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# technology, NATURE, AND AMERICAN ORIGIN STORIES

DURING THE PAST decade, environmental historians have become interested in how narratives express values.[1] Increasingly, they have realized that narrative is not merely a literary concern. People tell stories in order to make sense of their world, and some of the most frequently repeated narratives contain a society's basic assumptions about its relationship to the environment. To change our relationship with nature, therefore, we need to change our stories.

Carolyn Merchant, for example, has written about "reinventing Eden." Calling for a "partnership ethic" that "would bring humans and nonhuman nature into a dynamically balanced, more nearly equal relationship," she argued that a new ethic required a new narrative. This new story "would not accept the idea of subduing the earth, or even dressing and keeping the garden, since both entail total domestication and control by human beings. Instead, each earthly place would be a home, or community, to be shared with other living and nonliving things."[2] Merchant's formulation suggests opposing narratives that express opposing values.

From this perspective, environmental history charts oppositions between different ethics, embodied in contrasting narratives that are rooted in incompatible conceptions of space. My own research suggests that one account of how Americans subdued the earth has been so widespread that it can be called a master narrative, which is to say that it defined the white entitlement to the land. White Americans long imagined that their history began in an Edenic new world, yet they charted the national story as continual technological improvement of that initial perfection. The master narrative slowly became widespread after 1776, as the newly independent colonies started to re-imagine themselves as a self-created community. When repudiating the colonial past, Americans wove stories of origin that emphasized particular technologies, notably the ax, the mill, the canal, the steamboat, the railroad, the steel plow, and the irrigation dam. The use of these technologies to reshape the land defined an American story of origins,

in which the nation was conceived as a second creation built in harmony with God's first creation. This essay will focus on this master narrative, analyze its underlying assumptions, and suggest the range of counternarratives that have opposed it.

## A MASTER NARRATIVE

EVERY CULTURE has a foundation narrative, but these are by no means the same. Amerindian and white stories of origin are fundamentally different. A first people are sui generis. They may claim emergence out of the local earth or claim the right to a place because of the intervention of spiritual beings. Most if not all Native Americans tell stories that express a sense of primeval oneness with the places they inhabit. While the specific stories vary, some parts of the world are almost invariably seen as sacred spaces.

Anthropologists found that the Navajo had an average of one sacred place in every twenty-six square miles. While a few of these were man-made sites, including Anasazi ruins, most were "features of the natural landscape" including "mountains, hills, rock outcrops, canyons, springs and other bodies of water, natural discolorations on rocks, areas where certain plants grow, mineral deposits, isolated trees, places where rocks produce echoes, air vents in rocks, sand dunes, flat open areas, lightning-struck trees and rocks."[3] These natural sites were not apprehended as isolated spots but rather integrated with the landscape through story telling. Although the anthropologists asked about places, replies frequently were organized as stories, and these tales linked sacred spaces both to rituals and to the central myths of their society. While Navajo sacred sites and stories were not the same as those of other Native Americans, most tribes seem to have embedded their culture in the landscape in equally detailed narratives about specific sites.[4]

For those who arrived after Columbus, however, such sacred places and local stories of origin were impossible. Instead, white Americans constructed stories of self-creation in which the mastery of particular technologies played a central role, and in which the mythic status of the stories was effaced, so that they are widely taken to be factual accounts. The Native-American self-conception was inseparable from the first creation of the world; Europeans had to imagine a second creation. They started without a detailed knowledge of the land itself, and they never could imagine away their belated arrival. Instead, they had to construct stories that emphasized self-conscious movement into a new space. One cluster of such stories were frontier epics that emphasized the hardships of the pioneers and the conflict with Native Americans. The central technologies were firearms, particularly the rifle and the six-gun. Such tales of what Richard Slotkin persuasively called "regeneration through violence" have received a great deal of scholarly attention.[5] But there is another important cluster of stories that also deserve study. These are narratives about the settlements that came after Native Americans were swept aside. In them, the original inhabitants are seldom mentioned, and the New World is treated as an uninhabited region. In these foundation stories an unknown and unused abstract space is transformed into a

technologically defined place. Particular man-made objects are valorized, because they offer the means to transform space.

Technological stories about the foundation of new American communities began to emerge at the end of the eighteenth century, and they were unlike those of settlers and explorers during the colonial period. When Europeans first began to colonize the New World, some imagined themselves to be returning to the bower of paradise, others saw themselves as conquerors of pagan lands, and yet others believed that they had embarked on an "errand into the wilderness" to create a better Christian community than had been possible in Britain.[6] These ways of thinking about America by no means disappeared in 1776, and derivatives of such ideas can be traced to the present. But after the Revolution and particularly in the nineteenth century, Americans developed another way to understand their expansion and settlement, as the story of transforming a new space with powerful technologies. As this foundation narrative was projected back in time as well as forward into the immediate future, a few technologies assumed particular prominence.

After the Revolution and until at least 1970, most Americans imagined their nation's settlement in variants of a paradigmatic story. In the earliest version, a settler entered the vast primeval woods. Using a new technology, the American ax (which the British Parliament later found was more than twice as efficient as the English ax), he (seldom she) transformed the forest into field and meadow, farming it for the first time.[7] Initial settlement drew others to the area, and as the population increased a community emerged. As the land was "improved" its value rose; the region prospered. Elimination of the forest was equated with progress, and hard work was tangibly rewarded for each acre cleared. Using an ax, the pioneer created a new landscape, inscribed within a technological narrative that moved from desolate forest to clearing, from trees to logs, from wilderness to home, from empty space to civilization.

A similar narrative pattern recurred in stories about the steel plow, the steamboat, the canal, and railroad, and the irrigation dam. Abstracted from many individual cases, the pattern looked something like this.

1. A group (or person) enters an undeveloped region.
2. They have one or more new technologies.
3. Using them, the group transforms a part of the region.
4. The new settlement prospers, and more settlers arrive.
5. Land values increase and some settlers become wealthy.
6. The original landscape disappears, replaced by a second creation largely shaped by the new technology.
7. The process begins again, as some members of the community depart for another undeveloped region.

Not every story contained all of these elements, and their order varied. Yet a few generalizations are possible. A foundation narrative often was not about an individual hero, but was told in the passive voice and emphasized the technologies themselves. It is the ax, the mill, the canal, the railroad, or the irrigation dam that "caused" the chain of events. While a particular person or a corporation is

acknowledged to have initiated the process or to have profited from it, the story is presented as a typical case of what "inevitably" will take place.[8] The narrative is less a story about a hero than an example of a developmental process. It is an exemplary tale of progress in which human will is conflated with natural and technological forces. Thus white Americans aspired to enhance the original perfection of the world, and Native Americans, who inhabited the first creation, would have to make way for progress.

Such a story implicitly assumed that nature was essentially abundant raw material waiting to be improved. In it, land properly belonged to the person who improved it (an idea given formal expression by John Locke).[9] This labor was a form of muscle power or mechanical force in a larger system where all conversions of forces took place with no loss. Americans would complete providential intentions in a universe without entropy: a perfect conversion of abundant energies. The second-creation story further assumed that natural resources were best developed not through mercantilist-inspired protectionism but in Adam Smith's free market. Second-creation stories were therefore not merely about progress, but about the certainty of automatic progress.

## EXAMPLES

THERE ARE many examples of this American narrative of origins. In 1843 an anonymous American declared that "nature builds us no house or temple, spins no dress. She writes no poetry, composes no music, presents us with no forms of intercourse. Having given out forms enough to beget activity in human taste, she scants her work that we may go on and exert a creative fancy for ourselves." To this author, it seemed obvious that the world was unfinished, waiting for human beings to improve it. With the coming of civilization, "The wild forests are cleared away, the green slopes are dressed and laid out smiling in the sun, the hills and valleys are adorned with beautiful structures, the skins of wild beasts are laid aside for robes of silk or wool. In a word, architecture, gardening, music, dress, chaste and elegant manners—all inventions of human taste—are added to the rudimental beauty of the world, and it shines forth, as *having undergone a second creation* at the hand of man" (emphasis added). From this perspective, mankind did not exploit nature, but employed the useful arts to improve its rudimentary forms. Only human beings could build a second creation, which distinguished them from "the animals. They can not dress. Their outward form is given them and they must wear it."[10]

In such accounts, nature is an unimproved space that a people enter, armed with tools that they use to reshape the land. The improvements are latent within the earth, which awaits human beings to fulfill its destiny. In this view, forests, rivers, streams, waterfalls, and even deserts were providentially located at convenient locations, awaiting the hand of man. As one newspaper editor put it in 1850, "Standing around scratching heads will never make Pomeroy *the city nature intended it to be.*" (Emphasis added).[11] That "nature" could intend a site to be something man-made was a central conceit in the doctrine of second creation. Man's duty lay in completing God's original creation. By this logic Pomeroy, Lowell,

Rochester, Omaha, Minneapolis, Denver, and other instant cities were not impositions on or exploitations of Nature. Rather, such towns expressed an intended design; their growth and prosperity measured providential intent.

Abraham Lincoln imparted a similar message in 1859, when he lectured on discoveries and inventions. It seemed clear to him that the Garden of Eden was merely a starting point for progress. "Take, for instance, the first of old fogies, father Adam. There he stood, a very perfect physical man, as poets and painters inform us; but he must have been very ignorant and simple in his habits. He had had no sufficient time to learn much by observation; and he had no near neighbors to teach him anything. No part of his breakfast had been brought from the other side of the world; and it is quite probable, he had no conception of the world having any other side. In all of these things, it is very plain, he was no equal of Young America."[12] Lincoln extolled industrial society as an agent of moral and educational improvement. Rather than see Adam as a perfect human being before the fall, Lincoln suggested that he lacked the advantages of education, morning coffee, and rapid transportation. His world was unfinished and awaiting the second creation.

This perception of nature was expressed in narratives where pioneers transformed entire regions, clearing eastern forests, damming streams to build mills, homesteading the plains, building transcontinental railroads, and irrigating the desert. These seemed to be inevitable developments that opened the land to full use. A correspondent in *McClure's* declared in 1894: "Millions of acres of land are lying idle in Western Kansas and Nebraska, in Colorado, Wyoming, Utah, Nevada, Idaho, Montana, Arizona, New Mexico, and California, wanting only the magic touch of water to make them bloom into a flower-garden, and yet producing nothing but lean coyotes, sun-dogs, and scenery."[13] Irrigation enthusiasts such as William E. Smythe wrote of "Man's Partnership with God," and suggested that the arid west was an unfinished creation where Americans would complete the work of the Almighty.[14] Smythe read God's intentions in the landscape, and declared: "He depends on man, working in partnership with Him and in harmony with the laws of the universe, to bring the world to completion."[15]

## THE NARRATIVE SETTING

THE SECOND-CREATION story implicitly expressed a sense of space, and those who repeated it took certain things for granted about the structure of their world. Just as the characteristic rectangular shape of a canvas imposes a framework of vision upon an oil painting, Americans literally prepared the ground that made the second-creation story seem "natural." By surveying the land into perfect squares, ready for purchase, they imposed a grid pattern on the land and provided the necessary setting where they could act out their master narrative. The act of clearing land to build a log cabin created its own entitlement to the property, and it was a representative act of advancing civilization.

The envelope of assumptions that supports a foundation narrative usually is un-voiced and remains at the margins of consciousness. As Pierre Machery argued in *A Theory of Literary Production,* cultural texts are not produced

autonomously, but in relation to often unarticulated assumptions about the "natural" structure of the world.[16] Often these assumptions are visualized in art. The second-creation story rested on an assumed perception of nature that was expressed brilliantly in the often reprinted Currier and Ives print, Frances Palmer's "Across the Continent: Westward the Course of Empire Takes its Way."[17] As many a teacher has elicited from class discussion, the image represents an unambiguous relationship between the railroad, the telegraph, and the landscape. In the image the distance remains vague and unformed, in contrast to the foreground where a new town has sprung into existence, impelled into life by the railroad. The caption itself is a quotation from Bishop Berkeley's often-repeated declaration, made in the 1720s, that "Westward the Course of Empires Takes Its Way."[18] This notion that human history records a continual westward shift in power from the Middle East, to Greece, to Rome, to Northern Europe, and then to the New World had become a staple of the American self-conception by the time this image was crafted and sold to a large public in 1868. By that date the first transcontinental railroad to the Pacific was nearing completion. The Currier and Ives image is both a vision of the recent past and a prediction of the future. It uses space to represent time: The new community in the foreground is the present, the empty land ahead of the train is the future, which extends to the vanishing point of perspective. This painting is also rather unselfconsciously imperialistic. The land ahead is presented as empty space awaiting the coming of white civilization. A few Native Americans on horseback are literally on the margins, watching, and the smoke from the train blows over them, obscuring their view of the land, and thus of the future. The print charts a landscape that naturalizes second-creation stories.

Related narratives remained common well into the twentieth century. They frequently underlay world's fair exhibits, which constructed landscapes that emphasized the changes human beings had imposed on the land. At the New York World's Fair of 1939, for example, miniaturized landscapes proved popular with the public. These included an enormous model railroad system that visualized the foundation story, showing how the railroad moved into and transformed empty space. Located in a building eight stories high, it featured a mountainous landscape where was enacted "the progress of railway building—forest clearing for a right of way; ore brought down the mountains to smelters, factories, and fabricating plants; logs cut and floated to saw mills; raw materials converted and assembled into the finished product."[19] The two most popular exhibits at the Fair were landscapes of the future: General Motors' "Futurama" and the theme exhibit, "Democracity." Each told the story of a new second creation, remaking the world of the depression into a prosperous 1960, which was uncluttered, streamlined, and thoroughly modernist.[20] Both exhibits presented landscapes of the future as though they already existed, giving the public not only a progressive vision of history but also a vision of malleable space that could be reshaped endlessly in the quest for improvement.

Futurama and Democracity contained no slums or poor neighborhoods, no traffic jams, no unsightly factories, no unemployment, no polluted streams, no

smog, no industrial blight. Science and technology had no ill effects in these utopias. If millions of people enjoyed these exhibits in 1939, such exhibits might now be criticized for being blind to the complexities of technological and social change. Yet second-creation landscapes retain widespread attention. On television, pioneers still regularly enter the "empty" space of the American west or homestead new planets. Children play computer games such as Sim City, which invite them to create new communities from scratch in an empty virtual landscape where a grid defines the contours of roads and the arrangement of houses, factories, and commercial districts. In short, a malleable, empty space implicitly organized by a grid still underpins second-creation stories. The grid defines the grounding assumptions of what is "natural" and "inevitable."

## THE GRID

THE ANTHROPOLOGIST Edward Hall once observed a striking difference between France and the United States that is visible in its road systems.[21] The French roads radiated out from towns, forming clear centers and peripheries. The cathedral stood in the middle of town, often as the literal focal point of highways, and its spire was the first object visible from a distance. Looking at a road map, a star-like pattern of lines flows out from the heart of older European cities and towns. The origin of the pattern is ancient, and the location of each road is a combination of local topography, history, and convenience. In contrast, most of the United States west of the Alleghenies was laid out in a vast checkerboard pattern, imposing a design on the contours of the land without regard for its topography and without reference to any history or custom of land use.

During and after the 1780s, Americans embraced this new sense of space, although the idea of surveying land into perfect squares was first tried on a smaller scale in several states. Notably, the year before the new system was enacted into federal law, New York state had successfully introduced it in its western areas. The grid was a fundamental change, literally putting a new frame around stories of migration and settlement. The imposition of a geometrical pattern on much of North America was central to the imagined order that made possible stories of technological creation. In the colonial period, not the individual but the community had been central. The theocratic order of first settlers was visible in the layout of the land, as Americans reproduced the European village, with the church at the center and the roads radiating outward. Early local governments did not conceive of land as being generic, but evaluated and divided it into woodlots, pasture, and farmland, distributing some of each to every household. A family's land was not all in one location but dispersed, and the shape of each lot was by no means regular and seldom a perfect square. In contrast, the new grid system erased hierarchy and centrality from the landscape, substituting the values of individuality and equality.

Considering this contrast between pre- and post-revolutionary space, it seems particularly significant that George Washington, before he commanded the American army, had been a surveyor, and that Thomas Jefferson introduced and

promoted the idea of the grid in Congress. The two most popular founding fathers were particularly well qualified to understand the decision to impose the grid on the new nation's western territories. It is tempting therefore to assume that the creation of the grid expressed an immediate and fundamental shift in consciousness. But a look at the discussions surrounding the adoption of the Ordinance of 1785 and the later revisions of the grid scheme demonstrates that the legislation was a practical program as well as a reconception of space. If it expressed the Enlightenment values of rationality, equality, and order, the survey also was intended to facilitate selling western land to pay off the national debt. Not only was the far side of the Allegheny Mountains largely uncharted, but the nation lacked a corps of skilled surveyors large enough to provide maps in a reasonable time. Thus, as Peter Onuf concludes, "policy makers faced an immediate, practical problem in linking supply to demand. They had to create a market for a commodity, unimproved frontier land."[22] To do this they needed a system to survey the land and guarantee title. The grid hastened that process. It was not an ideal solution for most localities, since the grid ran roughshod over topography.[23] But it could be put into effect immediately. Using longitude and latitude as the basis for land divisions, one could survey any location, no matter how remote.

Some geographers have defended the system down to the present. John Fraser Hart recently argued that "it may be the best system of land division ever invented. It provides an excellent frame of reference for orientation, and it conveys a sense of neatness, order, and stability." Perhaps even more important, the grid system "has obviated an enormous amount of litigation by facilitating a brief but precise description of the exact location of any tract of land."[24] But if the National Survey made land transactions easily comprehensible, it also encouraged farmers to ignore the contours of the land. The grid became the basis for a system of fields, roads, and power lines that followed north-south or east-west boundary lines and defied the actual landscape of hills and valleys. Such roads fatigued horses, which had to work much harder than they would have in a well-planned system based on topography. American roads also frustrated the traveller seeking to move diagonally rather than according to the four cardinal points of the compass.

During the nineteenth century, while Americans accepted and naturalized the geometrical ordering of the land, they moved from the Appalachian Mountains to California. Accepting this land division affected not only the sense of space but also the sense of the past. The grid, like the technological creation story that it underpinned, represented a radical break with the religious story of the settlement of the New World. That story had represented *colonists* as the carriers of European spatial patterns to a new place. The early settlers often were compared to the ancient people of Israel. In this encodation of events, the immigrants to America were bringing to perfection the religious and social ideals of Europe. Significantly, before the revolutionary period there are few fully worked out examples of the second-creation narrative, with its radically different assumptions about the relationship to the land. Only people who self-consciously saw themselves not as colonists but as *Americans* were ready to reinvent their

sense of space, and this reinvention found expression in the implementation of a national survey.

The grid was not a scientific solution but a technological convenience. As some legislators realized at the time, demanding that surveyors carve up land into squares based upon the lines of latitude and longitude was theoretically impossible. Such a plan assumed the earth was flat, whereas the "squares" surveyed on a globe were really trapezoids, slightly narrower at the top than at the bottom. Meridians converge near the poles, and as surveyors laid out thousands of contiguous "squares" they had to be shorter on their northern boundary, or they would soon be out of alignment.[25] Compromises and approximations were inevitable, and over time they learned to establish correction lines at regular intervals.[26]

Surveying was the essential precondition to owning land, building a mill race, or constructing a canal, railroad, or irrigation ditch. Surveying the land into squares was part of the underlying and often unarticulated ideology that was a necessary precondition for a technological narrative. Surveying was a kind of writing on the land, turning it into a free-market landscape. Before the surveyor measured the land according to a repeatable and verifiable system, legal ownership was literally impossible. As Americans divided their land in accord with longitude and latitude and made the units interchangeable in size, they materialized an egalitarian sense of space that had no center and no past.

The grid abolished the tightly bounded and circumscribed European space of space. Instead, most white Americans defined the west as essentially empty space, a tabula rasa, a "virgin land" waiting to be appropriated.[27] The system created a checkerboard of 640-acre squares, or sections of one square mile each, defined a township as a square containing thirty-six sections, assembled townships to form quadrangular counties, and ultimately projected perfectly square states. Congress adopted the land units of the section and the township in order to sell farms in advance of settlement, but it at first rejected purely geometrical state boundaries and left the definition and naming of new states to the future.[28]

Congress nevertheless initiated a revolution in the sense of American space. For the grid system expressed philosophical ideas that Americans literally inscribed on the land.[29] Most obviously, the grid asserted human dominion. As Denis Cosgrove noted, "Confidence that nature had been nailed down by geometry was shared by both railroad boosters in New York and Chicago and isolated homesteaders on their quarter or half-quarter sections that stretched across Oklahoma and the Texas Panhandle with only the rail line to measure the endless horizon."[30] This conception of space was atomistic, and assumed identical units. It assumed that in each place the same social reality could be replicated, creating a society that was at once homogeneous and at the same time made up of self-reliant parts.[31] Such a space had no limitations; it was conceptually unbounded, and it was perpetually open to new people and new technological systems.[32] Within this dominant geographical system, Americans soon felt that their land division was not arbitrary. As Philip Fisher presciently observed, "Such a Cartesian space provides for no observers, for no oppositional positions. There are no outsiders."

To be an "observer is a symptom of a divided social space."[33] The grid was a totalizing system, making it difficult to write, and even more difficult to win an audience for, a counternarrative.

White Americans overlooked natural boundaries when visualizing and settling the land, imposing a new geography that made it into an abstraction, a commodity, and an item of speculation. Yet at the same time, they paradoxically celebrated the moral values of settled, agrarian life. The grid also ignored and dispossessed Native Americans. Its endless squares declared that the land was unused, empty, and waiting for settlers. The adoption of the grid made it easier to believe in Manifest Destiny; filling in the "empty" and "undeveloped" spaces of the grid became an automatic historical process. The grid naturalized second creation.

At the latest, by the time that settlement began to venture west of the Mississippi, the grid had become fully assimilated. As J. B. Jackson noted, "whereas in the older states of Ohio and Indiana and Illinois (where the heritage of the colonial farm lingered) the straight lines of the grid were valued as an efficient and democratic way of organizing individual landholdings, west of the Missouri the grid played a much more decisive role: it was the *only* practical and speedy method of organizing space." In the western half of the country, the grid's "long-range effect was to eliminate, once and for all, the impact of tradition and traditional spaces in the forming of the new High Plains landscape. A composition of identical rectangular squares extending out of sight in every direction, ignoring all inherent differences, produced a landscape of empty, interchangeable divisions."[34] As one of Willa Cather's narrators put it, when first confronted with the Nebraska territory: "There was nothing but land: not a country at all, but the material out of which countries are made."[35]

The first white resident who took possession of a newly demarcated farm encountered not a geometrical space, however, but a changing, living biotic community, traversed by wind and water, that bore the marks of the Native Americans, whose trails often served as the first roads and whose arrowheads were turned up by the plow. The settler confronted what geographer John Rajchman called the "other geometries" of living. His examples are "the geometry of a young Japanese woman walking down a Parisian street or a Dutchman made to feel clumsy, elephantine, in a traditional Japanese house or inn."[36] For European settlers in North America, a similar unease was unavoidable when they visited Native-American settlements, whose spatial geometries remained opaque. Even within a single culture, "Each of us has such geometries, composed of lines of different kinds, coming to us in various ways, which make up the arrangements of dispositions of space–the assemblages–in which we move and relate to one another."[37] Since the Native American sense of space remained indecipherable to most colonists, the usual response was to erase the physical traces of that sensibility and impose geometrical order. Accordingly, in most foundation narratives there is no mention of any previous inhabitants, as though the continent had been completely raw and undeveloped, waiting for the ax, the sawmill, and the arrival of the first railroad.

## CONTEMPORARY NARRATIVES

THE NARRATIVE of second creation has by no means disappeared, as many Americans imagine ways to inhabit outer space. In March 1998, newspapers carried excited stories about ice on the moon, discovered in craters near its north and south poles. Scientists estimated that between 10 and 100 million tons of $H_2O$ was there, and this prospect set off a wave of speculation. The mainstream media exhibited little environmental concern.[38] Their reports assumed that water was a resource there for the taking, to be used to make rocket fuel, irrigate green houses, and supply tourist hotels. Preliminary market studies suggested that upmarket lunar travelers would want condominiums, tennis courts, and even golf courses. This speculation about colonizing and exploiting the moon manifested a long-standing tradition, in which American entrepreneurs have exploited natural resources in order to found new communities that would lure settlers and tourists. A private American corporation also sells lunar lots, after discovering a loophole in the international treaty that prohibits nations, but not individuals, from owning land on the moon.[39]

Such designs for the moon recapitulate the second-creation story. Once again Americans expect to use technologies to transform the raw material of an unsettled space. As had been the case with western irrigation, lunar speculators plan to build communities based on water. Colonizing the moon, however, would require a far more complex technological infrastructure and greater amounts of energy than the dams on the Colorado River. Habitable buildings on the moon demand materials capable of withstanding temperature swings from -200 to +200 degrees Celsius. Lunar plumbing, heating, and air-conditioning would need to function in weak gravity, and, given the distance to the nearest hardware store, inhabitants would require fail-safe back-up systems. Moon colonies also would need regular shuttles to and from the earth to ferry supplies and spare parts. Even this short list suggests the enormous costs and technological demands such a second creation would make.

Americans in 1998 did not see water on the moon in quite the same way that they had viewed irrigation in 1898. There was no sense that God had put water on the moon in order to challenge men to make a second creation. Many nineteenth-century Americans saw technologies as a means to carry out divine intentions "manifested" in the landscape, but fewer twenty-first-century Americans saw providential designs in nature, although they still wanted to create new environments. A popular science-fiction trilogy describes the settlement and biotic transformation of Mars.[40] Likewise, the Mars Society advocates building greenhouses in the carbon-dioxide-rich Martian environment. It recommends melting the ice caps, thickening the atmosphere and, "terraforming" the red planet.[41] Space colonies "on the frontier" are a staple in science fiction, and Robert Zubrin's *The Case for Mars* rather predictably compares its colonization to settling the American West. (In contrast, *Wired Magazine* compared it to settling Antarctica.)[42] Second creation on the moon, on Mars, or further out in space, demands more complex technology, but the underlying story remains the characteristic nineteenth century narrative.

## COUNTERNARRATIVES; RECOVERY NARRATIVES

BECAUSE SOME Americans continue to tell these stories in the twenty-first century, it is important to underscore that the assumptions underpinning the second-creation narrative already had lost much of their credibility by 1910. Historical experience had undermined the geometrical sense of space. Indeed, there was a fundamental contradiction between the geometry of the national survey and the premise of second creation itself. How could Americans discover the intended purpose of land, if it were uniform? The latent potential of a forest, a river, or a watershed lay in its distinctive features, not in its uniformities. A cabin, a mill, a rail line, or an irrigation ditch was best situated not by relying on an abstract mathematical system, but by studying the topography of each specific location. No homesteader or land speculator believed the pretense that land was everywhere the same. Under the Homestead Act, one undeveloped tract had the same price as all other tracts of the same size, but settlers knew better and looked hard for the best land. Some tracts were wooded and had good soil, others were sandy or rock-strewn wastes. West of the hundredth meridian, water became more important than the land itself, and because most irrigation required high initial investment, few homesteaders could afford it. Irrigation created relatively few family farms, but a good deal of agribusiness employing landless laborers. As Americans moved west, a system of land sales intended to produce Jeffersonian democracy increasingly produced oligarchy instead. The geometrical division of space was egalitarian in principle, but in practice it denied the rights of first inhabitants, imposed inconvenient boundaries, created social isolation, and often helped investors more than homesteaders.

By the 1920s, second-creation stories were less likely to describe the future than the past. Yet the trope of second creation by no means disappeared, and it continued to be rewritten and to circulate as part of the repertoire of stories many Americans tell to make sense of their migration to and settlement in the New World. Even if the beliefs implicit in the second-creation story have become indefensible, Americans remain loath to abandon the narrative itself. It has ceased to be merely a story, and become a national account of origins that confers entitlement to the continent to white immigrants.

It must be stressed that many have contested this master narrative, virtually from its inception. The second-creation story was always in tension with alternative visions of what the land might be used for, or what it meant to "improve" it. Readers of *Environmental History* need only think of the writings of James Fennimore Cooper, Henry David Thoreau, George Perkins Marsh, or John Muir to be reminded of protests against the assumptions of the second creation story, though it should be stressed that some women and minorities also belong to this tradition. For example, both Louise Erdrich's *Tracks* and Frank Waters's *People of the Valley* concern a landscape and a way of life that pre-exist a new technology.[43] Both novels evoke the life of a people who have lived for generations in one place and describe the destruction of their communities. Reversing the master narrative, outsiders enter an existing biotic and human community, and

acquire its land through a combination of force and legal trickery. The newcomers possess powerful new technologies, and they use them to transform the landscape. This undermines the first community's way of life. Such counternarratives, which also include such works as Marc Reisner's best-selling *Cadillac Desert,* emphasize injustice, misuse, and environmental destruction, and have become important parts of the discourse about what it has meant to inhabit the land.[44]

Yet there was more than a simple opposition between master narratives of second creation and counternarratives of loss. Many twentieth-century Americans instead embraced what can be termed a recovery narrative. Essentially about remaking despoiled landscapes, this recovery narrative begins not with empty space waiting to be improved by new settlers, but with a place corrupted and degraded by human misuse. At such sites the free market has unleashed selfish individualists who have exploited the land for short-term gain. To restore natural beauty and environmental harmony, a countervailing social force enters the area, in the form of a non-profit organization or a government agency. After taking control away from shortsighted private interests, this institution redevelops the area. It cleans up the pollution, halts erosion, plants new trees and shrubs, restocks rivers and lakes with native species, protects wildlife, and gives back to the public a restored version of the natural world. This restoration is not identical with first creation, or the world as it was before European civilization tampered with the environment. Nor is it a "correction" of abuses that provides the public with an idealized second creation that "should" have emerged through free enterprise. Instead, revising the assumptions of the second creation story, the result is a managed site that seeks to recuperate the virtues of the first landscape, while still making it both accessible to tourists and profitable for private enterprise. This was the narrative of the conservation movement, and it now underlies a body of law.

This story emerged along with another contrasting narrative that demanded preservation of the wilderness, with as little intervention by human beings as possible. Muir, and many others afterward, called for certain areas to be set aside in perpetuity from all forms of development. While such ideas seldom prevailed before 1900, they became increasingly popular in the twentieth century. As Roderick Nash pointed out, the popularity of the primitive and pristine nature had many manifestations in American culture in the first years of the twentieth century, including the creation of the Boy Scouts and the speeches of Theodore Roosevelt, who extolled the invigorating harsh conditions of the West and denounced overcivilized, urban life.[45] Organizations such as the Sierra Club gradually became advocates of preserving sublime landscape for its own sake and not for anthropocentric reasons. The wilderness ethic overtly seemed to contain no narrative at all, but rather denied the value of second creation. From this perspective, primeval forests should not be cut down, dams and railways violated national parks and forests, and irrigation projects destroyed delicate desert ecological systems. If conservation was a rewriting of second creation into a recovery narrative, the wilderness movement wanted to keep some portion of Nature pure and to prevent it from becoming part of any human story.

Environmental historians have rethought the recovery narrative of conservation and challenged the assumptions of the wilderness ethic. Based on this rethinking, such scholars as Carolyn Merchant and William Cronon have explicitly called for new narratives that avoid the opposition between human beings and wilderness. In order for these new stories to be heard, however, it will be necessary to overcome the lingering power of the trope of second creation. For most Americans continue to use and to modify technological creation stories to provide a roadmap for American history, describing a movement from east to west, from forest to field, from canal or railway terminus to metropolis, from arid wasteland to irrigated garden. Most Americans still believe that the clearing in the forest, the mill in the valley, the canals and railroads toward the west, and the irrigation ditch in the desert simply enhance the bounty of the earth. Second creation stories still legitimize white expansion into the "empty" continent, and they still describe capitalist resource development as an inevitable process. Each improvement seems to justify taking land that had "lain idle." Americans are loath to abandon the vision of second creation. The narrative itself has become so deeply embedded in American thinking that it has ceased to be merely a story. It has become a national myth of origin.

In short, there are three interlocking stories, which together give the master narrative a sequence: the wilderness tale, second creation, and the recovery narrative. The preservation of pristine places in America does not exclude but rather prefaces the second creation story. If one part of the government preserves the wilderness in its pre-narrative state, it does so in order to provide a point of departure for second creation. At the same time, the Forest Service and the Bureau of Reclamation institutionalize the recovery narrative of conservationism, working to ensure that second creation does not become a story of rapacious land exploitation. Outside government, a panoply of organizations and movements also repeat these three stories. The Sierra Club, Friends of the Earth, and Earth First! demand more wilderness areas. In opposition, private enterprises lobby for more technological creation, as they seek land for mining, oil exploration, ranching, farming, and logging. *The Wall Street Journal* editorialized recently on their behalf: "Radicals like to frame the environmental debate by dividing people into those for nature and those against it. In fact, the divide is much more practical, between those who would manage our land and those who would not. Because we necessarily intrude upon nature, we must take it upon ourselves to manage it–through road building, fire policies and, most importantly, logging ... to pretend that forests are pristine ecosystems that should be left to grow wild is absurd."[46] Thus the narratives of wilderness, second creation, and conservation are woven into public debate. Each of these stories in its own way is about human beings defining and dominating the natural world.

In the 2000 election campaign, George W. Bush stood primarily within the second creation tradition, as he called for oil drilling in the Arctic National Wildlife Refuge and appointed a secretary of the interior acceptable to loggers and paper manufacturers. In contrast, Al Gore had a campaign platform that was more "green" and rhetorically embraced the wilderness ethic. Yet the differences

between the two national parties may be less decisive than election rhetoric suggests. Both parties embrace the story of second creation for most of the land mass of the United States. They only disagree on how much of the remainder should be designated as wilderness or national forest. The three narratives of second creation, conservation, and wilderness have become less competing stories than a system of available explanations. Using this system, Americans cobble together a shifting consensus, depending on political and economic circumstances. Such a system cannot easily be refuted, and may well remain unassailable so long as scholars discuss only one story at a time.

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## NOTES

1. For example, see William Cronon, "A Place for Stories: Nature, History, and Narrative," *Journal of American History* 78 (1992): 1372-76; and James C. McCann, "The Plow and the Forest: Narratives of Deforestation in Ethiopia, 1840-1992," *Environmental History* 2 (April 1997), 138-59.
2. Carolyn Merchant, "Reinventing Eden," in *Uncommon Ground,* ed.William Cronon (New York: W. W. Norton, 1996), 157-58.
3. Klara Bonsack Kelley and Harris Francis, *Navajo Sacred Places* (Bloomington: Indiana University Press, 1994), 38-39.
4. See, for example, Loren Graham, *A Face in the Rock: The Tale of a Grand Island Chippewa* (Berkeley: University of California Press, 1998), 15-17, 29, 45.
5. Richard Slotkin, *Regeneration Through Violence* (Middletown, Conn.: Wesleyan University Press, 1973).
6. Narrative conceptions of the settlement of America have been frequently analyzed, notably in such early works as Perry Miller, *Errand into the Wilderness* (Cambridge, Mass.: Harvard University Press, 1956); Howard Mumford Jones, *O Strange New World* (New York: Viking, 1964); Leo Marx, *The Machine in the Garden* (New York: Oxford University Press, 1964); Max Savelle, *Empires into Nations: Expansion in America, 1713-1824* (Minneapolis: University of Minnesota Press, 1974); and D. W. Meinig, *Atlantic America, 1492-1800* (New Haven, Conn.: Yale University Press, 1986), 3-76.
7. For the parliamentary findings, see Carroll Pursell, *The Machine in America: A Social History of Technology* (Baltimore, Md.: Johns Hopkins University Press, 1995), 15.
8. When technologies are quite new, however, they often will be described as wonders in terms of the sublime. Some writers believed that the railroad had a morally uplifting influence, and nineteenth-century Americans celebrated in turn their canals, railroads, bridges, and skyscrapers in these terms. See David E. Nye, *American Technological Sublime* (Cambridge, Mass.: MIT Press, 1994).
9. John Locke, *Second Treatise on Civil Government,* Book V. Discussed in Mulford Q. Sibley, *Political Ideas and Ideologies: A History of Political Thought* (New York: Harper & Row, 1970), 376-77.
10. "Taste and Fashion," *New Englander and Yale Review* 1 (April 1843).
11. Cited in Daniel Boorstin, *The Americans: The National Experience* (New York: Random House, 1965), 131.

12. Abraham Lincoln, "Second Lecture on Discoveries and Inventions," *Collected Works of Abraham Lincoln,* ed. Roy P. Brasler (New Brunswick, N.J.: Rutgers University Press, 1953-55), 3:357-58.
13. Cy Warman, in *McClure's Magazine*, Sept. 1894, quoted in "The Opening of Empire," *Literary Digest* Vol. 19915 September 1894) 20.
14. William E. Smythe, *The Conquest of Arid America* (New York: Macmillan, 1905), 327.
15. Ibid.
16. Pierre Macherey, *A Theory of Literary Production* (London: Routledge, & Kegan Paul, 1978), 155.
17. Frances Palmer, "Across the Continent: Westward the Course of Empire Takes its Way," Currier and Ives, 1867. Copy in Library of Congress.
18. "Verses on the Prospect of Planting Arts and Learning in America," *The Works of George Berkeley, D. D.,* ed. Alexander C. Fraser (Oxford: Oxford University Press, 1901), IV:364.
19. Ibid., 167. On this fair, see also David E. Nye, *Narratives and Spaces* (New York: Columbia University Press, 1998), 104-8, 129-45; and Nye, *American Technological Sublime*, 199-224.
20. *Official Guide Book, New York World's Fair* (New York: Exposition Publications, 1939), 27. See also Robert D. Kohn, "Social Ideals in a World's Fair," *North American Review* 247 (March 1939), 116-17.
21. Edward Hall, *The Hidden Dimension* (New York: Doubleday, 1966), 146-47.
22. Peter S. Onuf, "Liberty, Development, and Union: Visions of the West in the 1780s," *William and Mary Quarterly* 43 (April 1986), 208.
23. John Brinckerhoff Jackson, *A Sense of Place, a Sense of Time* (New Haven, Conn.: Yale University Press, 1994), 4.
24. John Fraser Hart, *The Rural Landscape* (Baltimore, Md.: Johns Hopkins University Press, 1998), 155.
25. See John Stilgoe, *Common Landscape of America, 1580-1845* (New Haven, Conn.: Yale University Press, 1982), 103.
26. See Hildegard Binder Johnson, "Towards a National Landscape," in *The Making of the American Landscape,* ed. Michael P. Conzon (New York: HarperCollins, 1994), 127-32.
27. The classic work is Henry Nash Smith, *Virgin Land* (Cambridge, Mass.: Harvard University Press, 1950), while Annette Kolodny contributed to a revision of his work with *The Land Before Her: Fantasy and Experience of the American Frontiers, 1630-1860* (Chapel Hill: University of North Carolina Press, 1984).
28. For an overview, see Meinig, 341-43, or Boorstin, *The National Experience*, 241-48. Boorstin points out that part of Georgia was laid out into square-mile sections as early as 1717.
29. This inscription is beautifully visualized in James Corner and Alex S. MacLean's *Taking Measures Across the American Landscape* (New Haven, Conn.: Yale University Press, 1996).
30. Denis Cosgrove, "The Measures of America," in ibid., 9.
31. Philip Fisher, *Still the New World: American Literature in a Culture of Creative Destruction* (Cambridge: Harvard University Press, 1999), 47.
32. Ibid., 48.
33. Ibid., 50.
34. Jackson, *A Sense of Place,* 154.
35. Willa Cather, *My Antonia* (Boston: Houghton Mifflin Co., 1918), 7.
36. John Rajchman *Constructions* (Cambridge, Mass.: MIT Press, 1998), 91.
37. Ibid., 91.
38. John Carlin, "Fly Me to the Moon," *Independent on Sunday*, Focus, 8 March 1998, 20.

39. Exploiting a loophole in the 1967 United Nations Outer Space Treaty, real estate, divided on the grid system, is being sold on Mars, Venus, the Moon, and other locations in outer space. See http://www.lunarembassy.com/lunar/index_e.shtml.
40. Kim Stanley Robinson, *Red Mars* (New York: Bantam, 1993); *Green Mars* (New York: Bantam, 1995); *Blue Mars* (New York: Bantam, 1997).
41. Tim McNichol, "The New Red Menace," *Wired Magazine* (July 2001),146.
42. Ibid.
43. Louise Erdrich, *Tracks* (New York: Harper & Row, 1988); Frank Waters, *People of the Valley* (1941; reprint, Athens: Ohio University Press, 1969).
44. Marc Reisner, *Cadillac Desert: The American West and Its Disappearing Water* (New York: Viking, 1986).
45. Roderick Nash, *Wilderness and the American Mind.* 3rd ed. (New Haven, Conn.: Yale University Press, 1982), 146-151.
46. *Wall Street Journal,* 12 January 2001, A18.