and Environmental History

Katherine G. Morrissey

Master nineteenth-century photographer Carleton Watkins is arguably best known for his classic images of Western landscapes. Watkins produced some of the earliest photographs of Yosemite, striking images that helped shape an aesthetic appreciation of the glaciated valley. Western US and environmental historians are likely familiar with the story often told about those particular photographs, the thirty taken with a new mammoth-plate camera, as well as the hundred or so stereographs. Exhibited in New York, the mammoth prints attracted wide attention and, along with the stereograph sets, influenced the 1864 legislation to set aside Yosemite Valley and the Mariposa Grove as a California state park – a precursor to the national parks movement.

These landscape photographs, however, are only one part of Watkins' portfolio. As a commercial photographer, he also employed his majestic skills in other venues. On commissions from railroads, entrepreneurs, and resource developers, he documented the ongoing industrial transformation of that very same Western natural environment. Although we might consider industrial photographs and landscape photographs as two distinct genres, for Watkins, as for many of his nineteenth-century counterparts, they were closely linked. In fact, Watkins had been engaged in seeing the Western environment from a mining perspective ever since his arrival in California. In the early 1850s, young Carleton Watkins traveled through the Sierra Nevada foothills delivering mining camp supplies as a teamster for a Sacramento dry goods merchant. Along the way, he learned to interpret the mining landscapes with his eyes and developed his abilities to frame his subjects with a lens. And in the same years that he captured his magnificent Yosemite scenes, he began his work for California mining companies, which sought visual documentation for legal cases (Palmquist 1983; Naef 2008). Whether for disputed land claims or mining pollution conflicts, the legal photographs by Watkins and a host of other less celebrated Western photographers helped shape a different environmental legacy.

Framed in both sets of photographs – those that celebrated the monumental power of nature and those that championed the monumental power of mining technology – were culturally informed visions. Sheer cliffs, scarred and formulated by elemental forces, were turned into the images of Yosemite and of Malakoff Diggings now articulated in a sublime aesthetic. While each may have reflected the emerging genre of Western landscape photography, the photographs also crafted other views of nature. When the mining photographers sought to capture the destructive or the productive impact of human interventions as part of legal disputes, for example, they participated in and extended the contemporary dialogue about the appropriate uses of natural resources. What's striking is not that the same lenses snapped both subjects, but that the images have come to represent divergent approaches and understandings. My concern in this essay on mining and environmental history is to explore those different approaches and to discuss recent efforts by scholars who, like Watkins, offer us new angles of vision and ways to interrogate the mining environment. What follows is not an exhaustive review of every form of mining, each environmental impact, or the entire scope of mining environmental history. Instead, I offer representative snapshots of inquiries that have engaged environmental historians and other scholars of mining's past.

The California gold rush, that drew the young Watkins and some three hundred thousand others to the central Sierra Nevada foothills in the mid-nineteenth century, created noticeable environmental consequences. Placer and lode mining alike involved substantial uses of natural resources. From cutting timber to altering water streams to displacing earth, mining activities deeply transformed the natural surroundings. None of these were solitary impacts. The litany of significant changes – redistribution of plant species, flooding and silting, destruction of fish habitat, soil erosion – includes many that rippled through the ecosystems (Dasman 1999; Rohe 1986). For most contemporaries, these alterations were neither particularly unexpected nor unwanted. Often read as signs of industry, progress, potential wealth, labor, and human agency, similar impacts had marked earlier mining landscapes. Indeed, the classic sixteenth-century mining treatise by Georgius Agricola chronicled a series of such consequences:

> When the woods and groves are felled, then are exterminated the beasts and birds.… the water which has been used poisons the brooks and streams, and either destroys the fish or drives them away. Therefore the inhabitants of these regions, on account of the devastation of their fields, woods, groves, brooks and rivers, find great difficulty in procuring the necessaries of life. (1950: 8)

For Agricola, as for many later nineteenth-century mining advocates, these by-products were tolerable in exchange for the wealth accumulated from the earth. Agriculturalists early pointed to the environmental costs of mining: "those who condemn the mining industry say that it is not in the least stable and they glorify agriculture beyond measure" (Agricola 1950: 5).

In the California gold fields, the scale and intensity of environmental changes drew particular attention. Most dramatically, the impact and legacy of hydraulic mining captured the concerns of nineteenth-century farmers and politicians, and of twentieth-century historian Robert Kelley.

Kelley's *Gold vs. Grain: The Hydraulic Mining Controversy in California's Sacramento Valley* (1959) has come to be seen as the first environmental history of American mining. When Kelley completed his PhD dissertation at Stanford in 1953, however, he conceived of his work as a case study of sectionalism. The nineteenth-century story of the public conflict and court battle between central California farmers and miners in the Sacramento River watershed served for Kelley as "a chapter in the decline of laissez faire" (1959: 1), a precursor to the increasing role of the state in regulating industry. Environmental historians frequently cite Kelley's work as they retell the adversarial struggle between hydraulic miners, who diverted stream water through high-pressure hoses to wash gold-bearing rock gravel out of adjacent hillsides, and valley farmers, who watched the debris wash downstream, fill up stream channels, heighten riverbeds, exacerbate flooding and spread over their fields. It is a spectacular environmental tale. The hydraulicking process used a tremendous amount of water, could liquefy entire hillsides, and resulted in a dramatic rearrangement of the landscape. Less overtly visible were changes wrought through the increased presence of mercury and alkaline materials in water and soils.

As competing natural resources users, farmers and miners, even if not necessarily working at economic cross-purposes, held divergent beliefs about the values of their activities. You can hear the celebration of human control over the environment in the words of T. A. Rickard, who described an Idaho mine as "More than a hole in the ground; it is an expression of hope, initiative, energy and accomplishment; it is the fine flower of industrial achievement" (1932: 340). The language employed to describe hydraulicking's impact suggests the emotional potency of abrupt and substantial environmental change. Powerful technology at work in the diggings drew the awe and admiration of observers who struggled to capture their sentiments as they stood "on the brink of the mine and try to fix the salient points in thought and memory.… There is a real pleasure, very distinct, but hard to describe, about this gigantic force" (Kelley 1959: 51–2). The names of the hydraulic nozzles provide additional insight into attitudes toward the environment: Monitor, Dictator, Chief, Little Giant.

Downstream farmers, coping with the blankets of mining debris that covered their fields, and townspeople, facing financial losses from flood damage, considered the awesome force of the hydraulic process as an evil. Describing the "extreme desolation and ruin" of their farms "appalling" and "the very devil's chaos indeed," land owners brought public attention and legal cases into local and federal courts (Kelley 1959; Bowles 1866: 308). Valley newspapers published political cartoons depicting houses, ships,

cattle, trees, all swept up in the tailings-infused floods emanating from the hydraulic hoses, while self-satisfied corpulent mine owners surveyed their profits from the safety of the hillsides. Economic, political, and moral arguments swayed in the courtroom and in the court of public opinion. In the end, anti-debris activists succeeded in their efforts to force an injunction against upstream hydraulic operations. Justice Lorenzo Sawyer determined the "enormous deposit of debris … a continuing, ever-present … alarming and ever-growing menace, a constantly augmenting nuisance" (*Woodruff v. North Bloomfield Gravel Mining Co.* 1884: 800). Rivers could not be used for the deposit of tailings.

The Sawyer decision, hailed as a landmark, did not mark a significant change in environmental ideas. The farmers and miners in this case, as in other early environmental disputes, shared similar utilitarian views about natural resources. It was not the destruction of the environment that drew them into the courts – it was the destruction of their property and the attack on their ways of life. Motivated by different ideas about the value of their work for society, miners and farmers continued to reshape nature. The legacy of hydraulic mining, both ideological and physical – from its utilitarian approach to natural resources to its dramatic rearrangement of the landscape and the water system – remained. Consider what happened to the property of those mining companies. Other natural resource users – whether irrigation farmers, lumber operations, or hydroelectric power companies – took over the canals and flumes that snaked down through the foothills. And the legal decision applied only to the American and Yuba river watersheds. Hydraulic mining, albeit at smaller scales, continued elsewhere.

Tailings disputes – legal conflicts over the detrimental impact of mining debris, whether generated by hydraulic mining or other processes – surfaced in other regions through the nineteenth and early twentieth centuries. They did not always end in similar rulings. In Montana, for example, the prevailing industry and public sentiment, even as it acknowledged that the washed-out sediment damaged the ranches and farms miles downstream, defined the problem according to economic need and considered it a short-term problem: "the mines have to be worked and even should a few acres of land be covered up on the banks of Gold Creek [Montana], the new soil formed will be as good if not better than the old" (Smith 1987: 87). In Idaho, ranchers and farmers along the Coeur d'Alene River failed in their legal efforts to restrain mine debris with an injunction against the region's silver-lead mining operations (Morrissey 1999). In Arizona, Mormon irrigation farmers, through a legal case that went all the way up to the Supreme Court, succeeded in forcing copper companies to build dams and settling ponds intended to contain mining waste and to prevent it from flowing downstream.

The persistence of the tailings issues, as well as the variability in adjudications among competing natural resources users, highlights the conflicting

perceptions of mining's environmental impacts. The ways individuals and groups thought about mining reflected their ideas about nature, as well as their material dependence on specific resources. Those perceptions were also rooted, in part, in mining itself. Distinct forms of mining, ore compositions that varied from one geological region to another, and changing types of technology, all meant that how the landscape was reshaped by mining practices varied over time and from place to place. Although the scale and intensity of environmental changes may have turned the spotlight on California hydraulic mining, such factors did not always render cultural attention. One more quick case study – the story of dredging – makes this point.

Placer mining and hydraulic mining sites were often the locales of yet another form of extracting the minerals, especially gold, from the surface. Dredging companies reworked old sites from southern Idaho's Boise Basin to Alaska (Murray 1990; Spence 1996). Gold dredges were massive machines, looking somewhat like a misshapen boat, and like their visual counterpart, they floated on water. On one end, a large boom swung out a revolving chain of buckets which, rotated by steam or electricity, dug into the gravel layers lying beneath the surface of the water. The gravel brought up from the stream bottom was dumped into a hopper, and then washed over a screen. Here the gold was separated from the rock. Once they were washed through the screen, the smaller materials, in which particles of gold were suspended, were run over a mercury-plated sluice/washboard which caught the free gold as amalgam. The worthless gravel – the vast majority of the dug-up materials – ended up in long sinuous piles alongside the stream (Spence 1980; Rohe 1986).

In the early twentieth-century "golden age of dredging," as coined by mining historian Clark C. Spence, the results were impressive, both in the amount of profit (the Yukon Gold Company dredging along Prichard Creek produced more than $1 million worth of gold in its nine years of operation from 1917 to 1926) and in the amount of tailings. One 1928 report on dredging operations along the Middle Fork of Idaho's Boise River noted that "the tailing piles from these workings are almost continuous for 50 miles" (Lee 1928: 2). But if a reader of these descriptions might wonder about the impact of these concentrated tailings on the river's water quality, the mining engineer author saw these tailing piles as attestations "that the gravel along is gold bearing" (Lee 1928: 2). Not all dredging operations were technologically or financially successful – dredges sank, operations were under-financed – but all had an impact on the landscape. As one 1911 USGS report dryly put it (in a description of a Breckenridge, Colorado, dredging operation), "this ambitious project, like its lesser predecessors, failed to wrest its riches from the river channel, although it has left an enduring monument to itself as well as an instructive warning to others in the huge pile of bowlders, many of them over 6 feet in diameter, that now overlooks the town" (Ransome 1911: 19). Dredging destroyed original stream

beds and significantly rerouted the waterways and rivers. Overturning the soils and eradicating vegetation, the operations left an unsightly mess. Disrupting sediments released a flurry of toxic materials – mercury among them – that had settled in stream beds after earlier mining efforts.

Concern over the environmental impacts of dredging, particularly on agricultural lands, garnered some attention during the Progressive era. A series of bills in the California state legislature sought to restrict dredging in much the same way as judicial action had curtailed hydraulicking several decades earlier (Spence 1981; Chaput 1981). In Oregon and Montana, groups made efforts to regulate dredging operations for the protection of marine life and agricultural lands. But gold dredging, despite its dramatic and widespread impact on the environment, never erupted into the political battles that characterized the hydraulicking controversy.

As the hydraulic and dredging stories suggest, mining environmental history does not easily fit into a simple progressive tale. US environmental and mining historians have recognized that mining activities have varied in scale, in location, and in practice throughout the continent. Over the last two hundred years, variable technological changes, economic pressures, and international events have shaped the industry. Historical case studies of the impact of mining on the environment reflect changing mining practices and distinctive contexts: in the Pennsylvania oil booms (Black 2000), Klondike gold rush (Morse 2003), northern Rockies industrial hard rock mining (Aiken 2007), and Appalachian coal fields (Montrie 2003), scholars have noted specific historical circumstances, social concerns, and ecological processes. Geographers have mapped the ways mining processes have shaped and created distinctive landforms (Francaviglia 1991: 129–36; Rohe 1983). The diffuse impacts of mining across these distinct natural and cultural environments may not have allowed for a uniform story, but it has led the field of mining environmental history into rich crevices of inquiry.

Mining's environmental history, frequently told as a story of environmental costs, is emblematic of other industries. It is worth noting the ways that mining is closely tied to industrialism. The development of a mining region was reliant on extensive capital drawn from other regions; unearthing and processing ores was dependent on machine power and new technologies; it required horizontal and vertical linkages to other industries (for timber, water and other raw materials, for machinery, ore cars and other processed materials, for transportation, marketing and other corporate needs); wage labor management, and radicalism, characterized the workplace.

The conflicts over alterations of the environment by mining practices that have engendered the most attention by scholars have been those that erupted into legal cases – the court records provide rich testimony. Mining legal cases abounded in the industrial era; they concerned land and mineral claims, technological developments, and, increasingly, litigation among different natural resources users over water, soil, and air. From the Appalachian

coal fields to the California gold region, from the Idaho silver mines to the Missouri lead operations, from Arizona copper smelters to Michigan iron country – to name only a representative handful – every mining region confronted disputes that resulted from quartz, hydraulic, underground, open pit, and other mining operations and the uses of stamp mills, concentrators, smelters, and other technology. Complaints included destruction of property, obstruction of waterways, and pollution of water, soil, and air. In addition to the California hydraulic mining controversies (Kelley 1959, 1989; Isenberg 2005), the early twentieth-century smelter smoke debates swirling around international borders (Wirth 2000; Allum 1995) and the impact of copper mining in Montana (MacMillan 1973; Quivik 1998; Stiller 2000) are a few favorites. These powerful stories about contested terrains resonate with present-day concerns.

But there is a potential bias in structuring one's analysis within the adversarial setting of the courtroom: it creates a view of these conflicts as two-sided debates, with winners and losers. The situation in these and other mining regions was neither so clear cut nor dialectical. There were a range of ideas about the environment – ideas that were, and are, malleable. Nonetheless, removing the debates into legal settings reminds us, like the Watkins photographs, of cultural views and concomitant sets of changes. For along with mining's alterations in the material world – of rock, water, air, and trees – came changes in the mental world – of ideas and perceptions. These complexities and interconnections across the ideological/material divide make mining an especially powerful subject for environmental historians, whether they are tracking the movement of minerals from the environment into commodities (Cronon 1992; Isenberg 2005: 138) or tracing the meaning of work on miners' bodies (Morse 2003; Andrews 2008).

Environmental historians have shared the surge of interest in mining environmental history with mining historians (Aiken 2007; Smith 1987), public health historians (Snyder 1994), scholars interested in changing mining technologies and industrial hygiene (Quivik 1998; Sellers 1994, 1997), and urban historians (Tarr 1996, 2005). The intersections across these fields of inquiry have been quite fruitful, perhaps nowhere more so than in the investigation of smoke.

In the late nineteenth century the roots of changing environmental ideas are visible in mining; we can see them, somewhat ironically perhaps, in smoke. By the late nineteenth century, smoke was quite visible, in part, as a result of the increased use of bituminous coal, or "soft coal." It produced a highly toxic smoke, a more serious threat than the smoke from anthracite coal, wood, or coal-gas. Coal smoke, for many, was not a problem. As British environmental historian Peter Thorsheim has noted, the assumed biological origins of smoke kept attention away from its toxic properties (2006: 16). The assumed benefits of smoke in preventing disease, the efficiencies and conveniences of coal, along with its domestic uses and the economic investments in the industry, also contributed to sustaining positive perceptions.

The differential impact of industrial smoke also meant that air pollution only gradually became a national issue. In urban areas, it was most common in areas where bituminous coal was a primary fuel for industry, transportation, and domestic purposes. New York, Boston, and Philadelphia relied on anthracite. But in Pittsburgh, Cincinnati, St. Louis, and Chicago, where bituminous coal prevailed, the ubiquitous smoke resulted in dingy buildings, smoggy atmospheres, and health concerns (Stradling 1999; Tarr and Zimring 1997). In mining regions, both town residents and local rural ranchers and farmers readily identified the smelters that produced smoke conditions (Wirth 2000).

Minerals found in composite form – copper located in sulphide ores, for example – needed to be extricated from the surrounding rock and treated chemically to separate and release the minerals. Heat is an important part of the process. In Tennessee's Ducktown District, heap roasting – open air roasting of ores to burn off the sulphur – was standard industrial practice into the twentieth century. Sulphide ores typically include heavy metals such as arsenic, cadmium, and lead. The fumes emanating from the acres of roasting pits caused severe damage to vegetation, wiping at least 10 square miles clean of all plants and trees. This barren Appalachian landscape, severely eroded, reminded more than one observer of a moonscape or desert (Quinn 1993; Snyder 1994, 2003). Containing the roasting process within smelters did not eradicate the problem of sulphur dioxide damage, which typically spread with the prevailing winds. Butte, Montana, for example, boasted some six smelters by 1889, within a city of 10,000, and nearby vegetation experienced visible impact. The mountainous locations of mining towns, as geographer Randall Rohe has noted, "with its narrow canyons, thin air, and temperature inversion, exacerbated the smoke" (1994: 140). Initial industrial efforts to address the smoke problem in urban and mining areas generally meant going up (building taller smoke stacks) and going out (moving the smelters to another location). Anaconda became the home for those Butte smelters; in Arizona, Bisbee smelters moved to nearby Douglas. Such technological fixes, engineering a solution, reflected the reliance on scientific/professional experts, met political needs for social resolutions, and satisfied the industry's incentive to maintain economic profits (LeCain 2004).

What was the meaning of this smoke? "The thicker the fumes, the greater our financial vitality and Butteites feel best when the fumes are thickest," as the local Montana newspaper recorded (Wyman 1989: 17). And thick they were. Smoke had long been read as a visible sign of economic prosperity. Sure, smoke was a nuisance, but it was endured in return for material progress. Many argued for the benefits of smoke, beyond the financial. When a flu epidemic raged through Butte, one local resident explained, "It is the opinion of physicians that the sulphur smoke which permeates everywhere has a discouraging effect upon the microbe and causes it to relax its grip" (Smith 1987: 45). The ladies of Butte, according to one observer, are

"very fond" of Butte "because there is just enough arsenic there to give them a beautiful complexion and that is the reason the ladies of Butte are renowned wherever they go for their beautiful complexions" (MacMillan 1973: 21). For others, annoyances mounted. "We could smell Eureka before we got there," noted one contemporary observer of the Nevada mining town. "Black clouds of dense smoke from furnaces, heavily laden and heavily scented with the fumes of lead, arsenic and other volatile elements of the ore" filled the air (Rohe 1995: 182–3). Complaints about frequent nasal, throat, and bronchial problems were traced to smoke (Mitman 2007).

Anti-smoke campaigns connected these urban and mining region concerns. Mining refineries and smelters – often processing ores, mattes, and anodes that had been shipped from other areas – contributed to the urban smoke problem in Newark, Pittsburgh, Chicago, and Kansas City. Smelters in Western cities such as Denver, Salt Lake City, and San Francisco, although only one of several generators of air pollution, became the focus of smoke abatement efforts. Specific types of arguments became effective in the new industrial order. In 1908 the American Civic Association called upon landscape architect Frederic Law Olmsted, Jr., who was deeply engaged in City Beautiful campaigns, to author their pamphlet about the dangers of smoke. The "Smoke Nuisance," he noted, had affected city parks – which have "lost their evergreen character … as conifers cannot long endure city smoke." And "the direct menace to the public health in fostering tuberculous conditions by loading the air with carbon particles to lodge in the lungs, and by causing housekeepers to keep the windows shut for fear of the soot that floats in when they are open, is equaled only by the mentally and physically depressing effect of the pall which shuts out the life-giving and germ-destroying sunshine" (Olmsted and Kelsey 1911: 4). When reform-minded women relied on moral arguments as "municipal housekeepers," they connected concerns about children's health and domestic expenses with city sanitation, public health, and costs (Gugliotta 2000; Flanagan 2002). As Olmsted chronicled the health hazards of smoke on people and plants, he turned to science as an authority and financial considerations as a measure: "There should be complete understanding of the scientific fact that visible black smoke is made up almost entirely of unconsumed particles of combustible carbon, or coal, wasted into the atmosphere.… It is economic waste, in itself; and its emission creates additional waste." It was, he concluded, "an imperative economic and sanitary need" to combat the "Smoke evil" (Olmsted and Kelsey 1911: 5). As the Olmsted pamphlet indicates, arguments about health and environmental change shared space with concerns about property damage and economic waste.

In the late nineteenth century and early twentieth century, mining environmental conflicts were played out not only in tangible natural resources related to mining – water use or timber depletion, for example – but also in

workers' health and workers' bodies. Such conflicts drew on economic arguments and health and safety issues. By tying workers' health into economic arguments (just as Olmsted did in arguing against smoke), reformers succeeded in passing new laws and in winning court battles. In Utah, for example, the state constitution required "the legislature to pass laws to provide for the health and safety of workers in factories, smelters and mines" (*Holden v. Hardy* 1898: 380–1). And so the state legislators did. They established an 8-hour day for smelter workers. Working conditions in smelters, especially exposure to noxious fumes for many hours, they pointed out, constituted a health risk and so workers should not have to endure them for more than an 8-hour day. Challenged through the courts by a mine owner, the US Supreme Court in *Holden v. Hardy* 169 US 366 (1898) upheld the protective statutes. Justice Henry Billings Brown wrote that "certain … classes of persons, particularly those engaged in dangerous or unhealthful employments, have been found to be in need of additional protection" (386). With this legal precedent, other states followed Utah's lead and passed laws to limit mining work to 8-hour days.

The case is a landmark one for labor history as it is tied into the union struggle for an 8-hour day. But it is also important in terms of environmental history. It serves as a reminder of the ways that industrialized relations with the environment – in this case, the mining industry – led to an identification of environmental damages (Sellers 1997: 47). Hazards of industrial mining were also identified in the region outside the smelter – on individuals, on property, on nature. Lawsuits for smelter smoke damage proliferated in the early twentieth-century mountain mining regions, including Utah.

Recent works in mining environmental history pursue the directions suggested by the smoke scholarship, with a special emphasis on bodies, metaphors, and cultural meanings. These new angles of vision on the mining pollution story consider other complexities and interconnections. As historian of science Rosalind Williams notes, the mining environment may be technological, "but it is also a mental landscape, a social terrain, and an ideological map" (1990: 21). In *Killing for Coal*, labor and environmental historian Thomas Andrews offers the term "mine workscape" to refer to this expansive understanding; a workscape encompasses not only physical elements of land, water, air, bodies, and organisms, but also "the language people use to understand the world, and the lens of culture through which they make sense of and act on their surroundings" (2008: 125).

In her study of the subarctic mining region, Canadian environmental historian Liza Piper examines the language of mining, especially the practice of referring to underground ore bodies as, precisely, bodies. What does it mean, she asks, that mining men used anthropomorphic metaphors – veins, sinues, and arteries – to map their understanding of the subterranean world? While geologists employed such words to share their animated notions of how mineral solutions had circulated into specific formations,

miners and mine engineers did so to humanize the underground in order to make it a habitable place for work. Using terms of human body parts – ribs, hair, breasts, bones – to place the rocky chambers into a comprehensible scale for physical engagement, "deepened human ties to nature by extending the human experience into ever more alien and previously inaccessible places" (2007: 167). Above ground, the mills and refineries were part of an industrial system, an organic whole nourished and sustained by the rocks.

For Timothy LeCain, mining, especially hard rock mining, is neither inherently natural nor essentially inorganic. As a historian of science and technology, his interest is drawn to "environtechnology" – the intermingling of nature and technology. Technology, he tells us, is nature transformed. His concern is with the cultural shift that constructed conceptual barriers between technology and ecology and that enabled the development of "immense natural factories of mass destruction" (2009: 132), such as the Bingham, Utah, open pit mine. Just as Piper argues that anthropomorphizing language masked mining's negative consequences, LeCain sees danger in looking through a cultural lens. Our values of mass production and mass consumption have worked, he warns, to obscure the environmental costs of mining.

Environmental historian Kathryn Morse, too, explores mining as a cultural process. Klondike gold rush miners, "attuned to the earth in which they were digging," learned to read the landscape as they established new connections to nature. Their efforts may have disassembled the mining environment, but along the way nature reshaped the miners (2003: 102). This nature/culture symbiotic relationship, especially as engendered through work, is at the heart of Thomas Andrews' understanding of Colorado coal mining. As he explores the "interconnection of physical energy and social power in the industrial world" (2008: 18), he describes the ways coal miners shared an embodied knowledge of their underground labor. Their exposure to the mine explosions and accidents helped inculcate the solidarity to seek social and environmental justice.

From the California hydraulicking case study to these more recent works, environmental historians who have turned their attention to mining have explored a range of topics, many of them grounded in materiality. Following the lead of Robert Kelley, scholars have provided especially expansive coverage of mining's environmental costs. While an important and salient subject, it is not the only mining story that benefits from the approaches and insights of environmental historians. As these snapshots depict, mining environmental history has opened into other arenas of investigation – including shifts in perceptions of nature, the intermingling of technology and environment, and cultural meanings of the underground. Most suggestive have been the intersections across different fields of inquiry, at which interdisciplinary approaches link urban and rural environments or consider

public health alongside the laboring body. Like nineteenth-century photographer Carleton Watkins, mining environmental historians benefit from crafting their views of nature from multiple perspectives.

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Chapter Twenty-one

Who Cares About Forests? How Forest History Matters

Ellen Stroud

In late February of 1904, Sydney Nelson of the Mt. Airy neighborhood of Philadelphia learned that Arizona coyotes do not take kindly to being chained in Eastern back yards.[1] A friend had sent him the animal as a pet, and Nelson had built a doghouse for it, hoping to provide a homey shelter for his new charge. According to the local newspaper, though, "the prisoner had howled continually" (*Philadelphia Inquirer* 1904).

His neighbors complained, and the howling began to grate on Nelson as well, so he decided to re-gift the small beast. The coyote was to have a new home as the mascot of the neighborhood's Fire Engine Company No. 9, which everyone hoped would be better able to handle the noise. The coyote, though, had other plans. " 'The call of the wild' prevailed against captivity," the paper reported in early March. "The coyote slipped his collar and escaped to Carpenter's Woods. The engine company is now hunting him" (*Philadelphia Inquirer* 1904).

The newspaper does not report whether the animal was found, nor what happened to him if he was. But for our purposes, no matter: the Arizona native had found his way the several blocks from Nelson's house to the wilds of Carpenter's Woods. A century later, the wilderness of those woods still provides respite from civilization for the creatures nearby, despite offering only 37 acres of wild (Contosta and Franklin 2010: 267).

Carpenter's Woods is a modest branch of an immodest urban playground: Philadelphia's Fairmount Park claims to be the nation's largest in a city, and by some counts it is. Its 9,200 acres dwarf the 843 of New York's Central Park, for example, and is almost double the 4,108 acres of Los Angeles' Griffith Park. But not all pieces of Fairmount Park are contiguous: it gets to be so big by counting over sixty neighborhood parcels as part of the whole.

The park was founded in 1855, shortly after the city began acquiring land along the Schuylkill River in a vain attempt to protect the quality of

the deteriorating urban water supply. Since 1801, when the young city opened the valves for the nation's first municipal water supply system, Philadelphians had enjoyed being at the forefront of water supply technology. But by the mid-nineteenth century, industry along the Schuylkill threatened the water's purity; scientists and city leaders argued that if the land along the river could be purchased and protected as parkland, far less pollution would make its way down the banks. When the Fairmount Park Commission bought Carpenter's Woods in 1916, it became one of many purchases intended to create buffers for small creeks winding through the trees, eventually feeding the river that flows to the city taps (Gibson 1988: 9–10; White 1975; Contosta and Franklin 2010: 265).

Now that three treatment plants safeguard the quality of that water, who really cares about Carpenter's Woods? The occasional wayward coyote notwithstanding, the most frequent visitors to this small, scruffy patch of greenery are neighborhood birders and their natural enemies, the off-leash dog walkers. The tangles of dirt paths among the trees are rocky, wide, and trod to a cement-like hardness. Poison ivy, skunk cabbage, mosquitoes, and overfed squirrels pop up at every turn. On occasion, you'll find the odd pile of construction debris, illegally discarded just deep enough into the trees to escape notice until a contractor is long gone.

But I love the nature here: I grew up with Carpenter's Woods. As a young girl I collected salamanders in the creek in the clearing; I caught lightning bugs in the meadow; I careened over the dangerous and exhilarating jump on the sledding hill. In my childhood, these woods taught me to love nature. This was where science class was fun, where the world was mysterious, where maybe I'd get lost and have an adventure, or meet a gnome, or write a poem, or find treasure. My sense of possible worlds would have been much smaller without these trees.

To my adult eye, the sledding hill looks even steeper, though the jump isn't quite the catapult I remember. The clearing is smaller, and the creek harder to find, in part because saplings have begun to encroach on both. Yet in recent years, I have continued to learn from the woods, walking through them slowly with my father, and later with his grandchildren. My father was in the final stages of a painful illness during our last ventures to the woods together, but that wasn't the only reason we took our time: he was a photographer, and every step revealed another detail he wanted to capture in his lens. He taught me to see not just the fallen oak along the path, but the pattern and beauty in the tree's moldering bark.

My personal experience with Carpenter's Woods has affected me as a daughter and an aunt, as an environmentalist and a hiker, as a scholar and a teacher. Those perspectives, though, are not as reconcilable as I keep hoping they will be. In this essay, I purposefully move among them, exploring some of the many ways that forests and their history carry meaning and import for different people and peoples: personally, socially, and politically,

and on local, regional and global scales. I can only touch on the issues at stake here, and can barely dip into the rich international literature on woods, so my meanderings, while intentional, are idiosyncratic. My primary points are simple but important ones: that forests and trees mean many things to many people, and that both forest history and forest policy are at their best when they embrace ambiguity and divergent needs.

Trees are often far larger than people, and older, and forests can have more history and as much complexity as human society. Forests are captivating for many of the same reasons they are so difficult to preserve: the life of a tree can span generations; a tree can perform many functions, and can hold importance for people in ways beyond mere functionality; and the meaning of a forest, its value, its importance, the histories it can tell us, the stories it can hold, the timber or habitat or play space a forest offers, is never clear. Each person, squirrel, coyote, feral cat, oak tree, worm, and ivy sprig experiences a different Carpenter's Woods.

And while the history, meanings, and values of my local forest are tangled, forest history gets even more messy – and intriguing, and productive and fun, if never definitive or finished – as the scales and locales of stories move about. Forest history in Philadelphia is a different animal from forest history in Pennsylvania, or the Northeast, or the United States, or North America, or the industrialized nations, or the world. And these many histories are not building blocks or subsets or even necessarily overlapping parts of a hard-to-comprehend whole: they are different, even as they may all be true. As Richard White argues in "The Nationalization of Nature" (1999), historians' choices of scale and perspective shape our questions, answers, and narratives. And in forest history, the choices are vast. Forest history itself has no single past: forest historiographies the world over are distinct, and there is much to be gleaned from reflecting on the contrasting and complementary scales, perspectives, and threads.

Simon Schama, in his wide-ranging and impressive tome *Landscape and Memory* (1995), and Robert Pogue Harrison, in his challenging but compelling *Forests: The Shadow of Civilization* (1992), offer two of the best in-depth meditations on the meaning of forests in what is still absurdly referred to as Western Civilization. The forest has long been a place of mystery, of sanctuary, of renewal, of danger, and has a heavy function as metaphor and concept, quite divorced from (though still influential on) histories of physical place. Schama and Harrison suggest that woods – even modest woods, local woods, and small forest parks – carry a cultural weight in the West that is inescapable. Robin Hood, Hansel and Gretel, poetry, war, creation myths: there is so much culture and cultural memory bound up in forests that we can't help but be ensconced in it, even when we aren't aware that we are. I am not entirely sure what Harrison means when he writes that "in the depths of cultural memory forests remain the correlate of human transcendence" (1992: 247), and yet he strikes an emotive note

that I recognize when I walk in the woods. Both Schama and Harrison verge on essentializing a Western cultural memory that I find hard to imagine is as broadly shared or efficiently transmitted as their elegant prose suggests. However, as an environmental historian who privileges the physical world in my scholarship despite knowing that emotions and visceral reactions color my readings of physical places, I am grateful to Schama and Harrison both for reminding me of my inability to observe from outside, and of the value of recognizing the cultural positions and places from which I work.

Which leads me back to the question of caring about trees. Who does care about them, today, in Philadelphia, and beyond? Certainly, those who care about recreation, education, wildlife habitat, and green space in and near the city have a stake in wooded land. So do those who care about global warming, about wood products, about property values, and about the view from their front porch. People whose religious beliefs draw them to woods care deeply about trees and forests, and people who have reason to hide find them terribly convenient. Labor policy, tax policy, resource access, property rights, the reach and responsibilities of governments and their agencies – all of these are played out on, about, and with forested lands.[2]

The question of who cares turns out to be central to the project of forest history. The easy assumption that of course people care about forests elides the fact that people rarely agree on what they are speaking about when discussing woods, much less on the reasons to value trees. The *Journal of Forestry* even published a special issue recently devoted to the slipperiness of forest terms. "When is a Forest not a Forest?" asks one article (Lund 2002). "Forest, Forestry, Forester: What Do These Terms Mean?" asks another (Helms 2002). The answer to both questions: it depends. And that's not a wishy-washy answer; it is important to recognize that the answers do indeed depend on the time, place, position, and perspective of the person using the terms.

The danger of not recognizing the lack of a common vocabulary is not just bad policy; the risks are far more pernicious than that. Often, those who care about forests do not understand what is at stake for others who are just as invested in the woods, but for different reasons. As they talk past each other, they leave important questions not just unanswered but unformed. Which is tragic – for forests, their creatures, and for human societies.

Around the same time that Sydney Nelson's Arizona coyote was finding sanctuary in an urban wood, Olive Cousins was trying not to lose her claim on a small bit of forested land in Maine. Her conflict with her neighbors in the small municipality of E Plantation in Aroostook County demonstrated that even in early twentieth-century rural Maine there was little agreement on what a forest was, and whom it was for. In 1903, the local officials of E Plantation began petitioning the state forest commissioner for help in running Olive Cousins off the land. Cousins had been living on a state-owned wood lot for over a decade, raising her four sons alone while her husband

was confined to a mental institution. The officials were scandalized by the fact that Cousins frequently entertained male visitors in her small cabin among the trees. And worst of all, she had given birth to two more sons while her husband was away. She and the six boys were paupers, and the state was supporting them by allowing them to live on public land and harvest public lumber. "We the assessors as well as the majority of the people do object and kindly await your counsel," the local officials wrote. "She isn't a decent woman and we want to get rid of her" (Stroud 2001: 152–3; Hafford and Drake 1903; Hafford 1904; McGray 1908).[3]

Olive Cousins didn't want to move, and in her polite letters to the forest commissioner she explained that while her husband was in the asylum and her children were young, she was dependant on the state for her home. If the state would not support her, she had nowhere else to turn. She complained that the people of E Plantation "do all they can to hurt me, but I have a right to a home as well as any of the rest of them. Here, the rest of the women have a husband to furnish them with homes and I have not.… The people on E want to live themselves but they don't want to see anyone else live" (Cousins 1903). She convinced Forest Commissioner Edward Ring that she was a worthy recipient of state aid, and he allowed her to continue living in her cabin on state land and harvesting small amounts of timber.

Her neighbors found her use of the woods to be worse than wasteful. They wanted the land for hunting cabins, for storage sheds, for lumber income, for a post office, for a public school – for anything, really, other than supporting Olive Cousins or people like her. Each year brought a new plan, a new public use that would certainly, they hoped, be a better public use. They were never able to get rid of Cousins, but their repeated attempts brought to light fundamental disagreements about proper uses of public land and state trees.

In early twentieth-century Maine, the state was responsible both for the care of the poor in the smallest of municipalities, and also for maintaining public wood lots within the municipal borders. But if the state forest commissioner attempted to use state land or lumber to meet the state's obligation to support the local poor, he met fierce opposition. Local residents believed that public land ought to be used to benefit the public in general, and making it possible for paupers to stay in the area was far from a benefit; it was a nuisance. Cousins' neighbors argued repeatedly that the greater public good would be better served by getting her to just go away. Assessor Robert Hafford wrote to Commissioner Ring that Cousins' house was a "horehouse," and "it would be a god blasen to the plantation if she was of[f] it" (Hafford 1908).

When the local officials of E Plantation couldn't get rid of Cousins, they cut down the trees near her house. Cousins complained to the forest commissioner when one of the assessors had cut $100 worth of what she considered her timber, and had told her that he was going to cut more; when

the commissioner was unable to put a stop to the harvesting, Cousins let him know that she was going to increase her harvest as well. But when she brought her logs to the mill to be cut into railroad ties for sale, the town assessors confiscated them and notified the forest commissioner that she was stealing wood. In her frustration, Olive Cousins began petitioning the forest commissioner to allow her to purchase the land on which she lived so that her rights could not be constantly challenged. However, the state did not have the authority to sell the land.

In 1912, the records of correspondence between the residents of E Plantation and the forest commissioner come to an abrupt end, so just as with Nelson's coyote, we don't know the end of the story of the loose woman and her trees. But together the stories tell us of many of the reasons people care about forests. In the first decade of the twentieth century in the United States, just as in the first decade of the twenty-first century in both the US and many places around the world, people care about forests because they are home, they are money, they are habitat, they are beautiful, they are refuge, they are ecology.

But the very complexity of forests and their pasts has lent itself to narrow foci within the historiography. In part because it will always remain impossible to tell a complete history of a forest, many of our foundational forest histories have been very specific tales. These books focus on heroic acts, technological innovations, and administrative maneuverings, all of which have been critical to understand within the history of a forest, and which have laid the groundwork for later studies of the effects such happenings have had not just on industry, governance, and the fate of particular tracts of land, but also on local, regional, and even global experiences of forests, trees, nature, and the environment.

In an essay on teaching world forest history, Nancy Langston (2005) calls on those of us who study forests to write the history of woods in more exciting, interesting, relevant ways, moving beyond technical minutia and administrative chronicles to histories that not only get at more of a forest's meanings but also help us think more critically about forests' futures. She provides a compelling example in *Forest Dreams, Forest Nightmares* (1995), her monograph exploring the ways in which responsible science and the best of intentions led to abysmal forest policy in the Blue Mountains of the Pacific Northwest. Forests are more complicated systems than it has sometimes been possible for even the best-trained foresters, ecologists, or historians to give them credit for. To be engaging, she shows, forest history must do what the best history always does: take the reader beyond the tale at hand to understand something larger about the world. In *Forest Dreams*, we learn not just the sad fate of the Blues, but that good intentions and rigorous science can still let us down.

In her essay, as in *Forest Dreams*, Langston argues well for the importance and relevance of forest history to forest policy: we need to understand past

failures, successes, and serendipitous happenings in order to have any chance at successfully planning for a future with trees. And to do that, those who care about forests must understand them as fully as possible – not just as property, or resources, or subjects of regulation, but also as both artifacts and creators of culture. We forest historians could do well to take the central edict of the field of environmental history more fully to heart: to interweave the social, the political, and the material threads of our stories, as no one strand can do the environment justice.

The foundational US forest histories have very often been the history not of wooded land, but of forestry. They have told the history of conservation, of management, of institutions, and great men (and some women) setting out to create, protect, or maintain large networks of parks, tree plantations, timber land, and protected woods. This is where the field got its start, in ways similar to the beginnings of the (sometimes parallel, sometimes encompassing) field of environmental history: it was written by those who cared deeply about forests – as work places or as wilderness – and were interested in understanding how and when woods had been saved from market forces that seemed to put them under constant threat. In some of these histories (Cox 1985; Steen 1976, 1999; Miller 1997, 2001), the heroes are the foresters battling industrial waste; in others, the heroes are the conservationists, battling foresters exploiting the woods (Flader 1974; Hirt 1994).

In other geographic regions, a focus on state and industry forest management has also been a broad theme, and declension a narrative difficult to escape, whether the destruction is caused by individual greed, misguided government, or industry. Antti Erkkilä and Harri Siiskonen in *Forestry in Namibia, 1850–1990* (1992), Mohamed Ahmed Hisham et al. in *Whose Trees? A People's View of Forestry Aid* (1991), Douglas Weiner in *Models of Nature: Ecology, Conservation and Cultural Revolution in Soviet Russia* (1998), and Warren Dean in *With Broadax and Firebrand: The Destruction of the Brazilian Atlantic Forest* (1995) all tell of large-scale forestry initiatives and their (usually disastrous) effects over time. In his beautifully written account, Dean tells a grim story of forest exploitation and loss at the hands of not just foresters and government agents, but also other industrialists intent on extracting value from the woods and developing formerly wooded land for other needs.

At its best, the history of forestry takes us broadly and deeply into the social, political, and material pasts of wooded lands; many of the books cited above move the field solidly in that direction. Michael Williams, in *Americans and Their Forests* (1989), moves explicitly beyond a focus on forestry to recount the dynamic past of relationships between people and the trees of what would become the United States, from before Europeans arrived until the end of the twentieth century; his *Deforesting the Earth: From Prehistory to Global Crisis* (2003) takes the story around the world. Williams masterfully lays out the long and complicated history of human

interaction with wooded lands: people have been using and misusing forests for centuries, and modern technologies and markets – not just for wood products, but for agriculture, for homes – have accelerated global deforestation to a terrifying pace.[4]

The theme of losing forests – sometimes through crass exploitation, sometimes through misguided attempts at conservation or long-term stewardship, and sometimes through happenstance – is as strong a focus for forest history as is the history of forestry as an industry and a profession. As in much environmental history (and modern environmental writing more broadly), just as it is difficult to move away from stories of state policies, industrial might, and regulatory regimes, it is hard to depart from stories of decline and loss, mistakes and failure, and tragic crisis, with the only solutions too complicated or overwhelming to seem real.

But Conrad Totman, in his *The Green Archipelago: Forestry in Preindustrial Japan* (1989), manages to confound the common narrative of forest decline to ask why Japan had as much forest cover as it did in the late nineteenth century. His answer is one of both politics and economics: forests had been ravaged for resources there until the late seventeenth century, when a strong national government responded to widespread devastation and the threat of timber famine by undertaking a project of restoring and preserving forest land. In Totman's telling, the Japanese experience demonstrates that in specific times and places, foresters and governments can bring woods back.

But I am oversimplifying by writing as if forest history is somehow the same the world over. While themes and emphases may not be purely characterized as peculiarly American or explicitly African, Indian, or South American *per se*, neither the writing of forest history nor the pasts of individual forests fit neatly into any one historiography. It would be comforting to be able to claim confidently that forest history had progressed from the history of forestry, to the history of forest practices more broadly, to the role of forests in human societies, to a more holistic environmental history of forests – wherever they are – that now more fully recognizes the complicated interactions of ecology, politics, and ideas about woods.

The truth, as usual, turns out to be far more complicated. Karl Appuhn's work on Venice (2009), Ramachandra Guha's work on India (2000), Karl Jacoby's (1997, 2001) and Louis Warren's (1997) work on the United States, James McCann's work on Africa (1997, 1999) – like Langston, Williams, and many others – move us out of the realm of "mere" industry or "just" politics or "only" ideas to offer dynamic environmental histories of forested lands, forest ecosystems, and forest communities. How people have understood forests – what they are, what they are for, how people should or should not manipulate them or live in their midst – has shaped both the history and the historiography of woods.

As US environmental historians Paul Sutter and Lynne Heasley have called on us to recognize, there are differences to be understood and built

upon among the practices, assumptions, and resulting stories of environmental history in different places around the world. In complementary essays in *Environmental History*, Sutter (2003) and Heasley (2005) point to some of the most important of these differences for forest history: assumptions among historians of North America, for example, that the relationship of people to nature is most often one of degradation, which must be mediated or controlled, often through state power, in contrast with assumptions among historians of India and Africa that state power often corrupts symbiotic relationships between people and nature. Though this is an oversimplification both of Sutter's and Heasley's points, as well as of the rich environmental historiographies of half the globe, there remains an important kernel: the intersections of colonial rule, foreign state control over forests, and fundamental disruptions of local practices meant that forest history in much of the Global South has both played out and been recounted in ways far different from that in the United States, Canada, and Europe.

Among the lessons Heasley and Sutter ask US environmental historians to take from the work of our colleagues elsewhere are several that are particularly apt for the history of forests: that the adversarial relationship between people and forests is a cultural construct not universally shared, that protecting trees from people does not everywhere make sense, and that understanding forests as ecosystems separate from (even if intertwined with) people's actions and lives may be not only incomplete ways of understanding forests but also misleading and at times entirely counterproductive.

James Fairhead and Melissa Leach show us where such misunderstandings can lead. In *Misreading the African Landscape: Society and Ecology in a Forest-Savanna Mosaic* (1996), the two scholars argue that observers had long misread swatches of woods in the West Africa savanna as remnants of a historic forest long since devastated by local agricultural practices. In fact, their research shows, the forests are human artifacts, created and maintained by people's manipulation of environments that would otherwise have few trees at all.

Fairhead and Leach are among a growing group of forest historians who emphasize the importance of local knowledge in both understanding the past of landscapes and in choosing how best to manage them in the future. Richard Judd, in *Common Lands, Common People: The Origins of Conservation in Northern New England* (1997), and Brian Donahue, in *Reclaiming the Commons: Community Farms and Forests in a New England Town* (1999), are strong examples of historians of American forests who focus on the knowledge of the non-expert and the importance of understanding the historic role of local, individual involvement with woods. Often, the farmer, the neighbor, and the town council has as much or more to do with the preservation of a particular wood lot (and attitudes about trees in a region) than any distant corporation or government might have.

Understanding that non-expert agency, and the diversity of actors within and around the woods, is in large part what will allow more engaging and more useful forest histories to be written.

It is somewhat heretical (from within the academy, that is) to call on history to be useful. But environmental historians are often more likely than others to strive for utility, and like much environmental history, forest history is put to use whether it is crafted for that purpose or not. And if its focus remains too particular or culturally myopic, we allow lessons to be drawn that are not workable or appropriate beyond our small sphere.

And forests are not luxuries. They are, as many modern environmentalists have written, the lungs of the world. Little absorbs as much carbon dioxide, a greenhouse gas, as a quickly growing grove of trees. Preserving land that is wooded, and putting more acres into trees, serves a vital function for the future of an earth inhabitable by people and many other creatures. Yet the metaphor of the lung elides what developed countries are often asking of their more forested and geographically distant neighbors. Michael Dove, for example, asks historians and policymakers to consider how it might change our hearing of the phrase if a different body part were used. Are less developed, more forested countries "the muscles of the globe while the northern developed nations are, e.g., the global brain?" (2003: 103). In Dove's formulation, the insult and exploitation become crystal clear.

A more transnational kind of forest history is perhaps now most crucial to write, read, and understand in light of current policy debates on global warming, carbon sinks, local rights, and the responsibilities of industrialized nations to places that are as yet less built up. We can no longer afford the provincialism of local forest stories, since forests can no longer be merely local. My beloved Carpenter's Woods persists because of the privilege of the surrounding urban neighborhood; Central Park exists because of the campaigns of elites to carve it out of the already inhabited middle of Manhattan; the White Mountain National Forest thrives because early twentieth-century residents of New Hampshire were able to ship their food in from the Midwest; the Northeast's Northern Forest can be conservatively managed in the early twenty-first century because food and timber are shipped to the United States from the Global South, and international pressures on those Southern forests – both to harvest them and to protect them – have far-reaching effects on the peoples of those regions.

These are no mere academic issues. What forests are for, who forests are for, who cares about forests and why, are questions that can and should be informed by responsible history, but are already being answered – sometimes well and sometimes not – by politicians and corporations on the global stage. At the December 2009 United Nations Climate Change Conference in Copenhagen, which is being held after this volume goes to press, forests will play a central role. Can and should the United States and other major polluters and agents of deforestation pay governments, or

communities, or private individuals, in other parts of the world to not cut down their trees? Are (or should) property rights in places like Brazil, Peru, and Papua New Guinea legible enough to international parties for payments to be allocated and regulations to be put in place? What will the response be to the proposal from a consortium of leaders of African countries that the governments of that continent be paid reparations for the crises that climate change will bring to their peoples despite their relative lack of complicity in the disaster? Could cash payments be forthcoming, along with assistance in protecting what forests continue to stand? And will "avoided deforestation" find a place in carbon trading markets, or is it something else altogether? How could it possibly be measured, monitored, and commodified? All of these questions ask us to be careful, intentional, and reflective about the meanings and uses of forests, and about the assumptions we and others bring to understanding, researching, writing, and valuing their past.

I have argued elsewhere for environmental historians to stay keenly focused on materiality (Stroud 2003); in forest history, perhaps the need is entirely different. Materiality remains crucial: where are the trees, and why? What grows where, and under what conditions? But by focusing only on the material, we can miss what it is that people believe they are talking about, why they care about trees, and how that changes with time, place, and economic position. We risk continuing to talk past each other, each confident in our own rational, reasonable view, not understanding that forests can embody vast complexities for each individual, and that understanding the possible futures of forests depends heavily on acknowledging sometimes irreconcilable understandings of the past.

I both marvel at and take great comfort from the fact that a committee in Oslo awarded the 2004 Nobel Peace Prize to a Kenyan woman for planting trees. What is marvelous and comforting is not that Wangari Maathai – an accomplished scientist, professor, and environmental and political activist – would receive international recognition for her critical and pathbreaking work, but rather that the Nobel committee would recognize the very real connection between trees and peace. Forests are simultaneously in tension with human societies, and the place where society – or at least, some societies – can find salvation. Saving our selves means saving trees. In his final years, the woods kept my father alive. He was a photographer, and once he was no longer able to drive, his photo library grew in volume but contracted in focus. As his illness progressed, his photographic world spiraled ever closer to home, and much of his final work was of minutia in Carpenter's Woods: wildflower petals, mushroom caps, cavorting insects, a butterfly wing. He learned to look deeply where he had looked broadly before, and he took risks to feel alive. Unsteady on his feet, he would venture alone along the wooded paths in the early morning, cane in one hand and camera around his neck. He terrified me with stories of tripping over logs, of following an unknown path, of lying on his back just under the sledding hill jump to

get the best pictures of neighborhood children flying through the woods on fresh snow.

Carpenter's Woods were both wilderness and home for him, and his grandchildren now enjoy the short trek to a bench in the woods that bears his name. The oldest child, who is four, has already decided that if his mother is ever to die, he will visit a bench in the woods for her, as well. Memory and stories, wildness and tameness, knowledge and emotion, refuge and danger, local and world: all are bound up in the woods, and our forest histories ought to do justice to all.

Notes

1 For advice and criticism as I prepared this essay, I especially would like to thank Ari Kelman, Yvonne Fabella, Nancy Langston, Lauren Winner, Douglas Sackman, and David DiSabatino.

2 James Scott's work *Seeing Like a State* (1998) provides a compelling analysis of the ways in which governments and administrators have come up with methods for understanding and measuring land and property, and forests in particular, that have allowed them to manage and control resources that might otherwise have been beyond their reach. Scott's work provides an important bridge for understanding many of the differences between US forest historiography and the historiography of forests in the Global South, discussed later in this essay.

3 I tell a briefer version of the story of Olive Cousins in my dissertation (Stroud 2001); recent explorations in the archives have turned up a sixth son (my dissertation only mentions five) and additional controversy about her claims and rights. The book that has grown out of the dissertation project as a whole is tentatively titled "Seeing the Trees: How Cities Brought Forests Back to the Northeastern United States," and is under contract with the University of Washington Press.

4 There are so many important books that could have been mentioned in these paragraphs that it is not possible to offer an accounting of even just the "classic" works. US forest historians owe large debts to Cronon (1983, 1991), Foster and Aber (2004), Robbins (1985), and many others, just as North American forest history depends on the Canadian forest scholarship of Rajala (1998, 2006) and Wynn (1981, 2007). For reaching into transnational forest history, Grove (1995) and Tucker (2000) are among places to begin. For comprehensive forest history bibliographies, the online databases of the Forest History Society are invaluable resources.

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Chapter Twenty-two

Cultivating an Agro-Environmental History

Sara M. Gregg

Agriculture has occupied a consistent, if not always a narratively compelling, place in the practice of American history. The central place of agriculture in American development is indisputable: the first colonists relied on the fruits of the field from their earliest days; the continent's temperate climate and astonishing fertility helped to drive settlement across the land; the battle over the Union was fought largely over whether slave or free labor would work the farms of the West; and the consumer landscape of modern America has been made possible by agribusiness and the consequent access to cheap food. Even so, many historians have ignored the natural and economic impacts of agricultural developments in their analyses of the modern nation. While environmental historians have always acknowledged the impact of the land on the shaping of the nation, their attention to agriculture as a means of production and its interaction with natural forces has been more sporadic. Only recently have scholars dedicated sustained attention to the role of farming in the shaping of the American environment.

Early historians of the United States tended to overlook the quotidian nature of agricultural production in favor of chronicling the dramatic tales of exploration, national expansion, and military exploits that offered a memorable account of the nation's development. Those historians who considered the role of the environment in the trajectory of history, like Frederic Bancroft and Frederick Jackson Turner, described agricultural systems as a small part of a much larger story of national development. Agriculture thus represented primarily a stage in the evolution of the national economy, and an element of the nation's pioneer heritage that these scholars viewed with nostalgia. Since the turn of the twentieth century, other scholars have demonstrated a similarly limited interest in agriculture, with the bulk of studies focused on antiquarian topics such as the development of implements, the variations in crop prices, and the social

history of rural communities, rather than on the larger political, economic, or environmental implications of agricultural production. Over the past few decades, however, some environmental historians have begun to consider the integral part played by agriculture in the ecology of land use in the United States.

The strength of environmental history lies in its consideration of the complex relationships among species and the influence of natural forces on human culture. By extension, the study of agriculture using the methodologies of environmental history adds an important productionist angle to the discipline. However, the bulk of environmental history has tended to overlook agricultural landscapes as tangential to the ambitions of the field, even as those scholars who study agriculture have provided an important corrective in recent work. The practice of studying the environmental history of agriculture, what can be termed agro-environmental history, allows for examination of the intersections of ecology with economic activities – principally those activities that drive human sustenance. This trend harkens back to early histories of the United States, and to the origins of the field of environmental history, and has contributed to an important revitalization of the field.

Fundamental Concepts

Since the early days of the study of environmental history, scholars have wrestled with the impact of agriculture on the American landscape. Although environmental historians' attention to landscapes of production has waxed and waned, some of the most influential work in the field has focused on these domesticated ecosystems. The modern genesis of the field of environmental history originated with three classic books fundamentally concerned with the impact of farms on the land: Donald Worster's *Dust Bowl* (1979), Richard White's *Land Use, Environment, and Social Change* (1981), and William Cronon's *Changes in the Land* (1983). These books examined land use changes at the local and sub-regional levels, taking the evidence of human-induced ecosystem change as proof of the destructive tendencies of Euro-American agricultural practices. For the most part, other agro-environmental histories of the United States have embraced this same approach: focusing on the landscapes of a particular watershed, crop, or region, thus ensuring a relatively small-scale analysis of the impact of land use patterns on the ecosystem.

Since the publication of these early books, these historians have aspired to create a large, synthetic approach to environmental change, engendering a long conversation about environmental history's interpretive potential. In 1990, the *Journal of American History* published Worster's essay, "Transformations of the Earth: Toward an Agroecological Perspective in

History," in which he pressed historians to begin examining the neglected environmental history of agricultural ecosystems, alongside Cronon's response, "Modes of Prophecy and Production: Placing Nature in History." This conversation about the nature of environmental history, and its potential for telling important stories about world history, took place in a very public forum – before the eyes of all American historians – and the essays staked environmental history's claim to a new approach to studying historical change. While both scholars offered perspectives that have had an important impact on the development of the field more generally, one of Worster's principal objectives was to direct attention to the neglected history of agricultural ecosystems.

Arguing that human-influenced landscapes are characterized by a combination of natural processes and human alterations, Worster suggested that farms represent one of the most important locations where nature and culture connect. These "domesticated ecosystems," in turn, influence all areas of life on earth, since the production of food and fiber is centered on the land – whether organized as small diversified fields or as large industrial farms. Postulating that modes of agricultural production and the environment interact in important ways, Worster suggested that if progress in bringing to light the connections humans make to nature is to be made, applying this perspective "to food production must be one of the major activities of [environmental history]" (1990: 1091–2). Using the construct of an agroecosystem to orient this new framework, he points out that agroecosystems, though on one level human "artifacts," are nevertheless inextricably "dependent on the natural world – on photosynthesis, biochemical cycles, the stability of the atmosphere, and the service of non-human organisms. It is a rearrangement, not a repeal, of natural processes" (1094). By extension, the interconnections between soils, fertilizers, water use, exports, and profits, all merit the same attention as the more clearly identified community within a "single pond in New England" (1092). The challenge of this approach, of course, was that the inputs into the agricultural landscape were obviously human-influenced, and thus required additional levels of analysis, and the recognition that the ecosystem's original state had been transformed into a human-altered "second nature."

Cronon agreed with Worster that "Environmental history without agricultural history is inconceivable" (1990: 1129) – even if these articles were published in the midst of a decade-long dearth of new agro-environmental histories. Yet his reaction to Worster's wide-ranging essay addressed prescriptions for the field from an interpretively different, albeit philosophically sympathetic, framework. By questioning the utility of the Marxian framework of modes of production, and suggesting that local studies remain the most compelling structure for environmental history, Cronon shied away from Worster's urgings for a synthetic metanarrative. He worried that if all historians set out with Worster's model of the agroecosystem and the

mode of production in mind, they might end up writing essentially the same history over and over again, though the setting might change. Here Cronon warns against the environmental historian's tendency to hew to a declensionist framework: "Perhaps that oft-repeated story – of soils eroded, habitats destroyed, food crops simplified, communities dismantled, ecosystems destabilized – might in some broad sense be historically true, but it might also soon come to seem a Procrustean bed" (1130). While the ecology of the place would exercise a causal force on the outcome of each local story, the point remains appropriate: agro-environmental history has far more to offer to scholars and the general public than a boilerplate narrative of failure.

Declension and Negotiation

Environmental historians have been regularly criticized for their narratives of human disruption of pristine environments and the ecological disaster that has followed. In truth, the early environmental histories, like Worster's *Dust Bowl*, White's *Land Use, Environment, and Social Change,* and Cronon's *Changes in the Land*, as well as many books that followed, charted a depressing litany of Euro-American alterations of once-stable ecosystems and the social and environmental dislocations that ensued. The language these scholars used to discuss landscape changes associated with agriculture and forestry evokes the larger declensionist narrative that characterized the early state of the field. Some of the most artful, and lasting, of these descriptions includes the final sentence of Cronon's *Changes in the Land*: "Ecological abundance and economic prodigality went hand in hand: the people of plenty were a people of waste" (1983: 179); or Worster's introduction to *Dust Bowl:* "We are still naïvely sure that science and technique will heal the wounds and sores we leave on the earth, when in fact those wounds are more numerous and more malignant than ever. Perhaps we will never be at perfect peace with the natural order of this continent, perhaps we would not be interesting if we were. But we could give it a better try" (1979: 8). While other scholars have recoiled somewhat from such dire assessments, the study of environmental change in the modern era tends to reflect the dissipation of agro-environments and the cultural consequences of these changes. A critical approach to destructive practices, and the economic consequences thereof, has also helped to situate environmental historians as scholars with an inherently applied approach to real-world problems. This is not a field concerned only with knowledge for the sake of knowledge itself, but, instead, it seeks a deeper understanding of the causalities that shape life on earth.

The first American environmental history dedicated primarily to the impacts of agriculture was Worster's *Dust Bowl.* Among other things,

the book was an indictment of the agriculturalists of the Great Plains for what has often been called the most colossal environmental disaster in American history. Worster suggested that American culture has failed to adapt to the ecological constraints of the Plains, and that the consequences of this human shortcoming have been dire for the region and its soils. A grim assessment of capitalism and mismanagement, *Dust Bowl* faces squarely the environmental impacts of agricultural production. Worster put his critique of the exploitation of the land in blunt terms:

> Americans blazed their way across a richly endowed continent with a ruthless, devastating efficiency unmatched by any people anywhere. When the white men came to the plains, they talked expansively of "busting" and "breaking" the land. And that is exactly what they did. Some environmental catastrophes are nature's work, others are the slowly accumulating effects of ignorance or poverty. The Dust Bowl, in contrast, was the inevitable outcome of a culture that deliberately, self-consciously, set itself that task of dominating and exploiting the land for all it was worth. (1979: 4)

Through a wholesale critique of the soil-mining approach of capitalistic agriculture, Worster indicted Plains farming and established a precedent for a generation of other environmental historians.

Richard White used a similar line of reasoning in his 1980 *Land Use, Environment, and Social Change: The Shaping of Island County, Washington*, an assessment of the unanticipated consequences of Euro-American land use practices on the islands of Washington State. Here again, resource depletion is the focus of the research. White acknowledges the danger of shortsighted land use, outlining how increasingly efficient technologies outpaced users' comprehension of their impact. In the process, local people failed to comprehend the consequences of their practices on the land that provided the means of their sustenance. The consequence: "In Island County, after 120 years of white settlement, agriculture, fishing, and lumbering have all declined, and the resources upon which they were based have been depleted" (1980: 159). Ultimately, the people of Island County continued to adapt to straitened conditions, forever searching for new sources of income as their old forms of livelihood were erased. White captured within this book the perennial story of people forced to find new economic strategies because of over-zealous resource exploitation, which resonated once again in the annals of environmental history.

Shortly thereafter, William Cronon and Carolyn Merchant added another region and a third angle of analysis to the descriptions of environmental change inherent in Euro-American land use practices. Less focused on decline, and more attuned to the importance of negotiation between cultures and between humans and their environment, both Cronon's 1983 *Changes in the Land: Indians, Colonists, and the Ecology of New England* and Carolyn Merchant's 1989 *Ecological Revolutions: Nature, Gender, and*

Science in New England are examinations of landscape transformation and its consequences. Cronon surveyed ecological change during the seventeenth and eighteenth centuries, and the effects of these changes on Native and Euro-American conceptualizations of how the land might be used and managed. By focusing on cultural adaptation, the negotiations over land use and economic necessity, and the cumulative impact of human and natural communities on the fields and forests of southern New England, Cronon broadened the practice of landscape history to include a broader sweep of forces. Merchant pushed the investigation of the revolutions in New England's ecology into the nineteenth century, situating the period between 1600 and 1850 as a mirror of the major ecological changes that had occurred over the previous millennia in Europe. She also attended to gender and reproduction – both cultural and physical – as important factors in shaping the "ecological revolutions."

William Cronon's *Nature's Metropolis: Chicago and the Great West* (1991) offered a new approach to the intersections between agriculture and the environment, and it set a new benchmark for the field. Cronon chronicled the interactions of agricultural production with markets and the environment, portraying agriculture as part of a complex regional economic process involving commodity production within a system of exchange between metropolis and hinterland. *Nature's Metropolis* laid the groundwork for an innovative reinterpretation of the interactions among producers, manufacturers, and consumers. Here, commodification emerged as a key concept. Cronon argued: "The commodities that feed, clothe, and shelter us are among our most basic connections to the natural world. If we wish to understand the ecological consequences of our own lives – if we wish to take political and moral responsibility for those consequences – we must reconstruct the linkages between the commodities of our economy and the resources of our ecosystem" (1991: xvii). This book opened formerly unexplored avenues to environmental history, and showed how the resources most typically used by economic historians could be used to good effect by scholars concerned with natural systems.

Yet many environmental historians continued to overlook the environmental implications of agricultural production in favor of research on ostensibly more "natural" topics. As a consequence, particularly during the 1980s and 1990s, agriculture was frequently shunted aside in favor of studies of the national parks, forests, wilderness, and water policy. The essays within the collection *Uncommon Ground: Toward Reinventing Nature* (Cronon 1995a) demonstrate that most environmental historians during the 1990s were not paying much attention to the questions of the "human place in nature," *in re* agricultural production. In one of the few references to agriculture in this volume, Cronon's essay "The Trouble With Wilderness" acknowledged: "The dream of an unworked natural landscape is very much the fantasy of people who have never themselves had to work the land to

make a living – urban folk for whom food comes from a supermarket or a restaurant instead of a field" (Cronon 1995b: 80), yet during the late 1980s and early 1990s few other environmental historians demonstrated a sustained interest in studying the agricultural landscapes of rural America. Several years would pass before the culmination of other research in agro-environmental history reached the bookshelf.

The Field Evolves

Beginning in the mid-1990s, however, agro-environmental history experienced a resurgence, and several new books appeared that interpreted agriculture as a process of negotiation between humans and the environment. Neither comfortable with the declensionism that is often associated with environmental history, nor keen to celebrate the destructive tendencies of commercial agriculture, these latter historians have reconsidered the practice of agriculture as a partnership between man and nature. The monographs share a critical approach to the land use decisions made by farm people, and a nuanced assessment of the interactions between human choices and natural processes. These histories have also integrated class, economics, racial dynamics, and, occasionally, gender, into the analysis of how agricultural work has influenced a particular landscape. Consequently, these books represent some of the most cutting-edge and holistic analyses of American history, and they have been celebrated by scholars beyond environmental studies for their expansive approach to history. By adding nature to the already complex negotiations between human communities, these studies have entered a dimension of complexity that challenges the expertise of scholars from all disciplines.

This new approach was heralded by Mart Stewart's analysis of the Georgia coastlands, "*What Nature Suffers to Groe": Life, Labor, and Landscape on the Georgia Coast, 1680–1920* (1996), which stressed the contingency of interactions between human cultivators, both slave and free, and the landscapes they worked. In Georgia, plantation owners and their workers identified new crops and new methods to make their farms productive, and worked to develop a system that permitted reliable production as well as profits. The labor and knowledge of slaves shaped this agricultural landscape, and Stewart argues that the land as well as the people influenced the development of plantation society (xii).

Processes of negotiation between humans and the environment have provided the most compelling, and in many ways the most promising, direction for environmental historians over the last decade. Steven Stoll's *The Fruits of Natural Advantage: Making the Industrial Countryside in California* (1998) portrays how fruit and vegetable growers in California's inland empire harnessed science, water subsidies, marketing, and labor to create a newly

intensive landscape of production. Stoll contextualized the revolutionary reshaping of the physical and cultural landscape of the region, demonstrating how business interests were able to harness the growing power of the state to promote the produce of their farms. The end product of this partnership, a year-round supply of fresh fruits and vegetables easily accessed through the nation's growing transportation network, thus revolutionized American consumption patterns and reshaped the national diet (185).

Few books have achieved as nuanced an interpretation of the unpredictable trajectory of relations between humans and nature as Mark Fiege's *Irrigated Eden* (1999). Fiege's book is noteworthy for its rejection of a declensionist narrative, acknowledging instead the complex interconnections between human impacts and natural forces in Idaho's Snake River Valley. This book accounts for the often-unseen agency of nature without oversimplifying the complexity of land change, arguing: "We should view each place that we inhabit, Idaho's irrigated farmland or another, not simply as a departure or degradation but as a new environment, a new ecological system, that has been created and formed" (9). Fiege stresses the interconnections between human choices and the adaptation of natural systems, and the new world created by this partnership: "a complex, hybrid landscape, a compromise between human design and natural processes" (205). Agriculture is, inherently, a compromise between the producer and the resource, albeit one that has over the last century often been overshadowed by the apparent superiority of technology and human will.

More recently, a number of scholars have sought out evidence of agricultural sustainability in American history, returning to periods when farmers worked their land as a closed system, relying on manures, mineral inputs, and rotational cropping. In *Larding the Lean Earth: Soil and Society in Nineteenth Century America* (2002), Steven Stoll revisited nineteenth-century agriculture by analyzing it as a form of land improvement. Stoll presented farming as a "middle landscape," where "people engage in aggressive manipulations of plants and animals and also where they learn the limits of what they can take from nature" (8). Arguing that agricultural production has been central to environmental history, Stoll reminds the reader of the importance of farms to the history of land settlement, community development, and food and commodity production. Reaching into the present, Stoll concludes by demonstrating how some farmers remain tied to labor-intensive, rotational agriculture today, foreshadowing the subsequent eruption of interest in sustainable farms that has swept large parts of the country through an increasing awareness of the politics of food production.

Other scholars have applied the technological advancements of the last decades to agricultural landscapes. In particular, the use of geographical information systems (GIS) has demonstrated the potential to revolutionize the practice of history, and agro-environmental history has been at the forefront of the application of this technology. In a return to quantitative

methods, historians have begun deploying vast layers of data to support their reinterpretation of historical developments. In two cases, Brian Donahue and Geoff Cunfer have revisited familiar landscapes, offering empirical evidence that the negotiation between human communities and their environments was more complex than first assumed, thus contributing additional nuance to the tight analyses offered by Worster's *Dust Bowl* and Cronon's *Changes in the Land*. Ultimately, these recent books seek to correct a simplified narrative of declension with data that demonstrate complexity.

Brian Donahue's *The Great Meadow: Farmers and the Land in Colonial Concord* (2004) employed the township of Concord, Massachusetts as a test ground for contextualizing colonial land use change. By mapping family property holdings over generations, Donahue demonstrated that English settlers both acknowledged and depended upon the various qualities of land resources within the towns. This quantitative approach to property records and land use surveys from early town records led Donahue to the conclusion that the Euro-American approach to agriculture was far more responsive to local ecology than scholars had formerly assumed. Thus, he proposed, "Colonial agriculture was an ecologically sustainable adaptation of English mixed husbandry to a new, challenging environment.... The mixed husbandry upon which they depended for their daily survival and prosperity was deeply embedded in the expectation of long-term family and community life in a well-known place. It was thus bound by a set of ecological and cultural constraints that guarded against unbalanced exploitation of land" (xv). Although Donahue acknowledges that this balanced system did not endure long into the nineteenth century, the recognition that it existed adds a new dimension to our understanding of the practices of early Euro-American farmers, demonstrating that husbandry was a tradition imported from the carefully managed farms of the English countryside.

The reevaluation of long-held assumptions about the ecology of American agriculture using quantitative methods continued with Geoff Cunfer's *On the Great Plains: Agriculture and Environment* (2005), which revisited the landscape of the Great Plains during the late nineteenth and twentieth centuries. Cunfer focused on regional adaptation, arguing that on the fragile Plains, as elsewhere, "Farmers spend their lives managing natural systems to achieve human ends" (3). Cunfer premised his argument on the conclusion that the dust storms of the 1930s were part of a larger natural cycle of drought, and thus not influenced by human land use practices to the extent that Worster argued in *Dust Bowl*. Instead, Cunfer suggests: "Agriculture is the central realm in which human beings negotiate daily with the living and non-living forces of their environment" (8). By tracing a centuries-long pattern of dust storms, and the records of changing land use on the Plains, Cunfer argued that Worster's critique of the role of capitalism in the 1930s was overdrawn. The ensuing debate over the causes and effects of the Dust Bowl suggests that as additional research fills out this field, additional

controversies over the interpretation of land use data will emerge. The dynamism of this type of conversation over commonly accepted interpretations ensures continued discussion, and signals the vitality of the field.

In the past decade, other historians have published important analyses of American agriculture that consider the ecological impacts of farming, including Randal Beeman and James Pritchard (2001), Deborah Fitzgerald (2002), Bonnie Lynn-Sherow (2004), Lynne Heasley (2005), Sarah Phillips (2007), Sterling Evans (2007), Andrew Duffin (2008), Shane Hamilton (2008), and Benjamin Cohen (2009). This scholarship brings a fresh look at the questions once derided as the "cows and plows" school of agricultural history, and young historians' enthusiasm for agricultural topics is best articulated in Duffin's introduction to *Plowed Under*: "Agriculture is audacious … to succeed requires a tremendous amount of human, animal, and fossil-fuel energy, centralized political authority, and luck" (2008: 10). Each of these books wrestles with the interconnections between agriculture and environmental change, and revisits the central questions of the literature of both fields. The study of modern agriculture is prime territory for integrating the agricultural historian's interest in modes of production with the environmental historian's concern for ecological impacts. Duffin's book, for example, probes the influence of mechanization, the changing nature of soil science, the evolution of chemical inputs, and federal and state-level agricultural research and guidance on the agricultural practices of Palouse wheat farmers. Moreover, the themes woven through these books suggest that new directions in agro-environmental history will reflect the growing interest in energy, technology, food, and globalization that has already begun to transform the practice of American history.

The Next Frontiers: New Directions and New Tools

Fertile ground for the future expansion of the practice of agro-environmental history remains, as signaled by those extensive agricultural landscapes that have not yet been examined by environmental historians, and by the wealth of questions about modes of production that remain. Several different threads of agro-environmental history have recently emerged, including one with a focus on food (both as commodities and processed goods); another focused on the environmental history of production in agricultural areas; and a third concerned with the impact of technology on agricultural production. These supplement work on grazing, water policy, and farmers of color that has been inherently, if tangentially, linked to the practice of agro-environmental history. This research addresses the holism of agriculture more fully, as scholars investigate "the commodities that feed, clothe, and shelter us [that] are among our most basic connections to the natural world." As Cronon predicted in *Nature's Metropolis*, "If we wish to understand the

ecological consequences of our own lives – if we wish to take political and moral responsibility for those consequences – we must reconstruct the linkages between the commodities of our economy and the resources of our ecosystem" (1991: xvii). Beyond the expansion of national and international markets for commodity products, there is a tremendous amount of research left to do on the physical processes of production. The maturation of industrial agriculture and the cultural disconnects within the modern supermarket offer fertile ground for new research in agricultural technology and marketing. By contrast, the growth of the organic farming movement, and continuities between the way earlier generations ate and the new "organic culture," leave ample opportunity for historians to connect historic patterns of land use with the most advanced modern strategies for sustainable production.

With a flurry of new books, a number of other scholars have begun to systematically explore the environmental impacts of agriculture, ranging across the landscape and into the deep history of production at various stages in American history. The field of food studies has been growing steadily for over a decade, and from this conversation has emerged several academic studies of food, including E. Melanie Du Puis' (2002) history of milk, Richard Horowitz (1998), Douglas Sackman (2005), Steve Striffler (2005), Roger Horowitz (2006), and several essays in the edited volume by Susan R. Schrepfer and Philip Scranton (2004). These books join a slew of histories on popular foods, like Mark Pendergrast's *Uncommon Grounds: The History of Coffee and How It Transformed Our World* (1999), Mark Kurlansky's *Cod* (1997) and *Salt* (2002), Dan Koeppel's *Banana* (2008), and others that take food and its production as an international phenomenon with global significance.

Historians with an interest in food studies already benefit from a plethora of popular books on food – foremost among them Eric Schlosser's *Fast Food Nation* (2001), Michael Pollan's *The Omnivore's Dilemma* (2006), and Barbara Kingsolver's *Animal, Vegetable, Miracle* (2007), all of which draw sharp contrasts between historical modes of food production and the modern industrial model. These books have become bestsellers, and they have directed public attention at the complexity of food choices in the modern United States. By drawing on academic research, personal experience, industrial espionage, and the latest practice in sustainable agriculture, these books have opened a window into the realm behind the supermarket counter to mainstream American consumers. This accessibility has driven increased interest in the classroom and among academics in the complex regional and national agricultural systems.

The historiography of livestock production provides a compelling portrayal of how the production of food has changed from a land-based to an industrial process, as in the historiography on the cattle industry of the Plains. Here, the inherent interconnections between food production and

local ecologies were an early topic of regional historians, particularly those concerned with the grazing landscapes of the Great Plains. Beginning with the canonical surveys by Walter Prescott Webb, *The Great Plains* (1931), and James C. Malin, *The Grassland of North America: Prolegomena to Its History* (1947), the story of ranching and grazing has long exerted an incontestable place in the agro-environmental history of the United States. More recently, Jeremy Rifkin, in *Beyond Beef: The Rise and Fall of the Cattle Culture* (1993), and Elliott West, in *The Contested Plains: Indians, Goldseekers, and the Rush to Colorado* (1998), have brought a new focus on the unintended consequences of the expanding herds of the Plains. The mid-twentieth century, however, brought a reordering of the landscape of livestock production, from the grassland to the feedlot, and other more recent books have placed the new industrial economy of meat production into a social context, particularly Schlosser's *Fast Food Nation* and Pollan's *The Omnivore's Dilemma*.

Related to the practical interest in the fundamentals of food production is a growing attention among historians to the use of energy in agriculture. Contemporary press coverage of oil prices extends to the various arenas in which oil and natural gas have almost invisibly affected the national economy. Agriculture is a primary area in which a hidden oil-based economy has gradually asserted its control – ranging from agricultural chemicals and fertilizers, to the gasoline required to drive the massive combines that harvest crops, to the fuel required to transport food from farm to market to kitchen. With the expansion of alternate energy types, including ethanol and biofuels, the interconnections among food, petroleum-based agricultural inputs, and fuel promise to become even more compelling. Other fruitful avenues of research include the history of fertilizers, building upon Jack Temple Kirby's (2000) descriptions of Edmund Ruffin's fascination with marl, and Gregory Cushman's forthcoming history of the Peruvian guano trade, *The Lords of Guano: Global Ecology and Peru's Marine Environment*, based on his dissertation (2003).

The history of water in the West demonstrates how historians have often merged the study of land use, technology, and the environment with a peripheral interest in agricultural topics. While most scholars acknowledge the impact of agriculture on the development of US reclamation policy, the focus of most of their research has been on the process of water management, rather than on water's agricultural uses. Nevertheless, the place of irrigation in Western environmental history has long been an important topic, earning extensive treatment in Worster's *Rivers of Empire* (1985), Mark Reisner's *Cadillac Desert* (1986), Donald Pisani's *To Reclaim a Divided West* (1992), John Opie's *Ogallala* (1993), and Mark Fiege's *Irrigated Eden* (1999), among others. The authors' angles on technology and the environment range from Pisani's focus on the legal context of stock grazing and irrigation, to Opie's interest in the extractive nature of drawing water from the enormous Ogallala Aquifer to raise water-intensive crops on the High Plains, to Worster's concern with the role of water rights and control on the

creation of a powerful empire in the West. The topic of water and the agro-environment promises to inspire future generations of scholars, as they venture into a more sustained investigation of the complex negotiations behind agricultural water use and the physical reality of irrigation and production.

Policy histories of agriculture, like John Opie's *The Law of the Land* (1987), have laid the groundwork for additional research into the interrelationships between agriculture and environmental policy, particularly as awareness of the environmental implications of factory farms and feedlots continues to permeate the popular media. The nostalgia for an agrarian past has driven other scholars to research the history of self-sufficient agricultural production, and its future potential, which ties in with the growing interest within the academy and elsewhere in sustainable agriculture. Sara Gregg's *Managing the Mountains* (2010) examines the subsistence economy of Appalachian farms during the early twentieth century and the wave of reform that swept most of these farms from the landscape, making room for a new managed federal commons of national parks, forests, and wilderness areas.

The history of small-scale agriculture and what is now known as sustainable agriculture is receiving more coherent scholarly attention; in the future it is inevitable that agro-environmental historians will devote more research to the differences between small farms and the industrial landscapes of agribusinesses. While public opinion has recently shifted to widespread support for the small farmer and organic production, there has been little historical research into the environmental impacts of large- versus small-scale production. Using the data generated by the agronomists and soil scientists within the sustainable agriculture movement, and the deep and engaging literature on the culture of small farms, this would be a compelling project to undertake. While the study of ecologically sensitive agriculture and the agrarian ideal have concerned farmer-writers like Wes Jackson and Wendell Berry, the arguments they and other writers have been laying out for decades about agrarian ideals and the need for farmers to connect to their local ecology merit sustained historical attention.

Similarly, the study of non-white agriculture, including Native-American, Mexican-American, African-American, and immigrant communities' practices, offers another compelling direction for further agro-environmental studies. While the groundwork on Native-American agriculture has been laid by Cronon (1983), Merchant (1989), White (1983), Silver (1990), and Hurt (1997), there remains much to do to contextualize the agricultural practices of native peoples across time and space. Aside from their roles as farmworkers, there is a far less expansive literature on African-American and Mexican-American agriculture and the environment, or on those of the many immigrant communities that spread across the nation, and further work in this area promises to add nuance to the heretofore imperfect understanding of how these groups, who were often farming on the margins, approached agricultural production (but see Glave 2006; Montrie 2008: 35–52; Pulido 1996; Peña 2005; Limerick 1992).

One of the most fruitful directions in recent environmental history is signaled by the expansion of technologies for analyzing agricultural and environmental data, thus permitting the reassessment of land use. These tools provide an opportunity for historians to expand their research into the wealth of quantitative material available through government agencies and international research organizations. Land records, which have always been an invaluable resource for historians and geographers, are now open for analysis in an unprecedented way, and these promise to continue driving innovative research for years to come. The sources on agricultural production are rich and numerous: agricultural censuses, manuscript censuses, county and township data sets, family diaries and farm journals, US Department of Agriculture publications and Environmental Protection Administration reports, and Soil Conservation Service aerial photographs, as well as an abundance of state-level surveys. These records are ripe for the development of expansive databases providing empirical evidence of the impact of human activity on local ecosystems, as well as the influence of natural processes on agricultural production. Consequently, these data promise to provide fertile ground for new research questions in agro-environmental history.

Scholars who have taken advantage of the power of GIS to supplement their research demonstrate the transformative power of these technologies through their research in a way their predecessors could never have imagined. The methodology requires adding a new skill set, language, and dimension to scholarship, and it demands a sustained commitment to acquiring data, creating databases, and manipulating the material in a manner that allows for the formulation of interesting questions. However, once the groundwork has been laid, and in many cases, the research team assembled, fascinating dimensions of agricultural and environmental change can be identified at the click of a button. GIS's potential has only begun to gain the attention of environmental historians, and yet its use remains the path of future innovation.

Finally, reflecting the renewed emphasis on globalization, agro-environmental history is poised to contribute to the larger progress of the field by encouraging further research on the interrelated impact of consumption and production within the modern era. Promising avenues of research include the complex nature of food distribution and trade networks; the ecological consequences of chemical and biological research, particularly in the fields of genetically modified organisms and "heirloom" foods; international debates about the impact the nation-state on water cycles and nutrient transfer; regional water and soil politics; and the roles of governments, international organizations, and non-governmental organizations in encouraging particular models of commodity production and distribution. While most American agro-environmental history to date has been local or regional in its focus, with only a glancing look at parallels elsewhere in the world, the future borders of the field will surely expand to include the manifold interconnections within the global economy.

As new research and awareness generates unanticipated challenges for modern consumers and policymakers, scholars' understanding of the interrelationship between agriculture and the environment will continue to grow more complex and nuanced. Questions rarely anticipated by historians of earlier generations will inevitably consume future scholars, and the field will continue to adapt – likely with a sustained attention to the environmental history of agriculture that seemed unlikely only a few decades ago. The full measure of this contribution to the practice of history remains to be determined, but its possibilities are limitless.

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Chapter Twenty-three

Oceans: Fusing the History of Science and Technology with Environmental History

Helen M. Rozwadowski

Environmental historians have forged sophisticated understandings of interrelationships between humans and many parts of the natural world. The oceans – especially the great depths and the open seas – remain a challenge. In 1864, Henry David Thoreau expressed deeply held cultural assumptions about the timelessness and imperviousness of the sea:

> We do not associate the idea of antiquity with the ocean, nor wonder how it looked a thousand years ago, as we do of the land, for it was equally wild and unfathomable always. The Indians left no traces on its surface, but it is the same to the civilized man and the savage. The aspect of the shore only has changed. (1896: 85)

This apparent contrast between land and sea continues to hold sway; the ocean remains to many "empty of history, utterly without a past" (Stilgoe 1994: 30).

To the extent that historians have begun, recently, to turn seaward, the view seems always to include land as well as sea – islands, beaches, littoral environments, and ocean basins with an emphasis on rims. Scholars who take seriously the aims of environmental history must also seek to historicize the ocean itself, including its most remote parts, because even those are as intertwined with human history as the far corners of the terrestrial world. Similarly, histories of the ocean that deal only with oceanic peoples or those engaged in maritime work will never be as comprehensive as those that also succeed in accounting for the myriad other groups of people who interact with the ocean – consumers, writers, scientists, recreationalists, policymakers, dreamers – some of whom never even see the ocean. This essay situates

the oceans in environmental history by reviewing efforts from the range of fields that contribute to historicizing the ocean and by proposing a framework for writing histories of the ocean that can encompass even areas and aspects of the sea that seem remote from people.

The ocean seems fundamentally different from land. Simply adding the expansive territory of the world's salt waters to the terrestrial realms historians usually study might not be sufficient. People are closely intertwined with the oceans, but we do not live there. We do visit, work, fight, and play at and under the sea. We extract resources from and create cultural understandings of the sea. Yet the ocean is fundamentally opaque, indifferent to human presence, and often a hostile place for people – an environment perhaps more akin to outer space, the polar regions, or the cultural construct of "wilderness" than to places traditionally scrutinized by most historians. Environmental historians have probed and expounded upon wilderness but have hardly begun to take on environments such as space, the poles, or the deep ocean. To tell the history of the ocean, this essay argues, demands a new approach, one that builds on terrestrial environmental history but requires adaptations to account for the peculiarities of the ocean environment and human responses to it.

Among its noteworthy accomplishments, environmental history has become adept at using up-to-date science, especially ecological knowledge, to explicate the past. Possibly the most original contribution of the field is its insistence on taking seriously natural boundaries and ecological time in the face of historical units of both time and geography established by political, economic, and social factors. Something environmental history does less consistently – namely, investigating the knowledge systems, inherited and created, by which historical actors understood the natural world – may prove critical for the ocean, because of ways in which the sea differs from land.

In its inaccessibility, most of the ocean is a vast and challenging place that humans know only through the mediation of technology and knowledge systems. Fishermen have long known the ocean through their nets and ships – and also through the hard-won knowledge they passed down from generation to generation. Explorers likewise knew the ocean through sails and navigational instruments and techniques – and also through knowledge recorded in earlier government reports and expedition narratives. Different groups of coastal people have known, used, and explored the ocean to different degrees and for an array of reasons. Enlightenment natural philosophers, and later modern scientists, have known the ocean through tide gauges, sounding devices, and water samplers. People whose work does not take place on oceans can, nevertheless, come to know the sea, through maritime novels, passenger travel, and recreational activities on and in the water. Indeed, because of the mediated nature of knowledge about the ocean, cultural conceptions of this space are as central as technologies to the project of writing the history of the ocean.

Knowledge about the ocean has been employed in myriad ways, including to help people harvest resources, conduct trade, develop industries, dominate other people, migrate, demonstrate cultural achievement, and accomplish many other endeavors. Traditionally, such activities have themselves formed the subjects of historians' work. But the uses people have made of the ocean can also serve as a springboard for writing a history of the ocean. The scholarly literatures and the questions of two fields in particular – maritime history and the history of science and technology – will be integral to writing the history of the ocean. Taking a cue from Richard White (1995), knowledge about the ocean has been produced through work. Maritime history, then, can offer an avenue for exploring how labor at, on, and in the sea defined the human relationship with the ocean. Since at least the late eighteenth century, the practices of modern science have formed a critical dimension of this relationship. Knowledge systems of all cultures that have encountered or imagined the sea mediate uses and conceptions of the ocean, as do the technologies that enable human interactions with the sea. Looking beyond uses to knowledge formation provides insights into the motives, expectations, and actions of groups of people interacting with the ocean. The history of science, then, suggests that scientific work, along with maritime work, has in a sense been constitutive of the ocean environment itself.

Foundations for Ocean History

Very recently, the oceans have begun to attract scholarly attention across the disciplines, reflecting the growing concerns about depleted fisheries, ecosystem shifts in the sea, and the role of the world's oceans in the global climate. This new ocean focus is manifested far beyond the natural sciences and the realm of policymaking; the ocean is making an appearance in a broad spectrum of disciplines.

Geography, especially historical geography, has begun to contribute its sensitivity to space toward an understanding of how different cultures and different times perceived the sea (Steinberg 2001). Geography's focus on space and place provides a logical entry to academic study of the oceans and coastal areas. Disciplines such as history and political science often neglect the oceans, but geography has a built-in framework for studying and comprehending such spaces. In addition, the field now includes a group of scholars interested in coastal and marine geography (the Coastal and Marine specialty group of the American Association of Geographers) (Steinberg 1999; Psuty et al. 2004). Historians, including historians of science and environmental historians, have begun to look to geography when writing about vast terrestrial spaces and widely dispersed endeavors (Carter 1987; Livingstone 1995; Smith and Agar 1998). The application of the questions

and methods of geographers to histories of people and oceans will prove invaluable to studies of this vast, remote, and inaccessible environment.

Historical ecologists and fisheries scientists have forged an innovative partnership with historians to document past populations of marine organisms. The History of Marine Animal Populations (HMAP) project forms part of the global Census of Marine Life, a major international science program aimed at enumerating what did, does, and will live in the sea. To uncover past marine populations, modelers and ecologists recruited maritime historians to help identify and mine archival records to provide data or proxy information about past sizes of fish stocks and whale populations. In addition to contributing to scientific understanding of the oceans, HMAP has also sponsored gatherings aimed at contributing to environmental history (Holm et al. 2001). Recent scholarship has taken HMAP data and begun to consider it more firmly within the humanities tradition of history (Rosenberg 2005; Bolster 2006), though some historians believe this partnership has benefited science more than history (van Sittert 2005; Anderson 2006).

One additional limitation of the HMAP-inspired effort to create a field of "marine environmental history" lies in its resource-centered perspective. As the geographer Philip Steinberg (2001) points out, fish and oil and other resources are extracted from a very small proportion of the ocean's vast extent. A comprehensive history of the oceans must take into account the actual uses of all parts of the sea, including transportation, communication, and warfare, the ocean's paradoxical role as both bridge and moat, and also the simultaneous reality and imagining of the sea (Labaree 1975; Rozwadowski 2005).

Other fields have contributed, but could potentially contribute more, to writing the history of the ocean. The study of maritime literature is an established enterprise, one that not only provides insights into topics such as shipboard life, maritime cultures, and conceptions of the ocean, but also makes extensive use of historical sources and contributes to understanding the past (e.g., Bercaw Edwards and Heffernan 2004; Bercaw Edwards 2009). Recently, literary scholars have addressed the historicity of the ocean directly, mostly in the realm of cultural conception (Klein and Mackenthun 2004). Other fields can, and do, likewise contribute to our understanding of cultural constructions of the ocean and how those shape human use of and ideas about the sea, ocean spaces, and marine resources. Anthropology and sociology also can contribute to our understanding of cultural constructions of the ocean as well as island cultures, coastal communities, and cross-cultural contact in many oceans (Dening 1980, 1992, 2004; Finlayson 1994; Binkley 2002). Cultural history and landscape history also offer rich dividends for considering the ocean (Corbin 1994; Stilgoe 1994).

Only one branch of history, maritime history, pays attention to the watery three-quarters of the globe. Maritime history has always offered a venue, tightly connected to material culture and public history, through which

historians could focus on the sea. People who traversed the ocean or worked on ships earned the scrutiny of scholars interested in naval battles, the transatlantic trade, and the whaling industry (Labaree et al. 1998). Unfortunately, maritime history is not well integrated into general US history, with the distinct exception of colonial history. Few university history departments in the United States offer maritime history courses or hire specialists in that field. Though maritime history enjoys wide popular appeal, it trespasses sloppily over the national boundaries that ordinarily separate scholarly specialties.

The field, however, seems poised to integrate fresh approaches and questions from across the historical profession. Just a decade or two ago, maritime history partnered with social history to reveal, in a number of important studies, myriad ways in which the maritime world reflected and elucidated events and trends on land (Rediker 1987; Creighton 1995; Creighton and Norling 1996; Bolster 1997; Norling 2000; Rediker and Linebaugh 2000; Gilje 2004). Maritime history focuses on the work, society, and culture of the maritime world ashore and afloat. Ships and port towns are stages for action, but few maritime historians shift their gaze to the ocean itself, an omission noted by Daniel Vickers (1993). Yet the potential contribution of maritime history to marine environmental history is great, because this field offers an avenue for exploring how labor at, on, and in the sea defined the human relationship with the ocean.

What of other fields of history? Recently, some scholars have begun to view maritime history as an ideal lens for interpreting global history, because of the physical connection between places that the ocean offers (Finamore 2004). Ocean-basin views of maritime regions such as the Mediterranean, Pacific, or Atlantic provide historians with geographically defined, transnational ways of organizing history, starting with Braudel's (1972) famous study. A recent forum in the *American Historical Review* surveyed scholarship in this vein (Wigen 2006). Scholars are taking a cue from this work and exploring oceans – not only the Atlantic and the Mediterranean Sea, but also the Pacific and Indian Oceans – although not yet extending to the Arctic Ocean (McDougall 1993; Horden and Purcell 2000).

The Atlantic world has emerged as a strong focus of scholarship, encompassing the history of slavery, diaspora studies, imperialism and colonialism, and the relationships between nations and regions, in addition to traditional strengths in colonial British and American history, naval history, and maritime economic history (Bailyn 2005). The body of Atlantic world scholarship has richly illuminated the dividends of transnational approaches and inquiries that focus on exchanges and connections between places. While much of this work focuses on the land-sea interface and on people more than oceans, John Gillis's (2004) study of islands offers a compelling model for Atlantic world scholarship. Gillis explored the meanings and significance of Atlantic islands – both the real and the imagined – from ancient Greece and Rome through the twentieth century. At each point in

time it is possible to see reflected in the characterization of islands the contemporaneous cultural conception of the ocean.

One invaluable contribution of ocean-basin scholarship to a history of the oceans is its demonstration that historians must cross political and cultural boundaries to follow human actors across bodies of water. This work is, however, predicated on an understanding of the sea as a highway or stage. Kären Wigen, in her introduction to the *American Historical Review* forum "Oceans of History," reminds historians that, "the research surveyed in this forum rarely peers beneath the waves" (2006: 271). To write the history of the ocean requires consideration of its third dimension, a project that calls for new methods and questions, different from ones used to study the ocean as stage or highway.

Environmental history, which queries relationships between people and nature, seems an obvious tradition to inform ocean history. Yet the sea has until recently been almost entirely absent from this field. Early years of the journal *Environmental History* and its predecessors reveal a preoccupation with such topics as forests, agriculture, water quality, and nature. With a sparse handful of exceptions, the ocean is missing from the journal, although several articles studied fishing industries (Pisani 1984; Bogue 1987; McEvoy 1987). The exceptional contributions to environmental history of the oceans are: an examination of Alaskan whaling; a study of international cooperation in the sealing industry; and a chronicle of efforts by a wealthy French engineer to extract energy from the sea (Leibhardt 1986; Dorsey 1991; Pittman 1982). An additional contribution from a political scientist characterizes oceans, along with other environments including the seabed, Antarctic, airwaves, and orbits of satellites, as international commons, subject to the same misuses as local and national common lands but faced with the additional challenges of international law (Soroos 1988).

Several traditions within environmental history offer models, methods, or perspectives to historians of the ocean, including histories of inland water and waterways and histories of fisheries. It is a testament to the landlocked nature of history that Donald Worster felt compelled to state: "Water has been critical to the making of human history.…To write history without putting any water in it is to leave out a large part of the story" (1985: 19). Worster's story of water in the desert West explicates American democracy or lack thereof, but his work also illustrates how a place came to be characterized by interactions among ecology, water, and historical context. A similar approach could analyze how the ocean has been variously understood and experienced as desert, cornucopia, lawless realm, and familiar territory. Other histories of inland water suggest ways to account for characteristics of the sea such as the role of technology in knowing and using maritime environments and the lack of control people have over them (Steinberg 1991, 2000; White 1995).

Fisheries, which deal directly with ocean resources of paramount importance for people, will be a critical theme in ocean history. Much fisheries history excels at revealing social dimensions of the industry, enumerating the different, often conflicting interests of groups of fishers. Those fisheries historians who explore the interplay between social and ecological change provide the best models for a history of the ocean. Outside of work connected to HMAP, the most useful examples are those that bridge environmental history and history of science. Arthur McEvoy (1986), for example, examines California's numerous fisheries and heterogeneous groups of fishers, tracing the legal status and treatment of the resources and investigating efforts to learn about important fish populations in the state's waters. The work of Gregory Cushman (2003, 2005), Christine Keiner (2009), and Jay Taylor (1999) likewise contribute histories of Peru's marine environment, the Chesapeake Bay, and the Columbia River system as elements of studies of industries relying on seabirds, anchoveta, oysters, and salmon. An unusual trajectory of fisheries history, which explores the meanings and practices of eating whales, extends the bounds of environmental history and suggests novel ways historians might integrate culture into studies of fisheries (Oslund 2004; Shoemaker 2005).

Historians of science have a somewhat longer record of attention to the ocean. Until about two decades ago, historians concentrated on laboratory sciences almost to the exclusion of sciences practiced out of doors. By now, however, sciences ranging from natural history to glaciology to meteorology to public health have attracted historical study (Kuklick and Kohler 1996). Independent of this trend, a small but active cadre of historians, scientists, and popularizers had made oceanography's past their subject (Deacon 1971; Schlee 1973; McConnell 1982; Mills 1989). Meanwhile, historians of biology explained the development of marine research laboratories from the late nineteenth century (Benson 1988a, 1988b; Maienschein 1988). Fueled by the growing interest in field science, these strands came together when historians of oceanography, marine biology, and geophysical sciences met at Woods Hole in June 1997 to discuss the state of the history of oceanography, agreeing on the pressing need to pursue more profound understanding of past scientific efforts to comprehend the sea. That meeting spawned a series of workshops on the history of oceanography that resulted in the publication of two volumes and numerous published papers (Day 1999; Rozwadowski 1999; Allard 2001; Oreskes 2001; Rainger 2001; van Keuren 2001; Weir 2001a; Rozwadowski and van Keuren 2004; Benson and Rozwadowski 2007).

Those unfamiliar with this field may not realize how central oceanography has been in the post-World War II landscape, but the burgeoning body of scholarship in history of the ocean sciences makes this fact amply clear. In terms of funding levels and relevance to military and security concerns during the Cold War era, physical oceanography rivaled or exceeded physics

(Mukerji 1989; Hamblin 2005). Since the Cold War's end the ocean has, if anything, increased in importance as a research site for issues related to security for global shipping, to overfishing, and to global climate change. Much of the history of oceanography, as a result, documents the development of various branches of marine science, explores the effects of patronage on oceanography, and queries the relationship between science and the state (Mills 1989, 2009; Oreskes 2000; Oreskes and Rainger 2000; Weir 2001b; Hamblin 2008).

While much history of oceanography chronicles the development of the science itself, some addresses the ocean directly, asking questions about how science has acted in conjunction with politics, culture, and economics to define the sea. For example, a project that began as a study of the origins of modern oceanography revealed the co-contributions of science and culture to the mid-nineteenth-century discovery of the deep ocean (Rozwadowski 2005). That mid-century discovery of the ocean's third dimension was inextricably tied to imperial expansion, a theme also explored by Michael Reidy's (2008) study of tidal science. Noting that shipping, as the cause and consequence of industrialism, required Britain to promote freedom of the seas, Reidy argued that knowledge of the ocean was critical for the extension of its power across the globe. Ability to predict the tides enabled the exercise of imperial power due in part to the ease with which representations of knowledge of the oceans – not only tidal charts but also graphical depictions of magnetic variation, bathymetry, and current patterns – could be passed between men of science and mariners. Before the ocean could be transformed into the first-order site of British imperialism, changes that people wrought to the banks of the River Thames, drastically altering its tides, prompted the renewal of tidal studies in the first place. As good environmental history should, Reidy's work considers the mutual influences of people on the ocean and the ocean's effects on human history.

Some of the best models for writing the history of the ocean to emerge from this trajectory grapple with places such as the polar regions or cultural categories such as "wilderness." Environments such as the poles, atmosphere, "wilderness," and mountains share some characteristics with oceans. A group of historians, examining oceanography done in polar seas, found these regions on the fringe of civilization central to the practice of ocean science, due in part to the importance of the poles at such disparate times as the search for Sir John Franklin and the Cold War. What occurred in the Arctic and Antarctic, both on the ice and in the surrounding seas, reflected cultural and social forces in the homelands of the explorers and scientists and, in turn, redefined these natural environments (Benson and Rozwadowski 2007). Similarly, Gary Kroll's (2008) study of twentieth-century ocean explorers considers the interactive contributions of science and popular culture to shifting American conceptions of the ocean. More explicitly than most other ocean historians, Kroll meditates on the ocean's third dimension, both the

actual undersea realm and cultural perceptions of it. He successfully deploys recent scholarly discussion of "wilderness," demonstrating its utility for analyzing the ocean in American culture.

This swell of interest in ocean science could contribute much to understanding past human relationships with the oceans and their resources. The questions asked by historians of science must be augmented with the sorts of questions customarily asked by environmental historians about terrestrial environments and inland waterways: How have human activities changed the deep sea? How has the ocean environment affected human history? And, importantly, how have the powerful cultural associations of the ocean and assumptions about this unimaginably vast environment intersected with human understanding and use of it? Writing history of the oceans, in short, will require an array of tools and questions from various disciplines and several historical subfields whose subject matter has until now only skirted and crossed the seas. The following section explores how the questions, methods, and content of the history of science and technology, and also of maritime history, might contribute to an environmental history of the ocean.

Knowing Nature Through Work

Richard White, in *The Organic Machine*, wrote, "One of the great shortcomings – intellectual and political – of modern environmentalism is its failure to grasp how human beings have historically known nature through work." By work he meant labor. He explained: "The Nisqually knew salmon by catching them" (x). White's argument suggests that historians could use maritime history to learn about the ocean environment through human labor. Certainly, it seems clear that commercial fishers and whalers, like Native American salmon fishers, knew the ocean through work.

Matthew McKenzie (2003, 2004) has demonstrated the extent to which Salem fishermen from the mid-eighteenth through the mid-nineteenth centuries developed and communicated knowledge about the marine environment in the process of catching (and as a result of their motivation to catch) cod in offshore banks. In addition to amassing anecdotal evidence, he also showed, using HMAP data, that these fishermen changed their fishing behavior, moving to different banks at different parts of the season, to accommodate changes in the marine environment, specifically, declines in fish catches. Colonial Boston ship captains likewise accumulated and recorded information about the ocean garnered through their collective navigational experiences (Rosenberg et al. 2005).

In a similar way to cod fishermen and Boston ship captains, whalers played an important role as vanguards of knowledge about the deep ocean. Hunters who turned from disappearing right whale populations to pursue sperm

whales in the early decades of the nineteenth century were essentially the first people to encounter the ocean's great depths with regularity. "Deep" sea soundings in those decades were rare, undertaken, interestingly, by a handful of Arctic and Antarctic explorers, such as Sir John Ross and his son Sir James Clark Ross. Navigators were surprisingly uncurious about the depth as long as they sailed in water deeper than the standard 200-fathom deep-sea sounding lines they carried. Away from coasts, ruling out shallowness was more important than measuring precise depth. Whalers, on the other hand, quickly found that sperm whales dove deep when harpooned, sometimes taking hundreds of fathoms of line. Occasionally, whaleboats pulled far under would be recovered, waterlogged from the pressure under water. Whalers, who targeted calves in order to keep the mothers nearby for easier pursuit, wondered about the ability of whales, especially babies, to withstand the great pressures. They also wondered if whales, like fish, could be more commonly found over certain types of bottom. Whalers' "fish stories" began to appear in books by the first generation of professional scientists to write about the ocean, such as the British naturalist Edward Forbes and his countryman, the microscopist George Wallich. Whalers brought to the attention of scientific readers fascinating questions about the deep sea (Samuels and Tyack 2000; Rozwadowski 2005).

These examples suggest, not surprisingly, that humans have known the ocean through work such as fishing and navigation. Less familiar may be the suggestion that marine science can be understood as another type of work through which humans have come to know the sea. But first it is necessary to explore the dimensions of what White meant by work.

In White's (1996) essay, "Are You an Environmentalist or Do You Work for a Living?" he pointed out the propensity of American environmental historians to treat premodern work as having benign consequences for nature yet demonize modern work with machines as bad for the environment. White argued that all modern work changes the natural world, citing the electricity powering his computer as coming from a dam that kills fish. Work of all kinds links people to nature and creates knowledge of the land (and, presumably, the ocean), but it does not necessarily grant any protection to the land (whalers began to pursue sperm whales after decimating right whale populations). In White's view, modern work, both that done with industrial machines and that which appears to tread lightly on the earth, affects nature but also opens up the possibility for people to know nature.

In *The Organic Machine* (1995), White concentrated on the theme of energy – the energy of the river and the energy of human work and, especially, how these were related. For the purposes of this essay, the theme of energy is less central than how the labor involved in harvesting fish – or scientific specimens – was an integral part of the process of knowing the oceans. White observed that Indians, gill-netters, and sportsmen did not take salmon primarily for profit, but fished because the act of catching

salmon was tied to who they were. Salmon knit together the energy of the land and the sea; they knit together human and non-human labor; and they defined the Columbia River for millennia. But in addition to natural objects/resources, human creations also came to have an inextricable relationship with it. Dams, hatcheries, channels, pumps, and cities are products of human labor that link people to the river.

Moving from the Columbia River to the Atlantic Ocean, naturalists in the mid-nineteenth century began to collect and study marine flora and fauna. They did this, of course, not mainly for financial gain. Interest in marine creatures was fanned by the growing popularity of seaside holidays and aquaria, and also by developments in natural history that prompted questions about marine life, such as its relationship to fossils. A group of British naturalists and others in Scandinavia and the US began collecting marine organisms using converted oyster dredges. From the 1830s to the 1870s, they reached steadily deeper into the sea until they proved, through the HMS *Challenger* expedition, that life existed in all depths of all oceans (Rozwadowski 1995).

Like White's salmon fishers, these men of science, and the many seamen who helped them (common sailors, officers, paid yachting hands, fishermen, etc.), came to know the oceans through work. Some men of science helped with the physical labor of hauling in the dredge. Most participated in the work of voyaging and inspecting animals on the spot, at sea; most also shared the labor – both physical and intellectual – of transforming the animals collected in their nets into scientific specimens.

Historian of science Robert E. Kohler (1994) has investigated similarities between scientific work and other kinds of labor. Invoking E. P. Thompson's term for the system of implicit rules and moral assumptions about the rights of social classes to the fruits of production, Kohler argued that every system of production – including the production of scientific knowledge – has a "moral economy" that regulates access to the means of production and the goods produced (in the case of science, credit for discovery, for example). This insight prompts historians of science to consider science as a process that starts with the collection of natural objects or information about nature and ends with the publication and use of new knowledge. Keeping this in mind, it is time to return to environmental history.

In *Nature's Metropolis: Chicago and the Great West* (1991), William Cronon described the transformation of natural objects (resources) into commodities and, even eventually, into ideas. He began with the first Euro-American prairie farmers, who transformed grain – by making it into whiskey or feeding it to pigs – into a commodity that could be more easily transported. Merchants participated in the transformation of grain into a commodity by buying, storing, shipping, and reselling it – in short, by linking the farm to the trade of a wider world. Grain, initially transported and sold in sacks, was moved down rivers to cities. The railroad, and the attendant

industrialization, including steam-powered grain elevators, provided new routes for it. A standardized system of grading grain led to the discarding of sacks in favor of flows of similar-quality grain. Elevators, grading, the telegraph, and the creation of the Chicago Board of Trade together revolutionized the grain market, liberating it from the very process that had once defined it – physical exchange. Cronon summarized this process: "Chicago's great innovation … had been to simplify the natural diversity of wheat, corn, and other crops so that people could buy and sell them as homogeneous abstractions" (1991: 132).

The transformation of grain (or pigs and wood) into the abstraction of futures bears a strong resemblance to how scientists wrought marine fauna and flora into the abstraction of ideas – that is, knowledge about the ocean. Consider the production of knowledge by nineteenth-century naturalists (Allen 1976; Rudwick 1985; Larsen 1993; Farber 2000). Anne Larsen studied the emergence and development of zoology in the first half of the century, as it branched into the specialized subfields of entomology, ornithology, and marine zoology. Zoology grew in the absence of central institutions that historians had assumed were essential to foster new fields. Instead of a national museum, she identified networks of zoologists who corresponded with each other and exchanged specimens. Martin Rudwick previously described such networks of geologists. The sum total of the specimens held by zoologists, geologists, botanists, or other specialists in private collections functioned as a *de facto* national, indeed international, resource that served as the basis for the development and differentiation of natural history into specialty fields.

For present purposes, detailed consideration of natural history practice provides an understanding of how animals were transformed into scientific specimens. Collectors learned from experienced naturalists how to find and catch desirable species. From the animals or plants gathered or captured on a given day, naturalists selected the ones they judged best suited for their purposes; not every collected plant was destined to become a scientific specimen. Sketches of the fresh specimen recorded details that would be lost in preservation. Knowing what kinds of perishable information to preserve was part of the skill set of naturalists, and a preserved animal or plant without this information was not a good specimen (Larsen 1993; Allen 1976).

Creating a specimen out of a dead animal or plant was only the first step. The actual specimens formed a kind of currency in the zoological community, exchanged for information, other specimens, training, expertise in species identification, and access to the tight-knit virtual community of practitioners interested in specialized subfields (Larsen 1993). Experts devoted time to corresponding with enthusiastic amateurs because they could provide unusual specimens or collections from out-of-the-way places (Rudwick 1985). Experts, and also some amateurs, then published species identifications, an abstraction of the physical specimen into knowledge that could be

transported easily, via the printed page. Individuals and scientific societies exchanged publications more readily than specimens, providing a wider radius for the distribution of new knowledge (Farber 2000; Kohler 2006).

The mid-nineteenth-century transformation of marine animals and plants into specimens, and then into knowledge about the sea, has analogs for physical science of the ocean and also for later periods. Hydrographers in the nineteenth century measured the depth of the sea using sounding instruments. They recorded these measurements, along with the particulars of each sounding event, in order to support and analyze their results. Next, they inscribed the numbers on charts and drew depth isobars. The resulting bathymetric charts represented the ocean floor and provided support for transatlantic submarine telegraphy (Rozwadowski 2001; Hohler 2002). In twentieth-century fisheries science, research trawling provided scientists with specimens from which they extracted otoliths (ear bones), used to determine the age of the fish. Data on age, size, and sex of a sample of fish could be extrapolated to assess the age structure of a population – a tool which fisheries biologists used to predict future stock size and the probable effects of proposed fishery regulations (Rozwadowski 2002).

Government white papers and scientific publications translated fish bones, observations, measurements, and equations into scientific knowledge and also policy advice. Bathymetric charts, publications in zoology journals, and policy advice, then, resemble the dams, hatcheries, and other products of human labor that White described as linking people to the environment. They are the products of long processes involving the transformation of nature into transportable and usable ideas. They enabled, even encouraged, the exploitation of the sea and its resources. For example, the earliest deep-sea sounding project was connected to the first transatlantic telegraph cable (Rozwadowski 2001). New knowledge (even if it was imperfect, as it turned out) lent confidence that translated into availability of capital and engineering resources to lay cables. An example involving zoology was the discovery and naming of Pacific marine invertebrates, which reflected the exercise of cultural imperialism by serving as a means of "claiming" the ocean in the name of the nations that sponsored expeditions, in much the same way as did the collection of plants for Kew Gardens, the mapping of India, and polar exploration (Brockway 1979; Edney 1997; Burnett 2000; Robinson 2006). A final example is how the industrialization of fisheries at the end of the nineteenth century made knowledge about the sea pressing enough to promote lasting international cooperation in fisheries science (Rozwadowski 2004). The current tight, if uneasy, links between science and policymaking in fisheries emerged as a product of the work through which fisheries scientists knew nature.

The ocean is very difficult to know. If modern science is a form of work, then efforts to tell the environmental history of the oceans (as well as other remote or difficult environments) must include the knowledge systems,

technologies, and practices of science. Indeed, in the case of vast, opaque environments such as the sea, science appears to be critical to the project of knowing. So is technology. Implicit in the argument for studying not just knowledge of the ocean but its production is the need to recognize, in addition to the history of science, the related but distinct fields of history of technology and science and technology studies (STS). Machines, gear, tools, instruments, and skills have been critical to the development of conceptions of the ocean, particularly those parts otherwise inaccessible to people, but also simply to account for the immense dimensions of the sea (Rozwadowski and van Keuren 2004). More attention to the roles and contributions of technology offers rich possibilities for ocean history. Because of the critical significance of science as a way of knowing the ocean – and of the technologies that mediate knowledge of the sea – the environmental history of the ocean should be guided not only by the questions and methods of environmental history but by those of the history of science and technology as well.

Conclusion

The transformation of natural objects retrieved from the ocean into knowledge provides information about this inaccessible place, but it also does much more. Because people can only know the sea indirectly, knowledge – whether derived from subsistence activities, commercial or industrial work, or science – actually constitutes the ocean. People know the ocean through technologies and knowledge systems such as compasses, charts, and navigational knowledge, or nets, bait, and knowledge of how to find fish. Scientific knowledge, then, numbers among the ways that people know the ocean environment, alongside other kinds of work such as fishing, reconfiguring coastlines, building and operating vessels, and so on.

To understand the human relationship with the sea – a goal of environmental history – it will be essential to look at how knowledge about the ocean has been produced: by whom, with what kinds of instruments or tools, using what kinds of practices – whether scientific, industrial, or recreational – in which historical contexts, and for what intended uses. The fields of history of science and history of technology attend to the intellectual, political, and social factors that influence the development and deployment of various tools and knowledge systems. Telling the history of the ocean will, therefore, engage environmental historians in questions similar to those asked by historians of science – questions about how knowledge of such a remote and inaccessible environment was created, and how that knowledge was subsequently used. The questions and methods of history of science are just as relevant to understanding knowledge produced by ship captains and fishermen as by Cold War physical oceanographers.

Writing the history of the ocean, then, will likely fuse the framework of environmental history to questions and methods from history of science and technology. It will also, as this essay argues, draw from a variety of other fields and methodological traditions. The questions and perspectives of maritime history, especially, elucidate the labor that allows people to know the oceans. Geography contributes ways to comprehend and analyze vast spaces, both horizontal and vertical, that comprise the ocean. Anthropology and sociology offer means for understanding cultural and social constructs that relate to the ocean, while literary studies inform intellectual and cultural conceptions of the sea. The lessons to be learned about how to tackle the telling of environmental history of the ocean may also illuminate the task of studying the human relationship with other remote, inaccessible places including the poles, rainforests, mountains, the atmosphere, space – the kinds of places that are known as much through imagination as through direct experience. Places closer to home can, of course, also be known through imagination; histories of the ocean and other ends of the earth may turn out to be central after all.

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Chapter Twenty-four

Cities and Suburbs

Chris Sellers

Trees dominate the view out over my backyard as I sit to type this essay only 30 miles from New York City. Tucked in between the maples and yews, the house roofs look crouched and shadowy. Only the occasional murmur of a truck or plane disturbs the refrain of birds and cicadas. The uncluttered abundance of greenery and creatures before me makes this place seem worlds apart from any city. Yet were I to wander just a few hundred yards away, the clamor of traffic, the clumping of buildings and people, the hard surfaces of parking lot and sidewalk, would overwhelm the pastoral setting outside my window. This landscape could just as easily belong to a subdivision in any smaller town or city across the East Coast, or, with some species variation, the entire United States. Most urban historians would readily call this landscape "urban," and look askance at any hint it might also be "rural," even "natural." But those environmental historians who have, over the last couple of decades, turned to study cities have increasingly concluded otherwise. This place is a hybrid, they would aver, and the distinction itself, misleading. Their work has collectively made a powerful case that we cannot understand the making of cities without serious attention to the transformations of nature and environment that accompanied it.

The city has blossomed into a scholarly frontier in environmental history, yielding a growing number of novel avenues for "writing nature into human history." We now have acquired a substantial body of scholarship examining the historical shaping of interactions between city and countryside, and the ways in which city-making itself has worked and reworked the natural world. Environmental justice movements have helped prime us to the continuing importance of pollution and the most built of landscapes, especially when it comes to the environmental experiences of the least powerful – those situated below the middle class. The ongoing integration of social with environmental history has also steered its practitioners cityward. All of

this work has gone a long way to breaking down the working assumption that governed much of the field's founding visions of the 1970s and 1980s – that the core topics of environmental history lay in the least urbanized of places (see Rosen and Tarr 1994; Flanagan 2000; Platt 1999; Stephenson 2005; Brosnan 2004; Keyes 2000; Rose 2004).

Arguably, those more urbanized places, where most of us spend most of our days and nights, have been more formative to our modern notions of "nature" and "environment." Consider, for instance, the history of this place where I live, just outside of New York City. The most familiar name we have for these kinds of places is "suburbs," from the Latin, implying their "sub"-ordination to the "urbs," or city. Another more nature-attuned angle illuminates such a place more even-handedly, as an unsteady marriage between city and countryside. Interestingly, it is a marriage that has been fully arranged over the last century of American history. Over this period, such places acquired geographic and cultural centrality in the United States, to become where most of us live, shop, and work. In bringing the visibly built and polluted alongside the visibly organic and "natural," such places, over the 1960s and 1970s, also proved paradigmatic templates for a then-novel coinage, on which the field of environmental history now leans – "the environment."

As the Latin derivation of the word suggests, however, "suburbs" have been around much longer – as long as cities themselves. Understanding why and how they have evolved as they have requires us to step back and consider the longer environmental history of those cities of which suburbs have been a part. The last two decades of work by environmental historians has forged some illuminating angles on this past, heretofore the province strictly of "urban" historians.

Cities through the Nineteenth Century

Humanity's first cities are generally agreed to have arisen some millennia before the Roman Empire, around 3000 BC, in the Sumerian civilization of Mesopotamia. Uruk is generally thought to be the very first. Its edges, like those of many of its early as well as later cousins, consisted of defensive walls. It has been suggested that at least one early Mesopotamian city did not have a wall, and that it grew through additional settlements by migrants along its suburban outskirts. But throughout urban history, cities grew in part because of the military advantages conferred by city walls, and these defined the edges and "suburbs" of metropolises until well into the modern period.

More fundamental to why cities emerge is their connection to what was happening on land further beyond their bounds. In what geographers would define as urban "hinterlands," the Sumerians, and other early

urbanizing societies, had given up the mobility of hunting and gathering to farm, to tend to those plants and animals they had domesticated. Scholars disagree about whether cities or farms came first, but not on the larger pattern. Where and when agriculture became productive enough not just to feed cultivators but to generate surpluses, from Mesopotamia to the Indus Valley, to China and Europe, to the Americas, cities, too, coalesced. As minorities became capable of living off what others grew, cities sprouted hand in hand with a developing countryside. A fundamental contribution of William Cronon's *Nature's Metropolis* (1991) was to remind urban and environmental historians of a tradition of economic theorizing, starting in the early 1800s with the work of the German Von Thünen, that has explored just how cities organize surrounding lands into urban "tributary" regions. As market centers, they encouraged a more settled and intensive agriculture closer in, where transport of goods was less expensive. Further out, the difficulties and expense of travel made extensive crops more economical, along with trees, ores, or wild game without cultivation costs.

Archeologists debate whether early cities were centers more for religion and the supernatural than for markets, but clearly, a longstanding economic segmentation of urban regions into extractive, agricultural, and marketing zones has nourished some familiar cultural divisions and associations. At least since the Sumerian epic of Gilgamesh, as the literary historian Robert Pogue Harrison (1993) has reminded us, city dwellers have been portrayed as having a taming and civilizing power not just over surrounding lands but over their inhabitants. Whether or not this influence has been taken as positive – or as oppressive and alienating, a loss of, or distancing from, nature – has depended on time and place, and also on the eye of the beholder.

Among the determinants of the city's meaning across time and place has been the sheer size of urban populations in a given society. Through most of urban history, those living in cities made up only a tiny if influential minority of the larger societies of which they were a part. Those traders, artisans, and political and religious leaders lived off the work and wares of hinterland dwellers. Though Rome in its heyday may have harbored as many as a million residents, though Alexandria and then Baghdad may briefly also have approached this mark, cities through these early millennia were generally much smaller. Only with the rise of trade over the sixteenth and seventeenth centuries, but especially with the industrialization in the eighteenth and nineteenth, did city populations in some nations, starting with Britain, finally rival those of the countryside. The growing scale and productivity of factories, prodded by new corporate managers and technology, brought many new city-bound alternatives to farming. Whereas around 1800, only London and Beijing, China, had arrived at the one million mark, by 1900 some seventeen cities had, most of them in North America and Europe. The rise of these industrial cities from the nineteenth into the

twentieth centuries has preoccupied most of those environmental historians turning their sights cityward. Some early work, including a collection edited by Joel Tarr and Gabriel Dupuy (1988), as well as works by German and British historians, looked at the technological makings of industrial cities in Europe, as well as their environmental consequences. But much new work on urban history came within the United States, where environmental history acquired a more solid foothold in the history academy earlier on.

The American cities they studied offered an exemplary, if foreshortened, version of what was also happening in other industrializing parts of the world by the end of the nineteenth century. A predominantly agricultural nation over most of the nineteenth century, the American republic nevertheless grew four such million-person cities over its first century and a quarter. First New York, then Philadelphia and Boston, swelled rapidly, but the most meteoric rise was that of Chicago, the subject of Cronon's influential *Nature's Metropolis* (1991). Settled by whites only starting in the 1830s, by 1900 it had surged to become the nation's second largest city and the fifth largest in the world. This and other of America's newly burgeoning cities were the beneficiaries of innovations like canals and then railroads that hiked up the speed, volume, and distance of shipments and accelerated the flow of wheat, ore, and lumber into urban markets. City growth also hinged upon how many more people settled out from them to exploit their "hinterlands," most prominently, in the American West and South.

Cronon's work helped initiate rich veins of research into those areas out from city limits to where the crops are grown, the metals mined, and the trees cut whose trading, shipping, manufacture, and marketing formed the occupational core of urban life. Among the highlights of this vein of scholarship are works about San Francisco, Denver, and other cities' despoliation of their hinterlands, mostly through extractive resource use. Historians such as Kathleen Brosnan (2002) and geographers such as Gray Brechin (2006), as well as the editors of a number of volumes on specific cities (Diefendorf and Dorsey 2005; Tarr 2005; Melosi and Pratt 2007; Deverell and Hise 2006), seek ways of building a more regional scope to their narratives of urbanizing. One vein of connection between cities and their hinterlands that several historians have explored is waterways, the transport routes by which goods flowed down river. A slew of historians, following Donald Worster (1992), have looked at how cities themselves, especially in the arid West, turned to constructing their own reservoirs and conduits from surrounding lands, in order to supply water for urban needs. Through works such as Sara Elkind's (1998) and Ted Steinberg's (2004), this quest, familiar to an earlier wave of environmental historians from the battle between the early Sierra Club and the city of San Francisco, has also come into its own in urban environmental history (Fox 1986; Koeppel 2001; Righter 2006; Mauch and Zeller 2008). Generalizing from such work, urban environmental historians have developed a concept of "urban

metabolism" (Tarr 2002), pointing to the flows of resources from the hinterlands that enable cities to exist and thrive. Thus far, historians has had more to say about urban-rural circulation of materials than of people or mindsets (Schott et al. 2005), though a few, such as David Stradling (2008), have begun to explore how much tourism and the collective action of preservation groups hinged upon urban networks and influences.

An implicit debate has nevertheless emerged in the literature about just how present or visible "nature" might be within these cities themselves. Again, *Nature's Metropolis* (1991) provided an early reference point, by describing how many raw materials, in entering the city and becoming marketed as commodities, were stripped of most of the signs by which people recognized their earthly or ecological origins. Inside the city, after wood became lumber for an apartment, after ore had become steel for a streetcar rail, after cattle had became steak on a restaurant plate, they seemed far less a product of nature than of human hands. Jennifer Price (2000) has elaborated how the stuff of the city, such as a pigeon on a restaurant plate, contrasted dramatically and unrecognizably with the wild living bird it had been in a distant hinterland. Others, in looking at how city-making grappled with local features of land and geography, have presented more mixed conclusions about how recognizably natural these remained. Craig Colten's *An Unnatural Metropolis* (2006) narrates those ways that New Orleans' leaders sought to "wrest" this city from "nature," despite a naturally perilous location, prone to flooding and standing water. Ari Kelman, in *A River and Its City* (2006), points to how New Orleans became encircled with levees and drainage of all sorts so that it looked very much worked, altered, and built. But as Hurricane Katrina taught us, it remained ever vulnerable to the more violent of storms. New Orleans may have been unusually susceptible, but it was hardly unique. Far into the twentieth century, Jared Orsi (2004) has shown how Los Angeles remained susceptible to flooding; Mike Davis (1999) explored its vulnerability to a host of other disastrous forces, from earthquakes to wild animals. While Orsi and Davis track such vulnerabilities into the present day, Blake Gumprecht's (2001) work depicts a Los Angeles River rendered utterly unnatural by engineering correctives. Overall, environmental historians have opened the door to how the nature in these cities was often not so much gone as in disguise, just waiting to strike.

Environmental historians have thereby revived topics in which the last generation of urban historians had been losing interest: the death-dealing eruptions that came from packing so many humans together, from forces as palpable as storms or earthquakes, but also as microscopic and invisible as germs. Nineteenth-century industrial cities were extremely prone to infectious disease; cholera and other epidemics slashed from one part of the world to others by leaping from one urban agglomeration to another. They did so not just because of world trade but because, until the sanitary revolution of the late nineteenth century, city sewers were rare, contamination of

water supplies was rampant, and housing – especially for poorer urban dwellers – ever more dense and packed. These sanitary dangers, and their solution, served as centerpieces for the first wave of urban environmental historians, from Joel Tarr (1996) on the ironic downstream problems caused by the early sewer systems, to Martin Melosi's (1982) work on garbage and waste disposal. Early on, these narratives began to challenge more triumphal ones of public health historians, by pointing to the limitations of earlier solutions.

Over the 1990s, new scholarship inspired by social history and the environmental justice movement also dug out just how unevenly distributed were these and other bodily threats, and, especially in the case of industrial wastes and other by-products, how much of them remained. From a special issue of *Environmental History* in 2000 (Flanagan 2000; Greenberg 2000; Gugliotta 2000; Platt 2000) to books by those from David Pellow (2002) to Sylvia Washington (2005) to Julie Sze (2006), we have learned much more about the heavier burdens of these hazards borne by minorities and the poor. Studies of pollution in this era have taken up similar themes, in British as well as American urban history. Harold Platt (2005) has made a powerful case for skewed distributions of water-borne hazards as underlying late-nineteenth-century political struggles in both British Manchester and America's Chicago. So too with air pollution. Thanks to the work of David Stradling (2002), Steven Mosley (2008), and Peter Thorsheim (2006), we now know more about how the brown emanations of wood fires were being replaced by the darker smoke of coal, and just what kinds of communities became more rather than less susceptible to each.

While all of these dangers and threats may fit easily under today's rubric of "environmental," the materialist and sociological preoccupations of much urban as well as environmental history, along with a certain fragmentation by topic, mean we have learned less about how their historic contemporaries correlated or categorized them, or fitted them into their era's thinking about nature. The issue is pressed home by Ted Steinberg's (2008) provocative characterization of American cities, at least through the middle of the nineteenth century, as "organic." After the Civil War, pigs and chickens still roamed in many parts of the nation's largest town. Coursing through the streets were not just people and carriages, but quite prominently, horses, whose manure went to fertilize urban-fringe farms. But were not these horses (the subject of a book by Clay McShane and Joel Tarr, 2007), arguably more an urban than a rural animal over much of this period, until they began to be displaced by streetcars? McShane and Tarr apply to their topic what has become an increasingly popular metaphor for environmental historians, seeing these horses as entanglements of the natural and cultural, "living" or "organic machines." The latter phrase, wielded by Richard White (1996) based on coinage by Donna Haraway, is one of several keywords that have helped orient environmental historians toward the

"organic" as well as the more human-intended and constructed sides of the city and its inhabitants. But we also need to know more about just where, when, and how urbanites themselves talk about their surroundings as "natural" or "organic." Ironically, the disappearance of Steinberg's "organic city" may have come *because* vantage points on the city's organic components did not so much vanish as flourish – among public health officials seeking to track down the bacteria that were passing along diseases, city officials planning streets to accommodate more horse traffic, and engineers building sewers, or channeling rivers to avoid floods. Examining the city's nature, not just as we in the early twenty-first century see it, but as past actors did, may well open up new questions about the relationship between expert and popular ways of seeing, a topic heretofore illuminated chiefly by historians of science and public health (Dierig et al. 2003; Mitman et al. 2004). Clearly, this is also terrain onto which environmental historians of the city must tread, if they seek to answer, in empirical terms, the ways and extent to which urban nature was actually recognized as "nature," or not.

What nevertheless seems clear is that many urbanites of the mid-to-late nineteenth and early twentieth centuries were nagged by a growing sense that vital, customary contacts with "nature" were missing or vanishing from urban life. Among the stronger indicators of this perception was the self-conscious cultivation inside the city of places where "nature" was made recognizable – parks. Beginning with New York's Central Park, established along the northerly edge of that metropolis in 1857, more naturalistic or pastoral visions for urban parks successfully vie with other, more visibly built or cultivated schemes for public lands. Of course, the hankering felt by many urban dwellers for closer contacts with the natural world also had less local or collective solutions. By the turn of the twentieth century, many left the city, either periodically – for vacations to nearby lakes and forests – or more permanently – for residences in the neighboring countryside.

It may well be that at no time has the contrast between city and countryside seemed starker, or the American city itself more unnatural, than at the end of the nineteenth and beginning of the twentieth centuries. But the new fusionist social and environmental history of the city has as yet shied away from questions that might help us better sort out such a pivotal moment. Among these, how much of any divide was due to on-the-ground material changes, and how much to the prevailing and evolving perspectives through which people categorized and interpreted what they saw?

Twentieth-Century Cities

At least some of the city's seeming unnaturalness stemmed from how, over the Progressive era, American cities had joined British European counterparts in cultivating new scientific, legal, and administrative tools to cope

with the most pressing and soluble of urban environmental problems. This urban reform, as well, has preoccupied urban environmental historians. By and large, their work has upheld a familiar metanarrative in which the urbanizing of the industrial era stirs problems, for which Progressives begin to discover and disseminate solutions. Along these lines, we now have not just monographs but some sweeping and impressive syntheses: Martin Melosi's *Sanitary City* (2008) and Harold Platt's *Shock Cities* (2005). Platt takes these questions in a much-needed comparative direction, to illuminate deep parallels as well as differences between the British and American versions of this story. We've learned much from these and related works about history and politics, about measures from sewers to animal and mosquito control, that grappled successfully with problems of infectious disease. Despite the unevenness and prejudice with which they were often applied, these and other strategies, from the engineering of public works to housing and factory regulation to land use zoning, do seem to have made American cities safer and healthier places than before. Many of these efforts sought a taming of obtrusive or dangerous ecological feedback from what had already been built. Nature was easiest to notice when it ran amuck: the spread of germs in packed sweatshops, or the flooding to which riverside dwellings were prone. Many of the reforms experts advocated in this "progressive era" of American cities sought a further domestication of urban nature.

It was a domestication that, however incomplete in American cities, remained still patchier in other parts of the world. The kind of growth visited upon American cities in the early industrializing era has, especially after World War II, arrived in many developing nations and in the less prosperous economies of Eastern Europe. There, mega-cities have arisen, peopled by millions fleeing transformations of agriculture in the surrounding countryside. Though New York became the world's first city to surpass ten million people, of the twenty cities bigger than this by 2000, all but Tokyo, New York, and Los Angeles were in the Third World. If they are not among a privileged elite, residents in these mega-cities face dilemmas similar to those of America's nineteenth-century urbanites: among them, poor sanitation and housing, poverty, and political and social marginalization (Davis 2007).

By 2006, these burgeoning agglomerations had brought the world to an epic milestone. For the first time in history, more of humanity now lives in cities than in rural areas. Even the most rural-focused of environmental historians need to pay heed, as this turn will likely have far-reaching implications for the planet. This same milestone had been reached inside the US in 1920.

Since then, American cities had continued to grow, but in a manner different from the mega-cities of the developing world. Shifting to Sun Belt cities such as Los Angeles, Houston, and Atlanta, growth, more centripetal than centrifugal, has come, through what in the 1950s began to be called

"urban sprawl." While growing cities have always "sprawled" in one sense, by spreading urban land uses and activities into neighboring countryside, what distinguishes this twentieth-century version in American and other wealthy, industrialized nations, is that this spread has been steadily more decentralized and dispersed. Leap-frogging of houses and stores into the countryside has given rise to hybrid landscapes like my own on contemporary Long Island, where "open spaces" of trees and greenery coexist with dense traffic, malls, and freeways.

We may understand this process as many urban as well as environmental historians have – as a story of "anti-urban" flight. New York's core offers a case in point: Manhattan's density peaked in 1910 and has since steadily declined. Admittedly, business centers like Wall Street have continued to prosper, even sprout anew in the downtowns of rapidly growing cities like Los Angeles. Gentrification, redevelopment, and tourism have also more recently returned some wealth and businesses to many urban cores. But the overall twentieth-century trajectory of America's downtowns has predominantly been one of decline and "urban crisis" (Self 2005; Sugrue 2005). For the most part, those who could, moved out to where the new housing, markets, and jobs lay. Those who could not, mostly the poor and minorities, were left behind. There, they faced a neglect fostered by departing industries, declining tax bases, eroding infrastructure, and, in more recent decades, a neoliberal preference for market forces over the ameliorative power of the state.

More or less consistently, urban historians have also attempted to frame the fate of downtowns as part of a larger-scale urbanizing process, albeit one that stops where farms begin. The prevailing theme here, more or less unstated after first appearing in works of the 1960s and 1970s, has been fragmentation or splintering (Fogelson 1967). We have come to understand different corners of the city as having starkly different trajectories; increasingly, with the dominance of social history, we have learned more and more, especially about those least favored by local urban wealth and power. For at least a couple of decades, social historians of the city often specialized, confining their attention to those parts of the city inhabited by a particular group. With the cultural turn, geographers like Edward Soja (2000) suggest that the most modern of cities have turned into collections of places fostering utterly and starkly different vantage points on the world. At least one urban historian has asserted that poststructuralist challenges, combined with the ever more multiple urban trajectories illuminated by spatial tools like geographic mapping software, have undermined the credibility of overarching historical narratives about cities' pasts (Ethington 2000). With their notions of "urban metabolism," and also on other fronts, environmental historians have nevertheless been busy introducing and elaborating new ways of weaving together the histories of different corners of the twentieth-century city.

A starting model for how urban environmental historians have woven together twentieth-century differences in urban experience that social historians tend to pull asunder has been Andrew Hurley's *Environmental Inequalities* (1995), a study of Gary, Indiana. The different neighborhoods in Hurley's Gary amount to an urban commons, bound together by their economic dependence on US Steel, as well as a larger urban geography. Workers' living quarters were more or less laid out around the plant. Yet their experiences differed radically by group, with the African Americans bearing the brunt of air pollution hazards inside the plant and in their nearby neighborhoods, while white working class were somewhat more fortunate. Middle-class managers and their families remained the most insulated, yet raised the biggest early rows over the city's pollution. A venturesome foray into how "commons" notions might be applied to an entire city, Hurley's juxtaposing of social histories had weaknesses that have become apparent in the light of later work. Pinning group identities rigidly to one of three places, it framed each group's environmental experience as separate, with little interaction or sharing. Only via the local politics of pollution were these divides at least temporarily overcome, when in the early 1970s, Gary's first black mayor finally took up an issue long pushed by a white middle class.

Urban environmental historians have also opened other approaches to the commons with which city dwellers contended. Some of the more interesting have come as they have tackled the "public" character of much urban space, in recognition of how, even in the most fragmented of cities, experiences were shaped not just by how different kinds of people were segregated from one another, but by where and how they also continued to cross paths. Among the debates in which environmental historians have engaged, Mike Davis (1992) has joined other prominent urban historians such as Lizabeth Cohen (2003) in arguing that, especially after World War II, American cities suffered from a privatization and restriction of public spaces. But Ari Kelman's (2006) history of New Orleans shows that in that city, the downtown waterfront had actually been privatized and restricted in access much earlier, through late nineteenth and early twentieth-century industrialization. After World War II, he suggests, an anti-freeway environmental movement opened the door to a new public retaking of the waterfront, even if the resultant commercialization did not fully live up to this promise. More broadly, an environmental focus such as Kelman's on a concrete corner of the downtown yields insights into the more dynamic sides of the city's social topography.

Here, a materialist lens provided by environmental history not so paradoxically enables a methodological counterbalance to inclinations in much urban history to fix the social identities of particular groups to particular places. Beyond associations we may draw between a social group and some part of the city, most of these places also come to be visited by others, and even most residents' ideas about these places were shaped by other places

they had been. Alternatively, following the bodies and experiences of those who passed through different urban places – for instance, from Harlem to the Bronx, or from the Bronx to Long Island suburbs – can also shed light on how encounters with one corner of the city, as natural or otherwise, can shape people's understandings of another. Such studies can also help us probe the environmental, historically contingent grounds for sociocultural identities themselves. For instance, they may help reveal why, in an era when biological distinctions between the races were falling into disrepute, racial identifications, based on skin color, proved so powerful and so durable (Sellers 2005).

Another fruitful approach to studying the environmental or "natural" side of the city comes when we pose questions about how the ways that historical actors may see or imagine this nature may not always square with on-the-ground realities. While many of the above works draw on such an observation at one point or another, the most striking of contrasts comes in Mike Davis's *Ecology of Fear* (1999) where he discusses the many cinematic disasters visited upon Los Angeles. Davis's own historical narrative suggests the filmmakers to be right; a more subtle and ironic exploration of this same theme comes in Matthew Klingle's *Emerald City* (2008). Starting with Seattle's modern billing as city in harmony with nature, he contrasts its emergence and evolution with the more complex and contradictory dealings of Seattleites with the nature under their noses, from the lowlands where the poorest live to the salmon so many hoped to restore. In episode upon episode through the city's history, Klingle shows how the efforts of the powerful and influential to imprint their own vision of "nature" on and around the city often proved self-serving. From the description of Hoovervilles as "natural areas" to the neglect of polluted and "lost" places downtown in the modern "green" vision of Seattle as "Emerald City," Klingle's book follows that of other socio-environmental historians in asserting that ideas about "nature" often served the interests of the powerful at the expense of the powerless. But Klingle goes further than many of his environmental historian colleagues in taking his own and others' "nature" talk with a grain of salt, thereby opening historical questions not just about urban nature and the environment themselves, but about the ways historical actors thought and talked about them.

Important as downtowns were to the changing shape of the American city over the twentieth century, however, the migrations from them involved more than just urban flight, white or otherwise. Also driving them were pull factors, including a search for the countryside and "nature," which some environmental historians have also turned to study. Environmentalism itself – with its newly imagined locus of concern, the "environment" – may well have been a product of how so many Americans came to think of themselves, while still living within America's metropolises, as not *of* them.

Suburbs and Nature

Already before the Civil War, America's urban edges had begun to draw out nature-seekers. Henry David Thoreau in 1845 resolved to live a year as an urban-edge squatter at Walden Pond, not 30 miles from downtown Boston. That he was not himself a property owner and that he supplied his own provisions literally off the surrounding land made him representative of many other urban-edge dwellers in his own time. Over the next hundred and fifty years, after the rural isolation that Thoreau celebrated there quickly eroded, the migration to America's urban edges would become ever more prosperous and permanent. Suburban builders and residents' own self-consciously cultivated flora and fauna and the wilder nature they sought around them, reveal how, especially over the twentieth century, the quest for nature emerged as a powerful force in American cities' growth.

The resulting suburbs emerged as a major topic of historical (as opposed to sociological or geographic) research only in the 1980s, most prominently through Kenneth Jackson's *Crabgrass Frontier* (1987). If Jackson's book signaled the arrival of suburbia as topic of study, his approach viewed suburbs almost exclusively as an "anti-urban" extension of the city. Other historians soon came along to explore suburbia more on its own terms, and debates arose about just what those terms might be. Those such as Robert Fishman (1989), John Stilgoe (1990), and Margaret Marsh (1990) brought out the "country" or "borderland" aesthetic that shaped so much of suburbia. More recently, Greg Hise (1997) and others have argued that industrial deconcentration was a driving factor in suburbanization, while scholars of working-class and African-American suburbs such as Richard Harris (1999), Andrew Wiese (2005), and Becky Nicolaides (2002) have brought out a new appreciation of the economic as well as racioethnic diversity of suburbs before World War II, as well as later in the postwar era. Dolores Hayden's *Building Suburbia* (2004) encapsulates their arguments. Meanwhile, urban historians such as Owen Gutfreund (2005) and Robert Bruegmann (2006) have turned to the history of sprawl itself. But prevailing assumptions in the field of urban history continue to steer these historians away from a more robust and sympathetic engagement with environmental questions.

By the light of this work, we know that as late as 1900, city perimeters across the Western world were still known more as places of poverty and factories than of wealth. In the US during this period, market farms, orchards, and dairies, as well as those industries considered too "noxious" for an urban setting, all made up prominent slices of urban-edge life. Suburbanites in this time ranged from the executives in Garden City who worked in New York City offices, to farmers who worked the wide stretches of land on which they lived, to itinerant squatters such as the African Americans driven out during the making of Central Park. Indeed, Andrew Jackson Downing,

Frank Scott, and other early American popularizers of what would later become known as a "suburban ideal" of single-family homes tucked among grassy lawns and greenery, preferred to speak of their "country" rather than "suburban" homes. Only over the first half of the twentieth century did American suburbs solidify their modern reputation, as a haven of the middle class. Place meanings of "suburbs" coalesced as more and more of the well-to-do moved there. By 1940, Americans who lived out from the urban cores comprised a third of metropolitan dwellers; over the next three decades they would become a majority. By the century's end, most Americans lived in what the US Census categorized as "suburban" places.

Over the post-World War II decades, urban-edge residence came to be mythologized as "suburbia" – a tame and grassy haven of America's (white) middle class. In many depictions of this new mass suburbia, nature seemed little in evidence. Those historians who first turned to studying its lawns and horticulture dwelt entirely upon their status as cultural artifacts, products of human artifice (Jenkins 1994; Teyssot 1999). More belatedly, suburbs have also begun to draw attention from environmental historians. This interest has come as trends in cities around the world increasingly suggest that, contrary to Jackson's argument from the early 1980s, American suburbanism is not so exceptional. Once people come to possess sufficient wealth and cars – once the opportunity arises – the attractions of urban-edge living might even be universal. Perhaps some species-wide instinct kicks in, what E. O. Wilson (1986) describes as "biophilia" – a hardwired preference for the rolling grassland of the African velt, scattered with trees and etched by meandering streams, where *homo sapiens* first evolved. But as Ted Steinberg (2006) and others have argued, the peculiar "marriage" between city and country that we see as "suburban" today reflects just how dramatically our urban edges have evolved over only a tiny slice of eight thousand years of urban history.

The main profile of "suburbia" in environmentalists' arguments was as nature's nemesis; most environmental historians turning to suburban history have emphasized the resulting environmental destruction. Adam Rome's *Bulldozer in the Countryside* (2001) considers just what it took to build the 17,000 houses that made up a huge development like Levittown on Long Island. Levittown's builders razed much of what was left of the only naturally occurring prairie east of the Alleghenies, the Hempstead Plains. The destructive politics of suburb-building has also drawn the attention of environmental historians of Western cities (Logan 1995). Once people moved into suburbs in large numbers, they collectively imposed huge new burdens on the local environment. Like those of their species in any urban agglomeration, they generated sewage, and, with more voluminous abandon than their urban predecessors and contemporaries around the globe, they also exuded tons of garbage. Their sewers funneled wastes into groundwater, rivers, and the sea. Historians of air pollution have

pointed to how cars, so vital in navigating the new "spread cities," pumped vast new loads of pollutants into the skies (Dewey 2000). So did the decentralizing industrializing industries that continued to provide suburbanites with jobs, as well as distant electric plants on which they relied to run their televisions, refrigerators, and toasters.

And yet, the park-like private spaces of suburban neighborhoods marked a significant environmental contrast with earlier versions of the American city, including those many Levittowners left behind. This new suburban landscape only became possible not just through home-building, but through step-ups in cultivation and planting. The apparent uniformity of grassy lawns from the British Isles to Levittown to the sprawling cities of the American Sunbelt came only through considerable adaptive work. Outside the Northeast, differences in climate meant that lawn aficionados and researchers had to find substitute species for the bluegrasses and fescues that composed the classic English lawn. Suburban lawns, gardens, and landscaping spawned lucrative businesses and industries after World War II, from national firms like Scotts and Toro to turf and nursery products that many urban-edge farmers turned to growing. A postwar rage for pets, led by suburban dwellers, also stimulated nationwide markets for dog and cat food and other supplies. At the same time, in these same places, ideas about, and ideals for, "nature" were also undergoing changes. If America's urban edges were becoming genuinely "organic" cities in Steinberg's terminology, their residents nevertheless had an ever more difficult time finding "nature" there. Work like fertilizing and mowing, done by suburban homeowners and their families, made it more difficult for them to recognize these flora and fauna as "nature." So after World War II, urban edges of New York and Washington, DC became the earliest breeding grounds for a new "ecological" style of land preservation championed by the Nature Conservancy (Sellers 1999; Birchard 2005).

If suburban dwellers became increasingly inclined to equate nature with the wild, neither were these suburban landscapes quite so tame as often imagined. As anyone knows who just lets their grass grow for a summer month, an important goal of lawn work was to protect yards from a natural susceptibility to unwanted species. Through the many weeds and pests that thrive in the absence of mowing, fertilizing, and brand-name "treatment systems," nature in even the most thoroughly suburbanized of neighborhoods took on a life and agency of its own. As environmentalists have made clear from the movement's beginning, the domestication of suburbanizing wrought unintended consequences, from pesticidal fish kills to the fragmentation of forests. As ecologists have undertaken to study these places, that vast and widening middle zone in the gradient from the more purely "urban" to more unmistakably "rural," a growing body of scientific literature offers environmental historians myriad ways of taking the material ecology of suburbs far more seriously (Marzluff 2008; Johnson and Klemens 2005).

That so many environmental supporters have nevertheless *chosen* to live along the urban edges suggests that the urban-edge migration of the last century has meant more than just environmental taming or destruction. If anything, in comparison with life among the skyscrapers, suburban living meant a closer acquaintance with open space and sky, with non-human flora and fauna. With its abundant plant life, both trimmed and weedy, with its ubiquity of pets and wilder creatures, from deer to songbirds, urban-edge living has kept alive those aspirations dreamed by Rachel Carson in the opening of *Silent Spring*:

> There was once a town in the heart of America where all life seemed to live in harmony with its surroundings.… The town lay in the midst of a checkerboard of prosperous farms, with fields of grain and hillsides of orchards where, in spring, white clouds of bloom drifted above the green fields. (1962: 1)

Environmentalist visions like Carson's strayed away from the urban toward the rural, gravitating the eyes and affections of their readers toward the countryside. Like so many other expressions of environmental "ideals," Carson's prose obscured her readers' own ties to and dependences on the cities of modern America. Living within metropolitan areas, her suburban readership remained deeply enmeshed with urban cores which lay not so far away, but on which, in reading through Carson's and other environmentalists' tracts, they reflected little.

Suburban landscapes were precisely where that characteristically "environmental" array of worries came together. For post-World War II suburban residents around Long Island – as for those around Washington, DC or Los Angeles – it made sense to group both pollution and sprawl under the same term of "environment," because one converged upon their bodies, the other on their backyards. From the first public stirrings against DDT and on behalf of "open space" and "nature" parks, to innumerable polls on environmental issues, suburbs, even more so than cities, have proven themselves a political bulwark for environmentalism. To understand why, we need to consider the contradictory role of nature in such places. Unlike those moving to cities in this as in earlier times, many who moved to modern suburbs expected to find a visible nature nearby. As suburban homeownership came to set the terms for American middle classness over the middle of the twentieth century, these expectations were at once whetted and frustrated.

Conclusion

If the convergence and overlap between America's cities and its countryside have widened over the last century, our own ways of seeing have only partly adapted. We still tend to see places either as full of nature, or as emptied of it. Either we focus on what is built and "urban," from sanitation to freeways

to electronic connections, or our eyes fixate on their surrounding features of flora, fauna, and open space, and we call them countryside, or more recently, "ex-urbia." No doubt environmental history will continue to attract those who themselves prefer these latter places, both personally and as subjects for historical study. Yet much of the collective thrust of non-urban environmental history over the last couple of decades has been to show that perceptions of these places as "nature" are not just illusory but dangerous, often yielding oppressive consequences for rural residents. These histories also keep pointing back to more urban places, projects, and inhabitants. Historically, cities have proven incubators for the most abstract and absolute distinctions between what is "nature" and what is "culture." Thereby, they project people, markets, and power country-ward.

If environmental historians are to contribute to breaking down such distinctions, rather than reinforcing them, more of us need to delve into the history of such places, where most of us, like most Americans, spend the majority of our time. Certainly, we need to continue to study the material and ecological transformations of cities and urban regions, of the natural resources that go to support urban lives, and of the many resulting environmental inequities. But we also need to take a hard, reflexive look at those categories and mental habits that have steered so many historical actors, and that continue to govern our own ways of thinking. For our field to help find ways out of the human and ecological violence that comes from positing stark divides between "nature" and "culture," we ourselves need to start taking the whole of "nature" seriously – how it is not just a material reality but also a cultural category. Environmental historians, in other words, need to forge their own ways out. Those who would do so will find no more promising historical terrain than in those most built and unnatural of places, our cities and suburbs, where nature also never ceases to matter.

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Chapter Twenty-five

Energy and Transportation

Brian Black

Nothing seems more unnatural than an open-pit coal mine. A massive, man-made valley, the mine is most identifiable by the roads that spiral down its perimeter in order to connect Earth's surface with the bottom of the man-made hole, where the coal is being excavated. There is a cartoon quality to such a scene, because each detail appears magnified beyond anything seen in our everyday life on Earth's surface: dump trucks with tires as tall as a four-story building and shovels with a scoop seemingly able to contain an entire city block at once.

This uncanny unnatural quality continues throughout the process of deriving energy from the coal, right up to the moment when the coal powers our hair dryer as electricity. However, even the most artificial-seeming sources of power can't change the fact that energy – in any form – is part of nature. As they have worked to remind us of the relationship of human development to nature, environmental historians have taught us a great deal about human life with energy. This is good news. The better news, though, is that the lines of questioning that environmental historians have opened up on energy and transportation open up lines of inquiry in other areas. Most importantly, by connecting these issues into the broader patterns of human life in which environmental history works, our findings also promise to significantly inform the policies that determine our energy future.

Energy for Life

Humans, of course, have not always made open pits to acquire coal; nor will we continue to acquire energy in this fashion forever. But it is safe to say that humans will always have some relationship with energy sources.

Reliance on energy may seem like a vague notion because energy is not an object that can be picked up and held – it does not occupy space. Instead of being defined in terms of what it is, energy is defined by the work it can do. The scientific definition of energy is the capacity to do work and transfer heat. Work can be boiling water or sawing a log; however, energy is also the heat that flows automatically from a hot object to a cold one when they come into contact.

Methods for energy harvest have taken many forms, beginning with the use of fire and the agricultural revolution. Although many observers do not categorize it with energy use, of course, agriculture (or more precisely, the process of photosynthesis) is the conversion of the sun's energy into food that humans can eat. Approximately 99 percent of energy used to heat Earth and all our buildings comes directly from the sun.

When humans first harvested these energy-producing beings – whether plants or animals – they became involved intimately in Earth's energy cycle. But during the hunter-gatherer phase and even after the agricultural revolution, humans had a limited impact on Earth's biological systems. In short, there is every indication that humans could very likely have continued to live in this fashion in perpetuity. But the human population changed significantly after the 1700s, both in number and in the prevailing living patterns. Energy use provided the lifeblood of this new way of life. Dependence on energy sources such as coal grew so significantly that by the end of the twentieth century extremely costly production methods, such as open-pit mining and mountain-top removal, became acceptable.

The phenomenal growth of the twentieth century was largely made possible by energy harvested from one-time, non-renewable sources. In *Children of the Sun* (2006), Alfred Crosby notes:

> In the past two centuries we have … been burning immense, almost immeasurable, quantities of fossilized biomass from ages long before our species appeared. Today, as ever, we couldn't be more creatures of the sun if we went about with solar panels on our backs.… In the last half century our demand for energy has accelerated to the verge of exceeding what is produced and can be produced by conventional ways of harvesting sun source energy. (5)

The use of such resources, though, can neither be considered sustainable nor renewable. As the physics and science behind energy management have crept out of laboratories and into other realms of thought (including the work of historians), it has become apparent to an increasing number of planners and designers that new forms of renewable energy must be integrated into our twenty-first-century energy future. By using the ethics of ecology and physics to understand the high-energy existence of the industrial era, environmental historians can contribute to the cultural change that transitions us to more sustainable modes of energy use. As humans

make choices about the extent to which they will exploit or rely on certain resources, they exert or express an ethic. Their culture, then, becomes an artifact of this approach.

Energy Patterns Organize Human History

Similar to the way a biologist works, environmental historians must study human society in order to see the larger systems at work around us. Energy systems are one of the most critical spheres with which humans interact with the natural world. During our era of industrialization, the human relationship with energy became expansive. Prior to this era, virtually all energy was renewable energy – a recurring, inexhaustible power source. In many cases, these sources of energy were transformed into relatively complex forms of work and applied by humans to many activities. These societies were defined by what they asked of the sources of power that they knew.

Historian John R. McNeil refers to this structuring characteristic of human life as each society's "energy regime," which he defines as "the collection of arrangements whereby energy is harvested from the sun (or uranium atoms), directed, stored, bought, sold, used for work or wasted, and ultimately dissipated" (2001: 298). Choices about which resources to utilize and in what fashion to use them are controlled by ethics, which are often cultural characteristics held across a specific society. A society's choices about energy reveal a great deal about it. In *The Hydrogen Economy*, Jeremy Rifkin writes: "Energy is the elemental force and the medium upon which all human culture is built. And, yes, human history shows a marked increase in both flow of energy and the complexity of social institutions needed to accommodate that flow" (2003: 42).

As societies attempt to facilitate and integrate specific regimes, we can move from the systematic level and begin to see the ground-level stories of human culture. There we can see the ways that energy ethics influence consumers – us – in our everyday lives. Particularly in examples such as the US, the ethics with which we use nature have broad implications. Historian David Nye writes that the "hegemony of large systems is culturally shaped." The energy systems a society adopts create the structures that

> underlie personal expectations and assumptions about what is normal and possible.… Each person lives within an envelope of such "natural" assumptions about how fast and far one can go in a day, about how much work one can do, about what tools are available, about how work fits into the community, [etc.]. These assumptions together form the habitual perception of a sustaining environment that is taken for granted as already there. (1999: 5–7)

By themselves, these decisions and the machines that they inspire, adds Nye, do not make history. He argues against technological determinism,

suggesting instead that consumers can play a prominent role in managing and even to some extent guiding the "technological momentum" of a specific era. "Energy choices are social constructions that often appear to be inevitable once they acquire technological momentum," he writes (176).

Today, our lives are witness of such an era of apparent inevitability – a fossil fuel era. These fuels dropped in price and grew in availability to the extent that we could implement cheap energy into nearly every facet of our life, from brushing our teeth to making our dessert Twinkies, one of the highest-energy foods created in man's history. We are creatures of a high-energy lifestyle never seen before in human history. These systems must be deconstructed in order to reveal the energy behind them and the culture that demands them.

At this macro-level of analysis, environmental historians are fortunate that one of the field's preeminent scholars, Alfred Crosby, has penned an approachable, engaging survey. His *Children of the Sun* can provide us with the raw material to construct a 12-step process for acknowledging and understanding our addiction to energy. While *Children of the Sun* resembles his earlier work in its ability to synthesize voluminous amounts of extremely technical scientific concepts and writing, the finished product could not be more different. Crosby does not castigate our wasteful ways. Instead, he educates us to see the folly of such usage patterns. Each chapter of *Children of the Sun* tackles a different era in human use of energy, including fire and cooking, agriculture, coal and steam, oil and the internal combustion engine, electricity, fission, and fusion.

Crosby's book engages undergraduates, even in an introductory-level course. Similarly, Richard White's *Organic Machine* (1996) sneaks the lesson of energy systems into its readers in a brief, approachable book that can be used in many types of courses. Using the Columbia River as the conduit, White's book first links the river into natural systems of energy through salmon and Native cultures. Then, he traces European settlement and the various phases of mastery over the river's energy, from salmon canning to hydroelectric development. This electricity leads to urban and industrial development after the 1930s.

Crosby and White's titles function well for undergraduates to equip them with the ability to perceive the webs of culture and energy use that run throughout human societies, throughout time. For more advanced readers, though, John McNeil's *Something New Under the Sun* (2001) takes this concept and ties it into the general patterns of world history in the twentieth century. McNeil's emphasis is on nations' use and mastery of energy as one of the primary determinants of political and economic success. In particular, the ability of societies to convert raw energy into commodities to be consumed and sold, he argues, has separated the developed and less-developed nations of the world.

Crosby, White, Nye, and McNeil, among others, lay a broad foundation that allows environmental historians to approach more focused case studies

of energy in human life throughout the world and across time. The rest of this essay surveys some of the book-length studies of energy use, particularly in North American environmental history. Inspired by McNeil's approach, I will trace environmental historians' consideration of a series of "energy sources" and "energy outcomes." While not exhaustive, this overview will allow me to offer concluding reflections on the uses of environmental history to our energy future.

Energy Source: Rivers

River development and agriculture (see chapter 19, this volume) merit discussion as applications of energy use. As White demonstrates in *Organic Machine*, rivers connect the sun's energy to humans in a complex interrelationship. Soils and plants, of course, do so as well in our most basic energy relationship. Although many historians have investigated agriculture's importance for environmental historians, David Montgomery's *Dirt* (2007) clearly ties the science of geomorphology with many exceptionally important stories in the world history of humans. The inclusion of river systems has also been approached by many scholars. Often, this river management has impacted agricultural development (Worster 1992; Reisner 1993), but rivers also provided the energy for industrial production.

The river as prime mover is explored with the most clarity by Theodore Steinberg in *Nature Incorporated* (1991). This book explores the industrial revolution in New England as it caused alterations to gender and class relations, but also in the way the natural world was handled. Focusing on the legendary Waltham-Lowell style mills, *Nature Incorporated* examines the legal, economic, and social methods by which these textile factories brought water under their exclusive control. Steinberg offers a reinterpretation of industrialization that centers on the struggle to control and master nature. In *Fish Versus Power* (2004), Matthew Evenden applies Steinberg's general approach to conflict over energy development to the Fraser River in British Columbia, Canada in the twentieth century. Evenden writes:

> From the role of state systems and geopolitics to the importance of monumentalism and modernism in dam design, environmental historians have sought to understand the forces that have made dam development politically possible, economically feasible, and ideologically acceptable. Complementing a number of important studies focusing on fisheries, they have also catalogued a host of environmental consequences of river development, not only on fish, but also on changed flow regimes and on human settlements. Relatively few national and international studies have sought to resurrect and understand protest movements against dam development. (15)

In his book, Evenden analyzes the way such protest movements defined this powerful waterway (which, incidentally, never was dammed).

Environmental historians might also find significant fodder in the early twentieth century, when hydroelectric dams were one of the greatest symbols of conservation. The Tennessee Valley Project has been analyzed as a precursor of environmental planning during its early years (Black 2003). Sara Phillips' fine work *This Land, This Nation* (2007) traces the connections between New Deal energy projects and agricultural policy. Most helpful, though, might be a variety of sources that explore dams and their design as material artifacts of larger political and social ideas (Jackson 1995). Although primarily about flood control, Martin Reuss's *Designing the Bayous* (2004) stands as the preeminent history of the Corps of Engineers and the management and control of the Atchafalaya Basin. Finally, Jeffrey Stine's fine study of the conflict over the Endangered Species Act of the 1970s, *Mixing the Waters* (1993), explores one of the basic conflicts facing hydroelectric development in the era of environmental policy.

Energy Source: Coal

As the predominant energy source behind the industrial revolution, coal and its effects on society have interested historians – particularly labor, social, and economic scholars – for generations. Many of these sources, such as Anthony F. C. Wallace's *St. Clair* (1985), contain useful insights about the social implications of coal mining. Early in his career, Martin Melosi wrote *Coping with Abundance* (1985), which provides a useful introduction to energy transitions in the nineteenth century. In describing the adoption of coal in the early 1800s, he ties the energy transition from biomass to coal as one of available supply, particularly due to the war of 1812. Growing reliance on coal would fuel America's industrial revolution, creating landscapes and land uses unlike those of previous eras. To demonstrate these transitions in nineteenth-century industry, environmental historians should draw from the rich work of industrial archeologists, including Robert Gordon and Patrick Malone's *The Texture of Industry* (1994).

Environmental historians have begun to interpret the intensive land use of coal harvest and use. In doing so, however, it is difficult not to default to the perspective of Wendell Berry, the eloquent writer on nature and agriculture, when he castigates the ethics of the industry. Throughout his writing career, Berry found inspiration in the rural Kentucky environment in which he grew up and lived. He became an outspoken critic of strip mining and other practices that damaged the natural environment to extract the desired coal. His work helped to fuel the call for policies regulating coal industry practices and demanding remediation once coal had been extracted. In his essay "Mayhem in the Industrial Paradise," Berry wrote:

> I have just spent two days flying over the coal fields of both eastern and western Kentucky, looking at the works of the strip miners.… In scale and desolation and, I am afraid, in duration this industrial vandalism can be compared only with the desert badlands of the West. The damage has no human scale. It is a geologic upheaval. In some eastern Kentucky counties, for mile after mile after mile, the land has been literally hacked to pieces. Whole mountain tops have been torn off and cast into the valleys. And the ruin of human life … is commensurate with the ruin of the land. It is a scene from the Book of Revelation. It is a domestic Vietnam. (1972: 174)

Richard Francaviglia used industrial archeology to study such locales of extraction. In *Hard Places* (1997) he makes clear that actual places in which people live and work have taken form from extractive beginnings, first in the mid-Atlantic area of the US and later in Western States. In *Extracting Appalachia* (2004), geographer Geoffrey Buckley uses photographs to delve into the landscape and culture of Appalachian coal during the early twentieth century. Buckley's research centers on a set of approximately four thousand photos of sites in Kentucky, West Virginia, and Maryland and collected in the archive of the Consolidation Coal Company. As he describes the moment of discovering the collection, Buckley initially asked the basic questions of a researcher: "Who took these pictures? Why were they made? How were they used?" (xii). *Extracting Appalachia* captures his intellectual effort to answer these questions. "To make any sense of them at all," he continues, "they must be situated in both historical and spatial context. This is particularly important given that they were company photographs taken to satisfy contemporary company needs. To interpret them in any other way – to view them as 'neutral' windows on the past for instance – would be confusing at best, at worst, misleading" (xxiii). Using approaches from history and geography, Buckley carefully manages the limits of his source material to yield a "collective glimpse of life and labor in central Appalachia's coalfields" (xvii). The photos also "allow us to follow closely the construction and development of mines and company towns; inspect the work of miners; to track the technological advances … to observe conditions in and around the mines … and to speculate on social and cultural aspects of coal town life" (xvii).

Mining is at the center of current environmental issues that influence regional life after the extraction has discontinued. Environmental historian Chad Montrie emphasizes the social implications of mining in *To Save the Land and People* (2003), which examines the twentieth-century movement to outlaw surface coal mining in Appalachia. He uses this issue to challenge traditional interpretations of US environmental activism, which often focus on middle-class suburbanites and tend to emphasize national events. In the campaign to abolish strip mining, farmers and working people pushed for regulation and conservation at the local and state level. The book also contributes to a long-running debate among American political historians

about common values by uncovering the importance of a tradition of veneration for small, private property in shaping political consciousness and social conflict in the United States.

Finally, for a general survey of coal in world history, historians might also use Barbara Freese's *Coal: A Human History* (2003), which is particularly useful for undergraduate students. In this overview, Freese covers the global rise of industrialization through the application of coal burning technology. Most importantly, her account finishes the cycle by connecting the various implications of burning coal. In particular, her chapter "A Burning Legacy" takes the global story of industrialization and matches it with the global story of the science clarifying the impact on the global environment, including climate change.

Energy Source: Petroleum

Petroleum is not like other sources of energy. With similarities to valuable minerals such as gold, petroleum's utility was realized in very different patterns from coal. In recent years, many environmental historians have come to investigate the culture formed around the extraction of petroleum. In *Petrolia: The Landscape of America's First Oil Boom*, Brian Black (2003) used landscape history and cultural geography to create a portrait of the industrial ethics taking shape in the earliest development of petroleum in the fields of Pennsylvania from 1859 to 1873. Running outside the bounds of typical property law, petroleum required a unique landscape of extraction. The trial and error of the earliest fields in Pennsylvania made the landscape one unlike any seen before. Black uses the oil fields as a case study of changing ethics in all of American industry. Similar usage patterns can be seen throughout industrial development after the 1880s; however, the story that Black tells is based in the subtleties that are peculiar to petroleum. *Petrolia* works well to introduce undergraduates to this new industrial ethic and the unique culture of petroleum as it plays out on the landscape. These details continue to help define human use of crude today, when petroleum has become one of the world's most important commodities.

Other oil frontiers followed in the Western US, particularly in Texas after 1901. Environmental historians have largely left these topics unexplored. One conspicuous entry, though, is Paul Sabin's *Crude Politics* (2005). Focusing on California's oil boom of 1900 to 1940, Sabin shows that it did not resemble the period of individual resource extraction seen during the rush for gold a half-century earlier. By 1900 the maturation of the ethic of extraction seen in the nineteenth century had moved out from individuals to inculcate the American systems of law and government to the point that it could dominate state politics. Whereas Cronon's *Nature's Metropolis* found that uncoordinated economic decisions expanded markets and altered

regional ecology in the West, Sabin's book explores the vital "political dimensions of environmental change" (8).

From Sabin's use of industry periodicals, court cases, manuscript collections, government archives, and corporate records, historians will gain important insights about the origin of laws and policies that bind resources to the humans making use of them. For instance, Sabin's account traces the implications of Teapot Dome, providing a new perspective on this well-known historical scandal. While Sabin's *Crude Politics* provides environmental history with one of its first great models of how the dynamics of business and policy play out in the modern era around resource extraction, his case study is not necessarily a representative one. During the first several decades of the twentieth century, California led the nation in oil production and consumption. The industry designed to take advantage of these far-flung supplies had to have flexibility and capital to reach and to develop fields wherever they were found. The industry that evolved was unique in its size and dominance.

Often, the analysis of business history has been of little concern to environmental historians. Joseph Pratt and others are demonstrating to the field that corporations are creations of culture and economics; they must be studied for their relation to environmental history as well. In the business history of petroleum, some titles will certainly be helpful to scholars in environmental history. For instance, in *Oil and Ideology: The Cultural Creation of the American Petroleum Industry* (1999), Roger M. Olien and Diana Davids Olien create an intensely focused story of the business discourse that helps to define ideas of the petroleum industry and the policies influencing it. Beginning with the early history of petroleum in Pennsylvania, the Oliens extend the image of boom and expansion in the 1860s industry as a fight between free labor and organizing management, particularly of John D. Rockefeller and Standard Oil. *Oil and Ideology* demonstrates the systematic contest over the meaning of the petroleum industry – its image, if you will. Following the anti-trust battles of the 1910s, efforts at conservation (meaning to control or manage the level of production) become the main battlefield for control of the industry. Producers, of course, wished to keep such control for themselves while not appearing outwardly greedy. A movement begun by John Ise in *The United States Oil Policy* (1926) depicts the history of the petroleum industry as "one long moral disaster for America." The reckless and wanton waste inherent in the industry, Ise argued, grew more disgraceful as American dependence on petroleum grew greater with each year. New Deal efforts led by Harold Ickes, of course, furthered this argument and formalized government controls over production – particularly that coming out of East Texas. The Oliens clearly demonstrate during these episodes the larger dynamics at work in American petroleum – those distinguishing the commodity from any other.

These business ethics helped to expand petroleum development worldwide. Wherever it was found, oil yielded similar outcomes. In one of the best accounts of the culture of oil on existing societies, *Ecology of Oil* (2006), Myrna Santiago provides a critically important historical consideration of petroleum and its massive social and cultural impacts. Although the book is quite constricted in its scope and coverage, it provides an example that will inspire environmental historians approaching any episode of industrial resource use. The story that Santiago chooses to tell – that of the Huasteca, Veracruz (an area of Mexico located along the inner coast of the Gulf of Mexico) – serves as a representative case study. Oilmen such as California magnate Edward L. Doheny represented great corporate behemoths such as Standard Oil and brought the ethic of extraction perfected in other areas – including Pennsylvania and California – to this place (and to wherever crude was found).

In the early twentieth century, the petroleum business became one of the world's most flexible undertakings: able to arrive in a non-industrialized, inaccessible locale, extract the crude and move on to the next site. These external priorities and values, of course, carried with them severe social and environmental consequences. In this case study, Santiago pursues what she sees as the fundamental aim of environmental history: "to locate human actions not only within their social, political, and economic spheres, but also within a network of ecological relationships" (3). Santiago provides a cultural portrait of the local residents, while also incorporating the techniques and practices of oil interests. Although resembling *Changes in the Land* (Cronon 1983) by exploring very different cultural perceptions of the same natural resources, Santiago is clearly critical of the ethics exerted by industrial interests and landowners who exploited the region to extract crude. "Environmental destruction and degradation were the unavoidable consequences of the process," Santiago argues. Indeed, they were "imprinted on the land.… Environmental destruction and degradation were omnipresent, clasping hands with everything that oil represented – progress, modernity, and capitalism – in a seamless continuum from change to ecosystem annihilation" (102).

Some journalistic accounts of petroleum and its future can offer environmental historians strong insights and serve as effective tools in the classroom. For instance, Lisa Margonelli's *Oil on the Brain* (2007) uses technical knowledge to pull back the curtain to reveal the infrastructure of today's petroleum business, which serves as the primary energy infrastructure for the American standard of living. Writing about gasoline, Margonelli notes that Americans consume "1,143 gallons per household per year, purchased in two-and-a-half-minute dashes. We make 16 billion stops at gas stations yearly, taking final delivery on 140 billion gallons of gasoline that has traveled around the world.… And then we peel out, get on with our

real lives" (8) With its series of snapshots from our petroleum conundrum, *Oil on the Brain* provides an engaging ride through the details of our dependency. With its technical information and intriguing data, *Oil on the Brain* instructs its readers about many details of the industry. Ultimately, she drops them unchanged right back where they began in a hapless moment of consumptive futility.

Adding a political emphasis to this contemporary story, Antonia Juhasz's *Tyranny of Oil* (2008) traces the corporate practices of petroleum to 2008, including the war in Iraq. Connecting politics to "Big Oil," she writes: "The political tyranny exercised by the masters of the oil industry corrupts democracy and destroys our ability to choose how much we will sacrifice in oil's name" (2). In her stark account of the dominance of Big Oil, the twenty-first century witnesses a graduation of sorts as the industry moves from the corporate bullying of Rockefeller's era to a contemporary era of political and diplomatic dominance. She masterfully connects the political and corporate dots, creating a clear portrait of just how a nation became willing to wage war over the commodity of petroleum.

Juhasz uses history to connect the corporate and political patterns she has identified. Policy and economic historians will likely quibble with her broad swaths as oversimplification. And yet, by accessing corporate records and federal documents and lending to them her considerable skills as a policy analyst, Juhasz offers new credibility to most of her general arguments. For instance, she demonstrates with real figures that petroleum companies of the twenty-first century are guilty of greenwashing. They depict themselves as extensively involved in alternative energies while, in fact, they invested an average of less than 1 percent of their gross capital (BP was the highest at 4 percent).

The Tyranny of Oil brings the story of Big Oil up to the present, with very disturbing revelations – even to the point of deceiving consumers. It is impossible to read Juhasz's carefully researched, 50-page account of the lead up to war in Iraq in the twenty-first century without hearing echoes of the recent chant, "Drill, Baby, Drill!" Through careful research and access to White House documents, Juhasz attacks a culture of oil that has allowed the nation's future to be co-opted by allowing our own economy as well as our place in the world to become increasingly dominated by access to petroleum.

In each case, journalists use history to add environmental context to our contemporary conundrum. Although some environmental historians (including the author of this essay) are attempting to do similar work on a more solid historical foundation, these journalistic accounts remain a tremendous source for students of environmental history who wish to know more about our contemporary petroleum conundrum. Tracing this historical story might help humans to better consider their options for their energy future.

Energy Source: Conceiving of Alternative Energy

By telling more of the less-conventional stories of our energy past, environmental historians may aid Americans in redefining "alternative" sources of power. Even this very terminology is a relic of the predominance of fossil fuel use in the twentieth century. Picking up on the general work of scholars such as Crosby and Vaclav Smil (1994), historians have an excellent opportunity to demonstrate the human use of such energy sources for generations prior to the cheap fossil fuel energy binge.

Additionally, environmental historians can help to clarify the record of some of the alternatives that have developed in fits and starts during the twentieth century. Inquiry has proceeded on atomic issues, although it is primarily into the pollution and toxicity left after mining and use. Nuclear power's history should be an emphasis of future work by environmental historians, particularly as it receives renewed interest for providing American energy. This work should build on Thomas Wellock's *Critical Masses* (1998), which discusses California's public movement against nuclear power between 1958 and 1978. Additionally, William Kovarick's *Radium Girls* (2009) as well as sources on Native-American uranium mining – Peter Eichstaedt's *If You Poison Us* (1994) and Valerie Kuletz's *The Tainted Desert* (1998) – are a promising start. Finally, Kovarick's work on alternative fuels such as alcohol indicates a future line of inquiry for scholars.

The promise of the twenty-first century may have been glimpsed in a July 2008 speech by Al Gore when he said: "There are times in the history of our nation when our very way of life depends upon dispelling illusions and awakening to the challenge of a present danger." After listing many sociological, climatic, and weather issues facing the nation, he arrives at the crux of what has brought him before the world community: "If we grab hold of that common thread and pull it hard, all of these complex problems begin to unravel and we will find that we're holding the answer to all of them right in our hand. The answer is to end our reliance on carbon-based fuels" (Gore 2008). Gore went on to challenge Americans to commit to producing 100 percent of their electricity from renewable energy and truly clean carbon-free sources within ten years. Through a system-view of energy, such as that put forward by McNeill and Nye, environmental historians can be instrumental in helping to define the new frontier of energy and transportation as we frame the stories of its past.

Energy Output: Transportation

Transportation is one of the most significant applications of energy. Environmental historians have begun to perform systematic studies of transportation in American history, but there are many opportunities for future

research. In *The Horse in the City* (2008), Clay McShane and Joel A. Tarr blaze a fresh path for environmental historians to consider the natural elements of our urban life. This is a story of animal centrality. It should be required reading for anyone interested in the environmental history of urban life in the eighteenth and nineteenth centuries. McShane and Tarr wrap the horse's story in that of urban change. There is neither a pre-history of the species' origins nor a post-history of nostalgic activities. As the authors put it, their story is a symbiotic one: the life cycle of the horse was mirrored in the city. For all the other aspects of the organic city that Tarr and others have explored, in this work McShane and Tarr see the nineteenth-century city as the "climax of human exploitation of horse power" (1). While human life in North America squeezed out other large grazing mammals, "the European horse survived because it found an ecological niche as a partner for humans. In a sense this was a co-evolution, not domination" (1).

The horse's life cycle became entirely anthropomorphized during this period, with its meaning defined by humans. "As one thinks about the horse not as an animal but rather as a living machine in an urbanizing society," McShane and Tarr write, "its role in the process of commodification becomes clearer" (35). Horses were primarily valued for the work they could do – that is, as sources of energy. As a biography of a limited technology, *The Horse in the City* also tells the tale of the transition away from the living machine. In a fascinating final chapter and epilogue, the authors explain the influence on urban areas of the decline of the horse (and vice versa). In this rapid but uneven decline in the early 1900s, the authors emphasize that despite "the horse's critical role as a flexible and evolving technology in the nineteenth-century city, it could not accommodate the requirements of the modern city" (179). Horse travel also constitutes a major portion of Ann Greene's *Horses at Work* (2009), which explores the era of horse transportation with even more specificity. Extending McShane and Tarr's idea of the horse as a living machine, Greene emphasizes the horse as a power source as well as a mode of transportation. She argues for recognition of horses' critical contribution to the history of American energy and the rise of American industrial power. She also puts forward a new understanding of the reasons for their replacement as prime movers.

The modern era of transportation has also been the subject of environmental historians' inquiry. In particular, Thomas McCarthy steers environmental historians toward a product life cycle of the American automobile in *Auto Mania* (2007). He creates a history of technological innovation with a particular emphasis on the environmental impact of the automobile, which John R. McNeill has called one of the twentieth century's most socially and environmentally "consequential" technologies (2001: 308–11). The American automobile is no typical consumer good: "All of the automobile's environmental impacts occurred in a larger context shaped by consumers as much as (and sometimes more than) producers" (McCarthy 2007: xiv). For instance,

in the treatment of Ford's Model T, McCarthy sees the auto of the 1930s as forcing a revolution in the gathering of raw materials over a broad area in order to collect them for manufacturing in a central location. He extends this discussion by investigating the environmental hazards that derived from the intensity of manufacturing at Ford's Highland Park and Rouge River plants. This point then connects smoothly to junkyards and manufacturers' efforts to wrestle with obsolescence and style changes. In the end, writes McCarthy, consumer exuberance over annual style alterations won out.

The book gains traction again later when it explores issues of pollution and the Clean Air Act, CAFÉ standards, and the ensuing alterations of automotive design (or the refusal to alter designs). In one of the most persuasive points in his book, McCarthy argues that the 1958 Buyer's Strike marked a critical moment in Americans' relationship with auto manufacturers because it "prepared the way for a generation of industry critics, including critics that later called attention to the environmental harm caused by the automobile." Even at this early date, American manufacturers had been criticized as "clumsy, clownish, Midwestern manipulators pedaling shoddy, expensive goods to pad their bottom lines" (146). His explication of this late-1950s episode provides an important corrective to the usual narrative describing the refusal of American manufacturers to evolve at the dawn of the twenty-first century.

Other books on transportation that environmental historians should consider include Shane Hamilton's *Trucking Country* (2008), a social history of long-haul trucking that explores the contentious politics of free-market capitalism in post-World War II America; Peter D. Norton's *Fighting Traffic* (2008), which describes the landscape and spatial impact of automobile use in the twentieth-century city; Thomas Zeller's *Driving Germany* (2007), which unpacks the social meaning of Hitler's autobahn as a technology with serious social and environmental implications; and *The World Beyond the Windshield* (Mauch and Zeller 2008), which is a comparative analysis of the impact of auto use on the landscape in twentieth-century Central Europe and the US. Finally, environmental historians should further explore the era of electric vehicles through books such as Jim Motavalli's *Forward Drive* (2001) and *The Electric Vehicle and the Burden of History*, the more scholarly account by David Kirsch (1986).

Energy Output: Implications of Energy and Transportation

The infrastructure to create our energy intensive society and transportation network has exacted significant alterations on the American living environment. Martin Melosi's *Sanitary City* (1999) as well as Joel Tarr's (1996, 2003) articles and books consider many of the issues of pollution deriving from our reliance on energy and transportation. The public reaction to the

reality of pollution has stirred studies such as Hugh Gorman's *Redefining Efficiency* (2001). Gorman traces the ideas of pollution and efficiency within the US petroleum industry throughout the twentieth century. Backed with Gorman's understanding of the industry's technological evolution, this book is a superb example of the junction of political and environmental history. Exploration of this connection helps historians to better understand the role industries have played in defining the infrastructure for their own regulation.

Redefining Efficiency is full of highly technical details, demonstrating not only the technological evolution of refining, transporting, and producing crude oil, but also the efforts to manage the environmental impacts of these undertakings. Preeminent in Gorman's analysis is the American Petroleum Institute, the industry's trade organization, which presided over petroleum policymaking in the early twentieth century. While government-enforced regulation restructured the economics of pollution control in the late twentieth century, Gorman demonstrates that this was preceded by efforts within the industry to reduce waste and, at times when it was particularly beneficial to the bottom line, pollution. Gorman traces how using the rhetoric of the Progressive era's "Gospel of Efficiency," special interests urged Congress to take constructive steps that gave firms time to increase efficiency and develop practical disposal methods. The Oliens' (1999) account demonstrated the ways that the petroleum industry shaped public rhetoric about the industry; now, Gorman has demonstrated that a great deal of that effort concentrated on industry friendly improvements to efficiency.

Throughout the US, the primary outcome of this new standard of living has been the suburbanization of the population. There is a great literature in environmental history on this trend, but Adam Rome's *Bulldozer in the Countryside* (2001) most specifically considers the larger systems of energy that make possible suburban development and expansion. With only a touch more specificity, Theodore Steinberg's *American Green* (2006) investigates energy concerns in the American fetish with lawns. His careful study of this pseudo-nature that covers 40 million acres of the US is engaging and humorous. As Americans sought to fit in with one another during the Cold War, writes Steinberg, "what better way to conform than to make your front yard look precisely like Mr. Smith's next door" (9). Just having a lawn was insufficient; the ideal quest was to have the *perfect* lawn. "Perfection is elusive," says Steinberg. "And it constantly creates the need for people to return to the hardware store to buy more chemical inputs in the quest for the perfect yard" (11). This conformity was made achievable and perpetuated through technology (chemicals, biotechnology, and mower technology) and through marketing that used sporting activities (sports fields and Astro-turf as well as golf and the sales of Scotts Turfbuilder). Energy and particularly petroleum, of course, make the industrial lawn possible. Each of these titles provides a great opportunity to force students to think more deeply about where they live.

Finally, cities rely on energy and transportation networks. Each of the books in the University of Pittsburgh's Urban Environment series has considered these dynamics for a variety of urban areas in the US. By far, though, the best example is the story of a city that allowed itself to be almost entirely defined by the energy industry. In their collection on Houston, *Energy Metropolis* (2008), Martin V. Melosi and Joseph A. Pratt write: "Cities are by their very nature energy intensive. A key challenge in urban and environmental history is to identify and analyze the central impacts of energy production and use on the evolution of cities" (12). Although it represents the energy intensiveness of all urban life, as a city defined by the creation of energy, Houston becomes an entirely unique city at once creating itself but always also fulfilling the expectations and needs of the nation's insatiable need for cheap energy in the twentieth and early twenty-first centuries.

As the nation's fourth largest city and a portion of the nation's seventh largest metropolitan area, Houston serves as an international center of petroleum processing and distribution. "In the case of Houston," write Melosi and Pratt,

> the production, processing, and shipment of oil and natural gas gave the city a distinctive identity within the national economy while also creating distinctive levels and forms of air, water, and ground pollution.… Because petroleum was both the major industry and the major fuel for modern Houston, this self-proclaimed "energy capital of America" has also been the *de facto* "oil pollution capital of America." (3)

The collection's introduction, which lays out the evolution of Houston and covers the environmental characteristics of its region (including weather and hurricanes), is necessary reading for environmental, urban, and Southern historians. Although it is a story of energy, *Energy Metropolis* is also a primer in one of the city's other defining characteristics: sprawl and the preponderance of the automobile. Melosi and Pratt discuss the evolution of Houston as a decentralized city that will provide a reference point for researchers considering any number of other cities, particularly those in the western and southern US.

Energy Output: Electricity

Environmental historians have done relatively little inquiry into the expansion of the use of electricity in the late nineteenth and twentieth centuries. What has been written, however, will prove most helpful. Harold Platt's *Electric City* (1991) looks at the expansion of electricity in Chicago; others, including John Findlay (1993), have connected the expansion of electricity to the development of urban areas of the American West. It is David Nye's work, though, that will prove most beneficial to those wishing to further

develop this line of inquiry. Nye's *Electrifying America* (1999) is a seminal exploration of the connection between social and technological history through the implications of electricity in American life. There is no better book to demonstrate how a scholar might trace the impact of a specific technology through the consumer networks it burrows by becoming essential. In *Consuming Power* (1984), Nye works a more macroscopic angle by tracing similar implications for energy in general.

Conclusion: Energy Conservation and Our Energy Transition

In the environmental consideration of energy use, consumption presents a critical portion of the equation. Governed by cultural preferences, consumption is directly tied to ethics of different eras and societies. Environmental ethics, for instance, helped to construct the American era of conspicuous consumption that might be more obvious in the use of energy than in any other sector. However, as Americans structured this high-energy existence, there have also been significant moments of contrary thinking that were supported by very different ethics. As we slide into a new era of energy management and use, environmental historians must reconstruct this narrative to see when American energy thought began to change. An excellent source to consider (particularly for use in classes) is Daniel Horowitz's unique book *Jimmy Carter and the Energy Crisis of the 1970s* (2005). This collection of documents begins with a thoughtful introduction that situates President Jimmy Carter in the intellectual history of the 1970s.

During his years as President, Carter wrestled with the intrinsic issues related to energy and its management arguably more than any other American leader. These documents – including speeches, Presidential Notes, Christopher Lasch's 1979 essay "The Culture of Narcissism," numerous inter-White Office memos debating energy issues, and journalistic, political, and public responses to the 1979 speech – portray a vexed leader attempting to seize a historical moment and to steer the nation in the most intelligent direction for future energy supplies. In short, this issue and this volume present a remarkable portrayal of American leadership. But, of course, the political outcome did not match Carter's vision. A similar collection that is less political in orientation is Karen Merrill's *The Oil Crisis of 1973–1974* (2007). Also excellent for use in undergraduate courses, this book's documentary materials help to reconstruct the 1970s reaction to the embargo for a generation of students not familiar with it.

Such reminders are just one method for using the history of energy consumption to contextualize the legacy of the twentieth century as energy gluttony. Environmental historians have only begun the task of rectifying the progressive stereotype of our high-energy existence, one of the great symbols of a society's decadence in all of human history.

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Chapter Twenty-six

The Global Ecological Reach of the United States: Exporting Capital and Importing Commodities

Richard P. Tucker

Introduction: The United States and Global Environmental History

Environmental historians often face the task of mastering familiar subjects in political, social, economic and geographical history, and then extending them to their ecological consequences. The study of the global ecological impacts of American history is no exception, but it is only beginning. Many of the elements of that imperial story have been studied intensively, including diplomatic and military history, multinational corporations, and international investment and trade.

Moreover, American domestic environmental history is a rapidly maturing field, as this volume attests. But the export of American capital, industrial technology, and corporate management to economic (plus a few political) dependencies in the tropical and subtropical world has caused transformations (often but not always degradations) of ecosystems very different from those that hosted Native Americans, Europeans, and Africans. American emigrants to the tropics packed their own cash, culture, and machines in their baggage. They looked for soil, sunshine, and rainfall to grow profitable crops for American markets, and they prospected for strategic resources – minerals and oil – to assure the growth and continuity of American power in the twentieth century.

As for minerals and petroleum, the global competition between Europe and the United States for control of these non-renewable resources has been if anything more intense than for agricultural and forest products. Hence we must not neglect war and militarization as sources of environmental change as important as peacetime economies.

The United States' global reach has been an "empire" somewhat different from its European predecessors: with the notable exception of forty years in the Philippines, it has not been a system of formal political and administrative control. This is important for assessing who exercised direct control over land use. The dynamics of resource extraction were also shaped by local elites (and on another level, local workers) in complex and shifting relations with foreign investors and managers. But for purposes of this essay the emphasis is on the roles Americans played in effecting environmental change.

The Spanish-American War and American Hegemony

From the beginning of European colonization of North America, the American economy has been transatlantic in its reach, notwithstanding its foundations in abundant resources at home. Because intercontinental flows of capital and commodities have had ecological consequences, American environmental history encompasses the global reach of American interests. Although the European ties of the United States have always been the single largest segment of its international economy, the environmental impacts of the American economy have been most momentous in tropical and subtropical ecosystems, through the Caribbean and Latin America, and across the Pacific into Southeast Asia. Even before 1700, entrepreneurs along the eastern seaboard began to probe opportunities in the Caribbean and beyond. Thus began a global search for investment opportunities and natural resources that was the heart of the American challenge to European supremacy in the tropical and subtropical world.

Shippers from Boston and other coastal towns established offices in ports around the Caribbean, especially in Havana, trading New England's timber products and northwestern Atlantic cod for cane sugar and its derivatives, especially rum. This entailed an exchange of environmental costs: depletion of northern forest and fishing resources, and loss of tropical islands' native forests to slave sugar plantations. In the nineteenth century the Atlantic world's sugar production was concentrated on Caribbean islands, especially Cuba. This was a major factor leading to the American strategic move into Cuba in the war of 1898, to displace Spanish control over the world's foremost producer of sugar.

Much has been written about that war as launching the formal challenge by the United States to European powers' hegemony over what we now call the "global South": colonial empires in Asia and Africa and the neocolonial region of Latin America and the Caribbean. But almost nothing in the literature on colonial and diplomatic history has addressed the global environmental consequences of the imperial rivalries: the search to control the natural resources of the world outside the North Atlantic.

This story has two general dimensions. The first concerns tropically grown commodities which when imported into the US would give profits to American investors and products to American consumers. The second concerns strategic resources – petroleum, natural rubber, and minerals – located outside the US that were vital not only for the industrial economy in peacetime but also for guaranteeing American power against its adversaries in wartime. The first category has a growing number of studies in environmental history; the second is still almost entirely neglected.[1] In each instance, technologies and managerial systems developed in the United States were exported to source locations in other countries, causing environmental changes wherever they went.

Extracting Economic Wealth and Consumer Satisfaction from Tropical Nature

In the aftermath of 1898 Americans invested massively in development of tropical crops for American markets: sugar in Cuba, Hawaii, and the Philippines; bananas in Central America; coffee in Brazil and Colombia. This marked the rise of multinational agribusiness, as managers of tropical soils, water resources, and vegetation.[2]

Cane sugar from Cuba

Cane sugar was the only major crop of the tropical lowlands grown for American markets before 1898 (Tucker 2000; Funes Monzote 2008).[3] Sugar had been the dominant export crop from Caribbean islands since the seventeenth century, the staple of Europe's slave plantations. In the 1800s Cuba emerged as the largest producer. There, Spanish landowners' slaves cleared the mahogany forests of the central lowlands, replacing biologically diverse forests with a single species. This was the classic case of biological reduction that results from capitalist plantations; it was to be replicated many times over by corporate agribusiness in the twentieth century.

Central Cuba would not have been transformed into an intensive sugar producing landscape without massive markets in the United States. By the 1880s bankers and importers in Boston and New York built fortunes on importing Cuban sugar.[4] But the greatest expansion of Cuban sugar production was achieved under the American-imposed constitution of 1902, which gave the US the right of military intervention if American investments were threatened. From then until Fidel Castro came to power in 1959, Americans dominated the Cuban landscape, injecting capital, technology, and management skills on an unprecedented scale. They built sugar "centrals" – processing plants engineered on a far larger scale than any

previous plants. They built a system of railroads across central Cuba to move the cane quickly and inexpensively. And they organized mass markets throughout the eastern United States.

Through the 1920s sugar plantations expanded rapidly across the rich soils of the Matanzas plains, and the vibrant American economy pushed forest clearance farther eastward onto marginal lands, where hilly slopes and poorer soils made sugar production ecologically riskier. When the Depression hit in 1929, US sugar imports declined for a decade, and marginal lands went out of production, lapsing into scrub and secondary vegetation. Many American landowners sold their lands to the Cuban sugar elite. Others kept ownership of their lands and centrals, such as Hershey Chocolate, which maintained the twelfth largest mill in Cuba until 1960. Even Castro's revolutionary administration failed to diversify the island's economy, which had been built on one gigantic monocrop, until the collapse of its Soviet market forced it to evolve into the hemisphere's leader in organic multicrop agriculture.

Bananas from Central America and Ecuador

The second great crop imported from tropical lowlands was bananas, which began to appear in east coast homes in the 1870s. The banana business saw the emergence of integrated corporate systems, from planting to transport to retail marketing. Efficient marketing became assured in the late 1800s, when the US railroad system linked to ocean-going refrigerated steamships, making possible prompt delivery of bananas to their ultimate consumers.

Responding to the new opportunity for corporate consolidation, United Fruit came into being in 1899. A year later United organized the first national distribution chain when it established a subsidiary, the Fruit Despatch Company. From then on, no other firm, American or European, could match United's capital resources or its control of the entire process from tropical forest clearing to American dining table. United's sole American competitor was the Standard Fruit Company. Until World War II the two rivals centered their operations in the "banana republics" of Central America, from Guatemala to Panama (Soluri 2005; Tucker 2000).

Formerly, small-scale growers had combined bananas with a variety of other crops for both local consumption and distant markets. But bananas were delicate, requiring efficient, large-scale production and marketing. Local growers could not compete with corporations from the north. United and Standard cleared and sold hardwood timber; they established agronomic research stations; they built entire towns and port facilities. And United Fruit organized cross-Caribbean shipment in the refrigerated ships of its own Great White Fleet.

Yankee engineers and managers directly supervised clearing the forest and planting and processing bananas. Their labor force cleared forest by the thousands of acres, and built the infrastructure of an entire economy in the former forest zone, importing a concentrated labor force to areas where human population had previously been sparse. As early as 1913, United's first corporate biographer expressed the pervasive ideology of that era, extolling the company for vanquishing tropical Nature, bringing chaotic, unproductive rainforests under disciplined Yankee managers.

Other American corporations in urban Latin America provided public works: communications, power supplies, and water. Few of these have been studied as environmental history. American medical teams and engineers also created greatly improved public health systems, to combat yellow fever and malaria, which threatened all corporate operations (Sutter 2007; Webb 2009). These enterprises brought healthier living conditions to expanding plantations and cities. But they also expedited development of all the environmental changes associated with rapid urban growth, including air and water pollution, regional food production, and channeling of water resources from landscapes to cities.

After United's environmental alterations in the landscape of production, consumers could now be encouraged to shift from seeing bananas as an occasional exotic treat to adopting them as a regular item on their tables. Bananas became the cheapest fruit available on peddlers' carts in poor neighborhoods, bins in general stores, and finally in A&P and Kroger supermarkets for the middle class. The advertising industry intensified consumer demand for tropical fruit (Soluri 2005).

The corporate gamble with tropical Nature was a dangerous one, because monocrop plantations virtually guaranteed massive attack by pathogens. In order to maximize profitability the two corporations grew only one variety of banana, the Gros Michel, to concentrate yields and to produce the largest possible stems. Shortly after 1910, Panama disease began destroying entire plantations. A decade later, Sigatoka disease also began ravaging the plantations. The two micro-organisms forced the companies to move onward every ten years or so into virgin soils, devouring additional rainforest as they left old plantations either to their former workers and scrub cattle, or to revert to secondary woodlands. During the 1930s the companies moved to the Pacific coast of Central America, opening a second front in the reduction of the rainforest. By the 1940s they were forced to spread even farther, making Ecuador the world's largest banana exporter in the postwar years.

By the late 1950s the two companies, United and Standard, were able to return to their old haunts on the Caribbean littoral, using a new variety of banana, the Cavendish, which was not susceptible to Panama disease. Intensive use of arsenic sprays succeeded in keeping Sigatoka disease under control. This introduced a new generation of tropical corporate

agriculture: the pseudo-sustainability of the agro-chemical era, in which long-term production has been maintained only by massive applications of chemical fertilizers and pesticides, with severe damage to soil, water, and human health.

Coffee from Brazil and Colombia

While American consumers of cane sugar and bananas inadvertently devoured lowland moist forests in tropical America, American drinkers of coffee provided the impetus that stripped the forests of fragile hillsides at higher elevations in the world's two largest coffee producers, Brazil and Colombia. In contrast with cane sugar and banana operations, Americans acted not as estate owners and managers, but as buyers, shippers, and marketers. They did not take direct responsibility for ecological change in coffee belts, but (alongside European competitors) provided the capital and consumer markets that sustained coffee ecology's degradation of forests. In both countries local elites controlled production, primary processing, and internal transport of the beans to the coastal ports, where foreign buyers maintained offices.

Two contrasting production systems evolved: large plantations in southern Brazil, and smallholder production in Colombia. In Brazil the coffee monocrop displaced almost all other vegetation, including food crops; in Colombia coffee became the cash crop grown in conjunction with peasants' multicropped food plots. This enabled Colombian farmers to grow a greater range of crops, but it also enabled large numbers of them to expand into mountain forests.

The marketing of coffee in the US began in the late 1700s; by the mid-1800s the American market permanently surpassed Europe's coffee imports. The New York Coffee Board was established in the 1870s to centralize and standardize the importation, roasting, and wholesaling of coffee. Just as with many consumer products in the late 1800s, coffee marketing came to be consolidated in a few highly capitalized firms. Arbuckle Brothers of Pittsburgh became the largest distributor of coffee in the Eastern states. After 1920 San Francisco emerged as a major competing center for the Western states, as Hills Brothers became a west coast regional powerhouse (Tucker 2000).

Southern Brazil has been the world's dominant coffee producer throughout the past two hundred years. In the mid-nineteenth century coffee became the leading edge of Brazil's economy; it was grown on large slave plantations in the rolling hinterlands of Rio de Janeiro and São Paulo, and exported primarily to the United States. With labor and land costs low and profits high, landlords allowed rapid soil erosion to occur over wide areas

of Rio de Janeiro and São Paulo states, then moved on to clear additional forests, rather than practice any kind of soil conservation. The result was the most massive erosion of hill slopes that ever resulted from world coffee production. For a century, Brazilian estate owners kept forcing the frontier of forest destruction onward, planting trees in rows up and down hillsides without interplanting shade trees whose root systems might inhibit soil loss and preserve some degree of biodiversity (Dean 1976; Stein 1957). Only after 1950, when cheap frontier forest land was no longer readily available, did the planters begin efforts to reduce soil erosion.

Colombia illustrates how dominant the US market could be for the export economy of a tropical country. In the mid-1860s the US imported only 26 percent of Colombia's exports; the rest went to Europe. But by the late 1920s the US bought 92 percent of Colombia's coffee. In the middle hills of the Colombian Andes both frontier peasants and large landowners grew coffee from the 1840s onward. By providing a cash crop for squatter peasants, coffee was the engine that removed tens of thousands of patches of Andean forest. Even that process of deforestation on a moving frontier, fueled by northern markets, could not prevent endemic social violence from flaring repeatedly in the coffee region. Colombian society came to be the most convulsively violent in all of South America. Steep slopes, once stripped of their vegetative cover, rapidly lose their soil. An American observer who traveled at length in Colombia in the 1940s reported seeing devastating erosion – land degradation accompanying social degradation – throughout wide areas where coffee had been the cutting-edge crop of frontier settlement (Tucker 2002: 190).

Brazilian rubber from Southeast Asia

Another monocrop replacing lowland tropical rainforests was the classic commodity of the automotive age: rubber. From the time Charles Goodyear invented the vulcanization process in 1837, prospectors searched the wet tropics for trees that produced latex. The only species that proved viable was *Hevea brasiliensis*, native to the Amazon basin. A rush to harvest its latex was the first commercial penetration of the great Amazonian forest. But rubber trees grow widely dispersed in their natural setting; it proved impossible to plant them in industrial concentrations, where they were destroyed by a parasite that had co-evolved with them. In the late 1800s British entrepreneurs took rubber seedlings via Kew Gardens in London to new locations in colonial Southeast Asia, where the disease did not follow; there they successfully developed large plantations. Both natural forest and subsistence farms were displaced by Dunlop and other companies, whose product flooded the market after 1905. Brazilian sources could not compete

with the efficiency of the Southeast Asian plantations, and the Amazon boom collapsed (Tucker 2000: 226–82).

American industry demanded high-quality rubber for many new uses; the most rapidly developing market was for automotive tires. American companies purchased the new rubber from British and Dutch suppliers in Singapore, but they were eager to establish their own supply sources independent of monopoly pricing by their rivals. In 1905 the United States Rubber Company, pulling out of Brazil, launched the first North American plantation, in Dutch colonial Sumatra. By 1913, just before the outbreak of war in Europe, its Indonesian subsidiary, nicknamed Hoppum, owned almost 76,000 acres of land, the world's largest rubber holding, and planted 32,500 acres in endless rows of Brazilian rubber trees.

Petroleum from Gulf Coast Mexico

As the twentieth century opened, oil production became the most fundamental support of European and American prosperity, and American consumption rapidly became the largest proportion of the global petroleum market. Unlike tropical crops, massive petroleum reserves were located within the United States. But oil was clearly fundamental to the strategic futures of the Atlantic Powers; competition for control of global supplies became a fateful drama ecologically as well as politically and economically. From 1900 onward American firms, led by Rockefeller's Standard Oil, began all-out competition with European rivals, especially Royal Dutch Shell, for control of potential oil fields in the rest of the world. Environmental historians are just beginning to consider this fundamental topic beyond American borders. A model study is Santiago (2006). Despite the dominant position of Middle Eastern oil in American and global energy politics since World War II, there is as yet no significant environmental history study of petroleum production in that region. For the global context, see Yergin (1991). For the Middle Eastern oil diplomacy of the United States, see Nash (1968) and Painter (1986).

The first Yankee oil company's move beyond American borders was into the Gulf Coast of Mexico, a region called the Huasteca, a 100-mile coastal stretch in northern Vera Cruz state, from Tampico southward, characterized by long coastal lagoons, huge swamps, and inland rainforest. In 1900 the Huasteca was still largely undeveloped, populated mostly by indigenous Teenek people practicing subsistence, communal land use, and a few Spanish and *mestizo hacendados* who raised cattle and market crops. Access to the political and population centers of the Mexican highlands was extremely limited until the first railroad was completed in 1889 (Santiago 2006).

After 1885 Mexico's President Porfirio Diaz courted foreign (especially British and American) investors, with a vision of modern civilization based

on industry and corporate capitalism. Many American investors in the Mexican economy in the following years were wealthy Californians. In 1900 the oil prospector Edward Doheny found pools of oil on the forest floor, the first of what became known as the Golden Lane, a vast reservoir of oil under swamps and lagoons. He quickly bought 448,000 acres of hacienda lands, plus the rights to develop oil on Indian lands, and incorporated the Huasteca Petroleum Company. Systematic dissection and poisoning of the region's delicate ecology was about to begin.

Tropical hardwoods from the Caribbean and Central America

Displacing the forest for crops and subsurface wealth created one kind of environmental wealth. But forest trees themselves had long had market value as well. Mahogany is the classic case of northern imports of tropical hardwood. Mahogany is a dominant tree, but it is only one species in the intricate complexity of the rainforest. Thus mahogany forests were cut selectively, never clearcut. But the work of reaching each prime tree resulted in severe damage to others around it and along the extraction routes.

In colonial times, logging in coastal forests of Mexico, Central America, and the Caribbean islands was carried out on a small scale. The primary mahogany markets were naval construction, especially in Havana, and elegant furniture and parquet flooring in Europe. By the mid-nineteenth century, American furniture makers developed parallel markets for mahogany, especially for established east coast firms and newer Grand Rapids furniture makers in the cities of the upper Mississippi region. Mahogany filled a separate niche from what domestic hardwoods could satisfy, so imports steadily expanded as the consumer class prospered. By 1920 American importers dominated the international market, reflecting American displacement of Europe's trade with Latin America generally. The prestige hardwood flowed into New Orleans, New York, Boston, and several other American ports. The degradation of the great rainforest resource was proceeding (Tucker 2000: 345–416).

Industrial minerals: Copper from Mexico and Chile

The environmental consequences of rapid industrialization were also felt in the rise of industrial mining in the United States, quickly followed by corporate expansion into other countries. The case of copper is illustrative, though international copper mining still lacks an environmental historian. Until the 1880s the major mines were located in the copper belt of northern Michigan, where Bostonian investors produced 50–90 percent of US production in the 1860s–1880s. There, high-grade ores required little capital-intensive smelting and refining. National and global demand for copper

escalated in the 1880s with a rapid rise of electric lighting. Soon, technological innovations made mining and processing of low-grade ores feasible, so copper mining moved swiftly westward, to vast but far lower concentrations of copper ore (Joralemon 1935).

Anaconda Copper Company began its rise to global power in Butte, Montana, where its geologists discovered the world's largest deposit of copper sulphides in 1882. In the previous year another emerging mining giant, Phelps Dodge, had bought old silver mines around Bisbee, Arizona, for their copper. Bisbee quickly became the hub of expanding agriculture, logging, and hunting throughout the region (Truett 2006).

In the early 1900s Anaconda moved beyond Bisbee into Cananea, Sonora, 40 miles across the Mexican border, in a long belt of high-concentration copper that paid no attention to political boundaries. Until the late 1800s the wide semi-desert of northern Mexico saw almost no industrial development, but the region was suspected to have great mineral resources. In that part of Sonora, small, colonial gold, silver, and copper mines had been abandoned in the early 1800s by Spaniards facing determined Apache resistance. Two generations later, in a pattern of displacing native peoples that was being repeated around the world, the Apaches were "pacified" by 1886, opening Sonora for mineral extraction in the Diaz years (Bernstein 1965).

Californians had been looking into northern Mexico since the 1860s with profits derived from the gold rush, cooperating with wealthy and politically connected Mexicans. In 1899 William Cornell (nicknamed "Colonel") Greene bought mining rights in Cananea. In ten years he changed Cananea from a frontier outpost to an industrial town of 20,000. As Samuel Truett notes, "a vast territory on both sides of the international border had been overlaid by an interlocking mosaic of mines, smelters, sawmills, ranches, farms, and working communities, all linked to the economic fortunes of copper mining" (1997: 163). In 1915 the ageing Colonel Greene sold his Cananea operations to Anaconda.

In the same years Anaconda's future rival in South America, the Guggenheim family of New York, was building its own minerals empire. In the 1880s Meyer Guggenheim invested in gold, silver, lead, and copper in the Western states. His family developed many holdings in the western United States, especially the great complex at Bingham, Utah in 1903. In 1907 they found a vein of 70 percent purity in Alaska, the world's purest ore, and opened the Kennecott copper mine at 6,500 feet on Mt. Wrangell (see Cronon 1992). This was the foundation of the Kennecott Copper Company, consolidated in 1915 with the Guggenheims' holdings in Chile.

Chile's Andean region provides the world's largest copper deposits, at sites in both the northern Atacama desert and the high mountains of central Chile. From the colonial era to the late nineteenth century, small-scale operators practiced surface mining there, digging shafts only a few feet deep. Most foundries were fueled by wood from surrounding hillsides,

pockmarking them with deforestation. Thousands of transport mules required alfalfa from farms and pastures in valleys. Almost no machinery or large-scale capital investment was available, and only high-quality ores could be profitably mined. Most of the mines fell into disuse by the 1870s. Revolutionary changes in mining technology and capital investment were needed; these the Americans provided after 1900.

In the 1890s American miners developed techniques of refining porphyry copper (ore of copper content below 2 percent), a technology requiring heavily capitalized, vertically integrated companies to organize mining, processing, transport, and marketing. They immediately took the process to Latin America in the scramble for ore deposits. In 1900 the American Smelting and Refining Company, the largest copper fabricator in the United States (it was controlled by Standard Oil), sent William Braden from Butte to survey Andean prospects. In 1904 Braden bought a disused mine called El Teniente, 50 miles southeast of Santiago. The mine was situated at an altitude of nearly 10,000 feet, a four day walk from the nearest town, Rancagua, in the foothills. Above timber line, the mine was a barren site, on ash fields in an extinct volcanic crater. It would take massive capital and new technology in order to make the mine profitable again. The infrastructure investment was staggering, and investors received no dividends until war in Europe bailed them out and the operations continued to expand. By 1930 El Teniente was the largest underground copper mine in the world.

The resulting environmental transformations were enormous. First, a road was laid out down the mountains to the railhead at Rancagua, by Guggenheim's Yankee engineers. Next was an entire new community: housing for 1,500 workers, plus stores and other company facilities, constructed with lumber imported from the US. Power was provided by imported coal and oil, and a new hydroelectric plant channeled three rivers into a large reservoir. An aerial tram moved the ore down the mountains to a processing plant near Rancagua. Crushing and smelting the ore was accomplished by mixing it with sulfuric and other acids (Klubock 1998: 20–30). Beyond all the changes on the land, the most pervasive and disastrous environmental cost of the mining process was to the health of the workers. Silicosis, or "miners' consumption," inexorably attacked the miners' lungs, leading to slow death for many (Finn 1998).

World War I and Strategic Materials

Even as these regional trends developed, events across the Atlantic precipitated a major expansion in the scope of American global interest in natural resources. Strategic imperatives and the chronology of wars accelerated the development of American exploitation of timber, rubber, petroleum, and minerals such as copper. In 1914 Europe plunged into fratricidal war, on a scale

that dwarfed anything the world had ever seen.[5] The war swept the United States into its vortex in 1917, and consumed resources from almost around the world on a scale that until then had been unimaginable. As the North Atlantic powers fought to cripple each other on sea lanes as well as on land, South-to-North shipping of peacetime commodities was badly disrupted. The American economy, not crippled like the Europeans', began to replace its transatlantic rivals (especially Britain) in controlling raw materials globally.

This war, like previous local and regional wars, was fought with forest resources. Timber had hundreds of uses, from gunstocks to railroad ties to reinforcement for muddy trenches. European powers strained the organizational networks of their colonies as well as their home forests, to ship timber to war zones (Storey 2009; Tucker 2007). From the western hemisphere, vast amounts of softwood products from the southeastern US pine zone were shipped to the European front. And with the opening of the Panama Canal in 1914 to supplement transcontinental railroads, the conifer forests of the Northwest were mobilized, catalyzing a massive postwar expansion of the lumber industry of western Canada.

As the war demonstrated, rubber was a strategic commodity, unlike any food or timber crop; rubber's place in the reduction of the world's biodiversity was of a different order. Rubber supplies were critically important to the new style of warfare, which relied on motorized vehicles. American firms, though officially neutral until 1917, helped supply the Allies. Responding to the urgent wartime demand, Hoppum's workers planted 14,000 new acres of trees in the war's first year, a monumental effort of forest clearance. Production continued to rise throughout the war, as fast as labor could be mobilized and trees could grow. War in Europe was devouring rainforests half a world away. The massive wartime investment in new plantations had its payoff on civilian markets after the war; by then the vegetation on a vast acreage was transformed.

Rubber and petroleum sources were strategically inseparable. The world war saw a fundamental change in the energy sources used for fighting: a shift from the previous century's coal to the twentieth century's insatiable demand for petroleum. The great navies – British, German, and American – had switched from coal to oil as fuel, while cars and trucks fought the war on land. The booming demand for petroleum during the war was a bonanza for producers, including the Americans in Mexico. US oil investments in Mexico rose from $85 million in 1914 to $200 million in 1919 (Eckes and Zeiler 2003: 46).

As for copper production, Guggenheim bought El Teniente mine from Braden in 1909, a well-timed investment, for the war made intensive demands for copper for shell casings and other purposes. In the war years the US produced 60 percent of global copper from domestic sources, plus another 20 percent from Chile. Chile yielded six million tons (equal to half of its entire nineteenth-century production). El Teniente alone produced net earnings of $140 million for its American owners, one of the great windfall profits of wartime.

Far to the north, in the Atacama desert, another great copper complex was emerging. On some of the planet's most barren land (rainfall there averages less than 1 inch per year), Guggenheim created one of the world's largest open pit copper mines, called Chuquicamata. In 1912 Guggenheim bought a wide region of mining claims in the harsh desert. Mining commenced in 1915; it required the construction of an entire new community, with resources brought from many miles away. The company built a railroad to the nearest town, Calama, and a 70-mile pipeline to bring Andean river water to the desert. Steam for the mines was generated 140 miles away by a $3 million plant, and then piped to the working site. The surface was stripped by power shovels brought from the newly completed Panama Canal (Finn 1998). All of this transformation was rewarded by wartime profits.

The Interwar Years: Expansion, then Contraction

Problems of boom and bust cycles for natural resources in peacetime were intensified in the transition from wartime to peacetime production, as the military demand for strategic materials suddenly ended. But once the short postwar depression was over, the prosperous 1920s marked a steady expansion of American markets for tropical products.

The war's drain on forest resources did not end in 1918, for war had devastated Europe, necessitating massive rebuilding of those economies. Pine forests of other continents, including yellow pine in the southeastern US, continued to be felled at a furious pace, for the bonanza profits that came from reconstruction. Wildfires and soil erosion on a wide scale resulted, triggering intensive efforts at renewing tree plantations in the 1920s, reflecting widespread fears of an imminent "timber famine."

The 1920s saw further development of tropical timber extraction, rooted in the war's introduction of motorized vehicles into forests in Asia and Africa. Forest roads, bulldozed during the war, enabled expanded production. Timber products laboratories and their marketing associates introduced widening numbers of tropical timber species on the market. And as Caribbean, Mexican, and Central American sources of mahogany became depleted, loggers searched for additional sources of the elegant wood in Amazonia and Southeast Asia. In the western United States the market for tropical hardwoods flourished. Timber importers from Los Angeles to Seattle found an equivalent to mahogany in lauan from the Philippines, calling that wood Philippine mahogany for their markets. Exports from the Philippines, almost entirely to the US, rose from 252 thousand board feet in 1907 to a high of 196 million board feet in 1936. By the 1960s the country's exports, still primarily to the United States but increasingly to Japan, began an irreversible decline, which reflected the decimation of her hardwood forests (Tucker 2000).

Petroleum presented a similar trend. By 1920 imports from Mexico met 20 percent of American demand; Mexico was briefly the second largest producer in the world, but this preeminence did not last long. Responding to running conflict with the Mexican government and the unions, as well as global overproduction, the American oil companies cut back severely on production in the Huasteca after 1921. Nonetheless, by the late 1920s well over 7,000 square miles were severely damaged, pockmarked by forest clearing, infrastructure, wells and refining, housing, and pasture, to say nothing of oil spills and fires. Oilmen had dug huge pits in the ground to catch gushers, and bulldozed earth dams to create huge oil storage ponds. They had cut rail lines, roads, pipelines, water lines, and pumping stations (using local water in boilers to heat oil for transportation) through the forests. By 1938, when President Cardenas nationalized the foreign companies and created PEMEX, the national company, "the northernmost tropical rainforest of the Americas existed no more" (Santiago 2006: 122).

Chilean copper production underwent a similar cycle. The immediate postwar decline of international prices for copper was quickly turned around in the accelerating civilian economy. In 1923 Anaconda purchased the Chuquicamata complex from Guggenheim, for production costs in Chile were far lower than at Anaconda's domestic US mines, which were barely breaking even financially. But during the 1930s demand for copper fell and prices dropped precipitously. Copper mines everywhere made severe production cutbacks, slowing the advance of their environmental impacts. A very similar case in Peru was the American-run Cerro de Pasco copper, lead, and zinc mining complex, which transformed an entire region in the highlands above Lima (Dore 2000: 12–15).

In the decade-long contraction of capital and markets after October 1929, the Depression spread rapidly from the US and other industrialized countries to raw materials supply regions elsewhere around the world. Consumers were unable to purchase what they had during the previous decade, so demand and prices fell and production was curtailed around the globe. But different commodities were affected to differing degrees; environmental historians have only begun to study these consequences for supply regions in Asia, Africa, and Latin America. The Depression years remain largely neglected in global environmental history publications.

World War II

By the late 1930s war clouds began shaping the priorities of economic planners in governments and the corporate world, who undertook new efforts to develop strategic resources. Rubber was perhaps the most dramatic example. Germany had no tropical empire as a reliable source of natural rubber, and Allied planners realized that Japan could cut off their Southeast

Asian supplies. Moreover, the Americans had failed to develop commercially large plantations in the Caribbean and Amazonia (Finlay 2009). German and American chemical companies raced to develop a petroleum-based alternative to natural rubber. I. G. Farben, the German chemical giant, synthesized one product that helped meet the Third Reich's military needs. But the Americans, in a massive emergency effort, succeeded in producing high-quality petroleum-based rubber in massive amounts, almost 700,000 tons in 1944 alone (Eckes and Zeiler 2003: 112). In the postwar world synthetic rubber provided approximately half of world rubber consumption, so the expansion of natural rubber plantations at the expense of tropical forests and subsistence agriculture has been far less than it otherwise would have been.

The second global war consumed even greater natural resources than its predecessor, for the 1920s had produced a vast expansion of industrial capacity, especially in American industry, followed by its severe under-use in the 1930s. Timber products for the war intensified harvesting from many countries (Tucker and Russell 2004: 121–35). More than a million acres of forest were devastated by the war's direct impact. In managed forests, such as in India, timber harvests nearly doubled. In war zones the damage was far worse. Mainland Southeast Asia's forests were badly damaged, and the Japanese occupation of the Philippines and Indonesia cut wide areas in only three years. In contrast, in tropical zones of Latin America and Africa, logging was still rudimentary and not amenable to emergency increases.

The wartime expansion of petroleum production in Latin America was very different. Political difficulties in the Mexican oil fields were partly responsible for the American companies (closely supported by the federal government) moving their major investments into Venezuela in the 1920s, where the long-time dictator Juan Vicente Gomez (1908–35) cooperated closely with foreign oilmen, led until the late 1920s by Royal Dutch Shell. By 1928 Venezuela was the world's second largest oil producer and the largest exporter; it was overtaken only in the 1940s by the Middle East. As Standard and Gulf moved assets from Mexico into Venezuela, they partially displaced their Dutch/British competitor, controlling two-thirds of the Maracaibo basin's production by 1939 (Brown and Linder 1998: 166–70).

In the early months of World War II German submarines sank many oil transport ships, and production was temporarily curtailed. But when the US and Venezuelan governments negotiated an agreement granting Venezuela 50 percent of the industry's profits, the new stability allowed American oil corporations to reinvest, and Venezuelan oil became a critically important contributor to the Allied victory (Lieuwen 1967).

Venezuela's major oil field lies under the basin of Lake Maracaibo, a shallow bay with a 40-mile river opening into the Caribbean; this narrow neck leaves Maracaibo's waters brackish. The surrounding region's wet and

marshy ecology was badly suited for building refineries, so they were built on the offshore islands of Aruba and Curaçao. Rigs for pumping the oil came to dot both the shallow waters and the nearby marshy land, and industrial towns led by Maracaibo city grew exponentially. Lake Maracaibo rapidly became one of South America's most severely polluted sites. Even today most waste water and industrial chemicals from the region's cities and industries are discharged directly into the lake.

The American demand for strategic minerals such as copper from foreign countries was a complex matter, depending on whether there were adequate domestic supplies. Before the war military and industrial planners were slow to assess realistically how much would be needed for a protracted war against Germany and Japan; as late as 1940 copper was considered to be adequate from domestic mines. But that June President Roosevelt established a Metals Reserve Company, which recognized that domestic copper reserves would be severely inadequate, and immediately purchased 500,000 tons of Chilean copper. Throughout the war, industry officials, led by Anaconda executives, worked closely with the Office of Price Administration and the War Production Board, and were once again rewarded by high wartime prices. After 1945 the mining companies were financially well placed to launch the next and yet more environmentally destructive era: open pit strip mining of low-quality ores.[6]

Environmental Costs of the Postwar Economic Boom

In the postwar years the American baby boom, suburbanization, and blossoming consumerism created constantly expanding demand for commodities from around the world. Coffee imports illustrated the trend. By the 1920s coffee had become a standardized product, advertised aggressively in daily newspapers and nationally circulating monthly magazines. The expansion of the American coffee market closely reflected the process of industrialization of labor and the domestication of women. The advertising industry taught women to define their households by the coffee they served, and encouraged industrial workers to raise productivity by taking energizing coffee breaks. After 1945 instant coffee and the fast food era led to another explosive round of expansion in American purchases of South American coffee. In 1960 the US imported 563,000 tons of Brazilian coffee and 261,000 tons of Colombian coffee, by far the largest figures for any importing country, from any region of the world. The advertising industry took on a leading role in this promotion, but American firms were by no means the only major players. The Colombian Coffee Board invented Juan Valdez, the image of a happy, prosperous, independent small farmer. His clothes were always neat, his donkey always well fed, and his hills always green. The sanitizing of consumption has rarely been

more charming – or more misleading, because the reality on the land was very different from the advertising image (Tucker 2002: 188–9).

Petroleum

The American automobile culture created a steadily rising demand for petroleum products, spurring the oil companies to search the world for new sources. One example illustrates its ecological and social costs. The Amazonian basin had been a tempting but extremely difficult target for oil prospectors. In the 1920s Royal Dutch Shell prospected in the Oriente region of northeastern Ecuador, but found no oil. The region was virtually impenetrable for commerce or political control: the only means of transportation were by river eastward into Brazil and by mule track up the Andes toward Quito. The region supported a thin population of Quichua and other tribes, plus a few *mestizo* immigrants who had escaped from Brazilian rubber barons by the 1920s. One of the richest biotic zones of Amazonia, it was a subsistence base for hunting, fishing, and shifting cropping (Sabin 1998).

In 1941 the Peruvian military (covertly supported by Occidental Petroleum) conquered half of Ecuador's segment of the Amazon lowlands. In the aftermath the Ecuadorean military was determined to establish effective control of the rest of Oriente, and used oil companies for its purposes. In 1967 a Texaco-Gulf consortium discovered oil. Almost immediately, twenty-nine foreign oil companies bought concessions in the region. In cooperation with the government of Ecuador, Texaco-Gulf built roads through the region, plus a 315-mile pipeline over the Andes to the Pacific coast. By the 1970s the country's national production rose from 5,000 to over 200,000 barrels per day, over 40 percent of national export earnings. Within a decade 300 wells spotted a region of over 2.5 million acres of forest. The military took direct control of Peru's government in 1972; in 1977 its national oil company, Petroecuador, bought out Gulf and owned 62.5 percent of the company. By 2000 this single company produced 70 percent of the country's exports, mostly to finance a heavy $12 billion foreign debt (Sabin 1998).

In 1992 Texaco also sold out to Petroecuador; by then oil production and its environmental concomitants were in place in Oriente. Oil pits overflowed during seasonal rains, spilling millions of gallons of crude into tributaries of the Amazon. Massive amounts of toxic water – by one estimate 3.2 million gallons of toxic water per day – accumulated from pumping the oil (Gedicks 2001: 71). Natural gas was burned off, contaminating the air with nitrogen oxides and sulfur dioxide. When wells ran dry, Texaco didn't dismantle drilling equipment or rehabilitate surrounding lands. Moreover, under the national development policy the new regional infrastructure included roads used by hundreds of thousands of highland and

west coast Ecuadorian Hispanics, displacing indigenes and clearing forest for agriculture and ranching. As in many locations around the modern world, the indigenous population suffered devastating diseases. Now the epidemics included petroleum-based diseases, including cancer, and neurological distortions.

Tropical fruit and vegetables

The postwar years were an era of corporate consolidation, and the agro-industrial giants were no exception. By 1960 only three banana companies remained, and they were diversifying their products to include citrus, pineapples, and other tropical fruit, taking over peasant food producing farms, and clearing more forests from the Caribbean islands, mainland Latin America, and even the southern Philippines. By the late 1900s, Coca-Cola owned Minute Maid and Pepsi owned Tropicana.[7] Corporate agriculture adopted a new regime of chemical-intensive food and fiber production which Monsanto and other American agro-chemical companies had developed. In the Central American banana and cotton belts, this resulted in greater production but also carcinogenic buildup in humans, soil, and water. Continuing improvements in transport systems enabled steadily greater integration of the international food economy, including fruit and vegetables produced in warm climates for year-round northern consumption. In northern Mexico the burgeoning truck farm belt produced winter vegetables for American markets, using intensive chemical treatments adopted from the American model. There, too, chemical-intensive crop production caused pollution on land and water, and carcinogens for farm workers and distant customers (Murray 1994; Wright 2005).

Grain production was undergoing massive innovation as well, especially wheat and then rice, to feed an accelerating population worldwide. Beginning in the late 1960s the green revolution, which had been initiated by Rockefeller Foundation plant geneticists in northern Mexico, was implemented first in northern India and then around the world. The remarkable expansion of grain yields generated an intensive debate over its social and environmental costs. Hybrid varieties of grains, which drastically reduced the genetic variety of grain crops grown, also required intensive increases of agro-chemicals and water, in order to balance their higher costs (Perkins 1997).

Tropical timber

One of the long-term results of World War II was the intensification of logging technology. Timber products laboratories in several countries tested new wood species, leading to their broader use in the accelerating postwar

civilian economy. A major new interest centered on tropical softwood species, leading to a boom in paper products in the 1950s, using tropical stock for the first time. Thus began a massive reduction of Southeast Asia's rainforests, first by American and then by Japanese and other companies (Williams 2003).

Coca and cocaine

Less well known for its impact on tropical forests is the massive American consumption of cocaine from the 1970s onward. Coca is a forest understory bush indigenous to the rugged eastern slopes of the Andes, thriving at elevations between 1,500 and 5,000 feet. Since pre-Hispanic times indigenous peoples of the region have chewed coca leaf as a mild narcotic and used it for religious rituals. On Indian communal lands coca plants were intercropped with subsistence crops. Like many forest products, coca use became destructive only when it became a large-scale marketable commodity.

Cocaine, concentrated from coca leaves, is a far more potent drug. When a chemical process for separating pure cocaine from coca leaf was introduced in the 1860s, cocaine became fashionable (and legal) in Victorian England and the United States. Other uses soon followed. By the 1880s pharmaceutical companies – Merck, Park Davis, and others – developed cocaine as a "miracle" anesthetic for surgical procedures. Cocaine also appeared in many tonic medicines, to alleviate "neurasthenia" or chronic stress in the high-pressure world of urban workers. And in 1886 coca became a key ingredient in the new drink Coca-Cola. The company de-cocainized coca shortly after 1900, and organized suppliers in Peru for its expanding markets. All of these uses combined to create a rapidly growing American market for the rainforest product. By 1903 cocaine exports from Peru, the largest producer, constituted 60 percent of total global cocaine trade (Gootenberg 2008).

As long-distance cash markets developed, coca bushes were grown more intensively as a row crop on terraces, usually on virgin soils, replacing native forest – or in unterraced rows on newly cleared strips. As a cash crop (somewhat similar to smallholder coffee in the Colombian Andes), it made possible the expansion of peasant farming into forest lands.

Around 1910 the American government reversed its cocaine policy, making its import illegal. South American exports fell from over 1 million pounds per year around 1910 to one fourth of that in the 1920s, mostly for the still legal medical market. Cocaine markets were primarily in Europe after that until the 1970s. During that half-century only a small percentage of the South American coca crop was exported (Gootenberg 2006).

In the 1970s the market changed drastically, as Americans took to illegal cocaine use in droves. The Peruvian government had begun efforts to open

its eastern region to settlement of politically restive highland Indians. Roads down the eastern slopes were being built with funds provided by the US Agency for International Development (USAID) and the American-backed Inter-American Development Bank. Using the new arteries, the American and Peruvian military launched a series of attempts at suppression of all coca production. This led to the rise of the Medellin and Cali cartels in Colombia as the major conduit of cocaine to American buyers on a burgeoning illegal market. During the previous century the average annual coca production was around 8 million pounds; by the late 1970s it roughly quadrupled.

Other Andean countries quickly joined the rush. Commercial coca production spread rapidly in Bolivia, as well as in Colombia, which soon became the world's largest commercial producer. Both immigrants and indigenous Indians grew coca on small plots, often replacing food crops, which then had to be imported. The profits went largely to political and military elites, or to finance guerrilla movements from Bolivia to Venezuela.

Coca for northern markets thus has produced pock-marked, fragmented hill forests and widespread soil erosion. Moreover, the first stage of processing uses large amounts of kerosene, sulfuric acid, and solvents; then cocaine is extracted using hydrochloric acid, acetone, and ether. These toxic chemicals damage farm lands, water supplies, and rivers, as well as workers' bodies (Painter and Durham 1995; Young 2004). The health impact on northern consumers of the product has been nearly as severe, but few northerners have heard of the ecological price that their addiction helps to extract.

Conclusions

In the early twentieth century, with World War I as the decisive turning point, the American economic empire came to dominate global resource exploitation and its environmental consequences through most of the twentieth century. In one setting after another, export economies marginalized indigenous communities and peasant farmers, depleting natural or multicropping ecologies and leaving legacies of systemic pollution.[8] American corporate capitalism (both agricultural and industrial), often closely linked with the US government's strategic interests, became a singularly powerful external force in the domestication and decline of tropical and subtropical ecosystems. The examples above indicate how intricate the interactions among American corporations, national elites, and local conditions were.

The task of determining the changing role of American interests in these ongoing processes becomes still more complex for the years after the 1950s, as host governments and labor unions became more assertive in controlling their own economic destinies. But every player's awareness of the environmental costs of development dawned only slowly. That is a story beyond

the scope of this study, but the central conclusion remains. The environmental histories of tropical and subtropical countries and the environmental history of the United States are inseparable, and the significance for our collective future is far more momentous than environmental historians have yet explored.

Notes

1 The fields of diplomatic and military history are only beginning to engage these issues (Lytle 1996). Conversely, environmental historians have largely neglected the State Department, the Commerce Department, and American consuls abroad, as well as military records.
2 The corporations were supported by the US government. The State Department and the military consistently pressed for open access for American investors against their European rivals, and guarantees of security for American operations from host governments. But the diplomatic corps did not always follow extreme demands of American entrepreneurs, especially when they became embroiled in local political rivalries (LaFeber 1984).
3 For details of sugar, banana, coffee, and rubber production, see Tucker (2000).
4 By mid-century sugar beet cultivation was spreading widely around the United States. Its product competes directly with cane sugar, but the market was expanding so rapidly that it consumed both products, as well as cane sugar from Hawaii and the colonial Philippines. This is an important example of how the legislative history of tariffs and import quotas has shaped the global geography of resource extraction.
5 For broad perspectives on issues of warfare and environment, see Tucker and Russell (2004), Closmann (forthcoming), and McNeill and Unger (forthcoming).
6 See the incisive summary in Dore (2000: 16–20), drawing out the environmental implications of Dore (1988).
7 For pineapples, see Okihiro (2009); for the citrus industry, an environmental survey is still needed.
8 A counter-trend to this is the gradual rise of more sustainable resource management, as a response to the deterioration that was becoming increasingly evident. Many elements of this trend are treated in existing publications, but syntheses by environmental historians do not yet exist.

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Chapter Twenty-seven

Food

Douglas Cazaux Sackman

Breaking Bread

Two young men are alone together in the crisp, high mountains. They are watching over sheep, 2,500 of them. The owner of the sheep is long overdue. He's supposed to ride up with more provisions. Food in camp is bad. And monotonous – it's all mutton all the time.

Their names aren't Jack and Ennis; they're Billy and John. It's not 1963 in Wyoming; it's 1869 in California. In fact, it's John Muir's "first summer in the Sierra" (Muir 1911; Proulx 2000). Our great icon of the wilderness is tending the sheep. Sheep were his ticket into the wilderness, which is ironic, considering that he would later call these creatures "hoofed locusts" (Muir 1894: 116). In his diary, he explained that "I was longing for the mountains … but money was scarce and I couldn't see how a bread supply was to be kept up" (3–4). Sheep tending would give Muir his daily bread. But the bread part of the bargain isn't being held up. On June 4, Muir ventured up the mountain to the high sheep camp with the sheep owner, and shepherd, and two other employees – a "Chinaman and a Digger Indian" (7–8). Muir is bemused by his companions, especially the Chinaman and the Indian who keeps himself apart "as if he belonged to another species" (13). The sheep owner, together with the Chinese man and the silent Indian, left the high camp on June 10, promising to return soon (47). Here's Muir's journal entry for July 4: "The air beyond the flock range, full of the essences of the woods, is growing sweeter and more fragrant from day to day, like ripening fruit" (99). So far so good: the air itself is like fruit, and Muir seems a breatharian monk who can live off of air. But a craving brings him down to earth, down to the valley. Muir reported that the shepherd was upset and feeling exploited, complaining "that since the boss has failed to feed him he is not rightly bound to feed the sheep, and swears that

no decent white man can climb these steep mountains on mutton alone. 'It's not fittin' grub for a white man really white. For dogs and coyotes and Indians it's different. Good grub, good sheep. That's what I say'" (100). Muir was not quite ready to declare his dependence on white bread.

But as we read through his food-obsessed entries for the days after the fourth, it becomes clear that Muir was projecting some of his own feelings on the shepherd. Muir becomes increasingly frantic about what he calls the "bread famine" (101). He scribbles on and on about beans, and dreams of bread, even describing in detail how the sour dough bread of the typical sheep camps is cooked in a Dutch oven. He muses about Eskimos living "north of the wheat line, from oily seals and whales" (104). He learns some of the nuts and berries Indians eat in these very mountains, but laments that he can't subsist off of them. Without bread, he can't even enjoy the wilderness. For Muir, good wilderness appreciation is predicated on good grub. But he is a bit disgusted with his own dependence on flour, confessing "one couldn't take a few days' saunter in the Godful woods without maintaining a base on a wheat-field and grist-mill" (103). Muir feels trapped in his beloved, elevated landscape: "Like caged parrots we want a cracker, any of the hundred kinds," he squawks (103). Relief finally comes on the seventh, when the sheep owner finally shows up with provisions. As "hunger vanishes, we turn our eyes to the mountains, and to-morrow we go climbing toward cloudland" (109), a physically sated Muir enthuses. Stomach full, the "cloudlands" can be gained – spiritual fulfillment pursued.

Up on Muir's broke-bread mountain – out of his musing about beans and bread, on the one hand, and the "godful woods" and the "cloudlands" on the other – we can find quite a lot for environmental historians to mull over. Labor, identity, nationalism, as well as whiteness and race – all wrapped around food – are all evoked in Muir's treatment of his bread famine. There is also the antithesis between bodily needs for food and nature appreciation that Muir draws – how he wants to know nature through the senses of sight, sound, and touch even as he represses and denigrates his need to know nature through taste. For Muir, consuming and appreciating nature ideally are to be removed from food, and removed from the flock that is mowing down the chaparral right before his eyes. He would deny the material in order to reach a nature conceived of as "cloudlands," as "godful woods." As environmental historians, we should put those two spheres back together. Looking at food allows us – even forces us – to put back together the material and the ideological, production and consumption, the human body and idealized landscapes like wilderness.

But for quite some time in environmental history, our scholarship has presented us with a Muir of the mountains, without looking at Muir the bread eater, or Muir the fruit grower in Martinez, or Muir situated within a multicultural social world (but see Worster 2008). We split off the two

Muirs, just as we have often done with our subject as a whole. We divide the world of history, separating the outside, public sphere of policy, parks and preserves from the inside, private sphere of hearth, home, and table. And each of these spheres is often also split off from issues of race, class, or gender. Following food allows us to transcend these all-too-common bifurcations, and return environmental history to a center of human experience that includes the social and cultural in all of their complexity.

Food has fully arrived as a topic for historians and American studies scholars, but it has arrived very late. In 2002, a perusal of panel topics at the annual conferences of the American Historical Association, the Organization of American Historians, and the American Studies Association for the previous decade revealed only about a dozen sessions on food (Belasco 2002: 5). At the 2008 American Studies Association meeting, every session in one room for the whole day was on food, making it a veritable food fest. There are now three journals devoted to food and history. The 2008 conference of the American Society for Environmental History featured three sessions on food – including a roundtable discussion later published in the organization's journal, *Environmental History* (Chester and Mink 2009) and one devoted to appraisals of Michael Pollan's popular book *The Omnivore's Dilemma* (2006) (Shoemaker 2009: 340). Food is clearly on the table for environmental historians, and it's a welcome addition to our repertoire. Food may just be, as Nicolaas Mink suggests, "the quintessential embodiment of that enormously complex idea we call nature" (2009: 313). Claude Lévi-Strauss once famously wrote that animals that are designated as food are not only "good to eat" (*bonnes à manger*) but "good to think with" (*bonnes à penser*) (1962: 128).[1] If food is good to think with, it is also good to gender with (Sackman 2003), to racialize or Americanize with (Gabaccia 2006), to reinvent oneself or one's nation with (Murcott 1996; Pilcher 1998), to make money with (Walker 2004), to cross natural and political borders with (Soluri 2005; Freidberg 2009) – and it's good to write environmental history with.

Five Reasons Why Food is Good to Write Environmental History With

1. *Food is a medium linking "environmental history" to "American history"*

When they think of environmental history, many American historians conjure up a narrow cast of characters and events. They may finger the usual suspects of the pantheon – Thoreau and Muir, plus Powell, Pinchot, Marsh, Roosevelt, Leopold, and Carson. They may picture them all as honorary members of the most famous gang of environmentalists, the Sierra Club.

Beyond these characters, they may think of the Columbian exchange and Indian relations with nature; westward expansion; Progressive-era conservation and the battle over Hetch Hetchy; the Dust Bowl; Earth Day, Love Canal, and the environmentalism of the 1960s and 1970s. Of course, environmental historians have been probing a whole range of phenomena in many ways that go beyond these familiar landmarks – and are even producing new insights about class, gender, and race, contrary to the impression that environmental historians have little interest in, or important things to say about, social relations and culture. On the one hand, there are certainly benefits to pursuing a brand of environmental history – using science and, for example, taking a long view of America and its impact on nature – that has little to do with how our colleagues in other fields periodize, conceptualize, or research the past. Such a history can provide unique insights. But there are excellent opportunities to join forces with cultural, political, social, and economic historians. Instead of being colonized by these fields' aims and concerns, environmental history can provide new insights that contribute to a fuller understanding of American history as a whole.

Staking out American "food history" is a promising way to change perceptions about the place and importance of the "environment" in American history. Food connects to the mainstream of "American history," and puts standard narratives in a new light: think of food and native America; establishing colonial societies; protests over tea and the trade relations swirling through the American Revolution in the economic and political context of an Atlantic world; slaves growing rice and tobacco and the role of food in fighting the Civil War; the long westward conquest and the wholesale reordering of landscapes to support both a new regime of property and food production; immigration, foodways, identity, whiteness, ethnicity and America as a Melting Pot (or, as some prefer, a Tossed Salad); progressivism, home economics, and food reform; industrialization and corporate capitalism from Swift to Sunkist and Monsanto; the rise of tourism and consumer culture – *especially* consumer culture.[2] If we draw our attention to the debates over food purity swirling around meat from the age of Sinclair to the age of McDonald's, we see that this basic element in human life has been knotted to important issues of both culture and politics. If we think of the communities formed around the production of food on small farms – or of the labor relations and racial divisions generated by industrialized farming – we see that this basic element of human life has been knotted to important issues of society and economics. In short, the environmental history of food in America is also at the same time America's social, cultural, economic, and political history.

Social historians have for a long time been uncovering the intimacy of American's relationship with the natural world, without always recognizing it as such. As Alan Taylor (1996) has pointed out, social and environmental history are not worlds apart, though historians seeking to uncover the

experiences of ordinary peoples often think of their pursuits as being far removed from those investigating nature. But history from the bottom up often takes us into the soil, after all. When pioneering social and women's historian Laurel Thatcher Ulrich – author of the Pulitzer Prize winning study *A Midwife's Tale* (1990) – visited my campus last year, I asked her about how her midwife Martha Ballard "knew nature through labor" (only half punning on the title of Richard White's [1995] vital essay on environmental history and work). To Ulrich, this question clearly opened up a new way of thinking about her book. We discussed how Ballard's work took her out in all weather, forcing her to cross frozen streams and walk trails at night, to attend to her neighbors giving birth. She became intimately acquainted with both her animal and human neighbors, tracing the extended landscape of home to practice her profession. Since, as Carolyn Merchant (1989, 1990) suggests, human reproduction is properly part of the purview of environmental history, Ballard's diary in fact discloses a whole world of relations with nature even as Ulrich was able to masterfully use it to reconstruct a whole social world.

In her pathbreaking work on the environmental history of food in America, *Kitchen Literacy* (2008), Ann Vileisis uses Ballard's diary to take us farther down the path toward understanding women's and families' relationship to nature in the colonial period. Through the diary, Vileisis seeks "to grasp what a woman two hundred years ago knew about the foods she cooked" (13). She shows how "the work of procuring and cooking food tied people to the land [and] linked them closely to the workings of the natural world" (17). In looking at what Martha cooked and ate, Vileisis does something very different than the anthropologist Mary Douglas does in "Deciphering a Meal" (2007). Douglas essentially analyzes the symbolism of food, and shows some of the work it does in representing and creating social relationships and expressing cultural ideals. In deciphering Ballard's meals, Vileisis shows them to be "centers of foodsheds … integrations of human know-how and natural cycles … culminations of stories" and energy derived from nature and the working bodies of humans (2008: 24–5). Vileisis goes on to show how the kind of intimate immersion into nature and knowledge of her food that Martha possessed was eroded as America industrialized, profoundly altering Americans' relationships to both food and nature. By beginning with Ballard's diary, but asking how she knew nature through labor and food, Vileisis delivers a very different portrait of Ballard's world than did Ulrich, demonstrating how social history and environmental history can enrich one another.

Similar harvests await by combining the environmental history of food with cultural history or economic history. The history of science and technology, particularly with respect to agricultural and nutritional science and biotechnology, can also be fruitfully combined with the environmental history of food (Fitzgerald 1990; Scranton and Schrepfer 2004; Walker 2004;

Sackman 2005: 53–83; Pauly 2007). We could also mix it with political history, in ways that go beyond just looking at the Pure Food and Drug Act or agricultural policy. Lincoln himself connected the breaking of the Union to a matter of food, implying that the right to enjoy the fruits of one's labor was a kind of natural right, one that should be understood in relation to those enumerated in the Declaration of Independence. In his second inaugural address, the Great Emancipator observed that Northerners and Southerners both prayed "to the same God." Lincoln then expressed outrage "that any men should dare to ask a just God's assistance in wringing their bread from the sweat of other men's faces" (Gates and Yacovone 2009: 311). In 1858, Lincoln had linked the ideal of equality to how we quite literally feed ourselves as people, insisting that "in the right to put into his mouth the bread that his own hands have earned, [the negro] is the equal of every other man, white or black" (Gates and Yacovone 2009: 120). Environmental history, Donald Worster has said, "begins in the belly" (Mink 2009); in critical ways, national history begins there too.

2. *Following food can help us bridge the gap between the material and the symbolic*

Responding to Donald Worster's lead essay staking out an agro-ecological approach to history in a critical forum on environmental history that appeared in the *Journal of American History* (Worster 1990), William Cronon noted that environmental historiography has been characterized by a split between those works that do a good job of dealing with the material levels of analysis (ecology and political economy) and those that deal with the ideological (representations of nature) (Cronon 1990: 1123). I would not argue that either strictly materially oriented or ideologically oriented studies have no place in our scholarship, now and in the future. Clearly, though, studies that meld the two approaches can yield important findings.

Of course, the split between the material and the symbolic is one that exists in other fields of history, and in other disciplines as well. While, until recently, historians have largely neglected a serious investigation of food in its social, cultural, political, and environmental contexts, anthropologists have long been interested in the social and cultural implications of the edible world. But the way they have been interested manifests the material-ideological split. On the one hand, Claude Lévi-Strauss emphasizes the role of food as a kind of mental medium, something used to order the social world. He suggests that human identity is constructed – transformed by the cooking fire, which assures "that a natural creature is at one and the same time *cooked and socialized*" (1969: 336). Thus was nature made fit, symbolically and physiologically, for human consumption. In eating, and deciding what to eat and under what conditions, we say who we are. You are what you

eat need not be a reductively materialistic position. Mary Douglas (1966, 2007) looks at food as a means of discovering how people have categorized themselves and the world through decisions about what is fit to eat, and what is not. She finds in food a code that expresses social relations and creates boundaries. But Marvin Harris has charged Lévi-Strauss and Douglas with "relentlessly dematerializing food" (1989: 60). Harris (1986) has put forward a polar rejoinder, arguing that food taboos such as those found in Leviticus ultimately are explained materially, by understanding disease and the agro-ecologies at work in the places in which prohibitions were initially incubated. Harris takes a butcher's knife to the symbolic interpretation of the popularity of beef in America put forward by Marshall Sahlins: "The designation of beef as a symbol of wealth, generosity, and virility did not generate the ecological, technological, demographic, and political ascendancy of the beef industry; it was the ascendancy of the beef industry as a result of those processes that has bestowed upon beef its special symbolic preeminence" (Harris 1989: 61).

But the symbolic interpreters of food have never been as purely abstract as Harris suggests; Douglas, for example, roots the biblical classification of animals as good or bad to eat ultimately to how people in a particular time observed those creatures inhabiting "the three spheres of land, air, and water" (2007: 45). By avoiding reductionism and taking the arguments of those who emphasize food's role in social and cultural symbolism and those who emphasize materialism and ecological constraints and contexts seriously, we can find that the perspectives can be melded. We might see a constructivism that takes construction materially, noting that everything we remake and consume comes from the material world, from nature.

An environmental history that is constructivist in this sense would enrich cultural and social history. It would push cultural history and cultural studies of food, with their facility in handling the production, circulation, and contestation of meaning and power, to become quite literally grounded – both ecologically and socially. Social historians, who sometimes self-deprecatingly refer to themselves as "cow counters," don't quite see the same thing as when environmental historians count cows and field rotations – as when we uncover the place of nature domesticated and cultivated as food for human consumption. Environmental historians have a potentially great role to play in interweaving the material and the symbolic in our accounts – just as they exist in real life.

A model study that manages this delicate alchemy is Linda Nash's *Inescapable Ecologies: A History of Environment, Disease, and Knowledge* (2006). Grounding her study in an examination of California's Central Valley, Nash shows how conceptions of the body and human health were fluidly connected to landscape in the nineteenth century and how a modern construction of the body divorced it from its surroundings in the first half of the twentieth century. Ultimately, her book traces connections between

the ever-changing agricultural landscapes of California that were shaped by intensive petrochemical regimes and the bodies of workers and consumers.

It is no longer news to note that what has been considered most natural about human beings – their body – in fact has a history. But that does not mean that the body is simply a shifting mental image, as those who wish to caricature the constructivist position would have it. Nash explains that she views bodies and diseases "as at once material realities and products of language and culture" (11). This position makes for a complex narrative, for Nash is always obliged to trace the dense interplay between the ideological and the material. Because of her orientation as an environmental historian with an abiding interest in "what happened on the ground – the changing pattern of disease, the changing uses of the land, the changing qualities of air, water, and soil" (10), Nash is unusually successful in jointly deploying ideological and material analysis without any reductionism or obfuscation.

Robert Chester III further underscores just how food history and the history of the body can be productively linked for environmental history: "we need to emphasize biological bodies as micro-environments, sensory experience as cultural sediment and ecological process, and bodies and sensory experiences in the aggregate as social ecosystems and cultural environments that help illuminate the social and cultural contexts in which eating occurs, tastes develop, and patterns of consumption reconfigure local and distant ecologies" (2009: 325). The environmental history of food is an aspect of the history of the body (or vice versa). In pursuing that history, we can move beyond the split between the symbolic and the material. For a few weeks, Muir was stuck with only his idea of bread – we can have that and eat it too. In approaching food and the body symbolically and materially, we should recognize that our relations with nature are always already social relations, since the nature we consume and the debris we leave behind contribute to what and who we are (Sackman 2003). It is the stuff of identity, the material world metastized and turned into meaning – flesh made into spirit (that will in time turn back to soil).

3. *The environmental history of food reveals the connections between landscapes of production and landscapes of consumption*

One of the great achievements of the field of environmental history is to take the basic formula of history – change over time – and apply it to landscapes, recreating the way places have shifted and how those shifts reflect and perpetuate changing political, economic, and cultural conditions. Examples include Richard White's *Land Use, Environment, and Social Change* (1981), Timothy Silver's *A New Face on the Countryside* (1990), and Cronon's directly titled *Changes in the Land* (1983). For the most part, these works are concerned with what might be called landscapes of production – agriculture and the other human activities that have reshaped land toward human

economic and aesthetic ends. In Cronon's second book, *Nature's Metropolis* (1991), he presented a stunning panorama including Chicago and the vast hinterland the city was involved in reshaping, tracing flows of capital, and nature as it became commodities. His story followed the wheat and the beef all the way through the technological and economic processes of disassembly, homogenization, and commodification in Chicago, and left the reader with a vision of just how removed from the source, from nature, a consumer would be in eating this stuff – how alienated.

But, for Cronon, the consumer was only an image, a visual trope to bring into relief the story he focused on – landscapes of production, and the transformation of nature as it moved under the gravitational pull of Chicago's commodity markets. As such, this was a far-reaching agricultural history, taking into account capitalism on the one hand and the nature of wheat, trees, and pigs and cattle on the other. But if we decide that we will look at agriculture *and* food, then landscapes of production and landscapes of consumption – what the cultural historian William Leach (1993) calls the "land of desire" – would come into even sharper focus.

Following food allows us to see the interrelationship between landscapes of production and landscapes of consumption – advertising, including its physical manifestation in billboards and retail displays, in addition to its pervasive presence in media from print to radio, television and beyond, consumers' ideas and behavior, including concern over price, environment, their sense of identity and wellbeing. This is something I tried to do with citrus in *Orange Empire* (2005), looking closely at the culture of consumption Sunkist created in relation to the ecological and social conditions in the groves on the ground in California; it's what John Soluri (2002, 2005) did marvelously by looking at banana marketing within the US and the social ecology of banana production in Honduras; it's what Kelly Sisson (2008) is currently doing with her project on corn, examining how corn production, promotion, and consumption "shaped ways of thinking about gender, race, nation, and nature"; and it is what Cindy Ott (2008) is doing with the pumpkin, showing how we must reckon with culture to understand the alchemy of turning pumpkins from animal fodder into a favored, savored, and even patriotic food. Drawing connections between agriculture and the table is also part of what makes Michael Pollan's book *The Omnivore's Dilemma* (2006) so engaging, for he follows food all the way into his own stomach, doing a "natural history of food in four meals" (as his book's subtitle promises). Reading the elaborate labels in a Whole Foods in Berkeley describing the farms from which Rosie the Chicken or carrots or artichokes supposedly come, Pollan coins the term "Supermarket Pastoral":

> the story on offer … is a pastoral narrative in which farm animals live much as they did in the books we read as children, and our fruits and vegetables grow on well-composted soils on small farms.… "Organic" on the label conjures up a rich narrative, even if it is the consumer who fills in most of the details,

> supplying the hero (American Family Farmer), the villain (Agribusinessmen), and the literary genre, which I've come to think of as Supermarket Pastoral … a most seductive literary form, beguiling enough to survive in the face of a great number of discomfiting facts. (137)

Pollan suggest that the genre gratifies "some of our deepest, oldest longings, not merely for safe food, but for a connection to the earth" (137). Though consumers deeply want to believe in these stories, Pollan reveals how, in many cases, they are deeply misleading. Indeed, Supermarket Pastoral fits Louis Althusser's definition of ideology to a tee: "a 'representation' of the Imaginary Relationship of Individuals to their Real Conditions of existence" (1971: 152).

The landscape of consumption – whether it be a Whole Foods, a Dairy Queen, or a kitchen table – is the demand that affects supply. It is the will that, as Thoreau would put it, makes a landscape "say beans" – or oranges, or corn-fed cows, for that matter. The production of food, as Robert Chester III and Nicolaas Mink point out, "brings both order and disorder to local, regional, and national landscapes and controls economies throughout the world" (2009: 309). The cultural, along with the economic, is connected to and warps and weaves the landscapes of production. Since studying food calls for cultural and social analysis, it again helps us meld the material and the ideological. Indeed, it shows us just how the seemingly ethereal "land of desire" is actually grounded.

Napoleon famously quipped that an army moves on its stomach. *Homo sapiens* as a whole are also gastropods. Everything we are comes from nature. But nature is recreated in our image as we eat and as a consequence of the patterns in which we eat. In large part, whole landscapes are transformed as we manage, shape, and reinvent nature to gratify our tastes. We eat to live, to *be*, biophysically, and to be who we are, culturally. In eating, we are making who we are, though certainly not under conditions entirely of our own making. Both history and nature have something to say about it. As we eat and make identity and reshape landscapes, we are connected to nature, though in ways that are not always obvious. As environmental historians, we can map that connection for various times and places and call it our "ecological mouthprint."

4. Food and place are reciprocally related; writing the environmental history of food allows us to contribute to the literature on the local, the regional, the national, the global, and the transnational

Wendell Berry says, "If you don't know where you are … you don't know *who* you are" (Stegner 1992: 199). And you don't know where people have been until you know what they ate, and where it all come from.

Place is a key concept for environmental historians (Flores 1994), as it is for cultural geographers and nature writers. Place-making and remaking is obviously a complicated process, intricately built up out of perception, memory, and the changing biophysical scene. But a very simple formula has been offered to define place: place is abstract space invested with meaning (Cresswell 2004: 10). In this view, space is raw until a person or people experience it and tell stories about it. While this definition is useful, I am suspicious of how the formula enshrines a dualism between material space and ideological place: it configures the material and natural world as abstract and preexisting and only later, when the human element is added, is place made. Furthermore, one person's space may be another's place. The novelist Wallace Stegner argued, "No place is a place until things that have happened in it are remembered in history, ballads, yarns, legends, or monuments.… No place, not even a wild place, is a place until it has had that human attention that at its highest reach we will call poetry" (1992: 202, 205). In writing about the sense of place, Stegner's perspective remained admittedly anthropocentric. It was also unconsciously Eurocentric: "Once … the continent stretched away westward without names.… The fact that Daniel Boone killed a bear at a certain spot in Kentucky did not make it a place. It began to be one, though, when he remembered the spot as Bear Run.… The very fact that people remembered Boone's bear-killing, and told about it, added something of placeness" (201–2). This idea of space has some similarities to the idea of wilderness, a landscape imagined to be devoid of any human imprint. Just as wilderness erases some people and history and imposes a dualism separating people from nature on the world (Cronon 1995), "space" may have a similar effect.

If we leave aside the anthropocentrism of definitions of space and place and the ethnocentricism involved in deciding which is which, we can recognize that exploring the relationship between food and place is a matter of agro-ecology in its widest sense, one that includes political economy, geography, technology and transportation, advertising, and more. The environmental history of food would reveal the reciprocity between the way different peoples have eaten and how those foodways have transformed landscapes near and far, creating a picture of how we become who we are as we eat, and how that eating in turn reshapes ecological and social landscapes.

To understand and explore place, we need to look at foodsheds as much as we look at watersheds. Place is intricately related to historiographic questions of scale. To be sure, the term "foodshed" implies a small scale – it conjures an imagined hunter-gatherer society with its seasonal rounds, or small-scale farm community, like those evoked in Supermarket Pastoral. If we use a different term, such as "food system," we begin thinking about a larger geographic system, and imagine a more modern situation. But wide-scale food movement has been part of human history for a very long time. Consider the granaries of the ancient world or rice and China's Grand

Canal – or the spice trade, which motivated Columbus. 1492 was a worldwide, ground-shaking event for people, plants, and place around the world (Crosby 1972). People and societies have adapted new world crops to other world environments, whether it be potatoes in Ireland, tomatoes in Italy, or corn in Africa – as James McCann shows in his cleverly titled book *Maize and Grace* (2005). Those crops have been part of vast changes in how and what people have eaten, how their societies have been put together, and how they have made and experienced place.

In addition to transporting the plants to be grown as crops elsewhere, transoceanic trade in foodstuffs emerged in full force with the modern, industrial, slave-based production of sugar, as Sidney Mintz brilliantly revealed in *Sweetness and Power* (1985). Food has been part of commodity chains of national and transnational scope ever since, a process intimately connected to transportation technologies and the ever-elaborating modern, capitalistic world system. These forces also set into motion the movement of peoples around the globe, and with them, their foods. To use just one example: Hawaiian lumber mill workers in the Pacific Northwest in the nineteenth century, known as Kanakas, could purchase poi at the company stores of Pope & Talbot (Cox 1974: 82).

Immigrants have often created a sense of national cuisine for the area they have left, using food to express identity (Gabaccia 1998, 2006). The expatriates create the national cuisine. They also write their food preferences into the landscape – or use them to redefine something others wrote off as weeds and turn it into something profitable, as Chinese immigrants in California in the nineteenth century did with mustard (Lydon 1985). Ironically, the forces of technological, economic, and cultural integration have breathed a new life into the "traditional" and the "local" (even as they have utterly transformed traditional ways of making and sensing place). Warren Belasco states that "international flows of money and people may actually promote – and indeed require – the construction of local identities" (2002: 13).

The rise of tourism encouraged the creation of local cuisines, which could be made part of the trip. As promoters like Fred Harvey knew, a trip to the Southwest would be more special if the tourist could partake of some creation labeled traditional Hopi cuisine. Nicolaas Mink argues "the same transportation and distributions systems that created hybrid cuisines while they obliterated place also helped to heighten the placed-ness of foods, foodways, and food systems." The capitalized routes through which peoples moved evermore quickly across places in the modern world created opportunities to create a nostalgic sense of place through the sense of taste. Mink notes that "Local and regional cuisines are created only when they find themselves in conversation with other foods from other cultures, and other environments. The very act of placing a food puts it in cognitive dialogues with … culinary Others" (2008: 6).

The supposed commodification and homogenization of food that comes with industrial capitalism has its symbol: McDonald's. But even corporate food seemingly stamped out and utterly removed from place – and culture – finds itself twisted in unexpected ways, getting adapted to local foodways to some extent through a process some call "globalocalization." Examine McDonald's in China and in other Asian countries, as James Watson has done in his edited volume *Golden Arches East* (2006), and you see a different ending of the declensionist narrative that starts with a world of different foodsheds and their attendant foodways in local places; then traces the rise of global capitalism; the industrialization of food backed by Western economic, military, and cultural imperialism; and culminates in the obliteration of place, culture, and any meaningful relationship to nature. There is much to recommend that narrative arc, but the stories of foods as they have been grown and been consumed in the modern world complicate it in critical ways, and we need to find out more about just how they do.

Two recent books give us a taste of the kind of scholarship that needs to be done in tracing the circulation of food, people, and culture into and out of American boundaries. In *Pineapple Culture* (2009), Gary Okihiro examines the growth and marketing of pineapples in the large context of Western empire-building in the tropics. He argues:

> The pineapple as a fruit of the tropics and a trophy of empire was but one of numerous material and symbolic objects of desire that prompted movements across the temperate and tropical zones in world history. Fueled by wants, those transgressions of places produced mappings to chart trails but also to name, describe, and classify novel airs, waters, sites, and peoples. (173)

This process undermined autonomy and ecology in Hawaii, "impoverishing … airs, waters, and sites to enrich alien peoples, lands, and cultures" (128). The "peregrinations of the pineapple" (174) also had a marked impact on modern Hawaiian and American cultures, economies, and foodways. In the process, the tropical and temperate worlds were "integrated, not in the nature of convection currents but in the human enactments of travel, migration, and empire, from mercantile and then colonial (im)plantations and their circulations of capital, labor, goods, and culture" (179).

Susanne Freidberg's *Fresh* (2009) also contributes novel insights into how – through the rise of national and global markets in freshness (and the rebirth of local markets in implicated reaction) – space, place, and nature have been deeply transformed. "A tour of the modern fridge," Freidberg notes, "reveals a world of interdependencies and inequalities, forged through trade, conquest, and politics. It is a world of sharp contradictions between marketed ideals and industrial realities. Nothing is as pure or natural as we'd like" (283). Unlike many of the other books in the broad genre, Freidberg does not focus on a single commodity, such as cod (Kurlansky 1997),

milk (DuPuis 2002), or bananas (Soluri 2005; Koeppel 2008; Wiley 2008). Instead, she is looking for what the refrigerator promises to protect and preserve: freshness itself.

A geographer by training from Berkeley – a fertile ground for scholars of food, agriculture, and society (Walker 2004; Guthman 2004) – Freidberg's approach is to historicize the development of the idea and practice of freshness, focusing on a number of different kinds of perishable foods: beef, eggs, fruit, vegetables, milk, and fish. "Biology alone can't explain what 'fresh' means to people," Freidberg (2009: 4) observes; "few qualities appear more complex and contested" (3). While explaining the "basic science of spoilage" (4) for each food, most of the book focuses on the complex and contested cultural, technological, and economic construction of freshness.

She puts us squarely in the realm of artifice with her first chapter tracing the development of refrigeration technology. In her fascinating account, she covers the technological innovations of cold storage and the attendant utopian boosterism which proclaimed that refrigeration would liberate mankind from nature and make the world happier, healthier, wealthier, and more rational. But Freidberg shows how the growing dependence on refrigeration in the modern world "undermined not just farmers' and merchants' local markets but also traditional understandings of how food quality related to time, season, and place" (19). The railroad may have annihilated space, as nineteenth-century Americans were fond of noting; but the refrigerated railroad car, and its various technological progeny, was a critical, if underappreciated, partner in obliterating space, time, and season. By creating a "nationwide cold chain" (11), the ripening crops of spring could be suspended in a preserving winter until they reached the consumer's lips.

Technology, economics, culture, and politics are at play in each case study of how nature as food was transmogrified in the pursuit of marketing it as fresh. The book does a marvelous job of uncovering the marketing approaches of producers in every industry, and identifying the contested ground of freshness. For example, in her treatment of salmon she shows how the rise of farmed fish set the stage for fishermen and marketers to promote "wild" salmon – not just any fish, but "salmon with a 'story' "(263). In tracing scares over spoiled milk and the political response in the early twentieth century – spearheaded by women's groups – she uncovers the contested process through which local and "pure" milk was defined, bounded, and certified (218–25).

In tracking food and freshness, Freidberg is willing to crosses boundaries to follow the scent of the trail. While much of the story focuses on developments within the United States, Freidberg's book as a whole takes us to many other places as well – including Hong Kong, Burkina Faso, Mexico, and South Africa. Refrigeration technology is a transnational story, and Freidberg's treatment includes revealing comparisons of its development

and different cultural reception in France, Britain, and the United States. The book also reveals much about the globalization of food, as her exploration of freshness documents a shifting geography of the local, the national, and the global. In her chapter on vegetables, Freidberg makes a special point about the class politics of food marketing, noting that it takes a great deal of unseen labor to bring "natural" food to the market: "the real cost [of freshness] has always been borne by the people whose work we don't see" (196). Though this point has been made before – by John Steinbeck and Carey McWilliams, as Freidberg acknowledges – and is made as well in several recent environmental histories focusing on fruit or vegetables (Stoll 1998; Walker 2004; Sackman 2005), Freidberg's account also unmasks the inequities of the global food system, wherein, for example, impoverished farmers in Burkina Faso grow premium beans for the French market. While "locavores" in Berkeley and elsewhere try to limit what they consume to foods produced within a closely bounded and discernable territory, Freidberg argues "the same larger forces that have produced prosperous local foodsheds in some parts of the world have undermined them in others" (281).

Food and plants travel; people and culture travel; food in motion makes and remakes place – transports it. It at once makes the local, regional, national, and global; and it busts boundaries. Following food in the way we can as environmental historians – with attention to culture and nature – allows us to contribute uniquely and critically to the burgeoning scholarship on transnationalism (Taylor 2008).

5. *Stories about food engage the public (including students); we should be writing and teaching many of those stories*

Food is popular, in a way that overlaps with and yet is different from popular interest in "the environment." Witness the success of Eric Schlosser's *Fast Food Nation* (2001), Pollan's *The Omnivore's Dilemma* (2006), and Barbara Kingsolver's *Animal, Vegetable, Miracle* (2007) – or, for that matter, Upton Sinclair's 1906 novel *The Jungle* (1985). This receptivity provides environmental historians with an opportunity. We can attract and interest students in food who may not be drawn to a course explicitly on environmental history. Students relate to food – certainly those who are interested in sustainability, and may be vegetarians or vegans, but even those blissfully blasé about food choices. In part, this is because everyone eats. Students also are almost unavoidably interested in body image; a course on food can include texts on anorexia nervosa (Bordo 1993) or the anthropology of fat (Kulick and Meneley 2005; Sobo 2007), for example.

Food is an entrée into historical consciousness, and a rich understanding of context, including the economic, political, cultural, and environmental. Courses on food can be historical and interdisciplinary. Opportunities for

guest lectures from across the university abound. Such courses can make significant contributions to the curriculum in history departments, as well as environmental studies programs. Courses centered on food can become staples for environmental historians, drawing in students and cultivating a new appreciation for just what environmental history can be about.

In noting the current popularity of history (especially political history), Margaret MacMillan suggests it is a shame that "professional historians have largely been abandoning the field to amateurs" (2009: 35). Indisputably, "amateur" food historians have a great deal to offer in the way of food history. Environmental historians have a great deal to offer as well. We are unavoidably tellers of tales, as William Cronon points out in "A Place for Stories" (1992). Food is good to tell environmental stories with – if we serve good ones up, we will bring a lot of people to our table.

Knowing Beans

I would like to end with a story of food drawn from Thoreau's *Walden*, his experiment in deliberatively living close to the soil and learning simply to grow beans. "This was my curious labor all summer," Thoreau writes, "to make this portion of the earth's surface … say beans instead of grass" (1910: 204). He prepared the ground for his rows of beans joyously and rather noisily, saying that "When my hoe tinkled against the stones, that music echoed to the woods and the sky, and was an accompaniment to my labor which yielded an instant and immeasurable crop." This bean-growing symphony "attached me to the earth, and so I got strength like Antaeus" (204). In the last analysis, "It was no longer beans that I hoed, nor I that hoed beans" (204).

As these beans were growing in Henry, he was gaining not only strength but a heightened consciousness of place and respect for nature. He contrasts the satisfaction he gets from his work with that of commercial farmers, who, without festival or a sense of the sacred earth, "know nature, but as a robber" (218). While his globetrotting "contemporaries [were] devoted to the fine arts in Boston or Rome, and others to contemplation in India, and others to trade in London or New York" (213), Thoreau expresses supreme satisfaction with his lot. While his contemporaries are traveling the world, Thoreau hoes to find a connection with other people of another time: "in the course of the summer it appeared by the arrowheads which I turned up in hoeing, that an extinct nation had anciently dwelt here and planted corn and beans ere white men came to clear the land" (206). His plot is not untouched nature, but a human landscape with a deep history. He writes of turning over the soil and disturbing "the ashes of unchronicled nations who in primeval years lived under these heavens" (209). Those nations – and

their agriculture – have now found chroniclers among contemporary environmental historians (Cronon 1983; Merchant 1989).

All the while, Thoreau made careful notes about the length of his rows (7 miles of beans) and the productivity of his crops. Partly, this is the naturalist in him, and partly, there is an implicit critical commentary on the exacting efficiency of the farmer growing food solely for profit. Thoreau's record keeping amounts to a kind of mockery of the bean-counter culture. It's clear that he is determined to have fun with this work of growing food: "It was a singular experience that long acquaintance which I cultivated with beans, what with planting, and hoeing, and harvesting, and threshing, and picking over and selling them, – the last was the hardest of all, – I might add eating, for I did taste." And then he coyly adds, "I was determined to know beans" (212).

It amused him to think that no one could now say to him "you don't know beans." Of course, *Walden* was a project aimed at getting to know himself and his place in the world, his landscape – not only beans. It is often taken to be a noble experiment in creating a pure landscape of resistance, a bulwark against exploitative capitalism draining land and soul both. But living solely off the beans he grew – the fruit of his direct labor – was not part of the plan. He says he is Pythagorean in his tastes (and Pythagoras advised his followers not to eat beans). In fact, while he may have mocked commercial agriculture and his globetrotting contemporaries, Thoreau ends up engaging in trade too that connects him to distant places to get something else to eat. What does he exchange his beans for?

Rice.

Even a fierce and unflinching abolitionist – who had been thrown in jail for refusing to pay taxes that undergirded slavery, who had served as a conductor on the underground railroad, and who had experimented living independently as a yeoman's yeoman, growing his own food and freedom – ends up exchanging the beans he cultivated with his own labor on Walden pond for rice (214), presumably grown in the tidal water plantations of the Carolinas or Georgia, landscapes that Mart Stewart has brilliantly mapped in their own social and ecological complexity in *"What Nature Suffers to Groe"* (1996). With every swallow, Thoreau was connecting the Southern landscapes of human exploitation with the Northern landscapes of an imagined freedom, embodying that relationship to food Lincoln found ominously unnatural and un-American.

Thoreau's mouth was an orifice of critical wisdom, which continues to sound off today through his writings. It was also, as I'm sure he appreciated, an opening that connected him to landscapes, near at hand and far away. Our mouths express our thoughts, ideas, and aspirations, and they connect us to nature and to each other, often in unexpected ways. We should closely examine all of those morsels of nature that we have – over time and in many places – raised to our lips, and consumed.

Notes

1 Lévi-Strauss's dictum has often been repeated – usually as "food is good to think." However, in the original context, Lévi-Strauss is writing about animals that are deemed edible or taboo – not food in general. In addition, the phrase he used could be translated as "good to think (with)" or "goods to think (with)."

2 Important works in American food history and politics – which may not be especially environmental in their focus – include Harvey Levenstein's pioneering two-part survey (1993, 2005). In addition to other sources cited in this essay, see Belasco (1989, 2006), Counihan (2002), Shapiro (1986), Kurlansky (2009), Nestle (2002), and Horowitz (2006).

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Part V

Outside of the Grid: Place, Borders, and Scale

Chapter Twenty-eight

Blinded by History: The Geographic Dimension of Environment and Society

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Answering the question "what can geography teach environmental history?" presents an opportunity for useful exchange between two fields that share considerable disciplinary overlap. After all, environmental history and human geography are close cousins in the extended family of academia. Both fields are fundamentally concerned with the encounter between humans and the environment, both eschew the longstanding tendency within academia to ignore the environmental dimension of human affairs, and both subscribe (implicitly and explicitly) to the value of interdisciplinary research.

Our personal histories (and chorologies) reflect the intertwining of the two disciplines. One is an unorthodox geographer with a penchant for history and an off-and-on engagement with environmental historians in debates, conferences, and publications. The other is an unorthodox environmental historian trained under the guidance of a founding mother of the field, but in an amalgam program in environment and society, with considerable influence from geographers. We share an abiding affection for both disciplines and, most of all, for the subject matter they cover. With that in mind, one should consider this a friendly critique of environmental history from close quarters.[1]

We believe that the two fields have much to teach each other. For example, greater consideration of historical origins would strengthen geographers' work and help to alleviate the historical flatness that pervades so much social science research. Geographers could also benefit from the meticulous research strategies and well-written narratives that distinguish so much work by historians. Nevertheless, these matters of form and depth are not our primary concern. Moreover, we have been asked to focus on the lessons environmental historians could draw from geography, not the other way round.

Finding meaningful differences between geography and environmental history is not always easy. The two fields explore many of the same topics and display many of the same preferences. For example, they share an abiding interest in the history of ideas about nature. Geographer Clarence Glacken (1967) set the standard for such intellectual histories with his survey of Western thought from classical times to the eighteenth century, and modern geographers have been deeply concerned with the intersection of nature and culture (e.g., Sauer 1925, 1975; Harvey 1997; Watts 2005). Environmental historians, too, have looked deeply at changing beliefs, attitudes, and ideologies concerning nature with the modern advance of science, capitalism, and nationalism (e.g., Nash 1967; Merchant 1980, 1989; Sears 1998; Worster 1994; Cronon 1995). Geography reverberates with such inquiries to this day, incorporating the latest in social theory and philosophy (e.g., Smith 1984; Braun and Castree 1998; Braun 2002; Kosek 2006).

Our concerns lie elsewhere, however; we wish to engage with the social science side of both disciplines – i.e., the analysis of the social use and abuse of nature – rather than the history of ideas. We see three main areas, long addressed by geographers, that offer promising ideas for the practice of environmental history: (1) the central role of urbanization in transforming the modern environment; (2) the use of political ecology to understand the social dynamics of environmental hazards; and (3) the need to consider the geographic dimensions of human activity, i.e., space, place, and scale.

We have two general points to make. The first is that environmental history is relatively young as a field and geography has been grappling with much the same subject matter for longer. This means that geographers have had more time to learn from their (often considerable) mistakes, such as environmental determinism, reductionist views of scale and locality, ahistorical analysis, cultural organicism, and inattention to politics and conflict. Environmental historians sometimes fall unwittingly into similar traps. This is not a question of disciplinary virtue or error, but of sharing some hard-won lessons.

A second point is the importance of a critical analytic stance. Historians as a rule shy away from theory and criticism, more than social scientists, in the pursuit of objectivity, specificity, depth, and narrative power. Nevertheless, those qualities alone do not suffice without the hard edge of social theory, if we are to fully understand the operation of a process such as environmental change by human hands. Here, some form of political economy is an indispensable tool, which has been employed to good effect by critical geographers in recent years. Political economy – how economies and states shape human affairs – offers a way to grapple with the underlying forces behind urbanization, resource use, and social-spatial dynamics, and the accompanying human-environment interactions.

Urban Environments

Capitalism and modernity are synonymous with urbanism, and cities now contain a majority of the world's population. Yet environmental history has shown a decidedly rural outlook, focusing on natural resources, conservation, and hinterlands (e.g., Worster 1979; McEvoy 1986; Langston 1995; Isenberg 2000). Environmental histories outside North America echo the emphasis on rural regions and peoples (Totman 1989; Whited 2000; Guha 2000). By shifting their gaze toward cities and urbanization, environmental historians can gain wider perspective on the sources of environmental change, the range of impacts of human activity on nature, and the kinds of social movements that arise to hold back the tide.

To be sure, a handful of environmental historians have studied city environments, exploring urban development, form and infrastructure, and impacts on land and water (e.g., Melosi 2000, 2001, 2005; Platt 2005; Tarr 2003). Then, of course, there's Cronon's (1991) magisterial treatment of Chicago's resource-based economy. Still, environmental historians too often ignore nature within the city and the second nature of the built environment, as noted by scholars within the field (Melosi 1993; Rosen and Tarr 1994). Geographers have been studying cities much longer, and did some of the earliest studies of urban environments (e.g., Detwyler and Marcus 1972; Platt et al. 1994).[2] Overall, historians would do well to draw on the work of urban geographers, who have pushed the theoretical envelope on the shaping of cities and the carving up of nature to provide for urbanization.

City-building and the environment

Understanding environmental transformation today necessarily means coming to grips with the construction of urban landscapes – one of the most profound alterations of land and ecology undertaken by humans. Urban geographers recognize that cities are "built environments" powerfully shaped and transformed by human activity, and have long turned a keen eye on the molding of the material landscape of cities (Jackson 1984; Relph 1987; Vance 1990; Whitehand 1992; Ford 1994). Moreover, geographers have been particularly attentive to the capitalist dynamics of city-making (Dear and Scott 1981; Harvey 1989; Smith 1996). These writers address the economic forces that create urban space, the way cities are built up only to be torn down, and the systematic arrangement and reshaping of urban land uses. Environmental historians have all but ignored such matters.

One of the key dimensions of city-building is the dramatic reconfiguration of land, water, and air to accommodate the hardscape of industry, commerce, transport, and residence. Urbanization has had a profound

impact on the natural substrate of cities, and has meant carving up hill and dale, covering up wetlands and creeks, and destroying wildlife habitat. This wholesale environmental transformation – normally invisible to later generations of urban dwellers – has been explored in depth by geographers such as Davis (1998), Brechin (1999), Gandy (2002), and Swyngedouw (2004). The attention paid by these scholars to the political-economic forces driving the city-building process leads them to a sharp critique of the moneymaking imperative behind land development and the extraction of rents, as well as the power of urban elites to bend nature and the state to their purposes. When environmental historians treat similar material, it has usually been in a more measured and uncritical way, and we are left wondering why cities wreck such havoc as they grow (e.g., Rome 2001; Orsi 2004; Rothman 2007; Klingle 2007).[3]

The environmental ramifications of urbanization affect human beings as well as the natural world. Air pollution, garbage dumps, and sewage discharges pose an intense and direct hazard to city dwellers, and their unequal impact on underprivileged communities remains a scandalous part of American (and global) life. While environmental historians document important urban topics such as sanitation, garbage disposal, and water pollution (Melosi 2000, 2001, 2005; Rome 2001), they would do well to tackle environmental justice directly. Most of the scholarship on environmental justice has been done in other disciplines, notably geography (Pulido 1996, 2000; Craddock 2000), sociology (Bullard 1990; Szasz 1994), and planning (Gottlieb 1993; Corburn 2005) – with some notable exceptions (Hurley 1995; Sellers 1997).

Urban land use

Questions of land use – where to build, what to build, and how to build – ought to be of the highest concern to environmental historians. Geographers have demonstrated that land use illustrates a great deal about social ordering and valuation of the environment (Tuan 1974; Cosgrove 1984; Olwig 2002). Yet environmental historians pay these issues scant attention, in contrast to geography (Heiman 1988; Walker and Heiman 1981; Pincetl 1999; Johnson 2006). Environmental historians would do well to analyze the history of land use debates and reform as a lens to understand the changing valuations of nature and shifting ideas about the proper relationship between humans and the natural world.

Land use planning, in particular, helps determine development patterns across huge swaths of territory and set the parameters of urban infrastructure, such as roads, sewers, and schools; consequently, it is hugely influential to environmental quality and to social justice. Environmental historians pay little heed to planning history, a topic on which geographers have

made signal contributions (Pincetl 1999; Harris 1996; Hise 1997). Urban geographers are normally well versed in the pantheon of urban designers and planners, including Frederick Law Olmsted, Patrick Geddes, and Benton Mackaye. These men did more than design urban spaces; they actively engaged questions of central interest to environmental historians: What is a "livable" city? What is a sustainable city? How do city dwellers interact with nature? No environmental historian ought to be unaware of the ideas of planning with nature that animated men like Ebenezer Howard or Ian McHarg (Hall 2002).[4]

Just as environmental historians tend to overlook the hardscape of cities, so, too, do they too often ignore the conservation of naturalized landscapes within urban areas – the country in the city – consisting of parks, open spaces, and wildlife preserves (but see Rothman 2004). Such urban green spaces complicate views of what constitutes natural areas, the meaning of environmental degradation and recovery, and the motivations behind a love of "nature," among other things (Bridge 2001; Walker 2007). Environmental historians could learn from the geographers, planners, landscape architects, and urban historians who take the study of the naturalized city seriously. The pastoral landscapes of urban parks, suburbs, and greenways are considered a basic element of urban geography (e.g., Walker 1978; Smith 1984; Ford 1994; Gandy 2002; Young 2004). These also receive close attention from a number of urban historians (e.g., Jackson 1985; Rosenzweig and Blackmar 1992; Schuyler 1986). Surprisingly, naturalized landscapes in the city have never been claimed by environmental history.

Urbanization of the countryside

Urbanization extends well beyond the city limits and the suburbs; it dramatically alters the fields, farms, and open spaces of the rural countryside. After World War II, in particular, the city powerfully transformed the American countryside. It did so not just by exploiting the hinterland's natural resources for urban development, as did nineteenth-century cities, but by bringing the patterns of urban development – the capital-intensive building projects, the sprawling residential subdivisions, and the commercial strips – to the country. Urban dwellers demanded recreation, scenic vistas, and other natural amenities; since these resources could not be extracted, urban dwellers flocked to them, giving rise to "seasonal" cities (Wright 1993; Thomas 2009).

While environmental historians have detailed the meaning and impact of recreational and tourist demands on rural areas (Rothman 1998; Coleman 2004; cf. Klein 1993), they pay less attention to the extension of the urban form into the countryside. In fact, such development closely resembles that on the edge of cities, particularly residential subdivisions, in density, scale,

and design. Moreover, the recreational Levittowns of the countryside have resulted in many of the same environmental problems that plague metropolitan areas (Rome 2001): inadequate sewage treatment, water pollution, loss of open space, degradation of wildlife habitat, and mounting fiscal costs for municipal services. For the most part, it is geographers and planners who discuss these developments in detail (Heiman 1988; Duane 1999; Sayre 2002; Walker 2007).

As with urban development, the politics shaping seasonal cities, the negotiations among urban developers, rural landowners, and local and state politicians, warrant greater attention by environmental historians. These negotiations reveal much about the political dynamics shaping widespread development and land use change. They also provide insight into the evolving social relations, property arrangements, and attitudes toward nature affecting rural land use over time (Thomas 2009). On these topics, environmental historians would do well to follow the lead of geographers and planners (Walker and Heiman 1981; Popper 1981; Pincetl 1999; McCarthy 2001; Kosek 2006).

Political Ecology

Grounded in cultural ecology and geography, political ecology is a recent field that examines multiple forms of resource use and their relationship to social, economic, and political pressures. It takes a distinct analytical approach to understanding human-environment interactions that environmental historians could learn from. Political ecologists focus on relations of class, gender, and race, the economic matrix of production and exchange, the role of the modern state and its politics, and identity formation and environmental justice (Watts 2000). Under the heading of political ecology we consider three geographic problems: nature as hazard, nature in agriculture, and nature as natural resources. In each case, political economy is an essential tool of inquiry – whether it's the market exposure that vastly increases risk of natural disasters in Central America, the gender relations that affect food production in West Africa, or state expropriation of surplus from the extraction of natural resources.

Natural hazards and social risk

Political ecology emerged as a critique of the prevailing wisdom among postwar geographers over natural hazards and environmental change.[5] A generation of geographers argued that disasters caused by drought, flood, wind, and pests were anything but natural (Wisner 1977; Watts 1983, 1986; Blaikie 1985). Rather, the risk of devastation by such events was tied

up with social inequality, market prices, and debt, among other things (Redclift 1984; Blaikie and Brookfield 1987; Peet and Watts 1996). This scholarship was based on broad-based political economy that often conflicted with prevailing wisdom in the developed world and global institutions such as the World Bank.[6]

Political ecologists asked why local people were repeatedly put at risk of natural disasters and found that they suffered from economic exploitation, lack of financial resources, and marginalization within national politics. Rather than blame nature, overpopulation, or peasant ignorance, political ecologists placed responsibility on ruling elites, the world market, and complicit governments and international institutions like the International Monetary Fund. Political ecologists offered sharp critiques of Malthusian population control, market liberalization as the road to prosperity, and introduction of advanced technologies of control, such as dams.

While political ecologists initially focused on developing countries, their attention has extended to include developed countries, including the United States (Schroeder 2005; McCarthy 2005a). Even geographers outside the domain of political ecology showed growing sophistication about the social origins of natural disasters (e.g., Hewitt 1983, 1997; Platt 1999; Colten 2005). A few environmental historians have drawn attention to social inequality, elite indifference, and natural hazards in the United States – notably Steinberg (2000) and Kelman (2003) – but the topic warrants greater attention.[7]

Agrarian systems

Agriculture is the single largest human land use across the globe, as well as the mainstay of the majority of the world's population until very recently. In analyzing the sources of poverty, risk, and environmental degradation around the world, political ecologists necessarily moved into agrarian studies, taking up questions of peasant livelihoods, dependent development, and transitions to capitalism in the global South. This led, in turn, to a more profound analysis of rural social relations and production that includes property arrangements, provision for common resources, and governance systems (Watts 1987; Peluso 1992) and then to agrarian systems and food supply at larger scales (Freidberg 2004).

Influenced by poststructuralism and feminism, political ecologists added further layers of complexity to their studies by taking in critical views of developmental discourses (Escobar 1995) and ideas of nature applied by states and global institutions (Neumann 1998). They also turned greater attention to gender relations and conflicts over land and rights (Rocheleau et al. 1996; Schroeder 1999), colonization and racial contestation (Cockburn and Hecht 1989; Moore et al. 2003), and popular struggles against exploitation and imposed development schemes (Bobrow-Strain 2007).

In recent years, geographers have applied agrarian studies to developed countries like Britain and the United States, which likewise possess unequal rural social orders, complex property systems, indebtedness and contract farming, and dysfunctional state policies. Geographers have examined chicken farming in North Carolina (Boyd and Watts 1997), Western grazing and the public lands (McCarthy 2002), hog farming in Iowa (Page 1993), and gathering rights in New Mexico's forests (Kosek 2006).

Among environmental historians, Worster (1979) is well known for taking a hard look at American farm practices, showing clearly the effects of markets, territorial expansion, and the environmental conditions on farming, as well as the ways that state institutions have shaped both. Nonetheless, Worster falls back on "culture" as the ultimate cause for the Dust Bowl, recapitulating the organicism of the old cultural geography and eschewing the hard conclusions of critical political economy. Stoll's (2002) work on nineteenth-century US agriculture touches on the big forces of Western expansion, sectionalism, and mechanization, but without rooting them deeply in capitalist dynamics. In their excellent studies of California agribusiness, Igler (2001) and Stoll (1998) are close in spirit to political economy, though neither goes as far as geographers covering the same terrain in theorizing the logics of class struggle (Mitchell 1996), finance (Henderson 1998), land and competition (Guthman 2004), or agrarian capitalism as a whole (Walker 2004).

Degradation and resource conflict

Another dimension of the exploitation of natural riches is how resource extraction has devastated the world's backcountry. This concern goes back to George Perkins Marsh (1864) – who had such modern avatars as geographer Sauer (1938a, 1938b) and near-geographer Mumford (1938), who in turn collaborated on a pathbreaking symposium on human sources of environmental change (Thomas 1956; cf. Simmons 1989). Geographers and environmental historians have been quite close in spirit on the subject of environmental disruption, and both rather unorthodox in terms of political orientation (whether liberal, center, or old left). Classics of the genre are Blaikie (1985), a study of the causes of soil erosion that helped launch the field of political ecology, and Worster (1979), which helped launch environmental history through an interrogation of the Dust Bowl. Similarly, one could compare the pioneering deforestation studies of geographer Williams (1989) and historians Tucker (1988) and McNeill (1992).

Environmental historians have gone on to produce some excellent studies of forests, fisheries, and rivers in North America (e.g., Langston 1985; Rajala 1998; Taylor 1999). Nevertheless, using a critical political economy, geographers have produced some of the most telling dissections of resource

economies, social orders, and human ecologies; exemplary studies are Sayre (2002), Braun (2002), Prudham (2005), and Kosek (2006). They provide a deft combination of the machinery of regional resource economics, the way class and race shape institutions and environmental perceptions, and the reasons why state agencies and actors are so deeply complicit in environmental degradation – without forgetting, to be sure, the ecological basis of the resource and the disputes over natural science implicit in all assessments of the natural order of things.

In addition, resistance, conflict, and violence resulting from competing resource uses and claims constitute explicit research topics for political ecologists. From Peluso's (1992) studies of Indonesia to Bobrow-Strain's (2007) analysis of Chiapas, political ecologists have explicitly tackled class and race conflicts, repression through violence, and popular struggles to regain control of land and resources (cf. Peet and Watts 1996; Peluso and Watts 2001; Moore et al. 2003). While environmental historians do address war, they tend to focus on its ecological consequences as opposed to its underpinnings in resource conflict (Tucker and Russell 2004). By following political ecologists' lead, environmental historians could shed more light on powerful social and political dynamics surrounding resource access, rights to land use, and environmental loss.[8]

For US environmental historians, such an approach might help to generate more understanding of the ordinary folk, following the lead of Jacoby (2001; cf. Olwig 1984).[9] Common people have resisted development, opposed pollution, and attempted to protect the air, water, and open spaces close to home; women, especially, have organized innumerable local fights against pollution, toxic dumps, and other assaults on their living spaces (Pulido 1996; Moore et al. 2003; Bullard 2005; Walker 2007). Environmental historians need to follow geographers and sociologists in keeping their ears close to the pavement and telling more stories of popular resistance and reform, in the manner of Hurley (1995).

Space, Place, and Scale

Geographers lay special claim to the spatial dimensions of human activity, arguing that space, place, and scale are critical tools for understanding human activity and its effect on the environment. "Space" refers to the relations among things (people, species, institutions) and places. Space is not an absolute position or distance, nor is it a container for activity. It is always relative (even to the earth), especially so as it relates to social interaction, social relations, and social significance. "Place" is a socially constituted, loosely bounded space and is embedded with social meanings. Place is more than the local and parochial, and it can occur at many scales. Both space and place are part of the way societies are structured. "Scale" refers to the different levels at which

human events unfold, not just the "size" of places such as local, regional, and national. The problem of scale is threefold: things occur at every scale, things at different scales interact constantly, and things jump scales all the time (by "things" we mean events, actions, institutions, etc.). Keeping one's analytic eye jumping from scale to scale is no mean feat.

The three-cornered problem of space, place, and scale has generated a flurry of theorization among geographers because there is no easy way to think about how the social world operates in many different places at the same time, how places interact in larger wholes, and how various systems function at multiple scales. Classic geography, in fact, took many wrong turns in its approaches to spatiality, leaving geographers of the last generation to undo the damage (e.g., Soja 1989; Massey 1994, 2005; Harvey 1997; Cresswell 2004; Sheppard and McMaster 2004; Sayre 2005). What they have made clear is that space is not a simple concept in social theory, any more than in physics. While some environmental historians have come to recognize the importance of these ideas, the field as a whole would to well to give greater consideration to this triad.

Space, place, and difference

Despite their attention to place-based histories, American environmental historians often overlook the meaningful differences between parts of the country – urban and rural, east and west, north and south. Too few recognize the degree to which region and place have shaped environmental values and politics, despite the notable example of Hays (1987). For example, New England, New York, and California played leading roles in promoting conservation in the Progressive era, as illustrated by the creation of such pioneering organizations as the Appalachian Hiking Club, the Audubon Society, and the Sierra Club, as well as conservation spaces such as the Boston metropolitan park system, the Adirondack Forest Reserve, and Yosemite and Sequoia National Parks (Walker 2007).

To the extent that environmental histories tackle local difference, it is likely to be ecologically based, even in social-cultural analyses such as Taylor's (1999). In this respect, environmental historians are recapitulating geographers' early focus on the natural region (e.g., Semple 1911; Sauer 1925; cf. Livingstone 1993). What today's geographers offer is greater attention to the political-economic logic of local difference. Geographers consider how localized power politics and systems of economic production affect logics of environmental change through resource extraction, agrarian production, urbanization, land conservation, and the like. Good examples of this approach are the work of McCarthy (2002) and Sayre (2002) on Western ranching and land rights or Henderson (1998) and Walker (2004) on California agribusiness.

Geographers further understand local places as cauldrons of political action and key loci of environmental and land use regulation in a federal system such as that of the United States. Local and state governments implement place-based ideas about a range of policies affecting the environment, including tax, infrastructure, and land use policy. California, for instance, has imposed the most stringent air pollution laws and Oregon boasts a history of strong state land use controls (Pincetl 1999). In contrast, Colorado largely abandoned comprehensive land use controls and Florida sacrificed its wetland wealth to sugar barons and land developers (Hollander 2008). Environmental historians might pause to consider why this degree of divergence has occurred in environmental policy. It is too often treated as a random effect of localized politics than the outcome of profound regional differences in outlook, organization, and power politics (Thomas 2009).

Thinking in scale

A common way of approaching large-scale human-environment interactions is to consider the demands cities place on resource hinterlands – a classic theme in geography. The idea dates back to Von Thünen (1826), who showed how economic rents shaped the countryside around market centers. Twentieth-century scholars took a harder line on the way cities exploited rural areas, drawing vast natural resources out of the countryside (Innis 1933; Baran 1957; Mumford 1938, 1970).[10] This theme continues in the works of recent geographers (Walker and Williams 1982; Brechin 1999; Gandy 2002; Swyngedouw 2004; cf. Kaika 2005; Heynen et al. 2006). Environmental historians of a geographical bent have done some of the most brilliant work addressing urban exploitation of hinterland resources (e.g., Cronon 1991; Robbins 1994; Elkind 1998). Yet the latter accounts could be strengthened by employing a more robust political economy (Page 1998). For example, Cronon does not move beyond a circulationist model to grasp the force of agro-industrialization across city and countryside in the nineteenth century (Page and Walker 1991; Walker 2004). Robbins takes a trenchant view of regional exploitation, but employs an internal colony model that lacks a sufficient theory of capitalist development in the West (Walker 2001). And both are insufficiently attentive to class power expressed at various scales, from the city to the world (Brechin 1999; Harvey 2003).

Looking beyond national scales to global hinterlands can also improve one's understanding of resource consumption and the way developed countries shape resource extraction, land use, and environmental quality across the world. The fingerprints of city dwellers are all over the global countryside, in resource pipelines, food systems, and tourist resorts. It is well known

that resource consumption in developed countries is a dominant force shaping the global countryside (Tucker 2000; Dorling et al. 2008). This involves high levels of personal consumption by the world's richest people, production systems that devour resources by the barrel-full, and globetrotting tourists tramping across the last beaches and forests. Geographers have been at the forefront of studies of the worldwide spread of consumer culture (Domosh 2006), global industrialization (Dicken 2007; Chari 2004), globe-straddling resource corporations (Bradbury 1984; Bridge 1999, 2008), international tourism (McAfee 1999), and global food systems (Wrigley and Lowe 1996).[11]

As environmental history has become a global endeavor, it has often drawn on geography and political ecology. It is tricky business to disentangle the intellectual roots of global environmental history, but it is worth noting the number of geographic contributions. Geographer Michael Watts (1983) set the stage for environmental histories of Africa by both geographers (Fairhead and Leach 1996, 2003) and historians (Beinart and Coates 1995; Beinart 2003). Latin American environmental history not only traces its origins to Sauer (1966), but has been greatly advanced by the work of modern geographers such as Watts (1987) and Brannstrom (2004), as well as historians such as Melville (1994). Geographer Suzanna Hecht (Cockburn and Hecht 1989) opened up Amazonian environmental history even before Dean (1995) and Raffles (2002). Geographer Richard Grove (1995, 1997) led the way not only in Caribbean environmental history, but also in the broad project of reconsidering the origins of modern conservation in tropical colonies. The environmental history of India has both been influenced by political ecology (e.g., Gadgil and Guha 1993; Gadgil 2001) and advanced by such geographers as Rangan (2001) and near-geographers as Rajan (2006).[12]

Moving to the global scale has naturally prompted efforts to write worldwide environmental histories. The field has boomed since the pathbreaking work of historians such as Crosby (1972, 1986), Ponting (1991), Guha (2000), Hughes (2002), and McNeill (2000). Geographers have been in the mix as well, including Turner et al. (1990), Grove (1995), Redclift (2006; Benton and Redclift 1994), and Williams (2003). Nonetheless, such sweeping geo-histories, while providing a large-scale temporal and spatial perspective on environmental change, are subject to certain pitfalls of jumping across scales. One is the additive fallacy, in which assembling many local case studies substitutes for deeper analysis of the common forces (or differences) behind similar effects (e.g., Diamond 2005). Another problematic move is to jump over intermediate scales, larger than the usual national narratives of environmental history, such as the Atlantic economy, the Indian Ocean, or sub-Saharan Africa (Rangan and Kull 2009). A third failure is to fall back onto environmental determinism of a subtle kind, as in the "large continent-strong species" theory of Crosby (1986) (cf. Diamond 1997).[13]

Geographic expansion and frontiers

One of the crucial dimensions of political economy is the geographic expansion of the capitalist system around the world (Harvey 2003). While the ideology of the frontier in American history has made many historians allergic to the concept, the frontier has returned in global studies, including global environmental history. The European world system had a frontier dimension, for example, from the early trading enclaves to the expanding slavery of the New World and the spread of white settler colonies thereafter (McNeill 1983). Equally is it clear that today's capitalism is expanding into new frontiers, from China to India (Cartier 2001; Johnston et al. 2002; Chari 2004) – and even within the United States (Hollander 2008).

Grasping the nettle of the global frontier requires serious engagement with such topics as war and conquest, race and slavery, states and development, and the spatial dynamics of capital accumulation. In these respects, geography – inflected by political economy – offers some guidelines for environmental historians. We can point to three examples of how geographers are advancing the field of environmental studies in these regards. The first is Moore's (2003, 2006, 2007) sophisticated model of early modern expansion from Europe, combining economy, geography, and ecology. In Moore's model, the rise of mercantile capitalism rapidly expands the commodity frontier; the search for resources, such as silver, sugar, and timber, leads to intensive exploitation of new regions; and extraction and processing result in severe ecological degradation that forces a shift to new frontiers. A second example is Harvey's (2003) reframing of primitive accumulation, or the subsumption of nature by private property and profit-making, as an ongoing process of "accumulation by dispossession." A third example of innovative thinking is Bridge's (2001, 2008) explorations of the frontier of resource extraction in terms of global production networks entangled with various states.

Another topic we all need to engage is the critical relation of the global periphery to the center of the Euro-American system. On the one hand, the metropolitan centers maintain staggering leads in wealth, technology, and military force. Out of these centers have come so much surplus capital, innovation, and warfare that one might be forgiven for thinking that the peripheries are damned to eternal marginality, poverty, and futility. Nonetheless, the fixed view of the center will not hold. Critiques have come from several directions: that surpluses from Caribbean slavery were decisive in propelling Europe to the top (Blackburn 1997), that the age of revolution and birth of the modern state reverberated between Europe and the Americas (Anderson 1983), or that new industrial spaces can leapfrog over old centers of production (Scott 1988). Global environmental history can add to this geographical dialectic between Europe and its colonies, as with the evolution of modern conservation forestry (Grove 1997; Rajan 2006) or scientific discovery in the

age of botanical and fossil collection (Brockway 2002; Schiebinger 2004). One could make similar arguments about center and periphery in other historic centers of power in the world, such as China and India, but the European system overwhelmed others in importance from 1500 onward.

Conclusion

Our survey of environmental history should be taken in a spirit of collegiality and constructive criticism. We firmly believe that there is nothing to be gained from academic rivalry and one-upmanship between geographers and environmental historians – to the extent that one can even sort the two out in a clear-cut way. After all, the unpleasant reality that hangs over us all is our shared marginality within the academy. Until recently, the two disciplines have had a similar, subsidiary place: environmental history as a small subdiscipline of history and geography as a minor discipline within the academic order of the United States.[14]

Yet both geography and environmental history have made great strides over the past quarter-century. Environmental history has created a substantial niche within history, just as geography has gained new prominence. In fact, what at one point contributed to the marginalization of the fields – their attention to nature – has been a key factor in their rise to grace in recent years. The environment and the wider compass of "nature and culture" are hot topics today, when the human impact on the earth is so massive that earth scientists have relabeled the present age from the Holocene to the Anthropocene. Within this new climate, the interdisciplinarity of both fields, particularly their ability to engage the physical and natural sciences, has proved a boon.

Nonetheless, the explosion of interest in environmental questions can be a mixed blessing. While the expansion of environmental studies programs of various sorts around the world is to be welcomed, there are three dangers to the kind of enterprise human geographers and environmental historians are engaged in. The first is the enormous bias in the contemporary university and popular ideology toward environmental *sciences*, with the view that disruptions in nature are to be handled by further scientific insights and technological fixes – despite the fact that both science and technology are heavily implicated in the excesses of human exploitation of the earth. A second danger is the inevitable bias toward the immediate and the practical, as in environmental *policy studies*. Not that there's anything wrong with good policy formulation, but it cannot just be a matter of quick assessment of environmental impacts and proposals for moderate changes in this or that state regulation; the sources of our environmental maledictions are too profound for that, and only serious history and social science can bring them to light.

The third challenge to our mutual enterprise is simply reinvention of the wheel, with bigger disciplines elbowing their way to the head of the table.

In order to stay at the forefront of environmental studies, geography and environmental history must continue to engage in dialogue, learn from each other, and offer each other support of the practical, as well as intellectual, kind. This is the kind of pragmatics rarely discussed in polite academic conversation, but is the necessary infrastructure for carrying on into the future – one that ought to be bright, considering our achievements thus far.

NOTES

1 Many thanks to Nathan Sayre, Michael Watts, and Jake Kosek for comments and criticisms.
2 A rural bias characterized geography for much of its early history, starting with European geographers in the nineteenth century (Livingstone 1993) and continuing in the United States with the work of Semple (1911), Sauer (1925, 1963), and Hartshorne (1939). Geography, however, underwent a profound change (and schism) in the postwar era (Peet 1998).
3 Mike Davis is, strictly speaking, of no disciplinary lineage, but most often calls upon geography as his spiritual home. Matt Klingle, it should be said, was a geography major at Berkeley before gaining his doctorate in history at the University of Washington. The frequency with which geography and environmental history claim the same scholars is further evidence of how close the two disciplines can be.
4 Pincetl's doctorate is in urban planning at UCLA, but her connections to geography run deep. Greg Hise had two geographers as dissertation advisors at Berkeley; he presently holds the urban history post formerly occupied by the late Hal Rothman. Peter Hall's degrees were in geography, even though he is often seen as a planner and planning historian today.
5 In part, political ecologists reacted to a generation of work on natural events, such as those by Gilbert White, Robert Kates, and Ian Burton, who looked at false perceptions of extreme natural events.
6 This group was deeply influenced by ecological anthropology, especially the work of Wolf (1982), and by the revival of Marxism in the 1970s.
7 And Steinberg acknowledges his debt to geographers, particularly Kenneth Hewitt.
8 Peluso is not, strictly speaking, a geographer, but works closely with the geographers at Berkeley from her post in the Society and Environment Program in the College of Natural Resources.
9 The main exception to this is attention to Native Americans (White 1980; Spence 1998).
10 For more neutral accounts of urban resource supply, see Blake (1956) and Wolman (1965).
11 The changing scale of environmental regulation also merits greater attention among environmental historians. Geographers have examined the perverse effects of the neoliberal era on environmental controls internationally (McCarthy 2005b).
12 Both spent time in geography at Berkeley. Thanks to Michael Watts for helping to educate us on this literature.

13 Crosby's earlier work (1972) was better on this score. Diamond is trained as a biologist, but has a joint appointment in geography at UCLA.
14 In Britain or Canada, by contrast, geography occupies a more prominent position. On some of the reasons for American geography's marginalization, see Smith (2003).

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Chapter Twenty-nine

The Northeastern Pacific Basin: An Environmental Approach to Seascapes and Littoral Places

David Igler

Where are the geographic boundaries of the northeastern Pacific Basin? To the extent it exists as a region, it does so primarily for those of us who consider seascapes a viable and useful counterpart to studies of landed space. And if it exists as a region, it should signify more than simply the coastlines and oceanic expanse between North America's westernmost states of California, Oregon, Washington, British Columbia, Alaska, and the Hawaiian Islands. This region has a history, or more accurately, many histories that elucidate what historian Rainer Buschmann (2004) calls "aquacentric notions" of the past. One part of that history lies in an environmental approach to the ocean: the ocean's tremendous ecological diversity, various cultural mappings of its space, and the increasing human imprint on its natural systems. These and many other considerations allow us to begin conceptualizing the northeastern Pacific Basin – a region at once quite amorphous but also delineated by geology.

Environmental historians who ignore geology do so at some risk, and those risks may be great when examining the northeastern Pacific Basin. First consider the ocean as a whole in terms of geological boundaries. The Pacific Ocean is encircled by the ominous-sounding "Ring of Fire" – a volcanic and seismic oval including a majority of the earth's active and dormant volcanoes, converging and diverging tectonic plates, and stationary "hotspots" funneling up from the earth's fiery core (Kious and Tilling 1996). All of these sources of energy amount to some very active geology surrounding and demarcating the earth's largest ocean. Now consider one subset of the whole by focusing on the geological boundaries of the northeastern Pacific Basin. Moving counterclockwise from southern California, the tumultuous San Andreas Fault runs north to the Cascadia subduction zone in British Columbia, which intersects with the Explorer Ridge tectonic plate and 57 volcanoes along the Aleutian Islands. Turning south and continuing deep

under the icy North Pacific Ocean, the Aleutians connect with the long-dormant Emperor Seamount chain that extends to the Hawaiian Ridge of volcanic islands. The Hawaiian hotspot gave birth to the 3,600 mile Emperor-Hawaiian chain of active and dormant volcanoes about 70 million years ago. Travel some 2,500 miles northeast along the seabed's Molokai fracture zone and you arrive back in southern California – having circumnavigated the northeastern Pacific's volatile boundaries.

Geology and seismic activity offer one way to understand this region's borders and its deep history. The geologist James Dwight Dana came fairly close to this approach more than 150 years ago. One of seven "Scientifics" aboard the 1838–42 US Exploring Expedition, Dana guessed the existence of the Hawaiian-Emperor Seamount chain (including its age and range), made a prescient conjecture about a possible Hawaiian hotspot (Dana called it a "central conduit"), and referred to the volcanic/tectonic action along the North American coastline as one portion of a "grand volcanic border" surrounding the entire ocean. "It is a fact of no little interest that the Pacific Ocean should thus be nearly encircled with volcanoes, active or extinct," Dana wrote regarding the Pacific's creation (1847: 398). His "discoveries" entailed some hefty guesswork and keen observation for a man with only marginal training in volcanology. Walking from the Columbia River to San Francisco Bay in the summer of 1841, Dana had more than enough time to ponder the 10,000-mile arc delineating the northeastern Pacific – and he was certainly the first naturalist to consider the many hidden connections among Pacific islands, continental edges, and the oceanic space between them (Natland 1997).

A focus on waterscapes may seem counterintuitive to some environmental historians, given the field's tendency to frame history by and about the land. Nations, regions, and localities – the "places" we typically analyze – have fixed borders enclosing terra firma, and we examine that terra as well as human perceptions of it. We have far less experience writing about oceanic space because, as historian Karen Wigen contends, "on the mental maps of most scholars, oceans are oddly occluded" (Bentley et al. 2007: 1). This is true, in part, because we imagine the oceans as a flight *from* history and humanity. Therefore, a history of the North American Far West – including California, Oregon, Washington, British Columbia, Alaska, and Hawaii – makes good sense to historians interested in Western affairs, but what if that history focused more on the ocean than the land? And what if we called it *eastern* (Pacific) rather than *western* (North America) history? How would we approach such a regional history, especially as environmental history, and especially for the late eighteenth to late nineteenth centuries?

I'd like to offer four areas of focus for this region – in part to explore its environmental history, and in part to conceptualize the broader project of historicizing seascapes (a project relevant to all the world's oceans, not only the Pacific). First is the ocean itself, or more specifically, characteristics of the Pacific Ocean that hold meaning for human understandings and interactions

with it. Second is the significance of islands: an obvious approach for the western Pacific (given its multitude of islands and island inhabitants), but also vital for the less-islanded eastern Pacific. Third is the concept of the littoral: those coastal zones where water meets land, ecologically and socially rich areas that in many ways define the very notion of an environmental history of the northeast Pacific Basin. The final focus is the stunning assault on marine resources: well known in our own day because of recent declines in worldwide fisheries, but also a central fact during the nineteenth century.

While some historians might periodize this region through the convenient markers of statehood or formal annexation by imperial nations (the United States, England, Spain, and Russia), such benchmarks hold only marginal value for environmental history or the goal of historicizing oceanic space. Instead – and with an eye toward ecological change and human agency – John McNeill has suggested the "pace of Pacific environmental history has been governed primarily by the spurts and lulls in human transport and communication throughout the ocean" (1994: 300). He offers three periods of change through the "ages" of the outrigger, the sailing ship, and the steamship. (We might add a late twentieth-century "age" of the nuclear powered submarine to acknowledge the ecological destruction wrought by atomic testing on western Pacific islands.) These phases correctly highlight technology as a harbinger of ecological change, and they also emphasize the increasing scale of "cross-cultural interactions" that profoundly impacted indigenous populations (Bentley 1996; Manning 1996; Igler 2004). For our purposes, the significance of each period rests on the scale and scope of environmental and cultural transformations brought about by various exchanges (trade, human and non-human migration, disease).

The period from the late eighteenth to late nineteenth centuries was marked in human terms by indigenous-outsider encounters and interactions, trade in material and biological goods, and increasing connections around the northeastern Pacific. Such activities held sudden and enduring consequences for marine and littoral communities (both human and non-human). Equally important for this time period, a series of watershed events concentrated global forces in the region, including colonizations and conquests, the oceanic fur trade and great whale hunt, and globally important mineral rushes in California and British Columbia. Ecological change went hand in hand with shifting geographic nomenclature: by the late nineteenth century this eastern Pacific region became reconstituted as the American Far West.

The Ocean

The northeastern Pacific Basin constitutes one part of a larger ocean complex and therefore its environmental history must begin with that broader ocean world. A tremendously large body of water, the Pacific covers approximately 64,000,000 square miles or one-third of the earth's surface.

It measures 12,000 miles across at its widest point and stretches from the Arctic to the Southern Ocean (D'Arcy 1998). The earth's landforms pale by comparison in size: Pangaea, or all of today's seven continents clumped together, fit comfortably within the Pacific's boundaries. Though overwhelmingly water, the Pacific also contains somewhere in the neighborhood of 25,000 islands and a vast majority of the world's populated islands. It remains a "sea of islands," Epeli Hau'ofa writes, filled with "ocean people" who viewed the surrounding waters as navigable and spiritual terrain rather than forbidding boundaries (Hau'ofa 2008: 31). True in Hau'ofa's birthplace island of Papua New Guinea, this perspective would make equal sense to California's coastal Chumash on the Channel Islands or other island people of the northeastern Pacific (Kennett 2005).

Consider two events that illustrate the Pacific's size as well as the connectedness between its northeastern quadrant and the whole ocean. In August 1964, NASA launched the first stationary satellite, Syncom 3, in order to telecast the Summer Olympics in Tokyo to viewers in the United States. Those images crossed the entire Pacific Ocean in something approximating "real" time, introducing American viewers to the concept of "live" television. Another use for stationary satellites is their ability to photograph the earth from any point in their orbits. When positioned at the equator and midpoint across the Pacific, the resulting satellite image of the entire earth's surface shows one massive ocean fringed by a few continental edges (Ward 1989). From this (admittedly eccentric) perspective – which you can try at home with Google Earth – we might conclude that the northeastern Pacific's watery expanse is actually the earth's norm rather than the exception for the known world. Now move backward in time to 1778, the year Captain James Cook's HMS *Resolution* explored the northeastern Pacific's frigid coastline before returning to the tropical island paradise of Hawaii. Cook and his crew had traversed that ocean for more than two years and to them it must have felt like the known world, given how much time they'd spent surrounded by water. Fortunately for Cook, he had no need for satellite communication to direct him back to Hawaii because his two ships carried the recently invented "clock machines" or "watches" (chronometers) that allowed fairly precise readings of longitude (Igler 2005). Hawaii is a needle in a haystack, but Cook's "watches" told him where to find that needle. Unfortunately for Cook, those chronometers failed to instruct him how to properly behave in Kealakekua Bay, and his blunders there cost him his life. The news of Cook's death soon reached communities from Tahiti in the South Seas to Nootka Sound in the northeastern Pacific (Sahlins 1981; Thomas 2003). Thus, the Pacific's tremendous size did not prevent the spread of information, even two centuries before Syncom 3's capacity for live broadcasting.

Both examples emphasize the ocean's size and interconnectedness. From outer space we see almost exclusively a watery globe. From the *Resolution*'s main deck crew members also looked out upon a watery globe, barring

those times the ship neared land. The perspective from the *Resolution* (and other vessels) allows a closer view of other oceanic characteristics and how seagoing people interacted with this environment. Some environmental characteristics were quite predictable. Pacific trade winds and currents, for instance, turned in a great clockwise "gyre" north of the equator that favored certain travel routes (Iida 2002). In 1804 William Shaler's *Lelia Byrd* had little trouble crossing the Pacific from Japan to the Columbia River, skirting down the coast to Baja California, and shooting west to Hawaii. The North Pacific Current and the North Equatorial Current (two parts of the same gyre) all but predicted his speedy passage, while a booming sea otter trade allowed Shaler a profitable cargo of the northeastern Pacific's sleekest furs (Shaler 1808). Shaler's greatest danger was another environmental constant of the eastern Pacific: the predictably dense marine layer blanketing the well-traveled coast from San Francisco to Nootka Sound. Shaler safely avoided running aground, but countless voyagers were not so lucky. The clipper ship *Frolic*, an opium trade vessel from China that hurried across the Pacific in 1850 to cash in on the Gold Rush, ended up like so many other ships that failed to pause outside the marine layer – dashed upon the treacherous shoreline of northern California (Layton 1997).

Diverse scholarship in history, geography, anthropology, archeology, and the natural sciences contributes to an environmental analysis of the ocean. The unique ecological status of islands animates recent works by historian John McNeill and anthropologist Patrick Kirch, both of whom emphasize the "privileged niche" of island isolation as well as the radical changes brought about by human and ecological invasion (McNeill 1994; Kirch 1997: 1). The ocean, once an obstacle to invasive species, became a vehicle for island change as technological advances accelerated human transport. Climatic variability offers another approach to environmental change and conditions in the ocean. Climate change – clearly of utmost importance today – has a long record of subtle and catastrophic impacts on Pacific marine species, coastal environments, and littoral societies (Biondi et al. 2001; Spriggs 1997). For instance, today's fear of a rising sea level has historical precedent in the Little Climatic Optimum (AD 750–1300), when sea levels rose, and the Little Ice Age (AD 1300–1800), when sea levels fell. Both periods led to changes in resource use and social relations for Pacific islanders and mainlanders alike (Nunn and Britton 2001). A final and unavoidable focus for the Pacific's environment is the ocean-atmospheric interaction known as El Niño/Southern Oscillation (ENSO). This recurrent warming of the tropical Pacific most directly affects sea life and communities in the southern hemisphere, but ENSO's tremendous power frequently reverberates throughout the northeastern Pacific as well (Enfield 2002; Taylor 1998). A boon to the cult of big wave surfing, ENSO occurrences also show how the ocean's environment directly impacts terrestrial environments from Hawaii to southern California and beyond (Davis 1998).

The emphasis on culture in environmental history, especially in relation to human constructions of landed space, suggests that oceanic space should undergo similar analysis. Source material abounds for the late eighteenth to late nineteenth centuries, a period during which indigenous relationships to the sea experienced severe trial and European explorers and traders penned voyage accounts *ad nauseam*. The pre-contact "aquacentric" cultures of numerous indigenous societies – including some Hawaiians, Aleuts, Nuu-chah-nulth, Makah, and coastal Chumash – remained highly significant aspects of cultural identity and subsistence despite the devastating results of foreign disease introductions, colonization, and trade (Stannard 1989; Clayton 2000; Arnold 2001; Igler 2004). On the other hand, European and American voyagers viewed the ocean as an enigma to be solved and ultimately rationalized. How to traverse its gaping space? Where to seek its concealed passageways? How to profit from its novel species? How to claim its coastlines given the territorial assertions of other nations? These foreigners explored, mapped, and sounded the ocean for their own cultural and utilitarian ends. To some native groups they seemed like meandering apparitions on the seas. One Quileute elder on the northwest coast called them "ho'kwat" – meaning wanderers without souls (Owens 2001: 69).

Islands

In an ocean dotted with 80 percent of the world's islands, the northeastern Pacific Basin appears to have few islands – that is, until one closely examines the upper continental shoreline or ponders the significance of the Hawaiian chain. Even in places where only a few coastal islands appear, such as southern California or the Baja Peninsula, those islands (the Channel Islands, Isla Guadalupe) provide important benchmarks for the region's environmental history of human habitation and resource exploitation. Move up the coast to Vancouver Island or the long coastline of Alaska and suddenly an island world appears – well or sparsely populated, continental or oceanic islands, rising or imploding from volcanic eruption. This coastline is an intricate patchwork of islands. On a map they resemble shards of glass dangling from a shattered mirror.

While indigenous residents considered their islands home and frequently the very site of creation itself, outside voyagers viewed them as tropical island paradises or (in the colder climes) welcomed outposts of trade and provisions. Naturalists viewed them in a different light: to people like James Dwight Dana the islands provided unique opportunities for scientific classification and speculation. Dana marveled at the variety of islands right down to the smallest coral reef. "These coral islands are truly fairy spots in the ocean," Dana wrote from Tahiti in September 1839, describing his joy for island research (Gilman 1899: 110). Each one was entirely unique, and

yet at the same time their relationships to one another hinted at patterns and systems for categorization. Dana knew some basic differences, such as the distinction between continental islands and oceanic islands. The former rest on a continental shelf generally not too distant from a continent, while the latter rise from the ocean floor through geological action and breaks through the waves "like a gasping whale," muses science writer David Quammen (1996: 53). The former interested Dana, but the latter truly fascinated him. Oceanic islands showed the geological process of creation itself, which in Dana's evangelical mind translated to Divine inspiration. And oceanic islands had coral reefs and volcanoes, both of which Dana found utterly sublime.

Dana's theories regarding the Hawaiian Islands allow us to consider the *longue durée* of an ocean's environmental history as well as the increasing connectedness of the northeastern Pacific. Dana expressed a feeling of "indescribable sublimity" as he stood at the rim of the Big Island's Kilauea volcano in November 1840. He expressed "surprise at the stillness of the scene. The incessant motion in the blood-red pools was like that of a cauldron in constant ebullition" (1849: 172). Dana was clearly in the midst of an Emersonian moment as he observed Kilauea's violent and creative potential, but he was also in the process of some serious theorizing about the age of this volcanic chain, its geographic spread across the ocean floor, and the connections between all Pacific volcanoes. He had already studied volcanoes in Tahiti and Fiji, and following his brief researches in Hawaii, Dana would examine active and dormant ones in the Pacific Northwest and California. He would soon conclude that a "grand volcanic border" surrounded the Pacific Ocean and that the Hawaiian chain held "the key to Polynesian Geology" – a "key" in the sense of solving the riddle of how islands emerged from the sea, the arrangement of island chains, and the geological difference between the ocean floor and the surrounding continents (1847: 398; 1849: 156).

Dana's work (of which this is only a brief glimpse) lays some important groundwork for thinking about the region's environmental history. He was deeply concerned with change over time: Dana theorized how islands came into creation, how a continental coastline was formed, and what a "hotspot" suggests about the earth's core. These processes cast him backward in time to creation itself and forward in time to his present surroundings. Indeed, he searched the human timescale to support his geological theories. He studied the erosion process in Tahiti, Hawaii, and the American coast, and soon concluded that erosion was the primary natural force sculpting most landforms. Our environmental histories today might benefit from this longitudinal perspective linking the "recent" to the deep, deep past.

The islands of the northeastern Pacific functioned as early staging grounds for broader ecological and social changes on the continent's western edge in the fairly recent past. Pre-contact Hawaii, for instance, had a startlingly high proportion of endemic species (possibly as high as 99 percent). By 1800 Hawaii no longer existed in "splendid isolation" but instead had its complement

of introduced plants, animals, infectious diseases, and humans that busily crowded in on those endemic populations (McNeill 1994: 340). North America's coastal islands from Baja California to the Aleutians had far less ecological diversity or isolation than Hawaii. However, these coastal islands held distinction for their unique positions in the maritime fur trade. European and American freelancers contracted or coerced native hunters to participate in the great hunt for "soft gold" on coastal islands – and as we'll see below, they were remarkably successful in the wholesale slaughter of seals, sea otters, whales, and other sea creatures (Vaughan and Holm 1982). The crucial and often overlooked point is that the land-based fur trade in beaver (and the like) had its counterpart with the island-based maritime trade – even the smallest islands, such as the Farallones outside San Francisco Bay, hosted groups of hunters who devastated certain marine populations (Ogden 1941).

The "island world" concept, so vital to the field of Pacific studies, may not entirely translate to the northeastern Pacific. But the sustained study of islands throughout this region would nonetheless make excellent grist for ocean-focused environmental historians. Richard White's first book, *Land Use, Environment, and Social Change* (1980), examined Island County, Washington, in a marvelously longitudinal fashion. New studies might benefit from a comparative approach to coastal islands and the ecological stories they have to tell, especially about their relationships to the Pacific on one side and the North American continent on the other. In this regard we might do well to follow in the footsteps of James Dwight Dana, Charles Darwin, and other nineteenth-century naturalists who found inspiration in Pacific islands.

The Littoral

The littoral may be the most useful and important concept of all, in large part because the northeastern Pacific Basin as defined here focuses on the oceanic connections between different coastal geographies. "Littoral" comes from the Latin *litus*, meaning shore. In modern usage the littoral typically denotes a coastal zone, extending from the high water mark to the tidal area that is permanently submerged. Geographer Philip Steinberg extends the zone a bit further into the sea, distinguishing between "land-like territorial waters" as part of the littoral in contrast to "non-territorial deep sea" (2001: 139). Echoing Fernand Braudel's work on Mediterranean coastal cultures, historian Michael Pearson employs the littoral in reference to "a symbiosis between land and sea" rather than a border or boundary between land and sea (2006: 357). The littoral is permeable as well as historical; it is shaped by the ocean, by terrestrial forces, and by human manipulation of both. Pearson further argues that littoral societies around the world "have more in common with other littoral societies than they do with their inland neighbors" (353). Littoral societies include fisherfolk, maritime traders, and odd

mixtures of populations gathered from different seaports and islands. The littoral, we might conclude, is more of a space than a place – a space across which resources and people move, and a space in which a great deal of history has taken place.

The littoral environment is decidedly relevant to the northeastern Pacific, given the extensive coastlines and dynamic history of human habitation. The proto- and pre-historic record reveals vibrant coastal societies whose subsistence and cultural identities owed themselves to the littoral environment. The Ohlone of Monterey and San Francisco bays typify many groups along the Pacific coast who were "almost amphibious": as fisherfolk they plied the tidelands and bays for food, as traders they exchanged items with coastal people from the north and south, and as bayside residents they constructed their homes from the littoral flora (Margolin 1978). Other native groups ventured much further across the littoral for their sustenance and trade items. The whale-hunting Makah, for instance, fashioned a "maritime world" from their villages on the Pacific coast and the Strait of Juan de Fuca (Reid 2008). Indigenous Hawaiians went island to island for their commerce and livelihood, exploiting and crossing the littoral for many purposes. For all of these groups, the littoral existed as a multifunctional space: a site of production and subsistence, cultural identity, and a territorial borderland.

Much like this pre-contact period, the littoral remained the active mart and point of cultural encounter during the late eighteenth to mid-nineteenth-century period. Land-based histories tend to elide this dynamism because they concentrate on inland towns and villages while ignoring coastal interactions. Consider the range of activities – and their environmental meanings – that transpired on the northeastern Pacific Basin littoral: the trading of foodstuffs, furs, iron objects, and livestock; the hunting/fishing of innumerable marine species that provided sustenance and trade items; the exchange of natural, geographic, and ethnographic knowledge between natives and outsiders; the mixing of outsider and indigenous populations; and the deadly transmission of biological goods that devastated indigenous communities. These and many other activities took place in the littoral zone. They took place on the decks of anchored maritime vessels, in native canoes, on the beach, and in beachside villages. Indeed, the littoral represented a space that compressed geography and intensified social interactions: goods and resources traveled far to the littoral for exchange, and people from distinct worlds encountered one another with equal amounts of keen interest and brute force. The littoral was a space unto itself during the period of contact and exchange from the late 1700s to the mid-1800s.

Alta California provides one example of a littoral-centered commerce and environmental interactions during this period. At least 953 vessels voyaged to Alta California between 1786 and 1848, making it the second most visited part (after Hawaii) of the northeastern Pacific (Ogden 1941; Igler 2004). These voyages ranged from short coastal runs to voyages "round the world."

Prior to the 1830s a majority of the vessels never entered any California port because of Spanish trade restrictions that severely circumscribed trade with foreign powers (Weber 1992; Hackel 2005). Instead, they trafficked along California's littoral and continued this form of coastal trade elsewhere in the northeastern Pacific. Knowledge of the coastline proved crucial for commercial success: "At present," wrote the American trader William Shaler in 1808, "a person acquainted with the coast may always procure abundant supplies and provisions" (1808: 153). Shaler traded with Indians and Spanish settlers alike on the beach as well as from the deck of his ship, the *Lelia Byrd*. The ecological dimension of the trade is fairly self-evident. European and American privateers bartered for a wide range of natural resources and marine or terrestrial species; meanwhile, they also passed deadly pathogens across the littoral to indigenous peoples, and quite consciously promoted their own ideas of economic acquisitiveness among Indians and settlers – propelling ever more harvesting of certain species. Shaler prophesized the region's future based on this market activity: "under a good government the Californias [will] soon rise to ease and affluence" (1808: 153). That "rise" took place in the late 1840s not only through a "good government" (an American one) but also by the wholesale exploitation of the inland and coastal natural environment (Isenberg 2006).

How can our environmental histories benefit from a critical examination of the littoral? The northeastern Pacific Basin offers a few lessons. First, it suggests that global forces of ecological change along the lines of the "Columbian exchange" (or in the Pacific, the "Magellan" or "Polynesian" exchange) initially transpired where ship met shore. The northeastern Pacific provides ample evidence of these incipient ecological revolutions because maritime trade on the littoral – rather than settler populations moving inland – served as the "shock troops" of ecological change (Crosby 1986). Second, littoral environments constitute some of the most altered ecosystems in the world, especially when we consider coastal bays and estuaries, wetlands, and rivers flowing into the ocean. The littoral provides a vital buffer between water and land; alter that buffer and both spaces experience radically changed conditions. Finally, studying the littoral forces us to look out toward the ocean rather than only observing land-based environmental stories. It is there that future environmental historians – like the ancestral peoples of the Pacific – might find a usable past to illuminate our present surroundings.

The Killing Grounds

The twentieth century witnessed an unprecedented assault on the world's ocean fisheries: according to one source, people harvested more marine life in the twentieth century "than in all previous centuries combined" (McNeill 2000: 246). Increasing human populations, their related food demands,

and technological advances certainly account for this stunning consumption of marine species. Despite the global impact of the mass harvest in the 1900s, it is nonetheless significant to recognize previous patterns of fishing and hunting that targeted specific marine populations in particular regions. In the northeastern Pacific Ocean, the late eighteenth to late nineteenth centuries saw a comprehensive assault on ocean mammals and other fur-bearing animals.

The North Pacific sea otter provides but one telling example. The habitat of sea otters ranged from the Kamchatka Peninsula to the Aleutian Islands to the coast of Baja California – well over 8,000 miles of coastline inhabited by countless sea otters in the late 1700s, when Russian, British, American, and Spanish traders converged in the northeastern Pacific for the great hunt (Ogden 1941; Ravalli 2009). The sea otter's sleek and glossy fur brought astonishing returns in Canton and other markets. While prices certainly fluctuated, individual sea otter pelts could sell in Canton for more than forty Spanish dollars in the late 1700s (Dalrymple 1789: 27). Killing sea otters, however, required the specialized skills of native hunters, which explained why Russian *promyshlenniki* initially took Aleut women and children hostage and forced the male hunters to gather pelts. By 1800 British and American traders contracted Aleut hunters from their Russian overlords, shuttling the hunters as far south as Baja California and turning the entire coastline into an extended killing field. Imported hunters pursued their prey in coastal bays and offshore islands, while traders like William Shaler filled their ships with the valuable pelts. Between 1800 and 1820, over 90 percent of American and British ships left the California littoral with sea otter pelts as some portion of their cargo (Igler 2004). The region's sea otter population faced extinction by the 1840s; only a few surviving pods sparked recovery efforts in the mid-twentieth century (Ravalli 2009).

The slaughter of sea otters represented but a tip of the iceberg. The trade in *all* furs and pelts – both land and sea mammals – reached epic proportions in the decades around 1800, especially in Russian Alaska. A table published in Vasilii Nikolaevich Berkh's *A Chronological History of the Discovery of the Aleutian Islands, or, The Exploits of Russian Merchants* attempted a crude summary of Russian exported furs for the years 1743 to 1823 (1974: 93):

Animal	*#Exported*
Fur seals	2,324,364
Sea otters	200,839
Sea otter tails	143,689
Blue foxes	108,865
Red foxes	57,638
River beavers	58,729

Cross foxes	44,904
Black and Black-brown foxes	30,158
River otters	22,807
Sables	18,121
Mink	5,349
White foxes	5,130
Bears	2,650
Lynx	1,819
Wolverine	1,234

Despite the seeming precision of Berkh's numbers, we can only guess at the actual amount of fur taken by the Russian American Company, much less by other European groups. Far more remarkable than Berkh's estimated numbers was the sheer variety of species slaughtered during the fur trade: sea and land-based mammals, seals and foxes and bears and wolverines. This was a truly wide-ranging assault on any animal unfortunate enough to wear a marketable fur.

Whaling constituted another extractive industry throughout the Pacific Ocean, especially after the entrance of the American whaling fleet in the early 1800s. The task for whalers was to locate and interrupt the migration routes of different whale species, or better yet, discover their yearly breeding grounds for an assault *en masse*. This was precisely what occurred to the eastern Pacific gray whale, whose annual migration route from Alaska to the breeding grounds off Baja California may be the longest of any mammal in the world (Wilcove 2007). While gray whales yield less oil than other species, the discovery of their "home" bays in the warm waters off Baja California made them completely irresistible. Evolutionary biologist David E. Wilcove estimates their numbers declined from 20,000 in the late 1840s to fewer than 2,000 in the 1870s (2007: 146).

Environmental historians should ask a number of questions at this point: What sort of "decline" was this? Who was involved in this assault on one of the world's largest mammals? What does it reveal to us about the northeastern Pacific as a place? The shipping records assembled by historian Adele Ogden (1941) allow us a rare perspective on whalers' activities in the region. For instance, we know that Pacific whaling vessels made Hawaii their primary home port in the Pacific, with sometimes 100 or more whaling ships stopping at Honolulu each year. From Hawaii, a good portion turned east toward California as early as the 1820s – long before they discovered the bays of Baja as a breeding ground. At least 212 whalers visited the coast of Alta California prior to 1848, with the largest numbers arriving in the 1820s and the 1840s. It was during this latter period that Bahia Magdalena was discovered half way down the coast of Baja. During the 1845–6 season, whalers harpooned breeding whales there for the first time – crews took only a month or two of intense hunting to fill their hulls with the precious

oil, a task that typically took a couple of years in the Pacific. By 1857 whalers had discovered a second mother lode of whale oil at Laguna Ojo de Liebre (Wilcove 2007).

The American whaling fleet out of New England dominated this killing spree in the 1820s and 1840s. A large majority of those 212 whaling vessels that reached Alta California prior to 1848 came from New England, and they returned with barrel upon barrel of melted down whale blubber. As Herman Melville mused to Richard Henry Dana as he put the finishing touches on *Moby-Dick*, "blubber is blubber you know; tho' you might get oil out of it" (Melville 2001: 532). That oil lit the lamps and produced the candles used by countless Americans in the mid-nineteenth century, which constitutes a marvelous environmental case study of American extraction-consumption patterns. However, this case study pattern was hardly limited to the United States. The owners of American whaling ships had long sold a portion of their oil to European (especially British) buyers, thereby linking the marine life of the northeastern Pacific to uses in the street lamps of London, Paris, and other European capitals (Crosby 2006). These international links prevailed in other ways too: American whalers may have dominated in the waters off Baja California, but British, Peruvian, Mexican, and other nations also contributed to the great kill. In the worldwide search for better energy supplies, localities such as the bays of Baja California were rapidly transformed by global demand.

Conclusion

This essay opened with a call for environmental historians to consider geology in their formulations of space, especially oceanic spaces such as the northeastern Pacific Basin. While geology certainly did not determine social and historical understandings of the northeastern Pacific, geological components have greatly influenced those understandings from the times of the ancient Pacific islanders to the modern geologists and oceanographers. Ancient Hawaiians explained the origin of their island habitats through the demigod Maui, who lifted the island chain from the ocean's floor with a great fish hook; island uplift, much later generations of Western geologists would conclude, was one theoretical step on the way to twentieth-century concepts of global tectonics and hotspot theory (Beckwith 1970; Kearey and Vine 1990). These geological features provide convenient geographic signposts for the northeastern Pacific Basin, though they only mean to suggest one possible way of describing an otherwise amorphous region.

Moving beyond the geological, this essay outlined four additional foci for conceptualizing a seascape: the ocean, islands, littoral zone, and the assault on marine resources. While each theme holds particular resonance for the northeastern Pacific in the nineteenth century, these themes also transport well

to elsewhere in the Pacific or other oceans around the globe. They provide environmental historians with tools to manage the tremendous (and sometimes paralyzing) scale of seascapes – like mariners themselves, we can tack back and forth between the immensity of the oceanic scale and the seemingly manageable scale of an island locality. Or more to the point, we can locate the "intersection of numerous [historical] scales" on the islands, littoral zones, or marine populations that contribute to a broader oceanic history (White 1999: 980). An environmental history of the northeastern Pacific Basin is an exercise in relationships. It is much smaller than the entire ocean and much larger than any given place within its boundaries; similarly, its history is a confluence of relationships among ecological features, evolving social communities, and global attention to its bounty.

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Chapter Thirty

Earthlings: Evolution and Place in Environmental History

Dan Flores

We are Earthlings.

While that simple declaration may sound to some ears like the opening of a science-fiction novel, and to others as belaboring the obvious, saying this as an essential point of departure for environmental history is a new thing. Indeed, the premise that as a species we have emerged from the evolutionary stream, that we are not separate from the origins of biological life on Earth but the very manifestation of those origins, seems to require forceful statement generally in the twenty-first century. A century-and-a-half after Charles Darwin published *On the Origin of Species*, a solid majority of the six billion of us on the planet still would not agree with that premise. And even those who do grasp the implications of Darwin's great insight may not be familiar with thinking of human history in terms of our evolutionary legacy. Yet, the simple reality that we are vertebrates, mammals, primates who adapt to and create places – that we are Earthlings engaged biologically with the planet of our evolution – is a starting point for understanding the big picture of human history in new and perhaps essential ways.

Consider, as a part of the foundation to thinking of ourselves as an evolved species, the human timetable. Six-to-eight million years Before the Present (BP), our ancestors separated from the evolutionary line that led to modern chimps and apes. We still share 98 percent of our DNA with chimpanzees like bonobos, enough that some primatologists have argued that we and the chimps actually belong in the same genus. Much of our basic makeup – such as the color vision that enabled our primate ancestors to pick out ripe fruits against a green background, and to help them spot danger (like poisonous snakes) – is a carryover from ancient adaptations to primate life in the forest (de Waal 2005; Dawkins 2004).

At four to six million years BP, our ancestors began to walk upright, freeing our hands for carrying objects and raising our line of sight across the landscape.

One of our ancestors, a species known as *Ardipithecus ramidus*, was walking upright in the forests before the move to the savannahs, but standing up became a particularly successful move for a species soon to live in open country with far horizons (Gore 1997).

Some 3.5 million years BP, a fortuitous geological event contributed to our destiny. Tectonic drift linked the Americas, North and South, via a sliver of land we now call the isthmus of Panama. That linkage stopped the flow of warm Pacific waters into the Atlantic, which contributed to freezing the Arctic more solidly, which in turn cooled and dried Africa and spread the grasslands there, in effect creating our Hominid evolutionary home. By 3.2 million years BP, Lucy, our *Australopithecus* ancestor, was living as a grassland primate in equatorial Africa, in a habitat that across much of the next three million years had an average mean temperature of 72 degrees – the temperature to which we evolved as a wild species and have ever since attempted to recreate in every setting around the world (Lemonick and Dorfman 1999).

At 2.6 million years BP our genus, *Homo*, evolved. We steadily began to lose most of our Hominid body hair (although we are yet able to "raise our hackles" or "ruffle our fur" via goose bumps). Our *Homo* ancestors of two million years ago pioneered an early human fascination with tools and "technology," and that primary technology enabled us for the first time to engage in a wanderlust that began to expose us to the rest of the planet. The next big Hominid breakthrough after bipedalism, in fact, was the refinement of tool working. Pushed, tool technology would enable our ancestors to colonize environmental zones much different from the ones in which they'd evolved, so that by 1.8 million years ago our early *Homo* ancestors were engaging in the first human migrations out of the African homeland, apparently along the coastlines into Indonesia and Asia. And the new tool technology that made scavenging possible, and later the blade technology of hunting, gave early humans a tremendous jolt of high-fat animal protein in their diets. That energy source made possible the evolution of our big brains (Cann and Wilson, 2003; Stanford 2001).

By a million years ago, those enlarging brains enabled our ancestors to learn to control the first great human technology of massive alteration. It was a technology that not only allowed us to reshape the ecology of the world around us, but one that would also permit us to live in colder settings than those to which we'd evolved. We had learned to control fire (Gore 1997).

With culture – the transfer of ideas across populations and generations – human technology continued to ramify. By 340,000 years BP, our ancestors were starting to construct shelters and beginning to make sewn clothing. Like controlled fire, these advances made it possible for us to colonize "alien" environments where earlier Hominids could never have survived (Ben-Avraham and Hough 2003).

By 230,000 years BP, a Hominid species we know as *Homo neanderthalis* had evolved, and as early Hominids spread out of Africa it became the

dominant Hominid in Europe and Asia. Eventually, Neanderthals living in cold, cloudy, northern settings would evolve a suite of physiological adaptations that some of our own species would later replicate: fair complexions, light eyes, and bulky bodies (Tattersall 1999).

Into a world in which multiple Hominid species often coexisted, 180,000 years ago *we* emerged. Anatomically modern humans, *Homo sapiens*, evolved in Africa with, perhaps, just a slight advantage over Hominids like Neanderthals, which already had the FOXP2 gene facilitating precise vocal motor control to form words (Pollard 2009). Mutation and natural selection early in our own evolution may have favored an emerging finely tuned sense of hearing, enabling an elaboration of spoken language (Tattersall 2003). Early in our life as a species we almost did not get to pit that advantage against other Hominids, however. At 171,000 years ago, we confronted an evolutionary bottleneck so narrow that all humans who survived it – and all of us today – are the descendants of a single woman whom evolutionary biologists call "Mitochondrial Eve" (Zimmer 2001).

At roughly 120,000 BP, following the footsteps of earlier Hominid ancestors, a small group of modern humans left Africa for the first time and during favorable years began to spread northward and eastward. Soon thereafter, at 100,000 years ago, modern humans began to bury their dead and bid the deceased farewell (or prepare them for an afterlife) with grave caches of funereal ceremonial objects. The first evidence of human body decoration, perhaps symbols indicating membership in particular bands, dates from the same period. All of these comprised a suite of mental steps that may indicate the beginnings of human symbolic thought (Wong 2003; Sale 2006).

Meanwhile, the great human trek out of Africa and around the rest of the planet picked up speed. By 65,000 BP there is evidence of modern humans in Australia, a feat that would seem to indicate the invention of seafaring vessels of some kind. Elsewhere, after being bottled up in the Middle East for 75,000 years, about 40,000 years ago our modern ancestors took advantage of a period of favorable weather to follow the Tigris/Euphrates valley system into Turkey and beyond, to Europe (Ben-Avraham and Hough 2003). There, beginning around 34,000 years ago in places like Chauvet Cave and Lascaux in France and Altimira in Spain, human artists – perhaps shamans – rendered the earliest paintings preserved in humanity's *longue durée* story. Literally a bestiary of the great Pleistocene animals, these rhinos, lions, horses, bison, and bears of Europe's limestone caves were drawn with such precision and grace that they work both as natural history observation and art. These paintings of animals with powerful meaning to us are our oldest representations of the actual world. They indicate both our biophilia – an evolved feeling of kinship for nature – and how very long we have been engaged in ecological observations about the world around us (Chauvet et al. 1996).

In Europe, these cave-painting modern humans coexisted for almost 15,000 years with the descendants of the earlier Hominid migrations out of Africa, the Neanderthals. At times our two species – the older one blunt and heavy, the modern one gracile and clever – may have even lived in the same valleys. But despite the Neanderthals' ancient adaptations to the cold, gray higher latitudes, somehow our ancestors out-competed them. By 26,000 years ago, the Neanderthals had become extinct even as our own ancestors began to mimic Neanderthal adaptations in surviving so far from the African homeland (Tattersall 1999).

While this slow drama was going on in Western Europe, on the other side of Eurasia modern human populations were pushing ever farther eastward, following animal populations and seeking passages through the glaciers of the Wisconsin Ice Age. By at least 15,000 years ago, and perhaps earlier than that, bands of modern humans whose ancestors had started out of Africa 120,000 years before crossed Beringia and entered the Americas, the last of the great continents we would colonize. Across the 15,000 years since, the growing and now global human population sought out and probed the last remote places on Earth – island chains like those of Hawaii, for example. As the global climate warmed and the ice sheets receded, humans practicing the ancient hunter-gatherer economy found ever fewer large animals to hunt. So by 10,000 years ago, when the human population of the entire Earth was no more than four million, we gradually commenced the great experiment in living off domesticated plants and animals that we know as the Neolithic Revolution. A few thousand years later, and for similar reasons, agriculture slowly began to emerge as the principal human economy in the Americas, as well. With agriculture came the impetus for human cities, and ultimately written history. By that time we had become a rarity in biology, a genus with only one living species: modern human beings (Ponting 1991).

Despite the obvious importance of human cultures and close study of them, I strongly believe that this deep-time evolutionary history – our origins as Earth animals, in other words – may be the most important thing about us, and that in the twenty-first century that importance is going to become widely appreciated. But what meaning will we draw from it? For the almost fifteen decades now that our animal origins have been acknowledged by science, and in turn, philosophy, history, and (grudgingly, if at all) theology, modern humanity's almost instinctive response is that within the animal must lie a core of evil (Ardrey 1963; Cartmill 1993). That is implicit in the Judeo-Christian conception of original sin, of humans as "fallen" from a purer, original state. That idea has endured into our own time even among environmentalists, whose notion that pristine Nature is a garden of harmony that can only be blighted by our touch stands as one of the movement's most powerful premises (Sale 2006).

Despite the long evolutionary stream I have outlined above, the belief that we humans are "fallen," somehow permanently divorced from a nature

that is somewhere "out there," is a reflexive tenet of modern life. The truth, of course, is that the only way we will ever escape nature and our evolutionary origins is if we can figure out how not to die. Until then, we are bound to the home of our origins in a Möbius feedback loop that has cycled on for thousands of generations, and we are hopeful will continue.

To many of us interested in ideas about nature and humanity, the emergence of environmental history has been one of the intriguing seismic stirrings in academia in recent years. Although environmental history takes as its operative premise that in its foundations history should be a study of the ecological relationships between ourselves and the planet around us, the field has only grudgingly addressed how our own evolutionary origins ought to inform historical inquiry (Flores 2001b). To some extent, this has been the result of the back-to-back success within the humanities of, first, materialist Marxist theory and later cultural relativism and postmodernism. Thus, what has really pushed environmental history as a field has been the story of how people and places have been integrated into the global economy, along with close examinations of how cultural ideas and worldviews have shaped human attitudes and actions towards the environment (Herron and Kirk 1999; Worster 1988).

Some historians of the environment have also applied postmodern techniques, wherein the "nature" that the evolutionary and ecological sciences describe is less important than the words and symbols we humans use to signify it, and the cultural constructions and power relations we impose on the world to fashion our realities. By insisting that reality springs largely from the words and ideas arising in the human brain, postmodernism has continued to embrace a basic Marxist premise: that through actions that spring from acts of will or imagination, we can create any kind of world we want. Determinism does not exist. Competitive struggle, violence, technological over-reach, human stresses on nature – all can be reformed and probably eliminated by "reimagining" the world. Presumably because of the deterministic tendencies of evolutionary explanations, the human animal – fashioned by evolution and still carrying genetic imperatives within us – has been invisible in most of these approaches. Or, more accurately, the ancient imperatives do appear, except that they are explained purely in economic or cultural terms.

My own suspicion is that in our efforts to come to a deeper understanding of why we interact with the world around us the way we do, environmental history eventually is going to have to investigate humanity at a more profound level than the cultural one alone. Horrifying as it may be to think so, it is the case that as a result of our peculiar evolution – that we sprang from a very small foundational population that was further winnowed by near-extinctions, and that we migrated from a single homeland – we humans appear to have a universal human nature, the one breathless tie we all share, no matter who we are or where we are. Beneath all of our rich overlays of

migrations, adaptations to specific places, and emergent cultures, we are the same animal all over the planet, motivated by similar impulses that appear manifest in our histories (Pinker 2002; Ridley 1999). We badly need, both intellectually and philosophically, to begin thinking of ourselves as a species that, at the very least, inhabits ecosystems and a biosphere. As Earthlings, in other words (Worster 1993; McDonnell and Pickett 1993).

That we are evolutionary animals, shaped by the ancient past, means several important things in environmental history.

The reality of our singular evolutionary origin would seem to argue, for one thing, that the human past in all of its specific variations of culture and place belongs to all of us. The whole of the past ought to be ours, as a species, to learn from, since in truth, everybody's story is our own. And to take another step towards acknowledging who we really are, our evolutionary history would argue that we humans cannot be considered separate from the Earth of our evolution. We, too, are "natural." Of course, this does not mean that as a "natural" product of the planet, our every act is therefore sanctioned and beyond critique.

Yet we seem most reluctant to look unblinkingly at our biological natures, perhaps out of fear – misplaced fear, I suspect – of what we might find. What good will it do us, we may wonder, to acknowledge forces within that may be harder to alter than a bad law or flawed institution? The answer is that understanding the animal within may be fundamental to our grasp of history and even our ability to shape our future. Moreover, embracing the ways in which we truly are nature's children may help us to discard the notion that once (in our childhood as a species) we were ecologically "sane" – green beings of the Paleolithic – only to have matured into "alienation" or "madness" (Shepard 1998).

In fact, human environmental history right down to the present appears to present us in a continuum, a species doing now exactly what evolution so precisely shaped us to do all along: to survive and succeed in nature and in our primate social world. The causes of twentieth-century environmental decay, the specter of a frightening twenty-first-century over-reach, are not collective human insanity, or caused by our technology or even our economics. The causes of the human assault on the world – and, conversely and ironically, the sources of our hope for ourselves and a biologically diverse planet, too – are evolutionary and mammalian. Despite the astonishing panoply of human cultures, religions, mythologies, and ideologies, there are patterns in how we've intereacted with the material world. And some of those basic patterns lie in our evolutionary biology (Ehrlich and Ornstein 1989).

For the past three decades one of the most ardent advocates of the idea that we accept and learn from our evolutionary nature has been Harvard biologist Edward O. Wilson. As Wilson wrote in *On Human Nature*,

"we are biological" (1978: 1), yet accepting this simple fact is horribly deflating for a species that had so long thought of itself as unique, outside nature, and possessed of an unquestioned free will. As Wilson argued, if our souls cannot fly free, we have no place to go but Earth, and that changes everything about history (1). Wilson's position over years of attacks from both Right and Left has been refined but not reformed. Genetic evolution of human social behavior, he argued in 1978, is the product of five million years; culture is mostly the product of the past 10,000. This has led Wilson to disagree with culturalists that human behavior is infinitely plastic, and he points out that much of our social behavior (band-type social groupings of 10–100, sexual dimorphism, a bias towards close kin, the development of technology from tools, and the Lamarckian ability to pass information along to the next generation) is shared with other primates (Wilson 1996a, 1998).

Further, Wilson argues, all human cultures share biologically derived patterns that relate directly to ecology, including ethnobotany, food taboos, population policies, property rights, soul concepts, and a desire to control weather. Evolutionary behavior, he asserts, should be the most general and least rational in our repertoire – our mating strategies, the importance of status, incest taboos, and parental investment, along with contract formations that make social relations possible. And finally, Wilson points to territoriality linked to aggression. Wilson, like some other evolutionists, continues to follow the Robert Ardrey argument that the human instinct for aggression resides in our territoriality and protection of resources, with conflicts aimed at "them" – a culturally identified outsider group (Wilson 1978, 1996a; Diamond 1992; Ardrey 1997).

Wilson initially believed that evolutionary science would enable social scientists to achieve what physics had achieved: a discipline (human history) that was "predictive." By 1993, in an essay called "Is Humanity Suicidal?" he was ready to venture predictions:

> Darwin's dice have rolled badly for Earth. It was a misfortune for the living world, in particular, many scientists believe, that a carnivorous primate and not some more benign form of animal made the breakthrough [to intelligence]. Our species retains hereditary traits that add greatly to our destructive impact. We are tribal and aggressively territorial … and oriented by selfish sexual and reproductive drives. Cooperation beyond the family and tribal levels comes hard. Worse, our liking for meat causes us to use the sun's energy at low efficiency.… The human species is, in a word, an environmental hazard.… Perhaps a law of evolution is that intelligence usually extinguishes itself. (Wilson 1996b: 184–6)

Wilson's conclusion was that we are not suicidal, but that survival – especially in a world that figures out how to preserve biodiversity – will necessarily entail "a reconsideration of our self-image as a species" (1996b). In a later book, *Consilience: The Unity of Knowledge* (1998),

Wilson further refines the idea that culture itself is biological and that much of our behavior exists as a "biocultural" loop where certain cultural traits are selected by the genes for their survivability. Culture essentially has converted humanity into one immortal super-organism that gets to learn and compile knowledge endlessly over time. It's this trait that has made us aware, finally, of who we really are.

In *Consilience*, much of Wilson's focus is on the evolutionarily derived "epigenetic rules" of human hardwiring that function as "gravitional centers that pull the development of the mind in certain directions and away from others" (1998: 243). Since this prepared learning represents natural selection at work (originally in the natural environment, now mostly in the cultural one), it has spread through human populations, along with the genes that dictate it. Some of the most basic epigenetic rules include a tendency to favor vision over the other senses (very different from the situation with most animals), an instinctive inclination to employ binary (two-part) classification, and a tendency in aesthetics that biases us towards bilateral symmetry and the "supernormal stimulus" – signals that exaggerate favored norms about youth, fitness, and reproduction. (Wilson 1998; Ectoff 1999). Wilson asserts that the role of the arts may be to signify certain traits of human anatomy, certain animals, and certain kinds of landscapes to which we are already drawn biologically. Of additional interest, particularly for regional history and the study of place, "People do not merely select roles suited to their native talents and personalities. They also gravitate to environments that reward their hereditary inclinations" (Wilson 1998: 140–1).

In its contemporary form – now known as evolutionary psychology – biological interpretations of human behavior have focused on an idea called the "maximization principle." The argument, presented in the form of the so-called Modern Synthesis (which some researchers have touted as literally a new Copernican Revolution), is that "The universe of biological organization is a system of genetic matter in motion obeying the immanent, natural laws of natural selection and genetic variation" (Lopreato 1989: 119). This is another way of saying what is self-evident if we pay attention: that the most deeply internalized prime directive of all biological species is genetic reproduction and survival, and a great deal of what we gendered species do is propelled (without our realization) by sexuality operating on what Richard Dawkins has called our "selfish genes" (Low 2000; Dawkins 1976, 2004).

That logic, of course, raises a crucial question: If the entire biological world is blueprinted around replication of the selfish gene, why is human culture not deterministically selfish? How can altruism and human morality be explained?

The answer, worked out by two of the founders of sociobiology, Robert Trivers and Robert Axelrod, is evolved reciprocity. Game theory demonstrated how reciprocity (cooperation) could evolve in nature, providing

rewards that enhance individual success through cooperation with others, an arrangement then buttressed by an ethical code (the social contract) that societies design to govern it. Canadian game theorist Anatol Rapoport's famous "Tit for Tat" (or, do unto others …) is thought to represent most closely how reciprocity, altruism, and morality evolved in a selfish-gene world (de Waal 1995; Wright 1994).

One of the most intriguing ideas about how human evolution can merge with modern environmentalism comes from Wilson's 1984 book, *Biophilia: The Human Bond with Other Species*, and a decade later the anthology Stephen Kellert and Wilson edited, *The Biophilia Hypothesis* (1993). Both books examine the viability of Wilson's assertion that our evolution has bequeathed us an "innate tendency to focus on life and lifelike processes" (1993: 4). In other words, biophilia is an aspect of human evolutionary nature that may bequeath us a very positive heritage with respect to the world around us.

The preliminary studies on biophilia (and its opposite, biophobia) remind us how rooted our social behavior is in the primate world. Studies of inherited biophobic responses (to snakes and spiders, for example) – as well as what appear to be genetic preferences in humans to savannas, parklands, certain tree shapes, and terrain scales that mimic our evolutionary home in East Africa – center both our fear of the natural world and our settlement strategies, even our aesthetics, on universal biocultural adaptations selected by evolution over deep time. There also appear to be some clear gender differences. Studies of both landscape art and architectural landscaping in places like Victorian England and the United States show that men worldwide respond most positively to depictions of open, park-like terrain with distant views. These, likewise, are the kinds of scenes male landscape artists are more likely to portray, and that park and grounds planners most often try to emulate. Women, including female painters, seem more strongly drawn to scenes of closed canopies and protected settings. One of the contributors to *The Biophilia Hypothesis*, Robert Ulrich, is willing to make a ballpark guess: genetic biophilias and biophobias may be 20–40 percent biologically determined, but appear to require triggering by experience and get established as clear preferences essentially through learning (Heerwagen and Orians 1993; Ulrich 1993).

One of the important questions here is how might these insights about human evolution be folded into the historical narratives that give our immediate stories meaning and power?

Probably the oldest, and still a most useful, way to think about and write human ecological/evolutionary history is through a local lens, commencing with a place that seems to hang together ecologically and tracing human adaptations to it. In American environmental history this is a tradition that dates at least back to Walter Prescott Webb's *The Great Plains: A Study in Institutions and the Environment* (1931) and to James Malin's

various works on the Kansas prairies in the 1940s and 1950s (Malin 1985). Some might argue that even their premises borrowed heavily from Frederick Jackson Turner and in turn from Darwin, since this so-called "bioregional" history is nothing if not Darwinian: humans considered as ecosystem animals making adjustments to particular habitats, in other words (Cronon 1987). Some of the best modern books written by environmental historians, considering regional human cultures as a kind of "adaptive package" to places, have roughly followed this approach.

In reality, an evaluation of *place* must be one of humanity's oldest fields of study, one that would have commenced at the moment, some 1.8 million years ago, that our ancestors of the genus *Homo* first left their evolutionary homeland on the plains of East Africa and began to experiment with living in new places across the planet. Like every other species, ours sprang from a particular habitat, in our case equatorial Africa. Evolution fashioned us to be adapted to that specific locale and its conditions, which is why twenty-first-century Canadians and Arizonans both still set their thermostats to 72 degrees. It's one of our technological efforts to replicate that first human place.

Some 120,000 years ago, when anatomically modern humans began to follow our ancestors' migration routes out of Africa to Asia and Indonesia and eventually Europe and the Americas, they must have formed powerfully strong impressions of just how important "place" was. Paleoanthropologists who have tracked these migrations believe that, like Canadians adjusting their thermostats to Great Rift Valley temperatures, initially we looked for and stuck with locales that reproduced what we had left. Only with new cultural and technological innovations such as controlled fire, shelters, and sewn clothing were we able to colonize environments different from the equatorial habitats in which we had evolved. And we now know, as happens with every species that finds itself in a new environment and isolated from its original population base, that these new places changed us, too. It took only 20,000 years for isolation, adaptation, and genetic drift to produce in at least some of us in Europe the paler coloring, lighter eyes, and bulkier bodies that were adaptations to colder, cloudier settings far from the sun-drenched warmth of the African equator (Tattersall 1999; Thorne and Wolpoff 2003). Across the last 120,000 years, then, after millions of years of evolution in Africa, our species colonized the world, discovering what must have seemed to our astonished ancestors the staggering diversity of settings around the Earth. There are still today some cultural groups – the Comanches of the American Southwest are one – who call their most prominent mythical heroes "Land Searcher" (Flores 2001a). As we searched out new habitats and settled into these settings and remained, we created thousands upon thousands of human places around the globe. Indeed, seen across the long durations of time, neither wars nor politics but the process of settling and creating places has been the great project of

human history. As geographer Yi-Fu Tuan sees it: space plus culture equals place (Tuan 1977, 1974).

Because, like everyone else, historians are usually born and raised in one place, then travel and find other places a strange mix of the familiar and exotic, history has always been fascinated with place. Homer's *Iliad* and *Odyssey* are travelogues about place, and the Greek father of written history, Herodotus, devoted much of his writing to descriptions of how people lived in different locales. Despite the enormous range of its interests, environmental history has place poured like concrete foundations into its beginnings. The three Americans historians we often regard as the fathers of environmental history – Turner, Webb, and Malin – all wrote primarily about places, how they were different one from another, the process of settling them, and how they influenced their inhabitants. Another primary source of environmental history, the French Annales School – as represented by Fernand Braudel's great 1949 study, *The Mediterranean World* – also kept place-based history at the center of its work. Environmental history's modern approach to writing about place, usually known as bioregional history, as a result sometimes seems the purest and most well-traveled genre of environmental history writing (McGinnis 1998; Flores 1994).

Modern historical thinking, writing, and teaching about place has become truly mind-boggling in the richness of its approaches. But back at the beginning of the field, Turner, Webb, and Malin were all interested in the most classic question about place: If we *are* a single species, evolved in a specific habitat in one place on the globe and forced by that fact to have to adapt to live in most other places on Earth, what form do those adaptations take? For Turner, the adaptations that Europeans had to undergo to live successfully in the North American wilderness created the American character; in his view, our adaptations to America figuratively fashioned a sort of new human subspecies, "Homo Americanus" (Cronon 1987). Webb and Malin, borrowing their main idea from John Wesley Powell's nineteenth-century insights and maps about *Western* places (in effect that aridity made water rather than land the key to place-based living), believed that the part of North America beyond the Mississippi River was so ecologically different from the East and South that adaptations to this arid landscape literally created *Westerners*, who lived differently than other Americans did. In the dry half of the continent, Euro-Americans, no less than Indians, had created new lifestyles – new laws, new technologies, new worldviews – as part of their adaptations to life surrounded by aridity and its effects on the world (Powell 1890, 1891; Webb 1931; Malin 1985).

Closer to our own time, Wallace Stegner inherited and expanded on these classic questions about place and adaptation. In *The American West as Living Space* (1987), Stegner praised the hard-eyed vision that Powell had about place, and he loved the distinctions Webb drew between East and West. But he was too careful a historian to buy Webb's environmental

determinism model entirely. Stegner and many others have found James Malin's "Possibilism" model – an argument that place does not dictate how people live in it, but instead offers a range of possibilities from which people choose based on their technology and the cultural baggage they bring – the best explanation of the classic questions about adaptation. Donald Worster has advanced the argument in his famous book *Dust Bowl* (1979), noting that when American settlers moved to new places they often endeavored not to adapt at all, but tried to recreate their old places in new settings. Trying to live in western Kansas as if it were Virginia, Worster believes, contributed to the disaster of the Dust Bowl.

In contemporary environmental history, the starting point for place-based study and analysis is deciding how to bound the place itself. To a certain extent, any historian who writes about a single nation like the US or Mexico is writing about place, and so is the historian who crafts histories of states or large-scale regions – such as the South, New England, the Midwest, or the West (Uvardy 1980; Bailey 1995). Even borders between discrete political entities have served as fertile grounds for comparative studies of places that often are ecologically the same but whose cultural histories may be vastly different. Historians Sterling Evans (2006) and Sam Truett (2007) have found boundaries like the American/Canadian and American/Mexican borders fascinating places to compare how different cultures interact with nature.

Others of us – influenced no doubt by a peculiar 1970s sub-genre of the environmental movement known as Bioregionalism, which began to urge Americans and Canadians to think of ourselves, and to live, eat, and work, as residents of natural places on the landscape – invented the environmental history known as bioregional history. Aware that for thousands of years Indian peoples had inhabited the American landscape not as citizens of a nation-state but as residents of particular ecological regions, such as the Chacoan bioregional empire David Stuart details in his book *Anasazi America* (2000), bioregional historians have attempted to write history from this "more natural" ecosystem perspective. Similar to what biologists have recently attempted with ecosystems management of natural regions like the Greater Yellowstone Ecosystem, the Southern Rockies Ecosystem, the Crown of the Continent Ecosystem, in the last two decades we historians have used river drainages, mountain ranges and other topographical units, and vegetation complexes – and sometimes even regions defined by ethnic or religious settlements – as place-bounded settings for history (Flores 2001b; Noble 1992).

The idea, obviously, has something of an environmental activist cast to it, because in part the motivation for bioregional history has been to help modern residents realize that they are part of natural places whose histories extend back thousands of years. One is not just a resident of modern Santa Fe. One is a resident of a natural High Desert setting at the foot of the

Southern Rockies, whose climate, native species, and human history have a distinctive arc through time that extends back 11,000 years, and includes you as the latest bead on the string. It is an empowering kind of history because the great events have not taken place, as national history often does, in some distant power place. History and nature are underfoot (Sale 1985; Andruss et al. 1990).

These kinds of histories are multiplying in part because, as evolved animals, we cannot escape feeling very strongly about hearth, home, our local places, our own regions – places where life and history are immediately meaningful. We now have bioregional histories of a staggering variety of American places, from larger regions like New England, the South, the Great Plains, the Rocky Mountain West, the "Near Southwest," to ecoregions like the Imperial Valley of California, the Llano Estacado Plateau of West Texas, the Everglades, the Pacific Raincoast, the Pacific Islands, the Georgia Coast; to mountain ranges like the Sangre de Cristos, the Jemez, the Sierra-Nevadas, the Southern Appalachians, the Great Smokies, the Black Mountains of the Carolinas, the White Clouds of Idaho; to rivers like the Mississippi, the Missouri, the Columbia, the Colorado, the Yellowstone, the Calapooia (a tributary of the Willamette), the Snake, and the Santa Cruz; to histories of bioregions that were mostly settled by ethnic/religious groups – Spanish/Mexican land grants of the upper Rio Grande and the Mormon Wasatch Front; to discrete spots like Lake Tahoe, and even a pair of islands in the Puget Sound. With many more underway right now, no doubt (Flores 2001b: 103–6).

What many of these bioregional histories have in common is not just their unexpected recognition that human stories tend to take place in natural settings, but a James Michner-esque, *long durée* approach to history. In books like William Cronon's New England story, *Changes in the Land* (1983), places are inhabited by a succession of cultures that inherit ecologies the previous inhabitants have already changed, and often the local history unfolds the way it does because of the different land use strategies new inhabitants employ. In Cronon's colonial New England, English settlers' suppression of fire and eradication of wolves – both of which had thrived under Indian management of the region – almost remade the local ecology. Another commonality in bioregional histories is the story of how local places and their resources get co-opted by larger systems like colonialism and globalization. Scholars of the Southwest's Hispanic land grants have argued about whether land grant *ejidos*, or commons, remained healthy so long as they were used only by local communities, and whether the coming of the market economy was the critical step in ruining mountain pasturage and depleting herds of game animals (Van Ness 1987).

There are also hundreds of place-based histories that are not full-scale bioregional histories *per se*, but nonetheless illuminate how we exist in and celebrate our places. It is obvious that people transform space into place not

only by technological know-how but also with symbols, images, and stories. Regionally based literature, art, music, and films are all ways in which we attempt to capture what literary scholars often refer to as a "sense of place" (Turner 1989). There are too many of these studies to mention, although I might make the observation that, so far, the study of regional artistic or literary traditions has been spotty, not evenly distributed across the American landscape. Southwestern scholars have paid relatively more attention to regional art in developing a sense of place. In the Northern Rockies it has been regional literature that has dominated, and in places like Texas, historians have studied regional music more than other art forms (Flores 2010). Some of these sense-of-place works have focused on gender and even ethnic differences in apprehension of place. The wonderful anthology *The Desert is No Lady* (Norwood and Rudnick 1986) elaborates on the similarities and differences in the way Indian, Hispanic, and Anglo-American women sought the essence of the Southwest through art, photography, and sculpture.

More so than "event" history or biography, bioregional histories that go beyond the provincial celebration we often associate with local history can attract large and often sophisticated constituencies of readers. With such audiences, the opportunity to write or teach meaningful history is really limited only by the historian's imagination. From the grand forces of geology and climate that shape places, to organizing principles of human inhabitation such as river valleys or mountain fronts, to the range of technologies and cultural practices and ideas that make our places meaningful and unique, modern historians of place are in a position to newly elaborate this old kind of human history. Bioregional history can be a sophisticated history with a nature-based heart.

Like Fernand Braudel, environmental historians can concentrate on regional economies and the incorporation of our places into globalism, but a range of other topics invites our attention. There is the creation of local sacred places, both religious and secular (like state and national parks). Or contemporary place activism – from NIMBYism to movements toward eating and consuming locally. Or place and conservation, which often is a changes-in-the-land topic, as when local commons like land grant *ejidos* got replaced with national commons such as national forests. Or the often totemic relationships between people and local creatures, such as salmon in the Pacific Northwest. And bioregions are at the heart of conservation biology's strategy of creating a continent-wide series of preserved ecosystems that we tie together with natural corridors to preserve natural gene flows (Soule and Terborgh 1999).

Speaking of genes, one of the more intriguing ideas about humans and place has emerged recently through the field of epigenetics. It seems almost an elaboration of what Frederick Jackson Turner had in mind in 1893 when he insisted that the American landscape changed Europeans and others into Americans. Epigenetics argues that neither nature (via our genetic inheritance)

nor nurture (the external conditions that shape us) adequately explain who we are or become. As Matt Ridley points out in *Nature Via Nurture* (2003), while we are hardwired as individuals with a specific genetic inheritance, our external conditions – including not just the natural places where *we* live, but even the places and conditions under which our *ancestors* lived – have the ability to turn our genes on and off like a kind of bio-feedback switchboard panel. Followed to its logical conclusions, epigenetics argues that *we actually become different people in different places.* As Winnifred Gallagher has theorized in *The Power of Place* (1993), the places where we live literally shape our thoughts, emotions, and actions. As transient as most of us Americans are across our lifetimes, it is fascinating to think that this dance of place, genes, and culture has the ability to make us slightly different people in each of the places where we put down roots and stay.

In environmental terms, what might be the overarching legacy of our long and ancient evolutionary origins? One conclusion that appears inescapable is that in the twenty-first century we continue to engage the world around us with the same selfish genes, the same sexually based prime directive, the same mental and sensory apparatus that evolution bequeathed *Zinjanthropus*, *Homo erectus*, and *Homo habilis* – and that we remain oblivious to our motives because natural selection designed us to be. Evolution prepared us to survive; it did not prepare us to penetrate to real self-awareness of our motives, and now they come as a shock.

Herman Hesse, the German writer who penned the surrealistic novel *Steppenwolf* in the post-Darwin 1920s, sums up the dilemma of his protagonist this way:

> He calls himself part wolf, part man.… With the man he packs in everything spiritual and sublimated or even cultivated to be found in himself, and with the wolf all that is instinctive, savage and chaotic. (Hesse 1963: 3)

Viewed across the vast expanse of human history, Steppenwolf's fate is a uniquely human dilemma bequeathed to us by our evolution. In the "dark view" of Darwinism so common in the mid-twentieth century, the classic sins of gluttony, lust, greed, envy, and anger are all stripped-down expressions of impulses emerging out of evolutionary natural selection and the operation of the selfish gene (Ardrey 1963; Wright 1996). If these are the traits with which we interact with one another and with the world, then we are indeed in trouble.

On the other hand, while our evolutionary legacy does point out patterns, it does not predetermine our history. An idea basic to the study of human history is that it unfolds as a result of choices that are themselves contingent on other choices, as well as entirely unexpected turns of events – in historical terms the alterations in the timeline imposed by unexpected events, individuals, or even ideas (Gould 1991).

The implication is that human history can never be predictive, no matter how well we understand human nature. Evolutionists insist, however, that *knowing* ourselves and our tendencies must be critical to our how histories unfold. Obviously, we have made many foolish decisions in our past. We seem fully capable of maladaptive choices, of short-sighted insensitivity, of disregard for the rest of the world. Indeed, selfishness and short-sightedness appear built into our very evolution. Knowing who we are, then, lays the responsibility for the kind of world we create directly at our feet. No power, aside from the legacy of our own past and nature, is directing us. While we may have a biological history stirring like a wind at our backs, understanding ever more accurately who we are puts our destiny in our grasp.

The environmental historian Donald Worster once wrote that the task of environmental history was to analyze a layer of historical relationships that lay beneath the ones historians commonly studied (Worster 1988). The evolutionary synthesis, to my mind, probes more deeply still into the origins of human behavior towards the environment. It makes clear that many of the questions we have interpreted in purely cultural terms in fact probably have an evolutionary basis.

There are many examples of this. At least some of the success Europeans experienced in transplanting their colonies to the rest of the world since 1500 had to do with the biological isolation of some regions from Old World disease epidemics, which became "Virgin Soil Epidemics" in the Americas (Crosby 1986; Diamond 1997). Whole societies have flourished or wobbled as a result of our biological susceptibility to climate change, human-caused or otherwise. Our battles with disease pandemics, historically and now, have much to do with our close kinship with other species, which makes us susceptible to diseases that evolve in birds, livestock, and other primates. We have fought wars – and face the specter of more – because of our evolutionary territoriality and our quest for resources on a planet of limited carrying capacity for our species. Even in our daily lives, the evolutionary "wind at our backs" pushes us towards status displays in the struggle for mates, which in capitalist societies often means over-consumption, influencing how we engage the environment around us. In historical terms, our evolutionary legacy is very real.

If I am right that one reason we have not been able to stop the steady destruction of the world in our time is because we refuse to recognize the animal within, then externally delivered checks are what we can expect. Checks like new disease epidemics running rampant through overcrowded populations. Over-consumption in search of status that could lead to unending wars over resources. Catastrophes as a result of human-caused climate change. And perhaps, ultimately, an imposed, top-down environmental fascism to keep us from destroying ourselves. We have stories about these themes in modern human affairs. We call them science fiction.

On the other hand, if Wilson and others are correct and there is a real biophilia residing in our evolutionary natures, it may be that through realization of who we are, we only now have arrived at a point in our evolution where it can achieve expression. Embracing ourselves as Earth animals, recognizing and confronting the role our long evolution plays in modern human behavior, is a critical step. Once we take it, and perhaps see human nature (like nature itself) positively, we may trigger our innate biophilia fully. If so, one suspects that our ancestral instincts, not just for the diversity of life but for place – for living and interacting in local homelands where feedback loops are short and the world looms about us in sacred detail – will surely be key.

The crux of our evolutionary human nature as cause in environmental history is that, read negatively, it gives us faint hope. But, we have our history. And history, like evolution, offers us the opportunity to understand the ancient dangers – and the wondrous potential – of being Earthlings.

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Chapter Thirty-one

"Most Fruitful Results": Transborder Approaches to Canadian-American Environmental History

Ted Binnema

"Nowhere has a nation-centered historical tradition been more resilient than in the United States," complained Ian Tyrrell in 1991 (1031). Almost twenty years later his criticism still holds, even in environmental history. This is disappointing, because environmental historians should be eager to defy artificial boundaries, and important, because their neglect of transborder studies renders our understanding of the environmental history of both the United States and Canada not only incomplete, but distorted. This is not to say that it is inherently wrong to write environmental histories of cities, counties, countries, states, and provinces, but that until they are accompanied by strong transborder studies, the entire field of American environmental history is flawed. This chapter explains why this is so, and illustrates how various transborder approaches to Canadian-American environmental history can enrich scholarship in North American environmental history generally and American and Canadian environmental history more specifically. It discusses several approaches to transborder history – bioregional, comparative, transnational, international, and borderlands – to show how framing mechanisms elicit particular and important transborder research questions that scholars often neglect. I do not mean to suggest that these are completely discrete categories or that any cross-border study ought easily to fit a particular category. Indeed, as the examples will show, the distinction among approaches is artificial, presented separately here to clarify theoretical and terminological discussions. When we move from theory to practice, the distinctions are almost inevitably, and appropriately, blurred.

Bioregional Approaches

Bioregional approaches should come naturally for historians of the environment. As Dan Flores has argued, "the particularism of distinctive *places* fashioned by human culture's peculiar and fascinating interpenetration with all the vagaries of topography, climate, and evolving ecology that define landscapes … ought to cause environmental historians to realize that one of their most crucial tasks is to write well what might be called *bioregional* histories" (1994: 2–3). "Bioregion," a term originally coined by Canadian Allan Van Newkirk in 1975, is aptly defined as "any part of the earth's surface whose rough boundaries are determined by natural characteristics rather than human dictates, distinguishable from other areas by particular attributes of flora, fauna, water, climate, soils, and landforms, and by the human settlements and cultures that those areas have given rise to" (Sale 2000: 55).

Transborder bioregional histories of Canada and the United States hold such potential because the border cuts across vast environmental regions whose historical unity, although more obvious before 1492 than since, has always been significant. These include the vast expanses of tundra and boreal forests stretching from Alaska to Labrador, the Northwest coast running from northern California to the Gulf of Alaska, the north-south cordillera spanning many degrees of latitude, the central grasslands extending from the North Saskatchewan River nearly to the Gulf of Mexico, and the mixed northern forests reaching from Wisconsin to Nova Scotia. Not only do the ranges of many species cross the border, but the life cycles of many animals (from ducks and salmon to caribou and butterflies) take individuals across borders. Furthermore, environmental historians, even more than other historians, need to acknowledge that human communities on opposite sides of the Canada-United States border – even those distant from one another – often share much in common, especially when they occupy similar environments. So Flores is right: "environmental history can go beyond traditional history and justify its reputation for new insight if we … [draw] the boundaries of the places we study in ways that make real sense ecologically and topographically. It ought to be agreed that with rare exceptions, the politically derived boundaries of county, state, and national borders are mostly useless in understanding nature" (1994: 5–6).

At their most thoroughgoing, bioregional studies are deliberately planned and executed to explore the relationships between environmental characteristics of natural regions and the human societies and cultures that inhabited them. Bioregions can be large (an entire biome, perhaps) or small (a valley). Size does not matter. What defines this approach is that the researcher explores connections between the environment and humanity in a region. But histories of bioregions that are now divided by the international border are rare. My study of the environmental history of the

northwestern plains before 1806 (Binnema 2001) and Richard Rajala's (1998) study of clearcutting in the rainforests of the Pacific Northwest are two notable book-length studies.

Bioregional approaches are particularly useful for researching periods before post-Columbian political boundaries became environmentally relevant, but scholars are still wise to ask how environmental characteristics of a place influenced its history, even if their studies are not primarily bioregional. Political jurisdictions are crucial to Margaret Beattie Bogue's (2000) excellent history of the Great Lakes fisheries, but she wisely organized it around a bioregion (the Great Lakes drainage basin). Still, her study would have been enhanced by analysis of the environmental characteristics of that bioregion that may have made its fish more or less vulnerable to the effects of human action.

Studies whose boundaries are not defined environmentally but ethnically, culturally, or religiously might be defined more loosely as "regional," but they too can benefit from attention to environmental regions. The environmental dimensions of Native history come immediately to mind. The precolonial territories of many Native communities, whose boundaries were often influenced by environmental realities, have since been bisected by the international border. In other cases, peoples formerly lived on one side of that border but now live on the other; some crossed the line quite intentionally. Furthermore, government policies have had important implications for reserve and reservation environments in Canada and the United States. Fortunately, transborder studies of Native history are already too numerous to list here, although the environmental dimensions of that history still offer tremendous potential for perceptive study. Non-Native communities are also amenable to such approaches. For example, scholars interested in the role of Latter Day Saints (Mormons) in the history of irrigation, or of Hutterites and communal farming, might consider the importance of transborder communities that occupy environmentally similar places.

Not all environmental histories need to be defined bioregionally, but in some cases limiting our gaze to one political jurisdiction when the phenomena we study are bioregional can distort our research. For example, a strictly national approach to the history of the bison obscures important aspects of the extirpation and restoration of that species. Not only did the historic range of the plains bison extend well north of the 49th parallel, evidence suggests that for most of history the population density of plains bison may have been higher north of the line than south of it (Bamforth 1988; Binnema 2001). Furthermore, herds moved freely across that line right until the extermination of the last roaming herds in 1882. Thus any comprehensive history of the plains bison that assumes that the bison "occasionally stray[ed] from the American Great Plains to Canada, Mexico, and the eastern United States" (Isenberg 2000: 4) will be fundamentally weakened.

For some phenomena, political borders may not have mattered much even after they had become important in other ways. A historian who tried to reconstruct the population dynamics of the passenger pigeon from 1492 to 1914 might conclude early on that governments and political boundaries mattered little in the history of the passenger pigeon. And by studying the entire historic range of the passenger pigeon – British fur traders and naturalists reported them as far north as 62°N – that historian might reach insights invisible to those studying the passenger pigeon only in a single political jurisdiction.

Scholars who study periods when political boundaries were environmentally significant will not normally take exclusively bioregional approaches. While a study of the history of the plains bison might take a purely bioregional approach to 1820, it must become increasingly comparative for years when the destruction of the bison in the Hudson's Bay Company Territories/Canada differed increasingly from the extirpation in the United States. Some important factors in the decline of the bison in the Mississippi/Missouri River drainage – the coming of the railroads and the activities of white hide hunters, to name two – were unimportant in the Hudson's Bay drainage, yet the bison disappeared from the prairies in Rupert's Land/Canada slightly before they did from the United States (Foster 1992; Dobak 1996). A comparative study for that period might still incorporate bioregional considerations, but a comprehensive study of the post-1890 efforts to restore the North American bison in captive breeding programs would demand a far more comparative than bioregional approach.

Perhaps the association between "bioregion" and radicalism has deterred some scholars, but environmental historians need not advocate particular ideologies, whether they be radical environmentalism or anti-nationalism, to acknowledge the utility of bioregionalism and regionalism as framing mechanisms. Not all will cross international boundaries, but many will. And when they do, they need not imply anti-nationalism or radical environmentalism. The truth must be plain to every environmental historian: bioregional approaches are essential. Thoroughgoing bioregional studies are necessary to enrich our understandings of how past human societies responded to the opportunities and challenges posed by their natural surroundings. The incorporation of bioregional approaches into other studies are crucial to remind us of the natural factors that impinged on historical processes that even environmental historians too often assume are wholly or primarily anthropogenic. When such studies cross political boundaries (whether they be tribal, state/province, or national), the potential insights may well be greater than when they do not.

Fortunately, the practice of bioregional history presents interesting and rewarding intellectual challenges and opportunities. Bioregional history demands imaginative and aggressive multidisciplinarity. Historians of bioregions must consult relevant work in the sciences (especially in the

environmental sciences) and the social sciences. This can be daunting, but if rated according to the number of valuable insights gained per hour (or dollar) of research, this kind of inquiry is actually quite efficient, especially when researchers enjoy supportive colleagues in other disciplines. Thus graduate students and faculty who are poorly funded and short of time should consider taking bioregional approaches to the history of the places in which they live, particularly if their home universities support scientists who study those same places.

Comparative Approaches

Today, thanks to contrasting land use and settlement patterns on opposite sides of the Canada-United States border, that boundary is easily discernable on satellite images (as a perusal of Google Earth's satellite images of the area east of Blaine, Washington, and along much of the northern border of eastern Montana reveals). Even where the border is less visible, public attitudes and values, economic realities, and government regulations and policies set apart environments on opposite sides of the border in less obvious but equally significant ways. The many illuminating similarities and differences in Canadian-United States environmental history provide many incentives to engaging in comparative study. Unfortunately, like bioregional studies, comparative studies in Canadian-United States transborder environmental history are surprisingly scarce.

Scholars have long recognized the value of comparative history. Robin Winks, one of its most sophisticated and passionate practitioners, once argued:

> All history needs to be comparative history.… Those who know only their own country's history know not their country's history. How is it possible to know what is unique about a culture, if one has studied only that culture? How can one conceivably understand how the culture stands apart from, or participates in a variety of generalizations about, the universality of humanity, if one has not studied other cultures? (1994: 16)

History that is not comparative also encourages historians to assume that the historical processes they study were natural or even inevitable. In his defense of comparative history, the French historian Marc Bloch argued rhetorically, "is there anything more dangerous for scientific inquiry than the temptation to regard all things as natural?" (quoted in Degler 1968: 427). Comparative history, then, allows us to move beyond the paradoxical myths of exceptionalism and inevitability to explore how like forces acted upon similar countries sometimes to produce parallel and sometimes strikingly different results. Examples illustrate the point. If we understand that from 1885 to 1930 Canadian bureaucrats believed that their national

parks should have permanent town sites with many tourist amenities (indeed, that such town sites should be planned if they did not exist previously), the history of national parks in the United States at the same time takes on new significance. Similarly, when we learn that in 1894 the Canadian government repudiated the riparian water rights principles long entrenched in English common law, *and* the prior appropriation principle then evolving in the United States (Burchill 1948), the history of irrigation law in both countries seems less natural than we might otherwise assume.

Unfortunately, comparative history often fails to reach its potential. As Winks once noted, "most comparative history seems to turn out to be simply two histories written parallel to each other: this happened here, this happened there. The reader is without any sense that by actively comparing the two … one has learned something greater about each, rather than merely having set fence posts down, and strung some barbed wire, some data between the posts" (1994: 16). The most thoroughgoing comparative histories are deeply interpretive and analytical studies that identify and explain similarities and differences in historical phenomena in two or more places to gain a better understanding of those phenomena than could be achieved by studying their manifestations in only one context. A fine example of such a study is Marilyn Dubasak's (1990) comparison of environmental movements in Canada and the United States from the early 1960s to the early 1970s. Her emphasis on the differences in what seem superficially to be very similar movements helps us better understand the environmental politics of both countries in that crucial decade.

But if, as Winks argued, "all history needs to be comparative history," not all history needs to be as thoroughly comparative as Dubasak's. Comparative history (like other transborder approaches) is not a method, but "a cast of mind, a temperamental openness to new questions, a continuing renewal of curiosity and search for fresh perspectives" (Grew 1985: 100). Research may still be considered comparative if the main purpose is a better understanding of the history of one country by comparing it with another. For example, the focus and most of the primary sources used in Richard Rajala's (1998) history of clearcutting are Canadian, but Rajala wisely sought to better understand British Columbia's history by comparing it with the history of the Pacific northwestern states. Indeed, even brief comparisons can forcefully show how differently things might have turned out had circumstances and decisions in one location been even slightly different. But historians need to be wary of oversimplifying and misinterpreting the evidence when their comparisons are superficially researched examples injected into a study of a single location.

American scholars who have undertaken comparative Canada-United States studies sometimes remark that it was not until they had become familiar with Canada that they understood the value of such comparisons. This may explain why so few promoters of comparative history have

advocated Canadian-United States comparisons in particular. They may assume Canada and the United States to be so similar that comparison makes about as much sense as comparing two Delicious apples. Those who understand the significance of the French presence in Canada concede the significant differences between French-Canadians and Americans, but perceptive observers also quickly recognize that comparisons between the United States and English-speaking Canada are at least as useful. If comparing apples with apples makes more sense than comparing apples with oranges, the neo-British settlement colonies (United States, Canada, Australia, and New Zealand) are ideally suited to comparative studies. To extend the metaphor, when we compare the United States, Canada, New Zealand, and Australia we compare Delicious, McIntosh, Gala, and Granny Smith apples. (The topic of apples brings to mind Jason Bennett's [2008] sophisticated environmental and cultural history of apple orcharding in British Columbia, Washington, and Oregon, although that study is not primarily comparative.) Thomas Dunlap (1999) has already demonstrated the value of comparative study of the environmental history of those four countries. But because Canada and the United States share a continent, the most apt comparisons of the United States are often with Canada. In short, English-speaking Canada and the US come as close to the clinician's "control" group for each other as a historian can ever expect. The similarities and differences in the environmental history of Canada and the United States render the countries ripe for comparison.

Examples drawn only from remarkable parallels in national parks history in Canada and the United States hint at the rich potential for comparative study. Uncanny resemblances mark the Hetch Hetchy and Spray River controversies. In 1923, about a decade after Hetch Hetchy was dammed, Calgary Power proposed to dam the Spray River, which was then inside Canada's oldest national park, Banff. Perhaps because of different political systems and cultures, and public attitudes, the Canadian controversy captured far less public attention than the American, but the Canadian protagonists often echoed – even quoted – John Muir and Gifford Pinchot. In Canada, as in the United States, preservationists lost the battle. Spray River was dammed. But the conflict left legacies not unlike the Hetch Hetchy controversy. The establishment of the Canadian National Parks Association and the passage of Canada's National Park Act (1930) – which stated that national parks should "remain unimpaired for the enjoyment of future generations" – were analogous to the establishment of the Society for the Preservation of National Parks in the United States, and the enacting of the United States National Parks Act (1916). In an interesting contrast to American developments, however, Canada's National Park Act was used to justify halving the size of Banff National Park, including removing the Spray River valley (Reichwein 1995; Bella 1987). These similarities suggest that Robert Righter's (2005) reinterpretation of the Hetch Hetchy controversy

may call for a reexamination of the Spray River controversy. More broadly, a comparative approach may lead to new insights about both controversies, or about the nature of North American conservationist and preservationist thought in the late nineteenth and early twentieth centuries.

Many other parallels in the history of Canadian and American parks policy are worth exploring. What Robert Craig Brown (1970) has described as the "Doctrine of Usefulness" in Canadian parks policy might be compared with Alfred Runte's "Worthless Lands" idea (1979: 48–64). Predator control in parks in the United States was sometimes defended on the grounds that these predators were still abundant in Canada. Subsequent efforts to restore the integrity of natural regions required international cooperation. The nearly complete extirpation of the elk from Canada meant that Yellowstone elk were used to restock Canadian national parks in the early twentieth century. More recently, the controversial reintroduction of wolves to American wilderness areas required the relocation of wolves from Canada. All the while, Canada often boasted of the abundance of its large game, and emphasized that abundance by donating animals to foreign collections (Dunlap 1991; Jones 2002; Colpitts 2002; MacEachern 2009).

Thomas Dunlap's (1984, 1986, 1990, 1991) work on predator control already proves the value of comparative work on that topic, but Theodore Catton's (1997) and John Sandlos's (2007) separate examinations of the roles of aboriginal people in national parks in Alaska and the Northwest Territories offer only unrealized evidence that a comparative study would repay the effort. Other studies relating to aboriginal people and national parks offer similar tantalizing evidence. The evidence that conservationists were more important than preservationists or wilderness advocates in the exclusion of aboriginal people from national parks in Canada in the late nineteenth and early twentieth centuries suggests that the parallel process in the United States needs reassessment (Binnema and Niemi 2006; Sandlos 2008). Clearly, even when historical processes were similar in Canada and the United States, comparative study is worthwhile.

Stark differences can often be as illuminating as remarkable similarities, as examples from irrigation history in Canada and the United States show. The histories of irrigation in Canada and the United States are intertwined yet divergent. The migration of Mormon settlers from Utah to the semi-arid western plains of Canada in 1887 influenced the Canadian government's decision to plan irrigation legislation. Canadian bureaucrats researched irrigation law in the United States, but the North West Irrigation Act of 1894 eventually emulated legislation passed in India in the 1850s, and especially in the colony of Victoria (Australia) in 1886. According to one scholar, the Victoria legislation was "the first legislation in an Anglo-Saxon country to reject the doctrine of riparian rights and to substitute the Indian principle that surface waters should belong to the Crown, rather than to individual property owners," but the Canadian legislation was "still more sweeping in its obliteration of the principle of riparian rights" (Burchill

1948: 357, 360; Breen 2004). Canadian scholars have offered preliminary comparisons between irrigation laws in Canada and the United States (Evenden 2006; Percy 1992, 2005). However, growing concerns over water deficits in western North America suggest that a thorough comparative history would be timely and instructive.

Bison restoration efforts in the early twentieth century also went in very different directions in Canada and the United States. Endeavors in Canada got a head start over those in the United States when, in 1906, misguided nationalist fervor inspired the Canadian government to buy up the largest herd of free ranging plains bison in North America, and move them from Montana to Canada, a decision that hindered restoration efforts in the United States. Then the Canadian government, which dominated restoration efforts in Canada, so badly bungled its bison conservation program that it is hard to conclude that Canada has been a net contributor to North American attempts to bring back the plains bison (Brower 2008). Research on later periods has raised similar questions about the effectiveness of Canadian government bison management strategies (Foster et al. 1992; Sandlos 2002). This Canadian history invites comparison with history in the United States (Isenberg 2000: 164–92).

Some of the challenges of comparative study are the same as those that confront all transborder historians (and thus will be discussed in further detail below), but others are particular to comparative study. Comparative historians, for example, ought to be particularly cautious about developing the presentist urge to compare two pasts in order to prescribe a path for the future, or to seek to correct the errors of the past. Legislators, policymakers, and advocates ought to be interested in comparative study for the purposes of identifying promising and dangerous alternatives, and comparative historical study will frequently allow us to do so. But, at best, examples from the past of one country can provide only imperfect models for future action in another. However well intentioned, a historian-advocate is likely to ignore or downplay the particular historical, constitutional, political, and cultural circumstances that make it unwise or impossible to implement one country's past policies in a second country in the present. Even less useful, historians may seek through comparative history to praise or condemn the actions or policies in one country by comparing them with another. Although not written about environmental history, those tempted to find "better" and "worse" relationships with the environment may benefit from reading Deborah Montgomerie's article "Beyond the Search for Good Imperialism" (1997).

Transnational Approaches

Many aspects of the environmental history of Canada and the United States are so interconnected that scholars will learn as much about them if they study them as variants of transnational (even global) phenomena as they

would by comparing them. Many scholars have already studied such phenomena, but rarely by focusing on Canada and the United States. So many factors – including geographical proximity, similar environmental challenges, linguistic, cultural, social, economic, and political similarities, and the actual movement of people across borders – have encouraged the diffusion of environmental values, ideas, and movements across the Canada-United States border, that North American environmental history ought to be studied transnationally. Transnational approaches examine phenomena in two or more countries that manifested themselves in different ways but still influenced and reinforced one another; were part of larger global trends; or were dealt with by people and institutions on either side of a border in similar ways (Taylor 2008).

Among the most thoroughly transnational studies in Canada-United States environmental history is the previously mentioned history of the Great Lakes fishery by Margaret Bogue (2000). Its central argument is that the Canadian and American federal systems that fragmented authority over fisheries among national and state/provincial governments undermined efforts to manage the fish of the Great Lakes. Thus, while the book's scope is defined bioregionally, and the book did conclude that Canadian environmental management was comparatively more effective than that of the United States, it is primarily transnational, rather than comparative. Other studies that are primarily comparative (Dubasak 1990; Dunlap 1999) also address transnational dimensions of environmental history. By exploring how similar or related environmental phenomena manifested themselves in two or more countries, and how they influenced developments in those countries, they enrich our understanding of the phenomena more generally, *and* of the manifestations of the phenomena in each country.

Environmental history is replete with examples in which developments in Canada and the United States were intertwined. Aspects of some important phenomena have been missed because their transnationality has been overlooked. We do not yet understand the significance of the Canadian examples employed in George Perkins Marsh's *Man and Nature* (1865) or Rachel Carson's *Silent Spring* (1962), although one Canadian historian has argued that American scholars have underestimated the European influence on Marsh and on nineteenth-century North American conservationism more generally (Girard 1990). Furthermore, few understand the significance of a multinational conference on conservation, organized by Theodore Roosevelt and Gifford Pinchot and held in Washington, DC in 1909. It does not feature prominently in the environmental historiography of the United States or Canada, despite the fact that its delegates from the United States, Canada, Mexico, and Newfoundland issued a bold joint Declaration of Principles of Conservation and resolved to create commissions of conservation in each of their home countries. The conference may be little known in the United States because the American Congress refused to create such a

commission there, and little known in Canada because the connection between Canada's Commission of Conservation (COC) and that conference has not been adequately appreciated. But there is little doubt that Roosevelt and Pinchot were crucial in the creation of Canada's COC, which, during its existence from 1909 to 1921, advocated effectively for national standards for air and water quality, proper sewage and waste disposal and treatment (including waste recycling and composting), and urban planning (including adequate urban parks). The COC had a mixed record of success and failure, but one Canadian historian concluded that "by 1921, most provinces had, or were in the process of adopting laws, regulations, and standards based on the commission's recommendations, thereby improving the quality of life for millions of Canadians" (Girard 2003: 109; 1991). The extent to which the COC's recommendations and reports influenced people in the United States is unknown.

It often requires only minimal investigation to discover potentially significant connections between events and trends in Canada and the United States. Greenpeace was founded by Canadians and Americans in Vancouver in 1971, but has since gone global. Ducks Unlimited was founded during the 1930s by Americans who were concerned about the disappearance of wetlands in Canada. Oregon passed the first bottle-return bill in the United States in 1971 (Robbins 2004: 298), a little over a year after British Columbia enacted the first such program in North America. Oregon's Senate Bill 100 (1973), which introduced that state's important land use planning law (Robbins 2004: 290–308), was passed six weeks after the British Columbia government passed its Land Commission Act. And the two developments were connected. To counter opposition suggestions that Agricultural Land Reserves were "Marxian," the social democratic premier of British Columbia, Dave Barrett, noted that it was a Republican government that had just introduced similar legislation in Oregon. And in 1992, when BC politicians debated amendments to the legislation to make decisions about agricultural land reserves less open to political interference, the agriculture minister, Bill Barlee, claimed that "the state of Oregon … wishes they had our agricultural land reserve act" (Binnema 2005: 116). Unfortunately, we do not know how much communication between Oregon and British Columbia in the early 1970s influenced the environmental initiatives in those two places, but there is good reason to believe that the two-way flow of people and ideas has significantly affected environmental history in both countries.

International Approaches

Since many North American environmental problems and challenges had international dimensions (including pollution, habitat degradation, species endangerment, water shortage, exotic invasive species, drought, forest fires,

and resource depletion), and because Canada and the United States share so many political, social, economic, and environmental values, the two countries were exceptionally likely to disagree, negotiate, and cooperate on environmental problems, sometimes in ways that broke ground in international law and diplomacy. Because of this, the history of Canada and the United States offers many interesting opportunities for international approaches to environmental history.

Kurkpatrick Dorsey's (1998) history of three milestone treaties in the history of United States-Canadian conservation diplomacy is the best example of an international approach to Canadian-American environmental history. Dorsey explores the failed Inland Fisheries Treaty of 1908, the North Pacific Fur Seal Convention of 1911, and the Migratory Bird Treaty of 1916. His study examines the reasons for the successes and failures of the three treaties. The history of the Trail Smelter Dispute (1927–41) has also attracted significant scholarly attention because "it is justly celebrated as the first international ruling on transborder air pollution and for its affirmation of the 'polluter pays' principle in international law" (Wirth 2000: 1). Tall smokestacks installed at a lead and zinc smelter to ease pollution in Trail, British Columbia, sparked the dispute because they exported the problem to neighboring Washington State (Wirth 1996, 2000; Bratspies and Miller 2006). Many examples provide excellent opportunities for further research in international environmental history, including one of the first international conservation treaties in history (the North Pacific Fur Seal Convention of 1911), the Boundary Waters Treaty (1909), the Columbia River Treaty (1961–4), the Water Quality Agreement (1972), the Canada-United States Air Quality Agreement (1991), the North American Free Trade Agreement's North American Agreement on Environmental Cooperation (1994), and the Great Lakes Binational Toxics Strategy (1997).

Borderlands Studies

Borderlands approaches turn scholars' gaze on the significance of borders themselves. Most focus on the legal, political, geopolitical, and social significance of borders for the regions on both sides (or less effectively on only one side) of a border. They are almost inevitably also comparative, transnational, or international, but are undertaken in the belief that the questions that a borderlands approach educes will lead to particularly valuable insights that might otherwise be missed.

Given the importance of the St. Mary and Milk rivers in irrigation history, they might feature prominently in any transborder history of irrigation, but a borderlands study might produce some fresh insights. The St. Mary River finds its source in the permanent glaciers and snows of the Rocky Mountains in northern Montana, but soon flows into Canada on its

way to Hudson's Bay. The Milk River's headwaters are near those of the St. Mary, but the Milk derives most of its water from the less dependable winter snows of the Montana foothills. Soon after it enters the western plains, it flows through southern Alberta for about 215 miles before reentering Montana and emptying into the Missouri River. The very fact that these rivers cross the border has significantly affected their place in history. The passage of Canada's 1894 Irrigation Act was facilitated by rumors circulated by William Pearce (the primary advocate of the Bill) that the Great Northern Railroad was considering damming the Milk River (flooding lands in Canada) to irrigate its lands in Montana (Burchill 1948: 361). The river's importance in United States history increased in 1898 when a conflict arose between non-Native settlers and the Fort Belknap Indians over access to the river's water. Litigation led to the landmark *Winters v. United States* (1908) Supreme Court decision that gave Indian tribes preeminent rights to the waters of Milk River. The different legal regimes in Canada and the United States mean that the international border significantly affects the way the St. Mary and Milk rivers are exploited on opposite sides of the border.

Canada and the United States also clashed over access to the water of the St. Mary and Milk rivers. Conflict began as early as the 1880s, but heated up when the United States Reclamation Service began constructing a canal to divert water from the Canada-bound St. Mary River to the Milk River for use by Montana farmers. Canada responded by beginning construction of another canal on the Milk River that would re-divert the water for Canadian use. The ensuing dispute was eventually resolved by the Boundary Waters Treaty (1909), which included provisions for water sharing by way of a canal that diverts water from the St. Mary River to the Milk River to be used for irrigation in Montana. The treaty is still in force today, and the bi-national International Joint Commission charged with preventing and resolving conflicts still oversees cross-border issues related to irrigation, hydroelectric developments, and water quality along the entire Canada-United States border. Environmental change (which affects the flow of the two rivers very differently) suggests that the two rivers will have as significant a place in the future as they have had in the history of irrigation and water management.

Challenges of Transborder History

If transborder approaches are to reach their potential, scholars should consider them continually, from the beginning to the end of their research projects. Transborder approaches affect a scholar's choice of research questions, primary sources, relevant evidence, interpretive biases, and imagined audiences. A scholar will proceed very differently if undertaking a bioregional

history of the Great Plains in the 1930s rather than a transnational study of the agricultural practices and government policies that contributed to and emerged from the environmental crises of the 1930s on the Great Plains. To a frightening degree, the questions we ask and approaches we take determine the conclusions we reach. However, on many topics, transborder approaches greatly increase the potential for finding unanticipated fresh insights.

But transborder historians face challenges and opportunities that other historians do not. They inevitably need to consult more primary and secondary sources (often involving expensive and time-consuming travel), need to understand the histories of more countries, and need to understand the historiographical traditions in different countries. Transborder studies almost always demand that historians understand very well the different political, constitutional, legal, economic, and social structures, processes, and cultures in Canada and the United States (and in jurisdictions within these countries). One of the most common mistakes made by transborder scholars is to assume that Canada and the United States are more similar than they are. Scholars need to understand not only how laws, governments, and institutions operated in the two countries (something that most will certainly anticipate), but also the subtleties that might escape the inattentive. For example, in Canada, one might find references to big game as "the Queen's beef" – a term than betrays different public attitudes toward Crown lands and resources in Canada and public lands in the United States that a researcher might overlook. On the other hand, an alert non-Canadian is more likely than a Canadian unfamiliar with United States history to be struck by the significance of that evidence. Given that relatively few non-Canadian scholars have researched Canadian history, non-Canadian scholars are in an excellent position to see in Canadian environmental history meaning and importance that Canadian historians have not noticed.

Unfortunately, when transborder studies contain basic errors of fact about one country, many readers will wonder about the reliability of those studies' supposed deeper insights. For Americans to understand this, they need only imagine how their confidence in a study would be shaken if it misspelled George Washington's name, implied that Texas or California was part of the United States in 1842, or got the completion date of the United States' first transcontinental railroad wrong even by one year. Analogous errors appear in transborder work on Canada. Editors, supervisors, and researchers themselves ought to ensure that transborder studies are read by (or even collaborated by) specialists (and copy editors?) on both sides of the border before they are published. Even then, researchers who crave the praise of their colleagues might want to avoid transborder studies. At the same time, scholars ought not to dismiss too quickly the work of foreign scholars who dare risk transborder studies.

An obvious obstacle to Canada-United States environmental history is that the field is far less developed in Canada than it is in the United States. As recently as 2004, Peter Coates described environmental history in Canada as "a fledgling compared to its American counterpart" (2004: 423). Things have improved significantly since then. There are now several introductions to the field suitable for students and researchers. Graeme Wynn's *Canada and Arctic North America: An Environmental History* (2007) is the first narrative survey. Two other recently published collections are commonly used as undergraduate and graduate textbooks in Canadian environmental history (Duke 2006; MacEachern and Turkel 2009). They largely supplant an older but still useful collection (Gaffield and Gaffield 1995). These all supplement the best general introduction to North American environmental history, Char Miller's *Atlas of US and Canadian Environmental History* (2003). To be sure, that volume inevitably reflects the weaknesses of transborder environmental historiography, as few sections of the book offer more than side-by-side narratives or superficial comparisons. Nonetheless, simply by presenting Canadian and United States environmental history in one book it reveals many suitable avenues for further research.

Transborder historians also need to confront the very different historiographical traditions in the United States and Canada. Sometimes differences can inspire historians to pursue new questions. The frontier thesis has had considerably less impact in Canada than it has had in the United States, but it did influence Canadian historians noticeably between the world wars when several scholars emphasized Canada's North American, rather than British, character (see Cross 1970). But because few Canadian historians ever argued that the frontier experience was a defining experience for Canada, "frontier" is freighted with little intellectual baggage there.

Of course, the Turner thesis itself suggests possibilities for cross-national and comparative study. Given that no one is more closely associated with the myth of American exceptionalism than Turner, it is ironic that Turner himself argued that "if … we should compare those [frontiers] of other countries … – such as Russia, Germany, and the English colonies in Canada, Australia, and Africa – we should undoubtedly find most fruitful results" (1932: 18–19). In fact, a transnational approach – rather than a comparative approach – to the North American frontier is most appropriate. As the University of Minnesota historian Paul Sharp noted, "even as [Turner] wrote, thousands of his fellow countrymen were seeking in Canada the economic and social opportunities he described as characteristic of a frontier society" (1950: 287). Viewed this way, the settlement of the Canadian plains "with its meaning for the American story, deserves analysis, for the Canadian plains were not a distant region to be listed casually with Australia, South Africa, or South America as another of the remote frontiers that remained after 1890 to challenge the discontented" (287). Indeed, Sharp

argued that "the year 1890 loses much of its focal character in western history when a truly regional view is adopted" (286).

Whereas Turner emphasized the frontier, Canadian historians have emphasized the influence of the metropolis. The Laurentian, staples, and metropolitan theses (associated most strongly with Donald Creighton, Harold Innis, and J. M. S. Careless) emphasize the role that major urban centers have had as the political and economic organizers and developers of their hinterlands. As recently as 1991, Ian Tyrrell argued that American environmental historians "could build on work done by the Canadian economic historian Harold Innis and others in the 1930s" (1991: 1049). The metropolitan thesis has influenced American historiography significantly. In the text of his widely praised *Nature's Metropolis: Chicago and the Great West*, William Cronon discussed at some length the shortcomings of the frontier thesis, although he puzzlingly relegated his nearly 600-word discussion of the value of the metropolitan thesis to a footnote (1991: 400–1).

Different historiographical traditions also pose significant obstacles to historians. Because of them, any cross-border historian has to wonder whether perceived differences in history are actually only differences in historiography. The historiographical traditions of Canada and the United States are different enough that few transborder studies based on secondary research, as valuable as they might be, should be considered as anything but highly tentative explorations. For the foreseeable future, the most authoritative studies will be narrower studies based on thorough primary research.

Conclusion

While it is often not possible to anticipate how any given bioregional or transborder study will enrich our understanding of environmental history, it is certain that they will do so. It is also certain that the present lack of transnational studies in Canada-United States environmental history means that our understanding of that history is not only incomplete, but distorted in significant ways. If the challenges of transborder history are daunting, the potential rewards make venturing out into this largely unknown and perilous terrain all the more compelling.

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Chapter Thirty-two

Seeing Beyond Our Borders: US and Non-US Historiographies

Paul Sutter

I am an environmental historian of the United States by training and practice, but, for several reasons, I have traveled among other environmental historiographies over the last decade. In doing so, I have been amazed by the richness of these literatures and embarrassed by prior ignorance of them. Moreover, I sensed that I was not alone among my Americanist peers in having a limited knowledge of environmental history beyond US borders. And as I work on a transnational environmental history of the US construction of the Panama Canal, I have been struck by how much more at home my central research questions – questions that have to do with imperialism, disease, race, and ideas of tropical nature – are in non-US environmental literatures. Such traveling has given me a new perspective on my own field and my own research.

Let me begin by offering several caveats about this essay. First, it is by no means the product of exhaustive reading in non-US environmental historiography. I have read selectively, and I have surely missed important works that might have contributed to, or even altered, my thinking. Second, I focus on specific historiographies – South Asian, African, and comparative – at the expense of others – European, Australasian, and Latin American. In part, this choice reflects those literatures that I have found most intriguing and useful, and in part it reflects my own continuing thin exposure to these other literatures. Third, this essay is addressed to my fellow environmental historians studying the United States, and as such I will be emphasizing those themes and questions that I think most useful to us. Fourth, my major distinction is between the United States and the rest of the world as subjects of study, not as places of practice. I am less interested in how historians from Europe or South Asia approach environmental history differently than Americans, and more interested in how those *studying* Europe or South Asia, whatever their national origin, might differ in their

approach from those *studying* the United States. Finally, and regrettably, I have had to confine my reading to English language sources. Stronger language skills surely would have made my travels more productive.

The most notable aspect of non-US environmental historiography lies in its focus on colonialism and imperialism as environmental processes. Indeed, studies of the environmental implications of colonial and imperial encounters have largely fueled the rapid growth of non-US environmental historiography (MacKenzie 1997). While this is not exactly a revelation, and while there are prominent exceptions to this rule, it is important to emphasize the extent to which non-US environmental historians have made central to their work processes that seem at best understated in US environmental historiography.

Should US environmental historiography be more attentive to colonialism and imperialism? The answer is an emphatic "yes," though with some qualifications. Certainly, the United States has a deep and distinctive history with colonialism, and US environmental historians have paid attention to the ecological consequences of the colonizing process (Cronon 1983; Crosby 1986). But to this point, few have worked to put this history into a broader colonial context. Environmental historians of the North American colonial experience would be well served by looking at such intellectual, institutional, and ecological themes as acclimatization, plant and animal exchange, the role of colonial science on the periphery, and the various networks that linked colonial encounters in North American environments to other colonial sites (Osborne 1994; Grove 1995; Dunlap 1999; Drayton 2000). A few models exist. Joyce Chaplin's *Subject Matter* (2001), which traces the development of an "Anglo-American corporeal identity," is the most ambitious effort yet by an early Americanist to deal with connections between science, nature, and empire that are often made in the non-US literature. And Thomas Dunlap's *Nature and the English Diaspora* (1999), though it focuses mostly on the nineteenth and twentieth centuries, has set an agenda for comparative inquiries into the US environmental experience as a "settler society," a concept most fully developed in the Australasian and South African historiographies (Griffiths and Robin 1997). Finally, one of the central insights of Richard Grove's work – that colonialism both promoted large-scale ecological change and provided a context in which those on the periphery could witness and think critically about such change – deserves careful application in the North American setting. Part of the importance of Grove's argument lies in its insistence that environmental concern emerged as early as the seventeenth century as a reaction to *global* processes, an argument that challenges the exceptionalist thread in the US historiography connecting environmental appreciation and nation. We have been too quick, Grove intimates, to see early American environmental sentiment within the context of an emerging national culture to which nature was a central component. Grove's work begs the question of whether the strong US environmental tradition, and particularly its attachment to

a declensionist narrative, has its roots in a critical response to a long history of environmental disruption by colonization, a history that was not unique to the United States and one that needs to be put in an international context (Grove 1995; Knobloch 1996).

As a modern nation, the United States has pursued its own imperial goals in places such as the Caribbean, Latin America, the Philippines, and Southeast Asia (and, for that matter, the American West), efforts that have only recently been mined for their environmental significance – more often than not by historians who have traditionally worked on non-US topics. Richard Tucker (2000), whose previous work has been on South Asia and the history of tropical deforestation, produced an important study, *Insatiable Appetite*, that examines how corporate internationalization and expansive American consumer habits have contributed to the degradation of tropical ecosystems, and John Soluri (2005) has followed suit with a superb study of the "banana cultures" that linked Honduran production and US consumption. These studies ought to be the first volley in a sustained campaign to better understand the international ecological footprint of the modern United States, and to put environmental history at the center of the broader transnationalization of US history. Michael Adas (2006), a historian of South and Southeast Asia, has written a compelling study about how engineers and an engineering mentality influenced US efforts to manage people and nature in places such as the Philippines, Panama, and Vietnam. And both Warwick Anderson (2006) and I (2007) have examined imperial public health efforts during the US occupation of the Philippines and Panama, respectively, efforts that linked ideas of tropical nature, race, and health into an ideology of control and supremacy.

The larger contrast that emerges out of a reading of what John MacKenzie (1997) calls "the historiography of the imperial environment" is one between capitalism (or market economies more broadly) and the state. To generalize, US environmental historiography traditionally focused on the former, and particularly on the impact of capitalism on wild nature, while non-US environmental historiography focused more on the latter, and particularly on how colonial and postcolonial states have intervened to upset human ecologies. This is, of course, too neat a distinction; US historiography has paid significant attention to government conservation efforts, for instance, and scholars such as Donald Worster (1985) have shown how the state has been a crucial partner in capitalist development. But only recently have environmental historians of the US started looking at state conservation as a colonizing force. Such a shift has produced narratives closer to, and sometimes influenced by, non-US literatures.

South Asian environmental history is one of the most developed non-US environmental historiographies, and environmental historians of South Asia have seen the state as "a leading, often the principal, actor" (Guha and Arnold 1998: 12). A few things are worth noting about this historiography.

First, it is preoccupied with the subcontinent's forest history, though the history of irrigation and water manipulation has also received considerable attention. Second, it has, until recently, been mostly concerned with delineating the history of British imperialism as an environmental watershed, which has meant an emphasis on the colonial state as the premier agent of environmental change. Third, South Asian environmental history has been centered more on the social consequences than the ecological consequences (to the extent that they can be separated) of that change. If the moral of South Asian forest historiography had to be reduced to a single sentence, it would read something like this: the importation of a scientific model of forest conservation by the colonial state upset a complex mosaic of localized forest uses, which dispossessed and destabilized Indian peasant societies and drew their members away from an intimate and useful knowledge of nature and into an endemic cycle of protest and conflict (Guha 1989; Guha and Gadgil 1989, 1992; Rangarajan 1996b; Guha and Arnold 1998; Grove et al. 1998).

South Asian forest historiography raises some useful comparative questions for environmental historians of the US. One has to do with the contrasting origins of the fields; in both cases, environmental history emerged from advocacy. Ramachandra Guha, a leading environmental historian of South Asia, has argued that the focus on forest history emerged out of grassroots protests against India's aborted Forest Bill of 1982, which promised tightened state control over, and limited gathering on, the subcontinent's public forests (which comprise almost a quarter of the landscape, giving India a public domain comparable to the US's, a worthy point of comparison itself). The proposed bill galvanized an agrarian movement, with women at the vanguard, that has embodied and personified the core critique of the South Asian historiography (Guha 1989). South Asian environmental history followed suit; it largely has been a story of the peasantry versus the colonial and postcolonial state, with the human ecology of the peasant as the ideal worth protecting.

One lesson of South Asian environmental historiography, then, is that US environmental historians ought to look for and listen to subaltern voices that have expressed opposition not only to the environmental costs of capitalist expansion but also to the social costs of state conservation. A number of scholars, including Mark Spence (1999), Karl Jacoby (2001), Louis Warren (1997), Steven Hahn (1982), Richard Judd (2000), and Maria Montoya (2002), have already done this to good effect. They have given voice to groups such as Native Americans, Hispanos, immigrants, African Americans, and working-class rural residents whose experiences on the ecological and social margins have embodied the same sorts of critiques of state-sponsored environmental management that are at the heart of the South Asian historiography. Such voices are there to be found, and they have added – and will continue to add – a level of complexity to the US literature.

South Asian forest historians have approached the nature of colonialism as an ecological watershed with growing sophistication, navigating through the dangers of painting too stark a before-and-after picture. Yet certain important transformations produced by colonialism still stand out. One is the way in which the colonial state privileged sedentary agricultural production and imposed strict regulatory regimes on non-arable environments – with the goal of providing resources crucial to the colonial project, securing labor, and further encouraging sedentary settlement. Historians of South Asia increasingly point out that precolonial states made demands on agrarian societies that were similar to colonial demands, though the nineteenth-century colonial state came armed with industrial technologies and techniques that precolonial states did not possess. In this sense, colonialism was an ecological watershed because it was a technological watershed. But the regulation of non-arable lands, and forests in particular, was an important exception. Precolonial regimes neglected agriculturally unproductive lands, allowing users to develop autonomy "on the fringes of the cultivated arable" (Rangarajan 1996a: 132). The colonial state changed that, affecting both sedentary farmers who had relied on such environments for augmenting their subsistence and those who had survived primarily by utilizing the resources of marginal landscapes through pastoralism, hunting and gathering, and swidden agriculture. Colonialism in South Asia was an environmental watershed not because an interventionist state appeared where none had existed before, but because the colonial state clamped down on precisely those commons landscapes that had previously escaped state scrutiny.

This South Asian focus on the environmental as well as the social margins helps us to see that state conservation and preservation in the US have also been about regulating non-arable environments and the people living in, or moving into, them. So much emphasis has been placed on seeing conservation and preservation as heroic limitations on capitalist resource exploitation – or, alternately, as policies that privilege resource efficiency or the recreational needs of the leisure class – that we have not recognized that our state conservation also arose as an effort to contend with marginality (Runte 1987). We still remain captured by notions of land and resource scarcity as the triggers for conservation when, in fact, marginality might be the more useful organizing concept. To put it another way, Frederick Jackson Turner's famous proclamation might have been more accurate if it had declared the end of *arability* as of 1890. Almost every major conservation measure that followed, from the Timber Reserve Act of 1891 to the Taylor Grazing Act of 1934, involved the federal government accepting responsibility for marginal public lands resistant to the American agrarian dream of a settled yeomanry. Environmental historians of the US would find it productive to think in terms of this duality, central to the South Asian historiography, between arable and non-arable lands – a distinction, it should be noted, that is at once ecological and cultural.

Other important lessons for US environmental historians, however, lie in the differences between the US and South Asian settings. The comparative study of the roots of environmentalism and environmental history in the US and South Asia begs the question of whether the US has agrarian or peasant traditions of environmental protest comparable to the ones in South Asia, and, if not, how the absence of such a tradition has shaped the history of US environmental thought and politics. The demographic histories of the two continents suggest an obvious contrast: the Indian subcontinent is still dominated by Indians, whereas indigenous Americans suffered demographic collapse and state policies that forced them to the margins of American society. As a result, environmental protest in the United States has been a movement dominated by the colonizers, not the colonized.

Native Americans are perhaps the closest that the US comes to a peasant or agrarian tradition, at least in terms of the legitimacy and moral authority many historians afford their traditional land and resource claims, and there are some useful parallels to be drawn with the South Asian historiography here. Native Americans suffered at the hands of European expansion in similar ways to indigenous societies in South Asia, and US environmental historians have already done considerable work on that subject. If there is a new comparative lesson to be learned, it may be that environmental historians of the US need to take a careful look at Native-American environmental politics, experiences, and perceptions not only as manifestations of traditional environmental beliefs and practices, but also as products of their modern condition of having been continually pushed into more marginal and restrictive environmental conditions by an expanding people and the state that supported them. In the history of confronting American environmental marginality, Native Americans have been at the vanguard, forced to make do on lands most settlers considered useless. And to that injury has been added the insult of having to contend with an interventionist state that has withdrawn lands and resources from Native-American control and access, often in the name of conservation. Native Americans thus offer to US environmental historians a subaltern environmental tradition worth further examination, not because they were the "original ecologists" but because they have inhabited a position on the political and environmental margins (Lewis 1995, 1997).

Several other groups fit the peasant model as well. Hispanos in the American Southwest struggled to maintain access to lands and resources as the US government superimposed new conceptions of property and new resource regimes atop a less formal tradition of rights and practices rooted in the Spanish era (Montoya 2002). Backcountry farmers also could be fit into this category, as could Southern tenant farmers, white and black, who, though they were only briefly the subject of state conservation interventions, nonetheless constituted the closest thing to a peasantry to be found in modern America. Even ranchers might legitimately be studied as members

of an agrarian tradition of protest against the conservation state, though a rigorous comparison of Western ranchers and South Asian peasants would likely reveal that their differences – from the political power each enjoys in shaping resource management regimes to the environmental impacts of their activities – outweigh the similarities. Nonetheless, as Karen Merrill's work (2002) suggests, ranchers' claims to public lands and resources, and their perennial conflicts with federal resource managers, deserve an empathetic and nuanced reading.

And yet environmental politics in the United States have not been strongly shaped by persistent conflict between a traditional peasant or agrarian population and the state (Guha 2000). State conservation in the US, though it has mirrored the South Asian experience in regulating the nonarable, did not lay itself atop a landscape quite as crowded with preexisting and traditional uses and claims. Nor did it attempt to tie the control of resources and the control of labor as tightly together. Among other things, this contrast suggests some ways of reconsidering the centrality of wilderness thinking in the US and the particular complexion of US conservation politics. Environmental historians have already done important work in charting the ways in which the wilderness idea has blinded us to the victims of state conservation (and land colonization more generally). That said, wilderness is an idea that, while hostile to a preindustrial peasantry, may in fact be quite at home in this postindustrial settler society of ours, with a large public landscape whose management is a contentious issue and without a citizenry who have a deep landed history. This is not to say that wilderness has not been dispossessive in the US context, for it has. But those who have most frequently challenged wilderness preservation, and who have thus defined the debate over wilderness, have not usually been peasants. Indeed, compared with other areas of the globe, the US environmental discourse has been constricted by the comparative absence of agrarian environmental protest, at least of the sort most US environmental historians would be willing to privilege. And that absence, Ramachandra Guha (2000, 2006) suggests, has ceded the field of environmental politics in the US – and particularly public lands politics – to ideological conflicts between utilitarian conservation and preservation. In fact, in the United States, wilderness advocates, not local resource users, have provided the most potent opposition to technocratic state conservation.

The South Asian literature also suggests the need to look at US conservation history with a more global perspective. US forest historians have long emphasized European connections, and particularly the importance of German forestry, to the professionalization of American forestry around the turn of the twentieth century, but we are only beginning to discuss the importance of colonial and imperial models of forest management to the US experience (Beinart and Coates 1995; Barton 2002; Rajan 2006). Gifford Pinchot, for instance, learned from European foresters who had cut

their teeth in British India, and the US Forest Service was also active in managing the forest resources of US imperial holdings, such as Puerto Rico and the Philippines. These are connections that can be found in other areas as well. Many important American conservationists, from Elwood Mead to Hugh Hammond Bennett, had a surprising amount of international and/or imperial conservation experience before they became leading agents of soil and water conservation in the US, and the activities of US conservation agencies and individual experts reached well beyond US borders throughout the twentieth century – particularly with the gutting of the New Deal conservation state and the rise of global developmentalism after World War II (Phillips 2007). Finally, transnationalizing conservation would allow us to highlight the work of individuals and agencies whose activities have not usually been seen as central to US conservation historiography – the career of David Fairchild and his work with the Bureau of Plant Introduction is but one example (Bennett 1912, 1929; Tyrrell 1999; Tucker 2000; Pauly 2000, 2007; Phillips 2007).

Yet, as influenced as American conservationists were by colonial conservation efforts, resource conservation in the US has not been the product of an authoritarian colonial state acting outside of democratic control, but of a weaker state whose actions have been marked by compromise, localism, and capture (though compared with certain other settler societies such as Canada and Australia, where conservation policy was largely organized at the provincial level, the US state has seemed strong) (Dunlap 1999; Worster 1998). That state conservation has served the interests of industrial capital in the US as often as it has provided regulatory challenges to those interests is an old thesis in American environmental history, but it is one that deserves to be revisited in a comparative light. What may turn out to be the most interesting aspect of American conservation, at least compared to colonial regimes, was the relative weakness of the American state, its reluctant embrace of managerial responsibility for marginal public landscapes, and its subsequent inability to do anything but serve the interests of capital (Balogh 2002; Beinart and Coates 1995).

I do not mean to imply that US environmental historians have, until now, been unconcerned with the state; in the literature on water, for instance, the state presence has long been a central analytical concern. But US environmental historians have not been quick to integrate much of the new political history into their discipline (Merrill 1999). It seems time to do so, and I think that South Asian environmental history can be an important comparative touchstone. Indeed, South Asian environmental historians are themselves embarking on an instructive reevaluation of the autonomy and capacity of the colonial state, and of the role of conservationists within that state (Yang 1989; Grove 1995; Rangarajan 1996b; Skaria 1999; Sivaramakrishnan 2000; Rajan 2006). To the extent that US environmental historians have brought the state back in, they have overemphasized its

autonomous reach and underemphasized the political complexity behind its policies – particularly the persistence of localism as a factor in federal environmental management policies and the porousness of state-society boundaries.

South Asian environmental historiography thus provides environmental historians of the US with a suggestive model, but one that ought not to be swallowed uncritically. It might be tempting to follow James Scott and employ an analysis that emphasizes the modern state's persistent emphases on legibility and centralized planning, which in turn resulted in ecological simplification and forms of social control hostile to local knowledge and autonomy. But such an analysis has the weakness of treating the state as a black box. Scott's *Seeing Like a State* (1998) represents both a seductive and a problematic model for importing the insights of state-peasant conflict into the US historiography (Keller 2001). Just as we ought to be careful not to project the wilderness idea onto societies with a strong peasantry, so we ought to be careful to avoid importing too strong a peasant tradition and too autonomous a state into the US historiography (Merrill 1999).

Like the South Asian literature, African environmental historiography has been dominated by analyses of the colonial encounter and its legacies, and in these studies the state has also figured prominently. Indeed, where the South Asian historiography has a wealth of cautionary tales about the social consequences of state forestry, the African historiography is rich in object lessons about the dangers of preservationist and desiccationist rhetoric, and the tendency of outside technocratic authorities and representatives to "misread the landscape." African environmental history also offers innovative models for thinking about disease and public health as imperial and environmental problems. Tying together many of these themes is the meta-theme of African historiography – that because the history of human land use on the continent is deep, complex, and non-linear, declensionist narratives must be treated with great caution and suspicion, as they have often served colonial and postcolonial critiques of traditional African land use practices.

African environmental historiography's focus on instrumental discourses of erosion, deforestation, and desiccation is the most pressing challenge the field poses to those studying the US, who, despite a growing appreciation of the difficulties involved in making normative judgments about environmental change, generally remain wedded to narratives of decline. The most stunning African environmental histories are those that take Western observations about environmental degradation and subject them to close ecological and cultural analysis. One of the best examples comes from James Fairhead and Melissa Leach, who show that where Western observers had seen the forest islands in the savanna landscape of Guinea's Kissidougou Province as the result of deforestation – as remnants of a once-expansive natural forest – in fact they were human creations, coaxed from a savanna that otherwise would have had little forest cover. Such "misreadings,"

as the historiography attests, have been rife in modern Africa, and they have justified misinformed interventions (Fairhead and Leach 1996; Leach and Mearns 1996). Indeed, African environmental historians seem keen to find such misreadings and thus to paint conservation interventions as both imperial and ecologically misinformed.

Could similar misreadings be made central to the US literature? Scholars such as Nancy Langston (1995) have shown that they can be found, but US environmental historiography has yet to fully tackle such analyses. The New Deal seems a particularly rich field for such studies, particularly since the most important environmental history we have of that era – Donald Worster's *Dust Bowl* (1979) – swims so counter to the spirit of the African environmental historiography in this regard and only heightens the intrigue. This is not to suggest that the African historiography somehow reveals Worster's indictment of the human role in that environmental catastrophe to be misguided. Rather, it suggests that the dissonances between these two historiographies – between the willingness of the US historiography to blame humans and the reticence of the African historiography to do the same – might well reveal instructive differences about the historical contexts and moral impetuses of the two fields. The work of Richard White (1983) and Marsha Weisiger (2000), who have both examined Navajo grazing controversies during the New Deal, suggests what an analysis more in league with the African historiography might look like. Borrowing the Africanist suspicions of degradationist discourses also might prove useful in examining the American South, where such discourses have been rife and where environmental historiography is markedly underdeveloped. Questions central to the African historiography might help scholars open up this region to environmental history – a region that obviously has its own strong ties to African environmental history (Earle 1988; Kirby 1995, 2006; Carney 2001).

In his synthesis of African environmental history, James McCann notes that one of his fundamental premises is that "Africa's landscapes are anthropogenic" (1999: 2). This is a premise that could serve to summarize the historiography in general, and it underlies the "misreading" school in the literature on Africa in particular. African environmental historians have problematized the notion that normative natural landscapes – landscapes shaped almost solely by natural processes – exist against which human transformations can be qualitatively measured and assessed. As Gregory Maddox notes, African environmental history "subverts the 'before' and 'after' distinction common to environmental history by demonstrating the ways in which human societies and the natural world have mutually constructed each other" (1999: 163). The results can be dizzying. The lament that Western thinking has long separated humans from nature has prompted many environmental historians of the US to try to link humans and nature together into a single fabric. If we want a model for doing so, African environmental historiography provides an excellent one. But it may not be an

entirely satisfying model, in part because many of us have wanted to be able to talk about nature as a separate, and separable, category – as an entity that can be transformed in ways good and bad, and that can shape the human experience. Indeed, as Ted Steinberg (2002) has argued, nature's agency is a fundamental premise of US environmental historiography and perhaps its strongest claim on US historiography more broadly. In African environmental historiography, by contrast, nature often ceases to be an independent variable (with climate as perhaps the major exception), making it difficult to distinguish nature from culture in ways that are analytically or normatively useful. African environmental history is thus a complex story of conjuncture, adaptation, and cultural and environmental flux.

African environmental historiography does offer US environmental historians an intriguing model for thinking beyond our preoccupation with wild nature: the notion of environmental control. Rather than thinking in terms of a dichotomy between wild and humanized landscapes, with wild nature as a baseline against which to measure human-induced change, the environmental control model offers a spectrum running from the feral to the controlled to the exploited, with environmental control as a normative middle ground. In this model, equilibrium is as much a cultural state as it is a natural one.

This notion of environmental control has been worked out most coherently in the literature on trypanosomiasis, or sleeping sickness, a disease whose ecology has long dictated that Africans living in the zone of its vector, the tsetse fly, must control vegetation and maintain a separation between livestock and wildlife. Climate change have been crucial in determining the ebbs and flows of vector zones; indeed, climate history has been a much more prominent part of African environmental historiography than it has in the US literature (Webb 1995). More importantly, human environmental control has worked to keep the tsetse and its preferred habitat at bay. When forces disrupted that control – colonial policies and practices most notably – and the landscape went feral, the disease wreaked havoc with human and livestock populations. The history of trypanosomiasis control in Africa provides a poignant and concrete example of how the protection, and in some cases the expansion, of wild nature at the expense of human control can have a dramatic impact on human populations and economies (Ford 1971; Kjekshus 1977; Giblin 1990, 1992).

There are also a few fine examples of environmental control as a model deployed in European environmental history. John McNeill, in *The Mountains of the Mediterranean World* (1992), suggests that throughout the long history of these fragile mountain environments, much of the worst erosion occurred not when humans entered and transformed them, but when they left the mountains and their systems of control broke down. Humans, in other words, were a stabilizing force, not a disruptive one. And Marcus Hall, in his book comparing US and Italian models of ecological

restoration, shows that Italians have, until quite recently, been much more likely to see humans as having a salutary influence on the natural world, and have tended to see nature unmanaged as a source of degradation and decay (Hall 2005). That is a disorienting notion for a culture preoccupied with wild nature – a preoccupation rooted not only in a romanticized notion of pristine nature, but also in a reverence for untrammeled nature – nature unyoked and free to determine its own course. The model of environmental control thus challenges environmental historians of the US to interrogate our cultural commitment to natural self-determination, one with obvious connections to our political tradition (Worster 2002), and to think through why these different settings have produced such divergent thought on wildness and degradation.

Can and should environmental historians of the US embrace this model of environmental control, and in what contexts might the notion prove most useful? Perhaps the place to begin is to recognize that preservation is itself a model of environmental control in which natural forces can be destabilizing and human interventions restorative. In examining the history of national parks and wilderness areas, for instance, one is struck by how much human intervention is involved in keeping these places wild. Yet to the extent that environmental historians of the US have recognized this, they have couched it as deeply ironic – within the logic of the American wilderness discourse it is. But if we were to look at preservation in the US as a form of environmental control, then some of this sense of irony might melt away. Or, to reiterate one of the most exciting intimations of Marcus Hall's (2005) study, preservation in the US, despite rhetoric to the contrary, has almost always involved *restoration*. That does not mean we need to see restored landscapes as mere human artifacts, but such an understanding does allow us to escape the logic that either a place is wild or it is managed, a logic that has been as crucial to critiques of wilderness as it has been to the wilderness idea itself. There are degrees of wildness, and human actions often are crucial to enhancing wild landscapes or supporting biodiversity (Nabhan 1982). Developing notions of environmental control might allow us to see such instances more clearly, and to breathe new life into the environmental history of North American agriculture, broadly conceived to include all sorts of pre- and post-Columbian environmental management techniques.

To note that ideas of nature in the US have been intricately connected with nationalism is nothing new. But while reading in the environmental literature beyond our borders, I was struck by the extent to which connections between nature and nation have traditionally kept US environmental historians within national borders and focused on American identity. Embracing a more comparative approach will necessitate letting that guard down, but it will yield (and has already yielded) some excellent new insights. In some cases, we will recognize new ways in which American ideals of

nation have affected how we understand nature and how we have enacted environmental policy. Thomas Dunlap (1999), for instance, has shown how connections between nature and nation – for instance, in the embrace of native flora and fauna in the wake of settler efforts to transform landscapes into more familiar, Old World form – are strong characteristics of other settler societies as well as ours. Donald Worster (1998, 2002) has shown, in a couple of essays that have compared US and Canadian views of wilderness and development myths, how extensive the differences can be between nations whose profiles seem so similar. Marcus Hall (2005) has revealed a set of distinctively American ideas about nature and restoration in his comparative study of the US and Italy. William Beinart and Peter Coates (1995), in their comparison of settlement processes in the US and South Africa, have, among other insights, suggested the inadequacy of American frontier exceptionalism. And, as I have already noted, a number of scholars have suggested the importance of situating American conservation efforts within a global context.

In perhaps the most impressive comparative study, Ian Tyrrell (1999) has shown how the connection between nature and nation obscured important ecological and cultural exchanges between California and Australia that were at once transnational, regional, and peripheral. Tyrrell suggests that to understand key natural ideals that evolved in California, and particularly what he calls a "renovationist" or horticultural garden ideal, scholars would be better served to look to connections between California and Australia than to connections between California and the rest of the US. This lesson – that environmental sentiment in the US has often been shaped as a result of transnational and cross-cultural exchange – is hugely important. Among other things, it allows Tyrrell to suggest that the conservation-preservation dichotomy that has defined so much of US historiography has been a product of the nationalist focus of the US literature, and that when we expand that focus to look at transnational cases, or even constrict our vision and look at regional ideals, we often see unrecognized competing ideals. As Tyrrell has concluded by looking at the Australia-California connection, "neither the idea of wilderness nor the modern idea of conservation for rational economic use encompasses the full range of nineteenth-century environmental thought" (12–13). Through the use of the comparative method, Tyrrell has highlighted for historians of the US another environmental tradition with which to reckon. As US historiography becomes more focused on the transnational (Bender 2002), environmental historians of the US would be wise to follow suit.

If I could digest all of the lessons from my historiographical travels into one emblematic maxim for environmental historians of the US, it would be this: pay more attention to George Perkins Marsh. There has been something of a Marsh renaissance in recent years, and it is a timely one (Lowenthal 2000; Stoll 2002; Hall 2005). Marsh not only presented a nascent vision of

state conservation, but he viewed environmental change in the context of world history and his influence was truly international. Marsh was a bridge figure between an antebellum tradition of agricultural conservation and modern state conservation. Moreover, Marsh's insights about past environmental transformations were the products of travel and comparative observation. Indeed, Marsh is perhaps the key figure for understanding and knitting together a transnational picture of conservation's development – for linking a seventeenth- and eighteenth-century tradition of conservation concern that emerged on the colonial periphery not only to the birth of American environmental thought, but also to colonial state forestry in British India and the emergence of the various discourses of environmental degradation that have preoccupied environmental historians of Africa. As Ramachandra Guha (2000) has noted, it was no mistake that Marsh's magnum opus *Man and Nature* (1864) appeared in the same year as the creation of the Indian Forest Department, or that it was surrounded by various other pioneering colonial conservation initiatives, including forest protection acts in the Cape Colony (1859), Cochinchina (1862), Java (1865), and Australia (1871). Yet, surprisingly, environmental historians of the US have paid less attention to Marsh than have non-US environmental historians, who see him as perhaps the most important figure in the American environmental tradition. Marsh's international importance, and the importance of his internationalism, are critical lessons taught by the non-US literature, not only in terms of rethinking Marsh's place in the American environmental tradition, but also in rethinking the American place in the history of global environmental thought and action. But Marsh was also ultimately concerned with the United States, and it was that concern that makes him the very embodiment of what I hope will be the central message of this essay: that we must move beyond our borders as a way of making sense of our home ground. US environmental historiography needs more such travelers.

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