CHANGES in the LAND
Indians, Colonists,
and the Ecology of New England

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The first premise of all human history is, of course, the existence of living human individuals. Thus the first fact to be established is the physical organization of these individuals and their consequent relation to the rest of nature. . . . The writing of history must always set out from these natural bases and their modification in the course of history through the action of men.

—Karl Marx and Friedrich Engels, *The German Ideology*

As we have seen, man has reacted upon organized and inorganic nature, and thereby modified, if not determined, the material structure of his earthly home.

—George Perkins Marsh, *Man and Nature*

I think, considering our age, the great toils we have undergone, the roughness of some parts of this country, and our original poverty, that we have done the most in the least time of any people on earth.

—J. Hector St. John de Crèvecoeur, *Sketches of Eighteenth-Century America*
I analyze the New England Indians, and although I am sure he continues to disagree with some of my interpretations, I have benefited a great deal from his suggestions. Timothy Weiskel has tried to keep me honest in my anthropological interpretations, and has been my chief guide to the literature of economic and ecological anthropology. Rebecca Bormann has been my most reliable and helpful ecologist critic. Others who have discussed the book with me and given me the benefit of their criticism include Jean-Christophe Agnew, Elizabeth Blackmar, John Blum, Lori Gimmba, Fran Hallihan, Tom Hatley, David Jaffe, Tim Mitchell, Michael Saperstein, Robert Shell, Paula Shields, Barbara Smith, Gaddis Smith, Michael Smith, Robert Westbrook, and Robin Winks. To all, I give thanks.

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A special note of thanks goes to my friend David Scobey, who not only gave me an exhaustive critical reading of the manuscript in all its stages of completion but engaged in long hours of discussion about it in the midst of his own busy schedule. This book in many ways is a direct result of our extended conversations, and would have been much the worse without them.

Finally, my wife, Nan (not to mention our golden retriever, Kira), has been my companion on hikes and drives from New Haven to Cape Cod to Mount Washington, during which we have together learned most of what we know of the New England landscape. For these and other journeyings, I dedicate this book to her.

William Cronon
New Haven, Connecticut
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On the morning of January 24, 1859, Henry David Thoreau sat down with his journal to consider the ways in which his Concord home had been altered by more than two centuries of European settlement. He had recently read the book *New England's Prospect*, in which the English traveler William Wood recounted his 1633 voyage to southern New England and described for English readers the landscape he had found there. Now Thoreau sought to annotate the ways in which Wood's Massachusetts was different from his own. The changes seemed sweeping indeed.

He began with the wild meadow grasses, which appeared, he wrote, "to have grown more rankly in those days." If Wood's descriptions were accurate, the strawberries too had been larger and more abundant "before they were so cornered up by cultivation." Some of them had been as much as two inches around, and were so numerous that one could gather half a bushel in a forenoon. Equally abundant were gooseberries, raspberries, and especially currants, which, Thoreau mused, "so many old writers speak of, but so few moderns find wild."

New England forests had been much more extensive and their
It is important that we answer this question of Thoreau's carefully: 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? There is nothing new to the observation that European settlement transformed the American landscape. Long before Thoreau, naturalists and historians alike were commenting on the process which was converting a "wilderness" into a land of European agricultural settlement. Whether they wrote of Indians, the fur trade, the forest, or the farm, colonial authors were constantly aware that fundamental alterations of the ecological fabric were taking place around them. The awareness increased as time went on. By the late eighteenth century, many individuals—Peter Kalm, Peter Whitney, Jeremy Belknap, and Timothy Dwight chief among them—were commenting extensively on these changes.

For the most part, unlike Thoreau, they did so approvingly. As early as 1693, the historian Edward Johnson could count it as one of God's providences that a "remote, rocky, barren, bushy, wild-woody wilderness" had been transformed in a generation into "a second England for fertility." In this vision, the transformation of wilderness betokened the planting of a garden, not the fall from one; any change in the New England environment was divinely ordained and wholly positive. By the end of the eighteenth century, the metaphors for environmental change had become more humanistic than providential, but were no less enthusiastic about the progress such change represented. In a passage partially anticipating Frederick Jackson Turner's frontier thesis, for instance, Benjamin Rush described a regular sequence for clearing the forest and civilized the wilderness. "From a review of the three different species of settlers," he wrote, speaking of Pennsylvania, "it appears, that there are certain regular stages which mark the progress from the savage to civilized life. The first settler is nearly related to an Indian in his manners—In the second, the Indian manners are more diluted: It is in the third species of settlers only, that we behold civilized completion." Though landscape was altered by this supposed social evolution, the human process of development—from Indians to clearer of the forest to prosperous farmer—was the center of Rush's attention. Environmental change was of secondary interest. For Enlightenment thinkers like Rush, in each stage, the
shape of the landscape was a visible confirmation of the state of human society. Both underwent an evolutionary development from savagery to civilization.1

Whether interpreted as declension or progress, the shift from Thoreau’s forest of “nobler animals” to Rush’s fields and pastures of prosperous farmers signaled a genuinely transformed countryside, one whose changes were intimately bound to the human history which had taken place in its midst. The replacement of Indians by predominantly European populations in New England was as much an ecological as a cultural revolution, and the human side of that revolution cannot be fully understood until it is embedded in the ecological one. Doing so requires a history, not only of human actors, conflicts, and economies, but of ecosystems as well.

How might we construct such an ecological history? The types of evidence which can be used to evaluate ecological change before 1800 are not uniformly reliable, and some are of a sort not ordinarily used by historians. It is therefore important to reflect on how they should best be criticized and used. The descriptions of travelers and early naturalists, for instance, provide observations of what New England looked like in the early days of European settlement, and how it had changed by the end of the eighteenth century. As such, they provide the backbone of this study. But to use them properly requires that we evaluate each traveler’s skills as a naturalist, something for which there is often only the evidence of his or her writings. Moreover, we can only guess at how ideological commitments such as Thoreau’s or Rush’s colored the ways they saw the landscape. How much did William Wood’s evident wish to promote the Massachusetts Bay Colony lead him to idealize its environment? To what extent did the anonymous author of American Husbandry shape his critique of American agriculture to preserve his purpose of preserving colonial attachments to Britain? Even if we can remove most of these ideological biases to discover what it was a traveler actually saw, we must still acknowledge that each traveler visited only a tiny fraction of the region. As Timothy Dwight once remarked, “Your travelers seize on a single person, or a solitary fact, and make them the representatives of a whole community and a general custom.” We are always faced with the problem of generalizing from a local description to a regional landscape, but our understanding of modern ecosystems can be of great help in doing so.1

A second fund of data resides in various colonial town, court, and legislative records, although here the evidence of ecological change can sometimes be tantalizingly elliptical. We cannot always know with certainty whether a governmental action anticipated or reacted to a change in the environment. When a law was passed protecting trees on a town commons, for example, did this mean that a timber shortage existed? Or was the town merely responding with prudent foresight to the experience of other localities? If a shortage existed, how severe was it? Was it limited only to certain species of trees? And so on. Only by looking at the overall pattern of legal activity can we render a reasonable judgment on such questions. These problems notwithstanding, town and colony records address almost the entire range of ecological changes in colonial New England: deforestation, the keeping of livestock, conflicts between Indians and colonists over property boundaries, the extermination of predators such as wolves, and similar matters. Deeds and surveyor records can be used statistically to estimate the composition of early forests, and are usually more accurate than travelers’ accounts even though subject to sampling errors.1

Then there are the less orthodox sorts of evidence which historians borrow from other disciplines and have less experience in criticizing. Relict stands of old-growth timber, such as the Cathedral Pines near Cornwall, Connecticut, can suggest what earlier forests may have looked like. The relict stands which exist today, however, are by no means identical to most of the forests which existed in colonial times, so that the record of earlier forests must be sought in less visible places. Ecologists have done very creative detective work in analyzing tree rings, charcoal deposits, rotting trunks, and overturned stumps to determine the history of several New England woodlands. The fossil pollen in pond and bog sediments is a reliable but fuzzy indicator of the changing species composition of surrounding vegetation; despite problems in determining the absolute age of such pollen, it supplies some of the most reliable evidence for reconstructing past forests. In addition, a wide variety of archaeological evidence can be used to assess past environments, particularly the changing relations of human inhabitants to them.1
Finally, there are those awkward situations in which an ecological change which undoubtedly must have been occurring in the colonial period has left little or no historical evidence at all. These include microscopic changes in soil fauna and flora, soil compaction, changes in the transpiration rates of forests, and so on. Here all arguments become somewhat speculative. Given what we know of ecosystem dynamics, however, it would be wrong simply to ignore such changes, since some of them almost certainly occurred even though no one noticed them at the time. I will occasionally appeal to modern ecological literature to assert the probability of such changes, and trust that, by so doing, I am not straying too far from the historian's usual canon for evaluating evidence. Silences in the historical record sometimes require us to make the best-informed interpolations we can, and I have tried always to be conservative on the few occasions when I have been forced to do this.

Although caution is required in handling all these various forms of evidence (and nonevidence), together they provide a remarkably full portrait of ecological change in colonial New England. But they also raise intriguing questions, questions which are both empirical and theoretical. One, for instance, follows directly from the impression of the data: travelers' accounts and other colonial writings are not only subjective but often highly generalized. Colonial nomenclature could be quite imprecise, so much so that the French traveler Chastellux wrote of the impoverishment of American English as a result:

Anything that had no English name has here been given only a simple designation: the jay is the blue bird, the cardinal the red bird; every water bird is simply a duck, from the teal to the wood duck, and to the large black duck which we do not have in Europe. They call them "red ducks," "black ducks," "wood ducks." It is the same with respect to their trees: the pine, the cypresses, the firs, are all included under the general name of "pine trees."

More confusing still could be the natural tendency for colonists to apply European names to American species which only superficially resembled their counterparts across the ocean.

The problems which this fuzzy nomenclature can create for those doing ecological history should be obvious. For instance, many early descriptions, including those by William Wood, make no mention at all of hemlock, although they do mention fir and spruce. On just such evidence, Thoreau concluded—in incorrectly—that the fir tree had been much more common in colonial times. But since fir and spruce are now largely absent in southern New England, and since fossil pollen shows that hemlock has long been a significant component of the New England forest, it seems reasonable to conclude that "hemlock" was subsumed by colonists under the names of "fir," "spruce," and probably "pine." But how common was it? Only the fossil pollen can tell us. As another example, the hickory was rarely mentioned by name, but instead was for a long time known as the "walnut," an entirely different genus of tree. Because white pine was valuable economically, many early visitors seem to have seen it everywhere, thus leading them to exaggerate its numerical significance. Colonists confused the native junipers with European cedars for the same economic reasons, so that the red cedar has carried a misleading name ever since. All of these problems of nomenclature must be borne in mind if one is not to give a distorted picture of the colonial ecosystem.

A second difficulty is the old and familiar fallacy of post hoc ergo propter hoc. When reading colonial accounts describing floods, insect invasions, coastal alterations, and significant changes in climate, we are perhaps all too tempted to attribute these by some devious means to the influence of the arriving Europeans. This will not always do. Not all the environmental changes which took place after European settlement were caused by it. Some were part of much longer trends, and some were random: neither type need have had anything to do with the Europeans. Trickier still are instances where Europeans may or may not have altered the rate at which a change was already occurring. Unless one can show some plausible mechanism whereby settlement could and probably did cause a change, it seems best not to attribute it to European influence. One cannot escape the fallacy altogether—any discussion of causality in history must encounter it with some frequency—but one must at least be aware of when one is flouting with it. I shall have occasion to do so here.

This brings us to the heart of the theoretical difficulties involved in doing ecological history. When one asks how much an
ecosystem has been changed by human influence, the inevitable next question must be: "changed in relation to what?" There is no simple answer to this. Before we can analyze the ways people alter their environments, we must first consider how those environments change in the absence of human activity, and that in turn requires us to reflect on what we mean by an ecological "community." Ecology as a biological science has had to deal with this problem from its outset. The first generation of academic ecologists, led by Frederic Clements, defined the communities they studied literally as superorganisms which experienced birth, growth, maturity, and sometimes death much as individual plants and animals did. Under this model, the central dynamic of community change could be expressed in the concept of "succession." Depending on its region, a biotic community might begin as a pond, which was then gradually transformed by its own internal dynamics into a marsh, a meadow, a forest of pioneer trees, and finally to a forest of dominant trees. This last stage was assumed to be stable and was known as the "climax," a more or less permanent community which would reproduce itself indefinitely if left undisturbed. Its equilibrium state defined the mature forest "organism," so that all members of the community could be interpreted as functioning to maintain the stability of the whole. Here was an apparently objective point of reference: any actual community could be compared with the theoretical climax, and differences between them could then usually be attributed to "disturbance." Often the source of disturbance was human, implying that humanity was somehow outside of the ideal climax community.16

This functionalist emphasis on equilibrium and climax had important consequences, for it tended to remove ecological communities from history. If all ecological change was either self-equilibrating (moving toward climax) or nonexistent (remaining in the static condition of climax), then history was more or less absent except in the very long time frame of climatic change or Darwinian evolution. The result was a paradox. Ecologists trying to define climax and succession for a region like New England were faced with an environment massively altered by human beings, yet their research program demanded that they determine what that environment would have been like without a human presence. By peeling away the corrupting influences of man and woman, they could discover the original ideal community of the climax. One detects here a certain resemblance to Thoreau's reading of William Wood: historical change was defined as an aberration rather than the norm.17

In time, the analogy comparing biotic communities to organisms came to be criticized for being both too monolithic and too teleological. The model forced one to assume that any given community was gradually working either to become or to remain a climax, with the result that the dynamics of nonclimax communities were too easily ignored. For this reason, ecology by the mid-twentieth century had abandoned the organism metaphor in favor of a less teleological "ecosystem." Now individual species could simply be described in terms of their associations with other species along a continuous range of environments; there was no longer any need to resort to functional analysis in describing such associations. Actual relationships rather than mystical superorganisms could become the focus of study, although an infusion of theory from cybernetics encouraged ecologists to continue their interest in the self-regulating, equilibrating characteristics of plant and animal populations.18

With the imperatives of the climax concept no longer so strong, ecology was prepared to become at least in part a historical science, for which change was less the result of "disturbance" than of the ordinary processes whereby communities maintained and transformed themselves. Ecologists began to express a stronger interest in the effects of human beings on their environment. What investigators had earlier seen as an inconvenient block to the discovery of ideal climax communities could become an object of research in its own right. But accepting the effects of human beings was only part of this shift toward a more historical ecology. Just as ecosystems have been changed by the historical activities of human beings, so too have they had their own less-recorded history: forests have been transformed by disease, drought, and fire, species have become extinct, and landscapes have been drastically altered by climatic change without any human intervention at all. As we shall see, the period of human occupation in postglacial New England has seen environmental changes on an enormous scale, many of them wholly apart from human influence. There has been no timeless wilderness in a state of perfect changelessness, no climax forest in permanent stasis.
But admitting that ecosystems have histories of their own still leaves us with the problem of how to view the people who inhabit them. Are human beings inside or outside their systems? In trying to answer this question, Thoreau is often quite profound. In his essay "Walking," for example, he describes a walk in the woods near Concord, Massachusetts. He writes about the natural beauty of the trees and the surrounding landscape, but he also considers the impact of human activity on the environment. Thoreau's essay illustrates the way in which human activities can shape the environment over time. The idea that human activity can shape the environment is not new, and it is one of the key concepts in the study of environmental history.

Logical climax. Saying that a community's rituals and social institutions "function" unconsciously to stabilize its ecological relationships can lead all too quickly into a static and hierarchial view of both cultural agency and ecological change. If we assume a priori that cultures are systems which tend toward ecological stability, we may overlook the evidence from many cultures—especially those cultures we often think of as "preindustrial"—that human groups often have significantly unstable interactions with their environments. When we say, for instance, that the New England Indians burned forests to clear land for agriculture and to improve hunting, we describe only what they themselves thought the purpose of burning to be. But to go further than this and assert an unconscious "function" in stabilizing Indian relationships with the ecosystem is to deny the evidence from places like Boston and Narragansett Bay that the practice could sometimes go so far as to remove the forest altogether, with deleterious effects for trees and Indians alike.11

All human groups consciously change their environments to some extent—one might even argue that this, in combination with language, is the crucial trait distinguishing people from other animals—and the best measure of a culture's ecological stability may well be how successfully its environmental changes maintain its ability to reproduce itself. But if we avoid assumptions about environmental equilibrium, the instability of human relations with the environment can be used to explain both cultural and ecological transformations. An ecological history begins by assuming a dynamic and changing relationship between environment and culture, one as apt to produce contradictions as continuities. Moreover, it assumes that the interactions of the two are dialectical. Environment may initially shape the range of choices available to a people at a given moment, but then culture reshapes environment in responding to those choices. The reshaped environment presents a new set of possibilities for cultural reproduction, thus setting up a new cycle of mutual determination. Changes in the way people create and re-create their livelihood must be analyzed in terms of changes not only in their social relations but in their ecological ones as well. Doing away with functionalism does not mean abandoning the system-oriented perspective which an ecological approach allows. In addition to assuming that relations between people and
their environment are not constant, but rather historical and dialectical, it sees those relations as being connected within an interacting system. Efforts to describe ecological history simply in terms of the transfer of individual species between segregated ecosystems, as Alfred Crosby and William H. McNeill have done, are thus bound to be incomplete. 66 Important as organisms like smallpox, the horse, and the pig were in their direct impact on American ecosystems, their full effect becomes visible only when they are treated as integral elements in a complex system of environmental and cultural relationships. The pig was not merely a pig but a creature bound among other things to the fence, the dandelion, and a very special definition of property. It is these kinds of relationships, the contradictions arising from them, and their changes in time, that will constitute an ecological approach to history. 67 

The study of such relations is usually best done at the local level, where they become most visible, the best ecological histories to date have all examined relatively small systems as cases. I have opted for a similar approach, albeit for a somewhat larger region. But despite its strengths, the choice of a small region has one crucial problem: how do we locate its boundaries? Traditionally in anthropology, this has simply involved the area within which people conduct their subsistence activities, often described using "ethno-ecological" techniques which analyze the way the inhabitants themselves conceive of their territory. 68 Yet anthropologists are increasingly aware, as historians have long known, that the development of a world capitalist system has brought more and more people into trade and market relations which lie well beyond the boundaries of their local ecosystems. Explaining environmental changes under these circumstances—as in the shift from Indian to European populations in colonial New England—becomes even more complex than explaining changes internal to a local ecosystem. In an important sense, a distant world and its inhabitants gradually become part of another people's ecosystem, so that it is increasingly difficult to know which ecosystem is interacting with which culture. This erasure of boundaries may itself be the most important issue of all.

In colonial New England, two sets of human communities which were also two sets of ecological relationships confronted each other, one Indian and one European. They rapidly came to inhabit a single world, but in the process the landscape of New England was so transformed that the Indians' earlier way of interacting with their environment became impossible. The task before us is not only to describe the ecological changes that took place in New England but to determine what it was about Indians and colonists—in their relations both to nature and to each other—that brought those changes about. Only thus can we understand why the Indian landscape of precolonial times had become the much altered place Thoreau described in the nineteenth century.

The view from Walden in reality contained far more than Thoreau saw that January morning in 1855. Its relationships stretched beyond the horizons of Concord to include vistas of towns and markets and landscapes that were not in Thoreau's field of vision. If only for this reason, we must beware of following him too closely as our guide in these matters. However we may respect his passion, we must also recognize its limits:

I take infinite pains to know all the phenomena of the spring, for instance, thinking that I have here the entire poem, and then, to my chagrin, I hear that it is but an imperfect copy that I possess and have read, that my ancestors have torn out many of the first leaves and grandest passages, and mutilated it in many places. I should not like to think that some demigod had come before me and picked out some of the best of the stars. I wish to know an entire heaven and an entire earth.

We may or may not finally agree with Thoreau in regretting the changes which European settlers wrought in the New World, but we can never share his certainty about the possibility of knowing an entire heaven and an entire earth. Human and natural worlds are too entangled for us, and our historical landscape does not allow us to guess what the "entire poem" of which he spoke might look like. To search for that poem would in fact be a mistake. Our project must be to locate a nature which is within rather than without history, for only by so doing can we find human communities which are inside rather than outside nature. 69
THAT WILDERNESS
SHOULD TURN A MART

New England in 1800 was far different from the land the earliest European visitors had described. By 1800, the Indians who had been its first human inhabitants were reduced to a small fraction of their former numbers, and had been forced onto less and less desirable agricultural lands. Their ability to move about the landscape in search of ecological abundance had become severely constrained, so that their earlier ways of interacting with the environment were no longer feasible and their earlier sources of food were less easy to find. Disease and malnutrition had become facts of life for them.

Large areas particularly of southern New England were now devoid of animals which had once been common: beaver, deer, bear, turkey, wolf, and others had vanished. In their place were herds of European grazing animals which constituted a heavier burden on New England plants and soils. Their presence had brought hundreds of miles of fences. With fences had come the weeds: dandelion and rat alike joined alien grasses as they made their way across the landscape. New England's forests still exceeded its cleared land in 1800, but, especially near settled areas,
the remaining forest had been significantly altered by grazing, burning, and cutting. The greatest of the oaks and white pines were gone, and cedar had become scarce. Hickory had been reduced because of its attractiveness as a fuel. Clear-cutting had shifted forest composition in favor of those trees that were capable of sprouting from stumps, with the result that the forests of 1800 were physically smaller than they had been at the time of European settlement. The cutting of upland species such as beech and maple, which were accustomed to moist sites, produced drying that encouraged species such as the oaks, which preferred drier soils.

Deforestation had in general affected the region by making local temperatures more erratic, soils drier, and drainage patterns less constant. A number of smaller streams and springs no longer flowed year-round, and some larger rivers were dammed and no longer accessible to the fish which had once spawned in them. Water and wind erosion were taking place with varying severity, and flooding had become more common. Soil exhaustion was occurring in many areas as a result of poor husbandry, and the first of many European pests and crop diseases had already begun to appear. These changes had taken place primarily in the settled areas, and it was still possible to find extensive regions in the north where they did not apply. Nevertheless, they heralded the future.

Why had these things happened?

To compare New England ecosystems in 1600 with those in 1800 as if examining two snapshots—New England before the Europeans and New England after—is to imply that the European invasion was the chief agent of environmental change. In a crude sense, there can be little doubt that this was true. Most of the transformations described above would not have occurred had the Atlantic never been crossed, and so our analysis of ecological change must inevitably focus on differences between the human communities that existed on opposite sides of the ocean: differences in political organization, in systems of production, and in human relationships with the natural world. The shift from Indian to English dominance in New England saw the replacement of an earlier village system of shifting agriculture and hunter-gatherer activities by an agriculture which raised crops and domesticated animals in household production units that were contained within fixed property boundaries and linked with commercial markets. Ultimately, English property systems encouraged colonists to regard the products of the land—not to mention the land itself—as commodities, and so led them to orient a significant margin of their production toward commercial sale in the marketplace. The rural economy of New England thus acquired a new tendency toward expansion. The dynamics which led colonists to accumulate wealth and capital were the most dramatic point of contrast between the New England economy of 1600 and that of 1800. The economic transformation paralleled the ecological one, and so it is easy to assert that the one caused the other: New England ecology was transformed as the region became integrated into the emerging capitalist economy of the North Atlantic. Capitalism and environmental degradation went hand in hand.

And yet the problem is not quite so simple. One serious danger of a two-point analysis which contrasts New England before and after the Europeans is that it obscures the actual processes of ecological and economic change. It makes that change seem too sudden and unusual. The Europeans brought to the New World, not just new economic institutions, new markets, and new ways of bounding the landscape, but other things that are less easy to attribute to the direct agency of “capitalism.” The devastating effects, for instance, of the disease organisms which wrought such havoc with Indian populations were primarily a function of the Indians’ isolation from Old World disease environments, and would have been similar no matter what the economic organization of the European invaders. For the Indians, new diseases were one of the clearest consequences of European settlement, but once present, their effects had more to do with biology than economics. This is not to say, of course, that biology and economics were unrelated. That sailors and settlers came to America in sufficient numbers to bring diseases with them was a direct result of social and economic transformations in Europe.

By the same token, the demographic collapse which diseases visited upon Indian populations was instrumental in disrupting the Indians’ status systems so as to encourage their participation in the fur trade; diseases also had the effect of clearing the land of its earlier inhabitants and facilitating its conquest by European settlers. If Europeans were responsible for bringing dis-
For Miantonomo, as for other New England Indians, the struggle against the English, in its most basic form, was a result of the colonists "having gotten our land." The English accomplished this by a wide variety of means: their different conceptions of property, their willingness to use military force and legal deceit in acquiring land, their ideology of conquest and conversion, and so on. The Indian response to English land hunger was a skewed mixture of economic self-interest and cultural adjustment, but was ultimately expressed as political resistance. Many villages which had initially welcomed the English presence as a means of acquiring trade goods and making powerful allies eventually chose to fight further colonial encroachments on their territories. They did so by forging new alliances with other Indian (and European) groups, responding with great creativity to the new diplomatic circumstances in which they found themselves. Miantonomo himself used his ecological analysis to argue for the necessity of a new Indian unity to match that of the English: "for so," he said, "are we all Indians as the English are, and say brother to one another, so must we be one as they are, otherwise we shall be all gone shortly." His argument for a new pan-Indian unity led him finally to propose that he and his allies ambush the colonists, "and kill men, women, and children, but no cows." The latter, he said, should be used for food "till our deer be increased again."

Miantonomo's speech illustrates the sometimes contradictory ways in which Indians responded to the European threat: theirs was a flexibility whose range of choices was increasingly constrained by colonial dominance. As in the case of the European cows which Miantonomo thought might replace Indian deer, Indians were quite willing to adopt and modify European tools and textiles to their own purposes. They learned to use and repair European weapons, and oriented their hunting toward production for European markets. They began raising livestock, expanding the size of their corn crops, and practicing more sedentary ways of life. Their political communities became more extensive in the form of tribal alliances and confederacies in order to meet the need for pan-Indian unity and resistance which Miantonomo described. Indians, in other words, adjusted to what the Europeans brought to New England by modifying the ways they obtained their livelihoods, but at the same time retained...
their political and cultural identity. By ceasing to live as their ancestors had done, they did not cease to be Indians, but became Indians with very different relationships to the ecosystems in which they lived. Only in this limited—but ecologically crucial—sense can we say that an earlier Indian way of life had become impossible by 1600, although the subsistence practices of the New England Indians resembled those of European peasants more than they had before. Indians continued to define themselves as people apart, people resisting full incorporation into the world of their conquerors. The material conditions which had allowed them to practice their annual journey through the seasons no longer existed, but the Indians themselves remained, however much their communities and economies had changed with their environment. 2 

There is thus a second danger in analyzing New England ecological change simply by contrasting two landscapes, one before, the other after, the Europeans arrived. By making the arrival of the Europeans the center of our analysis, we run the risk of attributing all change to their agency, and none to the Indians. The implication is not only that the earlier world of “Indian” New England was somehow static but also that the Indians themselves were as passive and “natural” as the landscape. In fact, the Indians were anything but passive in their response to European encroachments. Faced with what they perceived as new opportunities, they took them as they saw fit; faced with threats to their political autonomy, they fought back as best they could. There is no inherent reason to believe that Indians could not have made far more dramatic adjustments than they did to their new ecological circumstances, if in no other way than by becoming fuller participants in the North Atlantic economy. That they generally did not do so must be attributed in part to their own choice and in part to the English refusal—whether enforced by violence or by law—to let them do so. If Indian communities were no longer autonomous political entities by 1600, it was because English colonists had made them so, denying them access to the land and resources which would have allowed them a more independent existence. 3

Instead, those Indians who remained in New England were confined to reservations, forced onto inferior farmlands, left without animals to hunt or fish, and so had to make their ecologi-

cal adjustments in a far from ideal setting. Being overpowered is not a sign of passivity: however large the ecological forces that drove Indian communities toward change, it is crucial that we see those forces in their political and economic context. Ecology can help us analyze why Indians in 1600 had trouble sustaining themselves on the lands which remained to them, but it cannot explain why they had been compelled to live on those lands in the first place. Only politics can do that. Here the fate of Massachusett can serve as a token of the political interactions between colonists and Indians which accompanied the ecological conflicts he described so well in his speech. Ransomed by his tribe from a rival sachem who had captured him, he requested that he be turned over for safekeeping to the English with whom he was then allied. The colonists responded by arranging for his assassination: he was murdered in cold blood. 4

Putting the ecological transformations of colonial New England in their larger political and economic context carries us full circle to the expansion of European capitalism in the seventeenth and eighteenth centuries. Even after we have admitted the multi-causal quality of the European institutions transferred to the New World, even after we have acknowledged the autonomous agency of the Indians in meeting the challenges those institutions posed, we are still confronted with a regional ecology which in 1600 bore fundamentally new relationships to other parts of the world. Those new relationships had as their source a new human perception of how the resources of the New England landscape might be made useful to those who could possess them. As the French anthropologist Maurice Godelier has remarked, a natural “resource” cannot exist without some intervening human agency which defines it; “there are thus,” he writes, “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.” 5

By drawing the boundaries within which their exchange and production occur, human communities label certain subsets of their surrounding ecosystems as resources, and so locate the meeting places between economics and ecology. 6

All communities exercise choice in their labeling of resources, but they do so in radically different ways. Perhaps the central contrast between Indians and Europeans at the moment they first encountered each other in New England had to do with
that they saw as resources and how they thought those resources should be utilized. Indians had a far greater knowledge of what could be eaten or otherwise made useful in the New England environment; their economy defined a correspondingly greater range of resources. But most of those resources were simply used or consumed by the household which acquired them, or, if exchanged, were traded for similar items. Very few resources were accumulated for the explicit purpose of indicating a person's status in the community: wampum, flax, certain minerals, and ornaments of the hunt generally served these purposes. Class authority was maintained more by kin networks and personal alliances than by stores of wealth, and the latter were in any event limited by the community's commitment to geographical mobility. There was thus little social incentive to accumulate large quantities of material goods. A wide range of resources furnished economic subsistence, while a narrow range of resources conferred economic status. The community's social definition of "need" was inherently limited, and made economic abundance a relatively easy attainment for its members. It was for this reason that Roger Williams could write of the Narragansetts: "Many of them naturally Princes, or else industrious persons, are rich; and the poor amongst them will say, they want nothing." Rich and poor alike were relatively easily satiated, and so made relatively slender demands on the ecosystems which furnished their economy its resources.

The same could hardly be said of the European colonists. For them, perceptions of "resources" were filtered through the language of "commodities," goods which could be exchanged in markets where the very act of buying and selling conferred profits on their owners. Because European economies measured many more commodities in terms of money values—abstract equivalences which could be accumulated, no matter what the resource involved, to become indicators of wealth and social status—they had few of the limitations which constrained the growth of their Indian counterparts. As a result, European markets, as the anthropologist Marshall Sahlins has suggested, at least indirectly "erected a shrine to the Unattainable: Infinite Needs." Those needs were determined not only by the local communities which became established in colonial New England but by all the distant places to which those communities sold their goods. The landscape of New England thus increasingly met not only the needs of its inhabitants for food and shelter but the demands of faraway markets for cattle, corn, fur, timber, and other goods whose "values" became expressions of the colonists' socially determined "needs." Ironically, though colonists perceived fewer resources in New England ecosystems than did the Indians, they perceived many more commodities, and so committed much wider portions of those ecosystems to the marketplace, "Not could it be imagined," wrote the colonial historian Edward Johnson in 1635, "that this Wilderness should turn a mart for Merchants in so short a space, Holland, France, Spain, and Por- tugal coming hither for trade."
However true this may be, it must nevertheless be repeated that the abstract concept of the commodity informed colonial decision-making about the New England environment right from the start. The colonists brought with them concepts of value and scarcity which had been shaped by the social and ecological circumstances of northern Europe, and so perceived New England as a landscape of great natural wealth. Searching for commodities which would allow them to obtain European goods, they applied European definitions of scarcity—that is to say, European prices—to New England conditions of abundance. Operating in an economy where labor was scarce and difficult to hire, where accumulated capital was smaller than it had been in Europe, colonists turned to the factor of production which could compensate for the ones they lacked: they turned to the land and all it contained. Fish, fur, and lumber were assigned high values because of their scarcities in Europe, but were more or less free goods in New England. They had only to be taken and transported to market to yield a substantial return on invested labor; because of this, they were treated as wasting assets capable of rapid conversion to more liquid capital. Labor cost alone operated as a constraint on their exploitation, since colonists could consume natural wealth as a substitute for capital.

The result was an economy which used natural resources in a way which often appeared to European visitors as terribly wasteful. "In a word," wrote the Swedish traveler Peter Kalm of American farming practices, "the grain fields, the meadows, the forests, the cattle, etc. are treated with equal carelessness." A number of Americans agreed. In 1787, the physician Joseph Warren wrote a critique of American agriculture in which he argued:

There is, perhaps, no country in the world, where the situations, nature, and circumstances of things, seem to point out husbandry as the most essential and proper business, more than our own; and yet, there is scarcely one where it is less attended to.

Warren attributed this apparent paradox to several factors: the Americans' tendency to farm overlarge tracts of land, their "trade for commerce," their investment of little capital in their farmlands, and their wasteful practices in feeding livestock. At the

most basic level, however, what distinguished European and American farms was their production of nearly identical commodities with very different proportions of labor and land. As Warren noted, "Nothing will give a clearer idea of the different management, than the following facts: in England, rents are high and labour low; in America, it is just the reverse, rents are low and the rate of labour high." Here there was no paradox: American relations of production were premised upon ecological abundance, and so attached a higher value to labor than had been the case in Europe. Returns to labor were so high in America precisely because returns to land were so low.

Land in New England became for the colonists a form of capital, a thing consumed for the express purpose of creating augmented wealth. It was the land-capital equation that created the two central ecological contradictions of the colonial economy. One of these was the inherent conflict between the land uses of the colonists and those of the Indians. The ecological relationships which European markets created in New England were inherently antithetical to earlier Indian economies, and so those economies were transformed—as much through the agency of the Indians as the Europeans—in ways that need not be repeated here. By 1800, Indians could no longer live the same seasons of want and plenty that their ancestors had, for the simple reason that crucial aspects of those seasons had changed beyond recognition.

But there was a second ecological contradiction in the colonial economy as well. Quite simply, the colonists' economic relations of production were ecologically self-destructive. They assumed the limitless availability of more land to exploit, and in the long run that was impossible. Peter Kalm described the process whereby colonial farmers used new land until it was exhausted, then turned it to pasture and cut down another tract of forest. "This kind of agriculture will do for a time," he wrote, "but it will afterwards have bad consequences, as every one may clearly see." Not only colonial agriculture, but lumbering and the fur trade as well, were able to ignore the problem of continuous yield because of the temporary gift of nature which fueled their continuous expansion. When that gift was finally exhausted, ecosystems and economies alike were forced into new relationships: expansion could not continue indefinitely.
The implications of this second ecological contradiction stretched well beyond the colonial period. Although we often tend to associate ecological changes primarily with the cities and factories of the nineteenth and twentieth centuries, it should by now be clear that changes with similar roots took place just as profoundly in the farms and countrysides of the colonial period. The transition to capitalism alienated the products of the land as much as the products of human labor, and so transformed natural communities as profoundly as it did human ones. By integrating New England ecosystems into an ultimately global capitalist economy, colonists and Indians together began a dynamic and unstable process of ecological change which had in no way ended by 1800. We live with their legacy today. When the geographer Carl Sauer wrote in the twentieth century that Americans had “not yet learned the difference between yield and loot,” he was describing one of the most longstanding tendencies of their way of life. Ecological abundance and economic prodigality went hand in hand: the people of plenty were a people of waste.”

Looking back to its first publication in 1983, I still feel a considerable sense of wonder that this little book exists at all, to say nothing of my gratitude for the generous ways readers have responded to it over the years. In truth, it could easily have languished inside a filing cabinet without ever seeing the light of day. The story of how it finally found its way into print thus has more than its share of serendipity, and may be of interest for what it reveals about the quirky accidents that lead historians to study and write about the things they do.

In one sense, *Changes in the Land* got started during my first year of graduate school at Yale, when I wrote the seminar paper that eventually became this book. But in another sense, it began much earlier, in the years I spent growing up in Madison, Wisconsin. My father was a professor of American history at the University of Wisconsin, and although his approach to the past was not mainly environmental—he specialized in U.S. national politics during the first half of the twentieth century—he taught me from a very early age to move through the world with the most basic of history’s questions always in mind: “How did things get to be this way?”

The beauty of this seemingly simple query is that its answer is almost never as obvious as it seems. We typically take the world of our day-to-day lives far too much for granted, assuming without much thought and despite all evidence to the contrary that what we see before us is just the way things are—and presumably always were. This is, I think, especially true of many young people, which is a chief reason why high school history classes often