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The Ends of Nature and Culture

This book offers a new approach to understanding environmental change that builds on and pushes beyond the idea of a middle ground or middle zone between Nature and Culture.[1] The approach qualifies humans as "architects of Nature" rather than as Nature's rulers or victims, or as its destroyers or champions.[2] Instead of separating the realms of Nature and Culture, the natural and the artifact, or natural resources and technology, this book bridges the dichotomy: the products of both Nature's and Culture's creativity constitute environmental infrastructure. Moreover, whereas current models and approaches are primarily concerned with

[1] White introduced the concept of the "middle ground" to critique the concept of the frontier as a site of incessant conflict between European settlers/Western Culture on the one hand and Amerindians/non-Western Nature on the other hand. See R. White, *The Middle Ground: Indians, Empires, and Republics in the Great Lakes Region, 1650–1815* (Cambridge: Cambridge University Press, 1991). Dove, Sajise, and Doolittle use "middle zone" to denote what lays between the least and the most anthropogenic landscapes; see M. R. Dove, P. E. Sajise, and A. A. Doolittle, "Introduction: The Problem of Conserving Nature in Cultural Landscapes," in M. R. Dove, P. E. Sajise, and A. A. Doolittle (eds.), *Conserving Nature in Culture: Case Studies from Southeast Asia* (New Haven, CT: Yale University Southeast Asia Studies, 2005), p. 8. Agrawal and Sivaramakrishnan refer to agrarian environments as changing hybrid landscapes; see A. Agrawal and K. Sivaramakrishnan (eds.), *Agrarian Environments: Resources, Representation, and Rule in India* (Durham: Duke University Press, 2000), pp. 6–7.

[2] Schama stresses that humans are not, by definition, destroyers of Nature; S. Schama, *Landscape and Memory* (New York: Alfred Knopf, 1995), pp. 9–10. Acknowledging that Amerindians and other "aboriginal" peoples are real agents with a capacity to change their environments for the better or the worse is still controversial; see, e.g., Isenberg, who highlights Amerindian hunting as being partly responsible for the extermination of the bison. See A. C. Isenberg, *The Destruction of the Bison* (Cambridge: Cambridge University Press, 2000).

the outcome of environmental change (i.e., environmental degradation, amelioration, or sustainability) and the origins of its causes (i.e., either natural or anthropogenic), the focus on environmental *infrastructuring* or *environing* advances understanding of the *processes* of environmental change, highlighting the pluralistic and differentiated character of the agency, motivations, and mechanics involved. To be sure, environing should not be construed to be, per definition, an environmentally benign, degrading, or sustainable process.

Although modern societies are thought to construct, manage, and use *artificial* infrastructure (Cultural artifact), indigenous (non-Western) and premodern peoples are held to manage and use *natural* resources. The distinction has largely remained intact, even though the West–non-West and the Nature–Culture dichotomies have been challenged.[3] The idea that Western or "modern" people, armed with science and technology and motivated by a modern market-oriented outlook, actively seeks to harness and replace Nature with human constructs places modernity, the West, and science in the realm of Culture. The complementary idea that non-Westerners or "premodern" people live *by* Nature and *in* Nature assigns premodern, non-Western, and indigenous knowledge to the realm of Nature.[4]

[3] In his path-breaking *Rivers of Empire*, Worster attempts to move beyond both dichotomies. He argues that in the process of subjugating Nature, (human) Culture gets infused by it (in effect creating a hybrid; i.e., the modern U.S. West is deeply shaped by its (semi)arid environment) and applied Wittfogel's hydraulic society model (developed for non-Western and premodern society) to the modern United States; see D. Worster, *Rivers of Empire: Water, Aridity, and the Growth of the American West* (New York: Oxford University Press, 1985), p. 30. For critiques of the Nature–Culture and/or West–non-West dichotomies, see, e.g., White, *The Middle Ground*; W. Cronon, *Nature's Metropolis: Chicago and the Great West* (New York: W. W. Norton, 1991); R. B. Norgaard, *Development Betrayed: The End of Progress and a Coevolutionary Revisioning of the Future* (London: Routledge, 1994); R. White, *The Organic Machine: The Re-Making of the Columbia River* (New York: Hill and Wang, 2000); B. Latour, *Politics of Nature: How to Bring the Sciences into Democracy* (Cambridge, Mass.: Harvard University Press, 2004); Dove, Sajise, and Doolittle, *Conserving Nature in Culture*; A. Agrawal and K. Sivaramakrishnan (eds.), *Agrarian Environments*, pp. 6–10.

[4] On the conflation of the West with the domesticated, civilized, and Culture and the non-West with the uncivilized, wild, and Nature, see H. Ritvo, *The Animal Estate: The English and Other Creatures in the Victorian Age* (Cambridge, Mass.: Harvard University Press, 1987), pp. 16–41. Ritvo argues that this distinction was further elaborated in nineteenth-century English humanitarianism, which was less about protecting animals (or one could add a lesser class of humans, including slaves) against abuse and cruelty, and more about creating and maintaining a social order based on a hierarchical relationship between the civilized classes and subject humans in England as well as across the empire, ibid, pp. 125–288. Two critical edited volumes that highlight the dynamics of historical

The Myth of Culture's Environmental Domination and the End of Nature

The threat of avian and swine flus, HIV-AIDS, malaria, Ebola, and Marburg; the development of penicillin-resistant bacteria alongside the resurgence of tuberculosis; floods, wildfires, and fresh water and fuel shortages; nuclear disasters at Three Mile Island, Chernobyl, and Fukushima; and mounting pollution and global warming – all have cast doubt about the supremacy of Culture's reign over Nature.[5] Until recently, canalized rivers and large dams that generated hydroelectric power and spawned lush irrigated fields, orchards, gardens, and lawns were considered major tools and symbols of the victory of modern industrial society over Nature.[6] The historian Richard White, however, contends that the Columbia River, arguably the most dammed (and thus an artifice and paragon of Culture) and damned (in terms of the destruction of its Nature) river in the most technologically advanced world power, the United States, is in fact neither Culture nor Nature. White calls the Columbia River an

environmental change in Asia reject the conflation of the Nature–Culture and West–non-West dichotomies and its premise of a West–non-West hierarchical causality by focusing on continuities between precolonial and colonial dynamics. See R. H. Grove, V. Damodaran, and S. Sangwan, "Introduction," in R. H. Grove, V. Damodaran, and S. Sangwan (eds.), *Nature and the Orient: The Environmental History of South and Southeast Asia* (Delhi: OUP, 1998), pp. 13–14, and G. Bankoff and P. Boomgaard, "Introduction: Natural Resources and the Shape of Asian History, 1500–2000," in G. Bankoff and P. Boomgaard (eds.), *A History of Natural Resources in Asia: The Wealth of Nature* (New York: Palgrave MacMillan, 2007), p. 4. See also A. Skaria, "Cathecting the Natural," in A. Agrawal and K. Sivaramakrishnan (eds.), *Agrarian Environments*, pp. 265–276.

[5] For the 1960s–1970s optimism about the control over infectious diseases and their subsequent (re)emergence, see L. Garrett, *The Coming Plague: Newly Emerging Disease in a World out of Balance* (New York: Penguin, 1994). On floods, see, e.g., A. Kelman, *A River and Its City: The Nature of Landscape in New Orleans* (Berkeley: University of California Press, 2006 [2003]). On water and fuel as scarce resources, see Worster, *Rivers of Empire*; M. Reisner, *Cadillac Desert: The American West and Its Disappearing Water* (New York: Penguin, 1993 [1986]); and J. McNeill, *Something New under the Sun: An Environmental History of the Twentieth-Century World* (New York: W. W. Norton, 2000).

[6] See Worster, *Rivers of Empire*; Reisner, *Cadillac Desert*; R. O. Collins, *The Waters of the Nile: Hydropolitics and the Jonglei Canal, 1900–1988* (Princeton: Markus Wiener, 1996); P. P. Howell and J. A. Allan (eds.), *The Nile: Sharing a Resource: An Historical and Technical Review of Water Management and the Economic and Legal Issues* (Cambridge: Cambridge University Press, 1994); R. Coopey and T. Tvedt (eds.), *A History of Water, Volume 2: The Political Economy of Water* (London: I.B. Tauris, 2006); and R. D'Souza, *Drowned and Dammed: Colonial Capitalism and Flood Control in Eastern India* (New Delhi, India: Oxford University Press, 2006).

"organic machine" because, despite the human transformation of the river, humans have failed to unravel its workings as an ecosystem.[7] Although Worster emphasizes the environmental destruction wrought by modern hydraulics, he depicts Nature as far from permanently defeated. Modern dams are doomed because silt accumulates in their reservoirs, reducing their water-holding capacity and eventually breaching the dams. Downstream, the irrigated soils are slowly poisoned by the accumulation of salts.[8] The water consumption of modern irrigated systems is also unsustainable. Moreover, damming, diking, diverting, and canalizing rivers have not domesticated their Nature, as, e.g., the recent history of the Rhine and Mississippi rivers has demonstrated: destructive floods increased as rivers simultaneously were constrained to an ever narrower bed while embankments, dikes, and silt buildup in the channels raised the river beds.[9] Obviously, the Columbia River is not an exception.

The concept of the organic machine can be extended to the entire edifice of modern industrial and postindustrial society. The construction, maintenance, and renewal of its artificial infrastructure is literally fueled and oiled by a single, dangerously finite *natural* resource: hydrocarbons.

[7] White, *Organic Machine*.

[8] Worster, *Rivers of Empire*.

[9] Worster, *Rivers of Empire*. On the Rhine, see M. Cioc, *The Rhine: An Eco-Biography, 1815–2000* (Seattle and London: University of Washington Press, 2002) and D. Blackbourn, *The Conquest of Nature: Water, Landscape, and the Making of Modern Germany* (New York: Norton, 2006). Biggs makes a similar argument for the Mekong Delta, which is almost entirely cultivated but highly vulnerable to floods; see D. Biggs, *Quagmire: Nation-Building and Nature in the Mekong Delta* (Seattle: University of Washington Press, 2010). On the Mississippi, see Kelman, *A River and Its City*. On wetlands in the United States in general, see A. Vileisis, *Discovering the Unknown Landscape: A History of America's Wetlands* (Washington, DC: Island Press, 1999 [1997]). Collins argues that the Nile is not yet fully dominated by humans because Egypt is still short of water. See Collins, *The Waters of the Nile*. On silt, see M. A. Kahlown, A. D. Khan, and M. Azam, "The World's Largest Contiguous Irrigation System: Developments, Successes and Challenges of the Indus Irrigation System in Pakistan," in T. Tvedt and E. Jakobsson (eds.), *A History of Water Volume 1: Water Control and River Biographies* (London: I. B. Tauris, 2006), pp. 35–54. In a study that was originally published in 1955, Carter and Dale hold up the collapse of ancient irrigated civilizations as a warning to modern industrial society. They argue that modern irrigation technology and chemical fertilizer are no alternative to sound soil conservation. See V. G. Carter and T. Dale, *Topsoil and Civilization* (Norman: University of Oklahoma Press, 1974 [1955]). Tvedt and Jakobsson call "[t]he struggle to control water . . . a struggle without end" and argue that "[t]he continuing occurrence of vast floods, devastating droughts, and their aftermath, shows that despite 5,000 years of effort, humanity yet has to succeed totally in its attempt to control water." See T. Tvedt and E. Jakobsson (eds.), *A History of Water Volume 1*, pp. ix–xiv.

Thus the artificial infrastructure of modern society, its technology, and its science not only are built literally on the foundations of Nature but also continue to be entirely dependent on Nature for their production and reproduction.[10] Industrial technology therefore did not make human society less dependent on Nature or provide the means to definitively subjugate, destroy, or bring about the death of Nature. Moreover, postindustrial and postmodern society and science's frontier in many ways appear to lay in Nature: biosciences and biotechnology that create Nature–Culture hybrids. White's concept of the organic machine therefore has far-reaching and profound implications because it problematizes both the understanding of modern (agro)industrial and rural and (sub)urban landscapes as Culture, as well as the concept of Culture as an environmental category.[11]

The inability of modern Western science and technology to fully overcome, harness, or destroy Nature was presaged in the colonial era. Following World War II, imperial governments sought to jumpstart development in their colonies through large-scale dam, irrigation, livestock, animal, and human health, and soil, wildlife, and forest conservation projects. The undertakings amounted to a second colonial conquest, but of Nature rather than territory. The success was mixed. The projects resulted in large-scale population displacements; the massive enclosure of resources in parks, forests, and reserves; land alienation; forced labor; forced cultivation; the spread of disease; draconian veterinary measures; taxing soil conservation schemes; and the suppression of fire regimes. The measures elicited resistance and were in many cases frustrated by wars of independence, violence, or a shortage of means.[12] The failure to

[10] Goudsblom not only acknowledges the "industrial age" as the third major ecological transformation brought about by humans but also highlights a critical continuity: the steam and internal combustion engines that mark industrial society are still dependent "on the forces of nature" because its (fossil) fuels are natural. See J. Goudsblom, *Fire and Civilization* (London: Penguin, 1992), pp. 164–174. See also Worster and Reisner, who highlight how modern industrial agriculture depends on water and McNeill, who emphasizes the extent to which modern industrial society is dependent on fossil fuels, see Worster, *Rivers of Empire*; Reisner, *Cadillac Desert*; and McNeil, *Something New under the Sun*.

[11] Zimdahl is pessimistic about the future of modern agriculture. He stresses that modern monoculture makes agriculture ecologically vulnerable, doubts if weeds as a problem can ever be overcome because of herbicide resistance, and identifies major shortcomings of biotechnology. See R. L. Zimdahl, *A History of Weed Science in the United States* (Amsterdam: Elsevier, 2010), pp. 174–201.

[12] For Africa, see, e.g., A. Isaacman, *Cotton is the Mother of Poverty: Peasants, Work and Rural Struggle in Colonial Mozambique, 1938–1961* (Portsmouth, NH:

subjugate non-Western Nature through colonial and postcolonial development projects was attributed to factors emanating from "non-Western" environmental, social, political, cultural, or economic conditions, rather than to any innate weaknesses of the modernization paradigm itself.[13]

The Myth of the Natural

As with Culture, the boundaries and the very category of Nature have equally been questioned. Forests in the Americas, Southeast Asia, and Africa that had been presumed to be primordial have revealed thousands of sites with urban and rural ruins, as well as other signs of human settlement, use, and management. The island forests of Kalimantan are a case in point. From the seventeenth century onward, its Dayak inhabitants engaged in commercial export agriculture and planted and managed fruit trees, creating an anthropogenic forest.[14] The last conserved

1996); R. P. Neumann, *Imposing Wilderness: Struggles over Livelihood and Nature Preservation in Africa* (Berkeley: University of California Press, 2000 [1998]); N. J. Jacobs, *Environment, Power, and Injustice: A South African History* (Cambridge: Cambridge University Press, 2003); and K. B. Showers, *Imperial Gullies: Soil Conservation in Lesotho* (Athens: Ohio University Press, 2005). For North America, see, e.g., Worster, *Rivers of Empire* and White, *The Organic Machine*. For Asia, see, e.g., R. Guha, *The Unquiet Woods: Ecological Change and Peasant Resistance in the Himalaya* (Berkeley: University of California Press, 1989); N. L. Peluso, *Rich Forests, Poor People: Resource Control and Resistance in Java* (Berkeley: University of California Press, 1994 [1992]); R. H. Grove, V. Damodaran, and S. Sangwan (eds.), *Nature and the Orient*; and D'Souza, *Drowned and Dammed*. On fire, see, e.g., S. Pyne, *Vestal Fire: An Environmental History Told through Fire of Europe and of Europe's Encounter with the World* (Seattle: University of Washington Press, 1997) and S. Pyne, *World Fire: The Culture of Fire on Earth* (Seattle: University of Washington Press, 1997). For a discussion of the second colonial conquest as a conquest of non-Western Nature, see E. Kreike, *Deforestation and Reforestation in Namibia: The Global Consequences of Local Contradictions* (Leiden: Brill, 2010), pp. 44–73.

[13] Scott discusses the failure of "development" writ large. In *Seeing Like a State* he attributes the failure of imperialist high modernist development projects to "modernity" (i.e., the modern state) itself, irrespective of where it implemented its projects (in the process blurring the West and non-West dichotomy) because it oversimplified reality to make societies and environments "legible" (i.e., controllable and taxable by the state). But in *The Art of Not Being Governed*, Scott shifts his emphasis to the state-evading strategies employed by the subjects/victims of state development as the main reason for the failure of development in the past. See J. C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998) and J. C. Scott, *The Art of Not Being Governed: An Anarchist History of Upland Southeast Asia* (New Haven: Yale University Press, 2009).

[14] H. Knapen, *Forests of Fortune? The Environmental History of Southeast Borneo, 1600–1880* (Leiden: KITLV Press, 2001), pp. 189–281 and N. L. Peluso, "Fruit Trees and Family Trees in an Anthropogenic Forest: Ethics of Access, Property Zones, and

Edens – including national parks, forest preserves, game sanctuaries, and biological research stations – are typically neither pristine nor natural. Paradoxically, Africa, the ultimate "wilderness" continent, marked by vast rainforests and extensive savannas, and uniquely the last sanctuary of the large wild mammals that once roamed the earth, is also the continent with the longest human history.[15]

Yet, the late twentieth-century Nature–Culture dichotomy casts a long shadow over the conceptualization, analysis, and presentation of environmental change, even as it has been rejected as too static and too linear. The Nature–Culture dichotomy is fundamental to how the dominant paradigms of environmental change – the modernization, declinist, and inclinist paradigms – imagine environmental change. The modernization, declinist, and inclinist paradigms have, in turn, deeply shaped the major approaches used to understand environmental dynamics over time, including the population pressure, political ecology, ecological imperialism, techno-environmental determinism, and globalization/commodification models.[16]

Environmental Change in Indonesia," in P. Squatriti (ed.), *Natures Past: The Environment and Human History* (Ann Arbor: The University of Michigan Press, 2007), pp. 54–102. See also R. L. Wadley, "The Complex Agroforests of the Iban in West Kalimantan and Their Possible Role in Fallow Management and Forest Regeneration;" Deborah Lawrence et al., "Does Tree Diversity Affect Soil Fertility? Findings from Fallow Systems in West Kalimantan;" and W. de Jong, "Forest Management and Classification of Fallows by Bidayuh Farmers in West Kalimantan," in M. Cairns (ed.), *Voices from the Forest: Integrating Indigenous Knowledge into Sustainable Upland Farming* (Washington, DC: Resources for the Future, 2007), pp. 490–501, 502–514, and 515–520, respectively.

[15] J. S. Adams and T. O. McShane, *The Myth of Wild Africa: Conservation without Illusion* (Berkeley: University of California Press, 1996 [1992]). See also, e.g., J. Carruthers, *The Kruger Park: A Social and Political History* (Pietermaritzburg: The University of Natal Press, 1995); Neumann, *Imposing Wilderness* (Neumann worked from the premise that African landscapes were anthropogenic); and J. McCann, *Green Land, Brown Land, Black Land: An Environmental History of Africa, 1800–1990* (Portsmouth, NH: Heinemann, 1999), p. 2. Critical for the exposure of the myth of wild Africa is a body of literature that effectively focuses on the physical and spiritual domestication of Africa's challenging environments through a long-term focus on the transformations related to the development of pastoralism, agriculture, and iron technology. See, e.g., J. Iliffe, *Africa: The History of a Continent* (Cambridge: Cambridge University Press, 1995) and D. L. Schoenbrun, *A Green Place, A Good Place: Agrarian Change, Gender, and Social Identity in the Great Lakes to the 15th Century* (Portsmouth, N. H.: Heinemann, 1998). For a more general argument, see C. Merchant, *The Fate of Nature in Western Culture* (New York: Routledge, 2003) and Kreike, *Deforestation and Reforestation in Namibia*, pp. 16–21 and 144–158.

[16] For an overview of the discussion, see Kreike, *Deforestation and Reforestation in Namibia*.

The Nature–Culture dichotomy defines human and nonhuman entities and their physical and mental faculties and products as either part of Nature or of Culture and environmental change as occurring along a Nature-to-Culture continuum. Studies of environmental change predominantly set out to prove a hypothesis of environmental degradation (e.g., deforestation – the declinist perspective) or environmental improvement (e.g., reforestation – the inclinist perspective). The very vocabulary used to express environmental change – including such terms and concepts as agricultural revolution, deforestation, domestication and domesticate, anthropogenic, and sustainability – originate in and are derived from the Nature–Culture binary, and its continued use reproduces the dichotomy.[17] Moving beyond the restraints of the Nature–Culture dichotomy therefore requires the development of not only an alternative conceptualization of environmental change but also a new vocabulary.

The persistence of the Nature–Culture dichotomy is manifested, e.g., in the continued practice of making explicit or implicit distinctions between cultural and natural landscapes, between wild and domesticated plants and animals, and between modern Western-style industrial agriculture, horticulture, and forestry and indigenous or traditional natural resources management.[18] But many plants and animals, including feral animals and the so-called semidomesticated plants, do not fit neatly into this binary framework. The same is true for entire past and present environments – e.g., pre-Columbian cultivated landscapes (i.e., the dark earths of the Amazon), lost urban environments (i.e., Palenque), and shifting cultivation and fire-managed landscapes.

[17] Dove notes that the use of the term *anthropogenic*, e.g., perpetuates the Nature–Culture dichotomy. See M. R. Dove, "Nature, Society, and Science in Southeast Asia's Grasslands," in M. R. Dove, *Southeast Asian Grasslands: Understanding a Vernacular Landscape: Canonical Readings* (New York: The New York Botanical Garden Press, 2008), p. 4.

[18] For example, Denevan in his pathbreaking study fundamentally challenges many of the premises of the Nature–Culture dichotomy and highlights that the environment (i.e., Nature) and technology (i.e., Culture) interact, but, nevertheless considers the two as discrete categories. See W. M. Denevan, *Cultivated Landscapes of Native Amazonia and the Andes* (Oxford: Oxford University Press, 2002 [2001]), p. 129. Similarly, Doolittle, who also contributed a volume to the innovative *Cultivated Landscapes* trilogy, rejects the Nature–Culture dichotomy and the concept of domestication but also slides back at times (e.g., on pp. 24–27 where he defines agriculture very conventionally as involving domesticated plants). See W. E. Doolittle, *Cultivated Landscapes of Native North America* (Oxford: OUP, 2001 [2000]).

In fact, a closer look at many species and landscapes reveals that few, if any, are undisputedly Natural. Shifting cultivation and hunting in one form or another has dramatically shaped the forests and savannas of the Americas, Africa, and Asia. By far the largest concentration of land-based megafauna is located in Africa, but very little of it is found in the "wilderness." To the contrary, Africa's megafauna survives in heavily human-shaped environments: inside human-created and managed national parks, on communal and private farm and ranch lands, and on game ranches. In and beyond the parks, wildlife populations are not only protected from poaching but also often sustained by human-created wells, boreholes, and water reservoirs. The resulting high densities of lions in parks make them hostile environments for competing predators, especially the endangered cheetah. In fact, the largest remaining free-ranging population of the cheetah occurs in Namibia, on commercial ranches and farms in dense bush vegetation, rather than on the expansive savannas of conservation areas.[19] The phenomenon is not unique to contemporary Africa. The nocturnal Southeast Asian tiger, e.g., abandoned its quintessential

[19] On the cheetah, see L. Marker-Kraus et al., *Cheetah Survival on Namibian Farmlands* (Windhoek, Namibia: Cheetah Conservation Fund, 1996). See also R. L. Eaton, *The Cheetah: The Biology, Ecology, and Behavior of an Endangered Species* (New York: Van Nostrand Reinold, 1974), pp. 25–27. This raises the question to what extent the survival of large mammals in Africa is related to animals' adapting to human shaped environments. It is puzzling that the continent with the longest human history is also unique in terms of its large mammal diversity and quantity. If acknowledged, Africa's rich fauna is generally ascribed to human-animal coevolution and explained in terms of a Darwinian arms race between African humans and animals in which humans only gained the upper hand as a result of modern technology (i.e., firearms) in the twentieth century. Human agency, however, may have been more important, not so much through a "natural" conservation ethic and practice but because animals were managed as an environmental resource. Various species of antelopes were held in captivity in ancient Egypt and the same was true for the cheetah throughout history. Were these animals (semi)domesticated? If so, to what extent are current populations consequently "feral"? The surviving cheetah population is very vulnerable to disease because the species has passed through a genetic bottle neck. This is very likely the result of its near extinction in the past, but both domestic and feral populations of many species are also typically marked by genetic bottlenecks as a direct consequence of the selection process of domestication. On the cheetah's genetic bottleneck, see Marker-Kraus, *Cheetah Survival*. On ancient Egypt, see C. A. Spinage, *The Natural History of Antelopes* (New York: Facts of File Publications, 1986), p. 163. On the typical genetic bottleneck among domesticated animals, see J. Clutton-Brock, *A Natural History of Domesticated Mammals* (Cambridge: Cambridge University Press, 1999 [1981]), pp. 30–31. Clutton-Brock argues that the cheetah is, in fact, semidomesticated and would have been a common domesticate had it not been a rare breeder in captivity, see Clutton-Brock, *A Natural History of Domesticated Mammals*, pp. 199–203.

jungle habitat and became a daylight hunter to better stalk its favorite prey of wild pigs and deer, which in turn were attracted by the crops and fruits available in and around the edges of villages and plantations.[20] In the United States, opossum, squirrel, raccoon, deer, and coyote thrive in suburban environments where they are considered pests. Other animals, including the mouse, rat, sparrow, and starling, have adapted to urban environments worldwide, sharing our homes and gardens: they are domestic animals, although they have not been domesticated.[21] The same is true for many insects, including houseflies, mosquitos, fleas, roaches, ants, and bedbugs, as well as numerous microbes.

Post-Domestication Environments

Environments are generally held to constitute Culture when and where humans conquer, dominate, replace, or destroy Nature, gaining control over the environment's production and reproduction and replacing the natural with the artifice. The process of domestication is critical to the transformation from Nature to Culture. A species (or an entire environment) is defined as domesticated once its reproduction and survival are controlled by and dependent on human action.[22] In terms of the domestication of plant and animal species, the focus is overwhelmingly on human control of *sexual* reproduction. With some notable but highly compartmentalized exceptions (root and tuber crops, grafted fruit trees, and

[20] On the tiger, see P. Boomgaard, *Frontiers of Fear: Tigers and People in the Malay World, 1600–1950* (New Haven: Yale University Press, 2001).

[21] J. C. McLoughlin, *The Animals among Us: Wildlife in the Cities: An Appreciation of Inquilines – The Beasts That Share Our Bed and Board* (New York: The Viking Press, 1978).

[22] Clutton-Brock, *A Natural History of Domesticated Mammals*, pp. 30–33 and 130–135. Ingold tones down the domesticate-wild dichotomy and rejects the idea that domesticated species are "made" by humans. Instead, he sees humans as "isolating" and "selecting" breeding populations, see T. Ingold, "Growing Plants and Raising Animals: An Anthropological Perspective on Domestication," in D. R. Harris (ed.), *The Origins and Spread of Agriculture and Pastoralism in Eurasia* (Washington, DC: Smithsonian Institution Press, 1996), pp. 12–24. Goudie sees genetic manipulation as an essential trait of domestication; see A. Goudie, *The Human Impact on the Natural Environment: Past, Present, and Future* (Malden, MA: Blackwell, 2006 [1981]), p. 13. See also J. R. Harlan, J. M. J. de West, and A. B. L. Stemler (eds.), *Origins of African Plant Domestication* (The Hague: Mouton, 1976), pp. 6–10. Higgs emphasizes the fluid boundaries between the categories of wild, domesticate, and feral; pointing out, e.g., that they interbreed within a single species, E. Higgs, "Archaeology and Domestication," in J. R. Harlan, J. M. J. de West, and A. B. L. Stemler (eds.), *Origins of African Plant Domestication*, pp. 29–39.