INTRODUCTION INVADERS, SETTLERS, INHABITANTS

You know, I think if people stay somewhere long enough – even white people – the spirits will begin to speak to them. It's the power of the spirits coming up from the land. The spirits and the old powers aren't lost, they just need people to be around long enough and the spirits will begin to influence them.

A Crow elder, as reported by poet Gary Snyder¹

We Anglos – whites, whitefellows, pakeha – do not usually think in these terms. The land is something we possess, not something that possesses us. We know it and we shape it; it does not know or shape us. But even in our own tradition there is that other current. The land was ours, said Robert Frost, before we were the land's, and a multitude of others have said it too, in poetry, paintings, stories, and reports. This book is about the ways in which the Anglo settlers of Australia, Canada, New Zealand, and the United States have in the past two centuries sought to understand their lands and find their place in them by the use of their culture's organized nature knowledge – science. It is not as visible or colorful a tale as the epic of conquest that has become so much a part of national identity, but in the long run it is at least as significant. The current environmental crisis suggests that unless we learn to live with the land we might not live on it at all and certainly will not continue to live well.

These countries are my subject because of their common history, common demography, and interconnections. They are, in Geoffrey C. Bolton's terms, the Anglo "colonies of settlement," in Alfred Crosby's, the Anglo part of the "neo-Europes."² Unlike the "colonies of empire,"

¹ Gary Snyder, The Practice of the Wild (San Francisco: North Point Press, 1990), 39.

² Geoffrey C. Bolton, *Britain's Legacy Overseas* (London: Oxford University Press, 1973), 5; Alfred Crosby, *Ecological Imperialism* (Cambridge University Press, 1986). The latter appeared about the time I began research on this project and I am much in Crosby's debt.

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where a small foreign ruling class dominated a much larger population of "natives," here the Anglos were not only masters but by far the largest group of powerful actors. Here, and only here, predominantly Englishspeaking Europeans dispossessed and almost exterminated the earlier inhabitants, allowing the illusion that the lands were "vacant" or "wilderness." Here they could speak of creating a "new England" - a dream as marked in New Zealand, founded on the Wakefieldian vision of a transplanted and purified British society in the South Seas, as in Crevecouer's America. Read through their literature, newspapers, legislative debates, and speeches. They were new nations populated by new men. (Women were physically present but rhetorically almost invisible.) Everywhere there were the same appeals to the "conquest of nature," "progress," a particular kind of civilization, and until recently the virtues of an agricultural life and a society of independent farmers. Land laws had in common the aim of individual independence and self-sufficient small farms. (There is even a depressing similarity in the desire to evade these laws, accumulating more acres, and in the methods used to do it.)³ Statutes made the same kinds of animals "game" and set standards for a "fair chase." "Bad" animals were everywhere marked for destruction, and by changing the names of the species and adding or deleting references to "the Queen's most excellent majesty" to suit the jurisdiction, the same mammalian pest control laws could have been used from Perth to Fredricton.

These countries also form a group because of the connections they developed to each other. They had, to be sure, other ties. Australian connections to southern Africa, for one example, began when the First Fleet picked up plants and animals at the Cape on its way to Botany Bay, and continued into the twentieth century, when Australians looked to the region for everything from pasture grasses and farm stock to ornamental plants. An elite group of experts that conspicuously included continental Europeans as well as British scientists circulated among all the settler countries and the colonies of empire. German naturalists were not only travelers and explorers but directors of agencies and museums. German foresters staffed the South Indian Forest Service, which was the administrative model for the U.S. Forest Service, and they went from there to Australia. Others went to North America. Nor is the

³ Joseph Powell, Environmental Management in Australia, 1788–1914 (Melbourne: Oxford University Press, 1976); Manning Clark, A Short History of Australia (New York: Penguin, 1987), 140–6; Keith Sinclair, A History of New Zealand (Auckland: Penguin, 1980), 151–71; Fred Shannon, Farmers' Last Frontier (New York: Holt, Rinehart, & Winston, 1945), 51–75. A recent discussion of this topic is John C. Weaver's "Beyond the Fatal Shore: Pastoral Squatting and the Occupation of Australia, 1826–1852," American Historical Review, 101 (October 1996), 981–1007.

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demographic separation between the colonies of empire and settlement airtight. South Africa had two European populations, and Argentina an even more heterogeneous mix of Europeans.

These four countries, though, are at the far end of the demographic spectrum, and a common language, culture, and settlement experience insulated, if it did not isolate, them. Ties were closest between Canada and the United States - too strong and too one-sided for many Canadians – but enough Americans went to Victoria in the mid-nineteenth century that, a generation later, an Australian naturalist could complain that too many of the common names for animals and plants were not really Australian but American.⁴ The eucalyptus that form a distinctive part of California landscapes are the most visible evidence of an extensive set of connections – botanical, zoological, and intellectual – that began between that state and southeastern Australia in the nineteenth century.⁵ New Zealand legislators debated American ideas of conservation and imported American and Australian plants and animals. All the settler countries imported natural history's ideas, institutions, and practice from Britain in the nineteenth century. The American idea of vast wild country reserves and the British model of urban open space shaped the idea of a national park in the other three. In the twentieth century, ecology developed as a discipline in academic centers in Britain and the United States, and went from there to the others. American ideas and action influenced the early environmental movement elsewhere.

The ground of Anglo settlement has been the continuing process of discovery. It began with entries in ships' logs and continued through the measured prose of army and navy officers surveying coasts and interiors. Each generation of settlers added knowledge and lore, and had its maps, which mixed named and fixed features with ones observed and others conjectured or wished for, all embedded in the white space that gave scope for dreams. In Europe people lived in country they knew; these societies lived on land they were discovering. Our period is the ninteenth and twentieth centuries because this is when formal nature knowledge – bodies of knowledge that were also ways of organizing the world – guided and shaped that process. Such knowledge had profound effects on the settlers' understanding of their lands and their relation to them. Natural history provided the settlers with pictures of the land in maps and reports, and placed their local knowledge in a universal system that ordered plants and animals around the world. It also gave

⁴ J. A. Leach, An Australian Bird Book (Melbourne: Whitcombe & Tombs, 1911), 1, 72–73, 74.

⁵ Ian Tyrrell of the University of New South Wales has in press a major work on the connections between Australia and California in the late nineteenth century.

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individual settlers the chance to participate in the advance of knowledge. Collecting specimens, forming local societies, and building museums, they gave the world evidence of their societies' growth and maturity, and established social ties with each other and the elite of Europe. Ecology, which developed in the early twentieth century, was equally universal, but it had a different social context and presented to the settlers a different understanding.

Three terms need definition before we go on: "Anglo," "nature," and "science." The first is certainly something of a misnomer. Settler populations included entire groups - Africans and Chinese - who were not European at all, and many Europeans from the Continent. In places these last formed separate colonies - Quebec and New Mexico are obvious examples - ones the Anglos overran. A large proportion of those who traced their roots to the British Isles would not thank you for calling them either British or Anglo. On the other hand, the Atlantic and Indian Oceans were not the waters of Lethe or impassable gulfs, and the settlers who formed the governments and societies came from Britain and looked to it as home or at least a model. This was true even in the United States, which, for all its political heresies, was a cultural colony well into the nineteenth century. Continuity persisted, despite immigration, because newcomers found it advantageous to assimilate the dominant ideas and attitudes. "Anglo" is no worse a cultural tag than most, and it has the merit of fixing attention on the common cultural base and the ideas and aspirations of the people with the money and the guns.

"Nature" is another sticky term. We use it for everything from the essence of human psychological identity (human nature) to the physical universe. Here we will take it as the culture's understanding of the land and the living creatures on it at the level of "unaided observation." It was what people saw without telescopes or microscopes, felt, smelled, fixed in memory, and thought of as their "direct experience" with the world around them. Certainly viruses and galaxies are as much a part of "nature" as kangaroos and oak trees, but it requires experts with specialized equipment to place the first two in our picture of the world and everyone understands the others before they encounter formal education and even if they never do. This, admittedly, involves a certain analytical and philosophical sleight of hand. The existence of a "natural world," separate from society, the ideas of "direct experience" and "unaided observation," and the mental constructs that result from them are as layered and theoretical as anything philosophers have produced, even if the assumptions are not as clearly articulated. For this analysis, though, we can take all that for granted.

Nature on this level can be roughly but usefully divided into plants,

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animals, landscape, and climate. The first two pose few problems. The principles people use to decide what these are and to arrange them are so common that a taxonomist from New Jersey and a hunter from New Guinea would agree down to the level of what the scientist would call a species.⁶ Landscape, which Donald Meinig calls "an attractive, important, and ambiguous term," we will take as the culture's picture of the land. It may include the landscape of geographers, which John Stilgoe defines as "shaped land, land modified for permanent human occupation," but more commonly it is the picture of the land people see as having significance for the nation and their culture.⁷ It is what is presented in national myths of the "new country," in the landscape paintings hung in national galleries of art, the poems and stories printed in cheap paperbacks and taught to schoolchildren and found in exiles' recollections and memoirs of childhood. It is a continuing construction, shaped by each generation from the land, the culture, and experience.

Climate has something to do with temperature, rainfall, sunshine, and other atmospheric variables, but it has several meanings. It is, to start with, an economic and social reality. Our countries are what they are because European crops flourished there, and climate in this sense still dictates settlement patterns. It is also part of individual experience, a popular idea tied up with frosty mornings or harsh and sun-baked noons, wind, fog, snowstorms, and the rhythm of seasons. For much of our period it was also a physiological and even moral matter, for the Anglos retained classical beliefs about the links between climate and temperament. In the late nineteenth century Canadians saw the country's cold as a shield against moral dangers from their southern neighbors, and fifty years later Australian authorities fretted about the difficulties of settling their tropical North with white families.⁸

"Science" involves almost as many tangles as "nature." We apply the

⁶ On the common basis of our construction of nature see Scott Atran, Cognitive Foundations of Natural History (Cambridge University Press, 1993), 15–80.

⁷ Donald Meinig, "Introduction," in Donald Meinig (editor), *The Interpretation of Ordinary Landscapes* (New York: Oxford University Press, 1979), 1; John Stilgoe, *Common Landscapes of America*, 1580-1845 (New Haven, Conn.: Yale University Press, 1982), 3.

⁸ Clarence Glacken, *Traces on the Rhodian Shore* (Berkeley: University of California Press, 1967), 80–115, gives the ancient foundations of this. For late examples see I. Clunies Ross, "Blanks on the Map," in J. C. G. Kevin (editor), *Some Australians Take Stock* (London: Longmans, 1939), 83, and A. Grenfell Price, *White Settlers in the Tropics* (New York: American Geographical Society, 1939). This is late, though, even for Australia. See Warwick Anderson, "Geography, Race and Nation: Remapping 'Tropical Australia,' 1890–1930," *Historical Records of Australian Science*, 11, 4 (1997), 457–68. On Canada see Carl Berger, "The True North, Strong and Free," in Peter Russell (editor), *Nationalism in Canada* (Toronto: McGraw-Hill, 1966), 4–26.

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term to systematic attempts to acquire and organize knowledge, from ancient Greek philosophy and Babylonian astronomy to modern research, or confine it to a particular set of disciplines using a particular method of analysis and standards of proof. There is the additional complication that while the intellectual activity of modern European science dates from the seventeenth century, "scientist" as a social role, job, and profession developed only in the nineteenth. It was not until 1833 that William Whewell coined the word "scientist," and most of the disciplines we recognize, along with professional standards, degrees, and formal training, date from the second half of the century. Strict usage, therefore, would require us to call Newton a "natural philosopher" and Darwin a "naturalist" (which is in fact what he was called and what he called himself).⁹ Since the history of science and the status of scientists are not central to this argument we need only note the variety of meanings and the distinction between doing science and doing it for a profession (which will be part of this study).

Here we can take "science" as the organized, written knowledge of plants and animals and the land, supported by social institutions, that developed within European culture in the early modern period. It took two forms, which differed in their perspective, methods, and relation to society. The first was natural history, a distinct field by the eighteenth century and the organizing principle for the study of visible nature to the late nineteenth. The second was ecology. It developed as a discipline in the late nineteenth century and solidified, institutionally and intellectually, in the years between the world wars. Our primary concern, though, is not the development of these fields, but their use in the culture. They were successor, supplement, and complement to the settlers' folkbiologies, guiding and affecting but not displacing that unwritten nature knowledge that the settlers brought with them, developed in the new lands, and passed on to their children. They helped people understand. "The role of science, like that of art," said E. O. Wilson, "is to blend exact imagery with more distant meaning, the parts we already understand with those given as new into larger patterns that are coherent enough to be acceptable as truth."¹⁰ It is this use that is our central concern – the settlers' continuing journey from knowledge of nature to an understanding of their place in the land.

All this was in the settlers' minds. The lands, though, were not, and they had their own imperatives. If settler dreams were all that mattered,

⁹ On words associated with science see the *Oxford English Dictionary*, Second Edition (Oxford: Oxford University Press, 1989).

¹⁰ E. O. Wilson, *Biophilia* (Cambridge, Mass.: Harvard University Press, 1994), 51.

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North American wheat fields would extend north to Great Slave Lake; the Centre of Australia would be farms and pastures; and there would be any number of rural utopias scattered from the Canterbury Plains to Saskatchewan. People can think about the world in many ways and change it in many more, but it is not infinitely plastic. The settlers spoke of "new lands," but they were new only to them. In parts of Australia you can walk on the rocks of the vanished supercontinent of Gondwana, and even the Canadian Arctic, where the ground is still rising from the justremoved weight of the glaciers and all the plants and animals are pioneers, is in its ecology far older than any human records. Nor were the lands vacant or "unsettled." Except for New Zealand, where the Maori had landed less than a millennium before, humans had been shaping the lands in myriad ways for thousands of years. The Anglos saw lands before time and outside history, but the opposite was more nearly the case. They were people with little history, coming to lands that had much.

What was there? Let us review the ground – glance briefly, that is to say, at the current social construction. We will start with the area the Anglos settled first, North America. The main line of their expansion ran east to west. In what became the United States the beachheads were on an open coast, dotted with harbors, in well-watered and forested country, rich in game. The soil and climate supported familiar farming. In Canada the land was colder, rockier, and entered not along a broad coast but through the narrow passage of the St. Lawrence River. Americans also had an easier time reaching the central valley. They had only to cross the Appalachians, relatively low mountains whose passes had been used by humans and animals for thousands of years. Canadians faced the Shield, a thousand miles of Precambrian granite so forbidding that until railroads were built almost all traffic to the west detoured south around it into the United States.

Between the Appalachians (or the Shield) and the Rockies two gradients, temperature and rainfall, shape the country. They run at right angles. One, temperature, falls as we go north. South Texas is subtropical, and the bulk of the central valley is squarely in the temperate zone. At the Canadian border we are in cold temperate conditions. A few hundred miles north European agriculture dwindles out in the oat and canola fields of Alberta and Saskatchewan. Beyond is the boreal forest, then the tundra that stretches to the shores of the Arctic Ocean. Rain falls off as we move west. The eastern prairies are well watered, but as we climb the great outwash plains of the Rockies vegetables give way to corn, and corn to wheat, and only cattle graze in the mountains' rain shadow. In the United States the mountains divide to form the Great Basin, an arid region around the Great Salt Lake, and in the southwest

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there are deserts. West of the mountains the Pacific stabilizes the temperature of the coastal plain and in much of it produces a Mediterranean climate, whose rainy winters and dry summers are much like those of southeastern Australia. From Oregon north there are vast temperate rain forests, stretches of fir and spruce that are the last strongholds of wilderness and the lumber industry.

Descriptions of North America commonly start with the continent in place, but Australia is so much a product of geology that we must begin with the breakup of Gondwana, some 60 to 80 million years ago.¹¹ It has drifted since, and for millions of years neither volcanoes nor plate collisions have thrown up new mountains or made new soil. It is the lowest and flattest of continents, and its soils, leached by sun and rain, are often deficient in minerals. The drift has largely been outside the global rain belts and it is, except for Antarctica, the driest continent. The result is a unique suite of plants and animals, adapted to drought, great variation in rain, fire, and poor soil. Eucalyptus dominates the plant communities, marsupials the fauna (for species larger than rats or mice). Until the Anglos arrived, there were no hoofed mammals to compact the soil and no carnivores larger than the dingo, itself an Aboriginal introduction.

The climate is dramatically different from that of Britain or North America. Only the southeast has what Anglos and their crops would consider sufficient rainfall, and it falls off quickly as we move off the coast. Most of the continent is arid or semi-arid, and the Centre stony and sandy desert. The northern edge, reaching into the tropics, is another world, with rain forests and a dramatic two-season year – the Wet and the Dry – but that was outside the mainstream of Anglo settlement.¹² Even today 80 percent of the population lives within fifty kilometers of salt water, most in a strip in the southeast running from Adelaide to Brisbane, and enormous areas are still marked on maps as "sparse fluctuating population" or "virtually uninhabited." Perth is the only city in the

¹¹ Two accessible examples of this modern narrative are Stephen Pyne, *Burning Bush* (New York: Henry Holt, 1991), 1–11, and Tim Flannery, *The Future Eaters* (London: Secker & Warburg, 1996), 20–52.

¹² Bureau of Meteorology, *Climate of Australia* (Canberra: Australian Government Printing Service, 1989). In no other country was exploration so hard or explorers so lauded. Lewis and Clark and MacKenzie are minor figures in North American history; Burke and Wills, who died on the return leg of the first south-to-north crossing of Australia, became national heroes. A. L. Burt made this point in commenting on the political development of frontier societies: "If Turner Had Looked at Canada, Australia, and New Zealand When He Wrote about the West," in Walker D. Wyman and Clifton B. Kroeber (editors), *The Frontier in Perspective* (Madison: University of Wisconsin Press, 1965), 59–77.

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western half, Darwin (population 68,000 in 1988) the largest in the north. Canberra, established as a national capital, is the only inland city.¹³ Even in imagination the Anglos have not ventured far inland. Movement, said a modern Australian novelist, Thomas Keneally, "is not westward to the center but eastward to the coast. Australia is periphery. It dreams of and yet abandons the core."¹⁴

Plants, the lack of land mammals, and the suite of unique flightless birds show that New Zealand is also part of Gondwana, but it is a very different part, not a continent but two small islands. They do not lie in Australia's latitudes but across the great trade winds of the Southern Hemisphere, which makes them temperate and well watered. Too well watered in places – parts of the west side of South Island average thirty feet of rain a year. New Zealand is geologically active; the grinding of tectonic plates shakes the land, springs and geysers dot the countryside, and the mountains are still rising. More than any of the others it has conventionally scenic landscapes, coastal plains backed by snow-capped mountains. On North Island there is the perfect cone of Mt. Egmont (Taranaki) and the peaks of Tongariro, while the great chain of the Southern Alps stretches down South Island.¹⁵

That is the almanac view. Let us, in imagination, get a little closer, take a mental tour of now-vanished landscapes – another current social construction. Our first stop, on a warm June day a few centuries before Columbus, is the woods of what will be central New Jersey. In the eighteenth century the Anglos will start turning it into farmland, lacing it with fences and dirt roads, and a century later the railroad will connect it to New York and Philadelphia. After World War II wheat will give way to potatoes and vegetables, and at the end of the twentieth century they will yield to ranch houses. Now we walk under enormous trees, slathering ourselves with mosquito repellent. Those are oak, says the ecologist with us, and that is a beech. The bird-watchers in the party ignore her to focus on the scarlet tanagers, Baltimore orioles, and warblers in

¹³ "Physical Geography and Climate of Australia," 202–56, population density map after page 256; P. Laut, "Changing Patterns of Land Use in Australia," 547–56, all in Australian Bureau of Statistics, *Year Book Australia, 1988* (Canberra: Australian Bureau of Statistics, 1988). Canada is demographically comparable, its population clustered in a few strips along the border with the United States, but agriculture is possible in much more of the land. On the ecology of these inland pastures see Graeme Caughley, "Ecological Relationships," in Graeme Caughley, Neil Shepherd, and Jeff Short (editors), *Kangaroos: Their Ecology and Management in the Sheep Rangelands of Australia* (Cambridge University Press, 1987), 159–87. Caughley claimed in an interview with the author, June 1990, that equilibrium models of ecosystems were inappropriate and misleading in the chaotic Australian system. His viewpoint is not universal, but it is as least defensible.

¹⁴ Thomas Keneally, Woman of the Inner Sea (New York: Doubleday, 1993), 179.

¹⁵ New Zealand Official Yearbook (Wellington: Bureau of Statistics, 1992), 1-11.

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the branches overhead. The ground smells like any forest, woody and damp, but this is not plowed land gone back to woods. For centuries trees have been falling and rotting in place, and it is as lumpy as an old mattress in a cheap motel. It seems the forest primeval, but our ecologist says that the dense patch we hiked around yesterday afternoon was a Lenape cornfield, abandoned fifteen or twenty years ago.

Skipping across the continent, we find everything changed at each stop. Along the Ottawa River we camp beneath spruce and giant white pine - the latter evidence of dry years and Indian fires a century and a half ago. The woods are aromatic, but with the piney odor of decaying conifer needles, that thick layer of duff we walk on and kick up under the trees. We have a gray jay ("camp robber," as it is known) and wood ducks on the river. At dusk moose come to drink, and at dawn a loon wakes us with a cry that really does sound crazy. A few hundred miles west of the Mississippi and well south of the Canadian border, we pitch our tents on a low hill amid grass that stretches to the horizon like some green ocean, waving and rippling in the wind. The children flush chunky brown birds that sail off on stiff wings - meadowlarks. Piles of dung and a scraped-out wallow show that buffalo are here, even if today they are over the horizon. In the afternoon there is a prairie thunderstorm, as near a timeless spectacle as the land affords. Great black thunderheads loom overhead in a sky that, off to the side, still shows blue. They swell over us, then comes a cool, hard wind, smelling of rain, a few scattered warning drops, and a downpour. In an hour the clouds disperse and the sun shines again. We are lucky - no hail with this one. Along the Virgin River in what will be Zion National Park we camp on a floodplain below sandstone cliffs, hear coyotes and a mountain lion at night. Early risers get to see the sun paint clouds and cliffs deep red and watch a golden eagle prospecting for rodents. The rest of us have to be content with the harsher light and the washed-out colors of the desert day. On the West Coast we camp under gigantic Douglas fir and Sitka spruce, and have around the camp a handsome bird with a crest, metallic blue on the back and brown on the head and breast. The easterners call it Steller's jay, the westerners just "jay." To the Kiwis and Aussies in the party it is another oddity. In bright sunshine on the beach we watch great swathes of fog drift off the sea and into the trees, visible evidence of the Japan current just offshore.

Crossing the Pacific we arrive in Australia at twilight and set up camp near a billabong (water hole to the Americans) in what will be western New South Wales. It is winter here, and we gratefully take to our sleeping bags after supper to study the "wondrous glory of the everlasting stars" (a line from Banjo Paterson, author of "Waltzing Matilda," con-