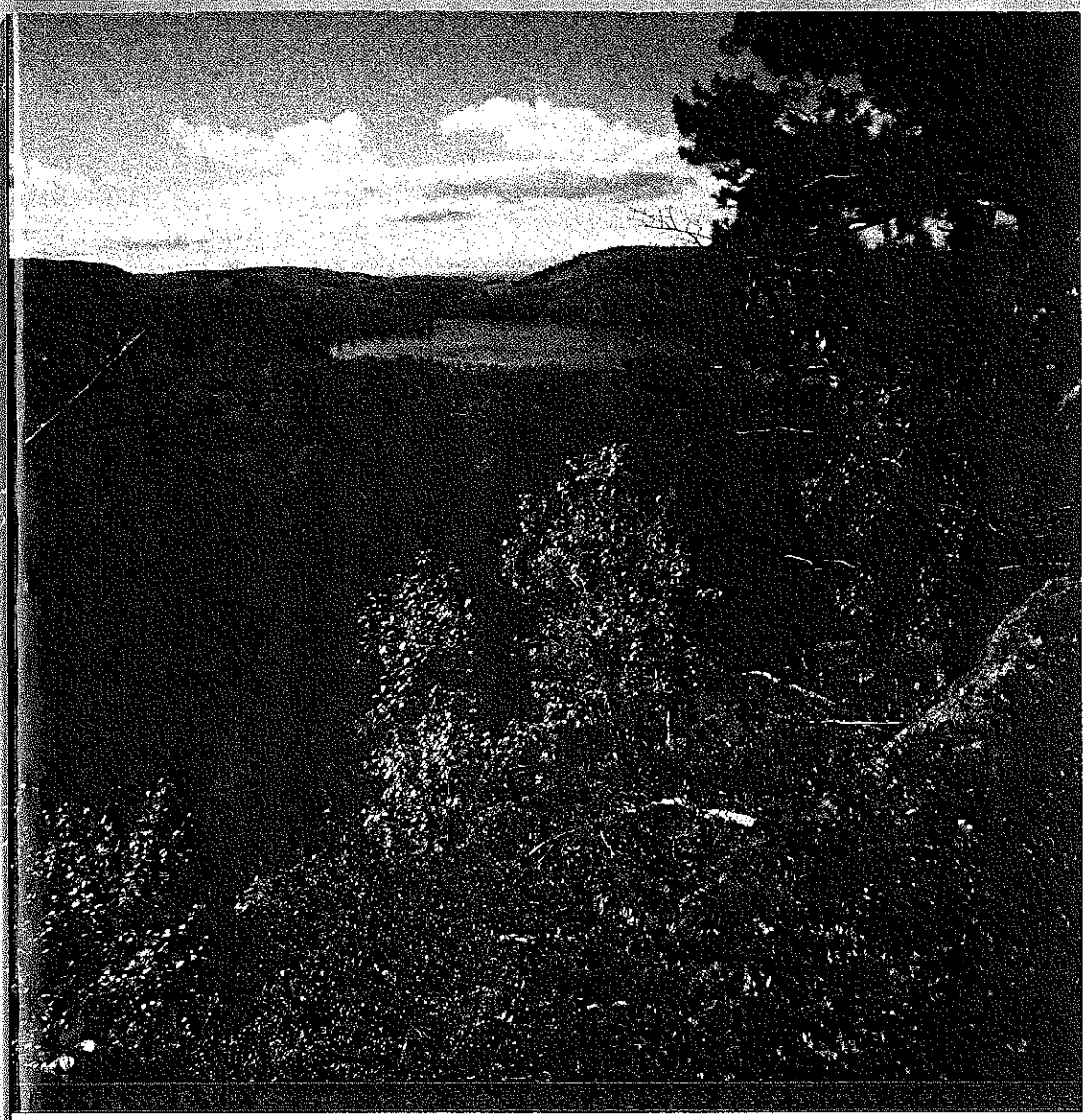

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Unmanaged Landscapes

Voices for Untamed Nature

Edited by Bill Willers

ıne of the humanities."
—Archie Carr

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From *Ecological Revolutions: Nature, Gender, and Science in New England*

Carolyn Merchant

Mechanism and the Domination of Nature

The mechanistic philosophy developed by the natural philosophers of seventeenth-century Europe legitimated the capitalist revolution and its domination of nature. Mingled with the rhetoric of the Great Chain of Being, Mother Earth, and the Garden of Eden that focused New England thought in the eighteenth century had been an undercurrent of instrumental concepts that would structure the management of nature in the nineteenth century. Mechanical metaphors and the rhetoric of manifest destiny became core concepts of a modern philosophy that saw the world as a vast machine that could be mathematically described, predicted, and controlled. A new chemical paradigm would quantify associations and dissociations of elements in soils and plants so that yields and profits could be predicted and increased. Mother Nature was delivered to the laboratory to undergo scientific experimentation.

In the seventeenth century, Descartes had characterized the human body as a machine and compared it to a clock that operated according to mechanical laws, while English political theorist Thomas Hobbes (1588–1679) had described the body politic in terms of springs, strings, and wheels. Newton's *Mathematical Principles of Natural Philosophy* had integrated celestial and terrestrial mechanics into a cosmology founded on the certainty of mathematical law and the divisibility of matter into inert atoms moved by external forces. Mechanism thus offered a unified theory of the human body, society, and the cosmos.

The mechanistic construction of nature is based on a set of ontological, epistemological, methodological, and ethical assumptions about "real-

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ity." First, nature is made up of discrete particles (atoms or later subatomic particles). Second, sense data (information bits) are discrete. Third, the universe is a natural order, maintaining identity through change, and can be described and predicted by mathematics. Fourth, problems can be broken down into parts, solved, and reassembled without changing their character. And fifth, science is context-free, value-free knowledge of the external world. As constructed by the seventeenth-century "fathers" of modern science, the mechanistic model served to legitimate the human prediction, control, and manipulation of nature.

During the eighteenth century, Enlightenment elites appropriated from the scientific idiom metaphors that described human society in terms of instruments, machines, gears, pulleys, and balances. The homes of gentlemen exhibited pendulum clocks, cannonball escapements, orreries (working models of the solar system), music boxes with moving figurines, telescopes, microscopes, meteorologic instruments, pulley systems for raising food or opening doors, mechanically driven fountains, hydraulic devices whose sudden commencement surprised and startled garden visitors, and a host of other machines and playthings. Thomas Jefferson's home at Monticello was filled with copies of European models as well as with inventions of his own. In the 1800s New England clockmakers produced large numbers of shelf clocks, wall clocks, and grandfather clocks with second hands and rocking manikins or ships that indicated whether the clock was operating.

Mechanical language derived from European philosophers permeated the writings of the nation's founding fathers and their fundamental documents—the Declaration of Independence and the Constitution. Scottish philosopher Adam Smith (1759) had explained how "all the several wheels of the machine of government [might be] made to move with more harmony and smoothness, without grating upon one another, or mutually retarding one another's motions." Referring to his role in the adoption of the Declaration of Independence, John Adams hoped that he had been "instrumental in touching some springs and turning some small wheels" of historical development. The language of the Declaration itself was Newtonian in emphasizing the necessity for action based on observation of a sequence of events. James Madison's "Federalist 10" (1788) treated society as a balance among atomized factions. The Constitution of the United States (1789) was constructed as a system of balances among the powers allocated to the three separate elements of government.

Mechanical metaphors also began to infuse the popular literature of eighteenth-century America. Since their inception, almanacs had taught

Copernican astronomy and Newtonian science to their readers. But a mechanical philosophy going beyond instruction on scientific laws extended the description of nature as machine. Nathaniel Ames informed the readers of his *Almanac* in 1754 that the Divine Artificer initially had made the body of man "a machine capable of endless duration"; but after Eve's ingestion of the forbidden apple, the living principle within had fallen into disharmony with the body, disrupting the smooth functioning of the parts.

Similarly, Ames's son and successor, Nathaniel, described the human body a decade later as "an infinitely more curious machine or piece of clockwork than anything contrived by man." Just as a clockmaker should know the make and machinery of the clock before attempting to repair it, a doctor should know the "make and machinery of the body." The physician must set his reason to work to "find out which of the pipes, springs, or strainers is out of order . . . whether they want stiffening or loosening, oiling or cleaning."

The mechanical paradigm of association and dissociation of atoms provided the rationale for agricultural and social improvement, while males moving in free association became the entrepreneurial pattern. The westward movement encouraged spatial mobility; emerging capitalism promoted social mobility. Manufacturers produced machines made of interchangeable parts, while managers hired wage laborers as replaceable cogs in the machinery of production. Men organized businesses for the specific purpose of profit making, and each male was free to associate with or to dissociate from them as opportunities arose. Efficiency dictated that each remain a part of a company or operation only as long as it was profitable and then be ready to move onward or upward to a new venture. Productivity and profit were the deciding factors rather than emotive bonds between individuals.

The rhetoric of manifest destiny sanctioned the spatial motion that encouraged control over natural resources as Europeans swept westward bearing the torch of "civilization." The elder Ames foresaw the day when art and science would change the "face of nature" west of the Appalachians as far as the Pacific Ocean. As civilization moves across the western deserts, he wrote in 1754, "the residence of wild beasts will be broken up, and their obscene howl cease for ever." Instead, rocks and trees would dance to the music of Orpheus, and gold and silver treasures would be discovered in barren rocks long hidden from "ignorant aboriginal natives." Iron ore already dug in the East would be set to practical use in creating plowshares and swords. All this would be sanctioned by God and the Gospel as the heathens were dispelled by light.

In extolling the present superiority of Christianized European civilization, Ames sent forth the ripples of manifest destiny that would legitimate the nineteenth century's westward movement: "the progress of human literature (like the sun) is from the east to the west; thus has it traveled thro' Asia and Europe, and now is arrived at the eastern shore of America." He concluded with a prophetic message to those of us who live today: "Ye unborn inhabitants of America! . . . when your eyes behold the sun after he has rolled the seasons round for two or three centuries more, you will know that in anno domini 1758 we dream'd of your times."

Ames had anticipated by almost one hundred years Missouri's Thomas Hart Benton, whose famous 1846 address to the Twenty-ninth Congress justified American expansion to the Pacific. Using the Bible as legitimation for manifest destiny, he proclaimed that the white race had "alone received the divine command to subdue and replenish the earth: for it is the only race that . . . hunts out new and distant lands, and even a New World to subdue and replenish." By then (as Ames had predicted), the red race had almost disappeared from the Atlantic. "The van of the Caucasian race," Benton gloried, "now top the Rocky Mountains, and spread down on the shores of the Pacific." Inevitably, white influence on the 400 million people comprising the yellow race of Asia would be felt, "a race once the foremost of the human family in the arts of civilization" but now grown degenerate. Under the influence of white trade and marriage, the sun of civilization would once again shine on them.

And John Quincy Adams, that same year, in promoting American expansion into the rich farmlands of Oregon, quoted from Genesis 1, urging the young nation to "make the wilderness blossom as the rose, to establish laws, to increase, multiply, and subdue the earth, which we are commanded to do by the first behest of God Almighty."

Upward mobility was to be achieved through extraction of natural resources from the earth by the most efficient and profitable method. In 1844, Yale's Whig essayist Calvin Colton characterized America as a "country of self-made men" and the American environment as a source of unlimited natural resources. "Providence has [given] us a rich, productive, and glorious heritage. . . . The wealth of the country is inexhaustible, and the enterprise of the people is unsubdued. . . . Give them a good government, and they cannot help going ahead, and outstripping every nation on the globe."

Echoing the rhetoric of upward mobility, agricultural improvers exhorted farmers to become rich, like the self-made men of other classes, by calling upon the resources of the earth mother. "When he would add to his earthly treasure," advised Reverend H. M. Eaton in his speech to the

farmers of Kennebec County, Maine, "he draws from the boundless resources of wealth concealed in the bosom of *mother earth.* She has a treasure for the farmer of such a nature, and so vast in extent, that giving does not impoverish her, and by withholding she is not enriched."

Subduing the Earth

To the biblical mandate for dominion over nature that had guided the Puritan transformation of the environment, nineteenth-century science added mechanical and chemical methods for altering it. A harmonious fusion between the Bible and Baconian instrumentalism established science as the method to be used in subduing the earth to improve the human condition. Francis Bacon's *New Atlantis* (1627) had been dedicated to the alteration of nature through scientific instruments and experiments. Fully compatible with the mechanistic view of nature, his scientific research program sought to command nature by obeying its laws. Grounded in the mechanical and chemical paradigm and augmented with an array of new mechanical technologies, Baconian utilitarianism became the ethic of agricultural improvement.

Improver Henry Colman began his address to the Hampshire, Franklin, and Hampden Agricultural Society of Massachusetts by quoting Bacon's principle: "The effort to extend the dominion of man over nature, is the most healthy and most noble of all ambitions." Just as "the great master of philosophy" had linked control over a female earth to the recovery of the garden that Eve had lost for humankind, Colman characterized the earth as a female whose productivity would help advance the progress of the race. Agricultural improvement, he believed, was the most salient example of how human power and creativity could help in controlling nature. "Here man exercises dominion over nature; . . . commands the earth on which he treads to waken her mysterious energies . . . compels the inanimate earth to teem with life; and to impart sustenance and power, health and happiness to the countless multitudes who hang on her breast and are dependent on her bounty."

Speeches made to farmers at local societies for promoting agriculture routinely drew on female earth rhetoric. M. B. Bartlett in his address to the farmers of West Oxford County, Maine, eulogized the pioneer struggles "with mother earth" that had created "sinewy arms and brawney chests" in the transformation of the cold, granite bedrock of New England into a habitable climate. Until only recently the wolf had prowled on the outskirts of town and bear were encountered in the forests; older farmers recalled Indian attacks and scalpings. Those who had gone west, Bartlett

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admonished, should have stayed to complete New England's transformation into a garden. He exhorted those who remained behind to finish the struggle: "Force the earth to yield to you her hidden wealth, act out your destiny with all the force and goodness that is in you."

As God's agent, echoed Ezekial Holmes, the farmer had submitted nature to "repeated and successive blows of the axe, hewing out, as it were, a farm and a homestead from Nature herself . . . making the wilderness blossom as the rose, and . . . converting the lair of the wild beast into smiling farms and thriving villages."

The transformation of the "howling wilderness" into "fruitful fields" and "smiling farms" was pushed with such frequency in journal articles, speeches, and commentaries as to become commonplace. John Goldsbury, writing for the *New England Farmer* in 1855, queried whether the descendants of Adam and Eve could have obeyed God's command to "be fruitful and multiply and replenish the earth and subdue it" without cultivating the land, even if they had retained their abode in the Garden of Eden. Human labor coupled with the progress made in agriculture, mechanics, science, and art had changed New England to prosperous towns of happy, enterprising people. "Agriculture is the mother of some and the nurse of all the mechanic arts," John Bullard told the Western Society of Middlesex Husbandmen in 1803. By cutting down the trees and clearing the land of rubbish, the earth could be made "an agreeable . . . abode to the children of men." Once the fields had been tilled and planted the farmer could delight in the valleys of corn, the pastures filled with sheep, and the perfume of the fields.

Like Bacon, Sidney Perham reminded Maine's Oxford County Agricultural Society that "knowledge is power." He advocated that the farmer follow and learn from nature's laws rather than subjugating it; but in true Baconian spirit, he also advised that this be done through scientific experiment. "We must enter her laboratory, and learn her various modes of distributing and combining her elements for the production of given results; and then we shall find her a co-worker with us."

While the ethic of the animate cosmos had urged farmers to imitate nature and hasten its own processes, the mechanical paradigm offered new techniques and powerful machines to fundamentally transform it. Dr. N. T. True, addressing Maine's Cumberland County Agricultural Society, urged farmers to appropriate nature's own processes wherein "instead of suffering the land to go fallow . . . she makes use of a rotation in crops." In planting pines on worn-out lands, nature provided deep roots that brought up potash and other nutrients. Deciduous trees used

the potash in their leaves, returning it to the soil when they fell. "You will find nature slowly, but surely at work, forming a suitable soil for some other crop, which in the lapse of ages she may see fit to introduce."

But in rotating crops and improving the land, True advised the farmer to use machines. He should hoe and shell corn, mow and rake hay, reap, thresh, and winnow grain, pull stumps, saw wood, pare apples, and churn butter with the new agricultural machinery. He should plow deeper, manure more heavily, and cultivate better than had his father and grandfather. With crop rotation, he need no longer blame his "good mother, earth" for failed harvests. "Be kind to your mother," pleaded True, "and she will always be kind to you in return. . . . The more carefully we study her in her works, the more probable will be our success in our attempts at imitation."

Nature was the best teacher when it came to managing her woodlots for shipbuilding timber. Even if the back forty had been improvidently hacked for firewood or exterminated in conflagrations, "Kind Nature, man's best friend, attempts to repair these breaches in her sylvan shades." She planted seedlings of oak, pine, ash, maple, and many other useful trees important for a "commercial people." But if thwarted by turning out cattle and sheep to graze, she would retaliate with thistles, burdocks, and brambles. Yet even as elites offered their allegiance to the earth as mother and teacher, their mechanical, instrumental view of nature was subtly legitimating and advocating its management and manipulation.

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From *Man and Nature*

George Perkins Marsh

Man has too long forgotten that the earth was given to him for usufruct alone, not for consumption, still less for profligate waste. Nature has provided against the absolute destruction of any of her elementary matter, the raw material of her works; the thunderbolt and the tornado, the most convulsive throes of even the volcano and the earthquake, being only phenomena of decomposition and recomposition. But she has left it within