

I. THE NATURE OF ENVIRONMENTAL HISTORY

1.

OBSERVATIONS ON THE NATURE AND CULTURE OF ENVIRONMENTAL HISTORY¹

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ABSTRACT

This article aims to consider the robust field of environmental history as a whole, as it stands and as it has developed over the past twenty-five years around the world. It necessarily adopts a selective approach but still offers more breadth than depth. It treats the links between environmental history and other fields within history, and with other related disciplines such as geography. It considers the precursors of environmental history, its emergence since the 1970s, its condition in several settings and historiographies. Finally it touches on environmental history's relationship to social theory and to the natural sciences as they have evolved in recent decades. It concludes that while there remains plenty of interesting work yet to do, environmental history has successfully established itself as a legitimate field within the historical profession, and has a bright future, if perhaps for discouraging reasons.

When Richard White wrote his survey of the emerging field of environmental history in 1985, it took him (he recently revealed) a summer in which to read the literature.² He prudently confined himself to American environmental history. Here I will survey the field globally. It contains, at a guess, 100 times as much work as it did in 1985, which means I have had to choose between a) investing a century of summers reading the literature comprehensively (generously assuming my efficiency equals White's), and b) writing on the basis of a small sampling of the literature. I chose the latter course. White confesses that he overlooked the work of Joel Tarr in his essay. I confess that I have, perforce, overlooked the work of most environmental historians (but not Joel Tarr). This essay is more a series of soundings, of varying depths, than it is a proper survey. Insofar as a vision of the whole emerges, it is therefore idiosyncratic and no doubt will seem to some readers downright quirky. But since, so far as I know, nothing of the sort has yet been attempted, I hope it will help to orient interested passers-by and newcomers to the field of environmental history.

1. Colleagues whose conversations or emails have helped me prepare this article include Bao Mahong, Franz-Josef Brüggemeier, James B. Collins, Carol Crumley, Alison Frank, Reinaldo Funes, Alexei Karimov, Thomas Lekan, Geneviève Massard-Guilbaud, Anders Öckerman, Jan Oosthoek, Marc Pavé, Peter Perdue, Scott Redford, Libby Robin, Jordan Sand, Myrna Santiago, George Vrtis, Brett Walker, and Verena Winiwarter.

2. For the revelation, see Richard White, "Environmental History: Watching a Field Mature," *Pacific Historical Review* 70 (2001), 103. The original essay is "Environmental History: The Development of a New Historical Field," *Pacific Historical Review* 54 (1985), 297-335.

Environmental history is many things to many people.³ My preferred description of the genre is: the history of the mutual relations between humankind and the rest of nature. Humankind has long been part of nature, but a distinctive part, especially in recent millennia, when it acquired the power and the numbers to become a rogue mammal, exerting ever-increasing influence upon earthly ecosystems. Human history has always and will always unfold within a larger biological and physical context, and that context evolves in its own right. Especially in recent millennia, that context has co-evolved with humankind.⁴

I. VARIETIES OF ENVIRONMENTAL HISTORY

Under that very big tent,⁵ several sorts of environmental history jostle one another amiably, competing for attention like acts in a three-ring circus. Broadly speaking, there are three main varieties, one that is material in focus, one that is cultural/intellectual, and one that is political. Material environmental history concerns itself with changes in biological and physical environments, and how those changes affect human societies. It stresses the economic and technological sides of human affairs. The cultural/intellectual wing, in contrast, emphasizes representations and images of nature in arts and letters, how these have changed, and what they reveal about the people and societies that produced them. Political environmental history considers law and state policy as it relates to the natural world. Environmental historians tend to be more comfortable in one or another of these rings, although some are willing and able to bounce around among all three, even between the covers of a single book.⁶

Material environmental history (where I feel most at home) has its own fissures. Probably the most conspicuous lies between rural and urban subject matter. Rural themes include agro-ecosystems, pastoral and grasslands ecology, forests, and the peculiarly American emphasis on “wilderness.” Urban environmental history originally focused mainly on pollution and sanitation, but diversified so as to encompass the development of technical systems generally,⁷ the

3. A passable definition was offered by an Australian stockman at whose cattle station I spent a couple of days in 1992. As he was showing me around his paddocks, generously overcoming his disdain for a city slicker who didn't know the difference between a bandicoot and a billabong, I explained my interest in the history of soils, erosion, livestock, fertilizers, and such. Later, when his wife asked me what I did, the stockman answered for me: “He's writing the history of the land, the real history.”

4. Ecologically speaking, of course, it is arrogantly species-centric to think of the biophysical realm as the context for human affairs. But for historians, whose subject is mainly (not exclusively) the human career, it is appropriate.

5. The tent is bigger than this description suggests. For many breeds of paleoscientists, “environmental history” refers to the evolution of ecosystems and need not have human beings in it at all.

6. Donald Worster, *Dust Bowl* (New York: Oxford University Press, 1978), to take one example, deals with prairie soils, climate, and agro-ecosystems, with prevailing ideas about land and climate, and with American resource politics.

7. *Technology and the Rise of the Networked City in Europe and America*, ed. Joel Tarr and Gabriel Dupuy (Philadelphia: Temple University Press, 1988); *Environmental Problems of European Cities of the 19th and 20th Centuries*, ed. Christoph Bernhardt (Münster: Waxmann, 2000); *Le démon moderne: La pollution dans les sociétés urbaines et industrielles d'Europe*, ed. Geneviève Massard-Guilbaud and Christoph Bernhardt (Clermont-Ferrand: Presses Universitaires Blaise-Pascal, 2002).

provisioning and metabolism of cities. It is possible, and some would claim logically necessary, to consider urban and rural environments together, but the habit of environmental historians has usually been otherwise.⁸ One of the most interesting ways to span the rural/urban gap is to use the concept of urban metabolism, in which the city is likened to an organism and considered in terms of its inputs and outputs. A recent study of Manchester, England, the “shock city” of the Industrial Revolution, employs this approach to good effect.⁹

The cultural/intellectual variety of environmental history has a long pedigree and has attracted some distinguished historians such as Sir Keith Thomas and Simon Schama.¹⁰ For the Western intellectual tradition up through the eighteenth century, the most comprehensive and insightful text remains Clarence Glacken’s *Traces on the Rhodian Shore*.¹¹ The largest-scale debate within this wing of environmental history has concerned the relative environmental impact, and perhaps by implication relative wickedness, of various religio-cultural traditions. The starting point is the contention that the Judeo-Christian West developed an environmentally rapacious culture that contrasts poorly with others. It is invidiously compared, typically, with East Asian traditions informed by Buddhism and Taoism, but also with the culture of indigenous peoples, in the Americas, Oceania, or Africa. The argument is normally based on quotations from ur-texts, generally scripture, rather than careful comparison of the record of environmental ruin around the world. An American variant of this theme argues that an “American culture of capitalism”¹² is particularly ruinous.

To my mind none of this is terribly convincing, because environmental change and ruin is and long has been widely dispersed around the world. Buddhists, Chinese communists, Americans, Polynesians, with all manner of contrasting ideas in their heads, all responded to risks and opportunities flexibly, using nature as circumstances permitted to achieve what comfort and security they could, and easily justified their actions in terms of their faiths and precepts. How disruptive their behavior may have been was affected more by their technologies, their numbers, their power to direct the labor of others, and their animals, than by their culture. Furthermore, the lability and resilience of their ecosystems had a great deal to do with what impacts their actions had, and how durable they were. This

8. Among works that bridge this gap are William Cronon, *Nature’s Metropolis: Chicago and the Great West* (New York: Norton, 1992) and Kathleen Brosnan, *Uniting Mountain and Plain: Cities, Law and Environmental Change along the Front Range* (Albuquerque: University of New Mexico Press, 2002).

9. I. Douglas, R. Hodgson, and N. Lawson, “Industry, Environment, and Health through 200 Years in Manchester,” *Ecological Economics* 41 (2002), 235-55.

10. Keith Thomas, *Man and the Natural World: Changing Attitudes in England, 1500–1800* [1983] (Oxford: Oxford University Press, 1996); Simon Schama, *Landscape and Memory* (New York: Knopf, 1995). Thomas and Schama are sojourners in environmental history; the bulk of their work lies elsewhere.

11. Clarence Glacken, *Traces on the Rhodian Shore* (Berkeley: University of California Press, 1967). See also Donald Worster, *Nature’s Economy: A History of Ecological Ideas* [1977] (New York: Cambridge University Press 1985); David Pepper, *Modern Environmentalism: An Introduction* (London: Routledge, 1996); Peter Coates, *Nature: Western Attitudes since Ancient Times* (Cambridge, Eng.: Polity Press, 1998).

12. This phrase and concept is used repeatedly in several of Donald Worster’s books, notably *Dust Bowl and Rivers of Empire: Water, Aridity, and the Growth of the American West* (New York: Pantheon, 1985).

position, I hasten to admit, is not shared by quite a number of environmental historians, who prefer a more Hegelian position: behavior is fundamentally conditioned by ideas and culture.¹³

Where intellectual and cultural environmental history makes its strongest contributions, to my mind, is in mid-level generalizations that concern the impact of specific ideas or sets of ideas. For example, the soil conservation gospel developed in the U.S. in the 1930s was fervently exported to Africa, China, and elsewhere. How did these ideas fit into new contexts, socially, politically, and ecologically?¹⁴ How did Dutch ideas about water management, formed in a very distinctive environment, translate into the Indonesian archipelago?

Political environmental history is almost all modern history. Pharaonic Egypt or Song China undeniably had policies toward the natural world, and disputes over the use of resources. But the systematic study of how states approached nature, how interest groups struggled over it, and how explicitly environmentalist organizations joined the fray is essentially confined to the era since 1880. Among the American pioneers in this field was Samuel Hays, who wrote about U.S. conservation politics as early as the 1950s.¹⁵ In Europe, green parties and politics have attracted historians and political scientists interested in social movements. Political environmental histories, and/or histories of environmental movements, exist for at least a dozen countries.¹⁶

Political environmental histories are the only ones that match neatly with the long-standing preference among historians to use the nation-state as their unit of analysis. They put political struggles at the center of their stories. In this respect they are, among the varieties of environmental history, the most easily integrated into mainstreams of history, and least challenging to the traditions of the profession. Cultural and intellectual environmental history can also be comfortably integrated within the traditions of historians. Its sources, methods, and subjects

13. The most direct statements in this debate are Lynn White, "The Historical Roots of Our Ecologic Crisis," *Science* 155 (1967), 1203-1207; to my mind refuted by Yi-fu Tuan, "Discrepancies between Environmental Attitude and Behaviour: Examples from Europe and China," *Canadian Geographer* 3 (1968), 175-191. Another variant holds that Western culture since Europe's Scientific Revolution displayed an instrumentalist attitude toward nature, in which men saw nature as feminine and exploited it accordingly. See Carolyn Merchant, *The Death of Nature: Women, Ecology, and the Scientific Revolution* (San Francisco: HarperCollins, 1983). My position is weak, I think, with respect to sacred groves. See for example Bruce Byers, Robert Cunliffe, and Andrew Hudak, "Linking the Conservation of Culture and Nature: A Case Study of Sacred Forests in Zimbabwe," *Human Ecology* 29 (2001), 187-218.

14. Kate Showers has begun to explore this theme for Lesotho: "Soil Erosion in the Kingdom of Lesotho: Origins and Colonial Response, 1830s-1950s," *Journal of Southern African Studies* 15 (1989), 263-286.

15. *Conservation and the Gospel of Efficiency: The Progressive Conservation Movement, 1890-1920* (Cambridge, Mass.: Harvard University Press, 1959); *Beauty, Health, and Permanence: Environmental Politics in the United States, 1955-1985* (New York: Cambridge University Press, 1987); *A History of Environmental Politics since 1945* (Pittsburgh: University of Pittsburgh Press, 2000).

16. A sampling: Pascal Delwit and Jean-Michel De Waele, *Les partis verts en Europe* (Brussels: Complexe, 1999); Michael Bess, *The Light-Green Society: Ecology and Technological Modernity in France, 1960-2000* (Chicago: University of Chicago Press, 2003); Jon Burchell, *The Evolution of Green Politics: Development and Change within European Green Parties* (London: Earthscan, 2002); Pem-Er Lam, *Green Politics in Japan* (London: Routledge, 1999); Melda Cinman Şimşek, *Yeşiller: dünyada yeşil partilerin gelişimi ve Türkiye'deki yeşiller partisi* (Istanbul: Der Yayınevi, 1993).

are all familiar to intellectual history. Material environmental history fits more awkwardly. It offers the unwelcome message that historians need to pay attention not only to more things, but to very different kinds of things, whether atmospheric chemistry or fish population dynamics. In this respect it resembles econometric history, which also challenged historians to develop new and unfamiliar sets of skills. Econometric history had its day in the 1970s and ever after remained the province of specialists whose contributions generally go unrecognized by the larger community of historians, unwilling or unable to master the vocabulary and mathematics involved. Environmental history, I believe, has found broad acceptance easier to come by. But to continue in such good fortune, environmental historians must write books that others can readily understand and will choose to read. That means not only developing the skills to make technical matters comprehensible and interesting, but building real intellectual bridges to the territories of other specialists.

II. THE BOUNDARIES AND BORDERS OF ENVIRONMENTAL HISTORY

Environmental history is about as interdisciplinary as intellectual pursuits can get. Practitioners find grist for their mills in the harvests of disciplines from anthropology to zoology. The borders among disciplines, and among genres within a discipline, are never sharp and watertight. In the case of environmental history, they are especially fuzzy and porous. In that lies some of the appeal of environmental history.

Its fuzziest borders are probably those with historical geography and historical ecology. Their subject matter is essentially the same as that of environmental history, and the differences are mainly matters of style, nuance, and technique. Historical geography, when it relies on texts, can hardly be distinguished from environmental history. But some historical geographers are also environmental archeologists, and work primarily from analysis of the land itself. They use what are occasionally now called geo-archives, the stratigraphic record of erosion and deposition, of soil chemistry changes, and so forth. Regardless of methodologies used, historical geographers and environmental historians are interested in very similar sorts of questions.¹⁷ The emergence of environmental history in the U.S. may be due in part to the weakness of historical geography there. Historical ecology, whose practitioners are generally trained in anthropology or archeology, also shares a similar set of interests. It is usually more self-conscious about scale than environmental history, typically involving local or landscape scales. It typically involves more theory, and sometimes more attention to local and indigenous knowledge, to ethnicity and class, although these latter concerns increasingly feature in the work of environmental historians as well. Lastly, historical ecology is typically a collaborative enterprise, whereas environmental historians normally work as historians, that is, alone.¹⁸

17. See, for example, Michael Williams, "The Relations of Environmental History and Historical Geography," *Journal of Historical Geography* 20 (1994), 3-21.

18. See, for instance, *Historical Ecology: Cultural Knowledge and Changing Landscapes*, ed. Carol Crumley (Santa Fe: School of American Research Press, 1994); *Advances in Historical Ecology*, ed. William Balée (New York: Columbia University Press, 1998).

Climate history too shares a lengthy border with environmental history, better defined but equally porous. Long-term climate history is the province of scientists who collect and analyze “proxy” data about past climates, in the form of tree-ring series, fossilized pollen, or carbon dioxide concentrations in ancient air bubbles trapped in ice. But climate historians work from textual sources too, especially on the last eight or ten centuries, mainly in Europe and China, where the records are best. In Europe, such climate historians are actively involved in the environmental history community,¹⁹ whereas in the U.S., where the textual record base lacks historical depth, climate historians by and large come from the natural sciences and interact minimally with historians. The most useful results from climate history concern spells of extreme weather that brought severe consequences for harvests, prices, and mortality. This sort of historical inquiry has been underway for decades in Europe and Japan,²⁰ but has grown steadily more sophisticated. And lately, with the emergence of Chinese data, it has become possible to suggest bold hypotheses concerning, for example, the widespread agrarian troubles of the seventeenth century, which may bear some relation to runs of cold weather in the northern hemisphere caused by atmospheric dust veils from multiple volcanic eruptions.²¹ One of the most active areas at the moment is El Niño history. El Niño episodes, it has recently been established, affect patterns of drought and flood not only around the shores of the Pacific, but in northeast Brazil, South Asia, and much of Africa as well. Lately historians have sought to link these to sustained famines around the world and to the agrarian unrest surrounding the French Revolution—one of the greatest El Niños in modern times took place in 1789–1793.²²

19. For example, Christian Pfister, a principal organizer of the European Society for Environmental History and author of climate history works such as *Wetternachhersage: 500 Jahre Klimavariationen und Naturkatastrophen (1496–1995)* (Bern: Haupt, 1999); and Lajos Rác, *Magyarország éghajlat-története az újkor idején [History of Climate in Hungary in Modern Times]* (Szeged: JGYF, 2001).

20. C.E.P. Brooks, *Climate through the Ages* (London: Ernest Benn 1926); Gustaf Utterström, “Climatic Fluctuations and Population Problems in Early Modern History,” *Scandinavian Economic History Review* (1955), 3-47; Emmanuel Le Roy Ladurie, *Times of Feast, Times of Famine: A History of Climate since the Year 1000* (New York: Doubleday, 1971); Hidetoshi Arakawa, “Remarkable Winters in Japan from the Seventh Century,” *Geofisica pura e applicata* 30 (1955), 144-146. A recent example that makes plausible claims for the relevance of climate is Neville Brown, *History and Climate Change: A Eurocentric Perspective* (London: Routledge, 2001).

21. William Atwell, “Volcanism and Short-Term Climatic Change in East Asian and World History, c.1200–1699,” *Journal of World History* 12 (2001), 29-98. A window into recent developments in Chinese climate history is Robert V. Marks, *Tigers, Rice, Silk, and Silt: Environment and Economy in Late Imperial South China* (New York: Cambridge University Press, 1998), 195-225; see also Jiacheng Zhang and Zhiguang Lin, *Climate of China* (New York: Wiley, 1992), which includes abundant historical information.

22. Richard H. Grove, “Global Impact of the 1789–93 El Niño,” *Nature* 393 (1998), 318-319. The seventeenth-century crisis was perhaps also linked to strong El Niños that produced withering droughts and famines in much of south and southeast Asia in 1614–1616, 1623–1624, 1629–1632, 1660–1662, and 1685–1688. The last was one of the most pronounced El Niños in recorded history. Richard H. Grove, “El Niño Chronology and the History of Socio-economic and Agrarian Crisis in South and Southeast Asia, 1250–1900,” in *Land Use—Historical Perspectives: Focus on Indo-Gangetic Plains*, ed. Y. P. Abrol, S. Sangwan, and M. K. Tiwari (New Delhi: Allied Publishers, 2002), 147-157. Strong claims are advanced in Mike Davis, *Late Victorian Holocausts: El Niño Famines and the Making of the Third World* (London: Verso, 2001). See also *El Niño, History and Crisis: Studies from the Asia-Pacific Region*, ed. Richard Grove and John Chappell (Cambridge, Eng.: White Horse Press, 2000).

Environmental history also profits from porous borders with disease history, economic history, the history of science and technology, and some sub-fields within social history, notably agrarian history and urban history. The traffic back and forth across these borderlands is probably greater in African, European, or Chinese environmental history than it is in American, where the emphasis on wilderness and the West remains powerful (although not what it was two decades ago). In the U.S. the border traffic with urban history and the history of technology has attracted some systematic notice.²³

Environmental history seems still to benefit from its youth. Although the actual process of multi-disciplinary self-education may seem arduous, environmental history has put up few to no formal barriers to entry. People migrate into it from several sorts of backgrounds, within and without the historical profession. Its institutionalization remains limited, its borders undefended. But maturity brings its benefits too, and there are many signs that environmental history is maturing. Despite the awkward challenges it can pose to historians, as it marches along it is certainly leaving a growing footprint upon the discipline of history generally. This is testament both to the skill of some environmental historians and to the open-mindedness of some of their colleagues in other branches of history.

III. THE FOOTPRINT OF ENVIRONMENTAL HISTORY

Historians began to use the term environmental history some time in the very late 1960s or early 1970s. In the U.S., a small handful of scholars joined forces to form the American Society for Environmental History in 1976, and today it has more than 1,000 members. A European equivalent, long in gestation, was born in 1999 and held its first meeting in 2001. It currently has about 350 members. Recent stirrings suggest a Latin American association for environmental history may soon be born.

There are two main journals in English. *Environmental History*, published in the U.S. and devoted primarily to American environmental history (although less so now than before), was begun in 1976.²⁴ *Environment and History*, published in Britain since 1995, is devoted mainly to European and European imperial subjects, with many articles on Africa, India, and Australia. A journal in Belgium focuses on environmental history mainly in the Low Countries: *Tijdschrift voor Ecologische Geschiedenis* (since 1998 *Jaarboek voor Ecologische Geschiedenis*.) In the Netherlands an environmental history quarterly, *Stichting Net Werk*, has appeared since 1986. At least fifty other history journals (counting only those listed on the Ingenta website) published environmental history articles in the years 1999–2003, as did many other journals in related disciplines. Perhaps the

23. See Christine Rosen and Joel Tarr, "The Importance of an Urban Perspective in Environmental History," *Journal of Urban History* 20 (1994), 299-310; Martin Melosi, "Cities, Technical Systems and the Environment," *Environmental History Review* 14 (1990), 45-64; Melosi, "The Place of the City in Environmental History," *Environmental History Review* 17 (1993), 1-23 ; Jeffrey Stine and Joel Tarr, "At the Intersection of Histories: Technology and the Environment," *Technology and Culture* 39 (1998), 601-640.

24. It was born as *Environmental Review* and changed its name to *Environmental History Review* before adopting its current title.

most consistent supporter of environmental history among history journals not specifically devoted to it has been the *Pacific Historical Review*.

Surprising for its neglect of environmental history is the most admired and influential history journal of the twentieth century, *Annales: Economies, sociétés, civilizations* (since 1994 *Annales: Histoire, sciences sociales*). The founders of *Annales*, and its editors ever since, had a strong appreciation of geography and its role in shaping history. From the late 1950s, *Annales* printed many pieces on climate and harvests, mainly in the western European context, several of them by Emmanuel Le Roy Ladurie. It continued to publish articles on epidemics and disease patterns too. In 1974 Le Roy Ladurie presented a collection of articles by various authors entitled "Histoire et Environnement," in total about 160 pages' worth divided among contributions on climate, epidemics, earthquakes in southern Spain, and irrigation in north India.²⁵ This was self-conscious environmental history (mixed with pieces of contemporary commentary), but it did not herald anything new in *Annales*. In the following twenty-nine years it published almost nothing that could be called environmental history beyond its traditional interests in climate, harvests, and epidemics—and it increasingly printed less of that as it shifted in new directions altogether.²⁶ According to its own subject index, it printed four articles in environmental history between 1989 and 1998 and none since.²⁷ Below I will comment further on the shadow cast by the great historians associated with *Annales*, and on the status of environmental history in France.

Another indication of the growing footprint is the spate of book series devoted to environmental history. Cambridge University Press and Texas A & M University Press began series in the 1980s, and in the 1990s they were joined by the University of Washington Press, Ohio University Press, and more recently by the University of Arizona Press; Columbia University Press has a series in historical ecology. Among commercial publishers, ABC-Clio and Greenwood have launched, or will soon launch, environmental history series. In Germany, Waxmann Verlag produces a series in which about a third of the titles are environmental history. Many other scholarly presses and commercial publishers bring out environmental history too, perhaps most regularly the University of California Press. In Britain the White Horse Press specializes in environmental history.

Finally, a number of universities now have more or less formal programs in environmental history, such as Bern in Switzerland, St. Andrews and Stirling in Scotland, Göttingen in Germany, Vienna in Austria, Australian National University, and Otago in New Zealand. American universities that train graduate students in the field include Kansas, Wisconsin, California, and Carnegie-Mellon. Recently Rutgers and Montana State have mounted formal environmental history programs too.

25. *Annales: E.S.C.* 29 (1974), 537-647; 915-965. Two of the articles included were not historical in nature.

26. The most interesting exception is Teresa Dunin-Wasowicz, "Environnement et habitat: la rupture de l'équilibre du XIIIe siècle dans la Grande Plaine européenne," *Annales: E.S.C.* 35 (1980), 1026-1045.

27. All of these concerned water, or Mexico, or both. *Annales* has published nearly 300 articles since 1989. Data here come from the Tables Analytiques published as supplements every five years since 1989; prior to that from my own perusal.

The community of environmental historians frequently worries that the mainstream of the profession pays it little heed. The degree to which this may hold true seems to me highly variable. Among historians of the American West, for example, environmental history is surely given its due. The same is true, I think, among China historians outside of China. Something depends on the skill with which environmental historians have packaged their subjects so as to make them attractive to outsiders; and something depends on whether or not prominent figures have succumbed to the charms of environmental history. The stature of Mark Elvin, for example, who first earned a name for himself doing economic and social history, has done much to draw attention to Chinese environmental history.²⁸ The same is true for African history, in which some of the more visible figures have taken up environmental perspectives.²⁹ The institutional conservatism of universities being what it is, it should come as no surprise that the academic job market has scarcely recognized environmental history, even in those countries where it is most prominent such as the U.S., Germany, Sweden, and India. With rare exceptions, young environmental historians market themselves as historians of China, modern France, or the antebellum South, as the job market requires.

IV. THE PREHISTORY OF ENVIRONMENTAL HISTORY

Historians since Herodotus and Thucydides have understood the importance of geography for certain kinds of history. Some, like Ibn Khaldūn, wove general theories of history around environmental factors.³⁰ Notions that environment, in greater or lesser degree, shaped a people's character or the course of history held easy appeal for many scholars in many cultures.³¹ But the notion that environments changed, and that human agency changed them in ways that in turn shaped human affairs, was much rarer. When such a view appeared, it often took the form of a lament about some fall from grace, some destruction of earthly paradise, based on no more than observation of the current state of affairs and fond imagination concerning the past.³² When history became an academic discipline

28. Elvin's first major book, *The Pattern of the Chinese Past* (Stanford: Stanford University Press, 1973), attracted considerable attention. His works in Chinese environmental history came only two decades later: "Three Thousand Years of Unsustainable Development: China's Environmental History from Archaic Times to the Present," *East Asian History* 6 (1993), 7-46; *Sediments of Time: Environment and Society in Chinese History*, ed. Mark Elvin and Ts'ui-jung Liu (New York: Cambridge University Press, 1998).

29. E.g., John Iliffe and Allen Isaacman. In the U.S., the young cohort of Africanist environmental historians is both large and vigorous. Earlier influential Africanists, such as Philip Curtin and Jan Vansina, were interested in environmental factors too.

30. In *The Muqaddimah*, transl. Franz Rosenthal (Princeton: Princeton University Press, 1967), Ibn Khaldūn (1332-1406) builds a theory of political development that emphasizes the hardihood of desert peoples.

31. Among the more influential examples is Montesquieu. In his *Esprit de lois* (1748) he credited climate in particular with shaping societies and mentalities. For the evolution of environmental thought in Western culture, Clarence Glacken, *Traces on the Rhodian Shore* (Berkeley: University of California Press, 1967); Rolf-Peter Sieferle, *Bevölkerungswachstum und Naturhaushalt: Studien zur Naturtheorie der klassischen Ökonomie* (Frankfurt: Suhrkamp, 1990).

32. The botanist Oliver Rackham and geographer A.T. Grove in *The Nature of Mediterranean Europe: An Ecological History* (New Haven: Yale University Press, 2001), 8-10, pursue this theme for painters and travelers interested in Mediterranean landscapes who, they assert, misread what they saw.

in the nineteenth century, its foremost inspirations were German philosophers who believed in the power of ideas and who regularly denigrated geography's influence.³³ The insistence on careful documentation, associated with the scientific history of Leopold von Ranke, drew historians' attention to the sorts of things that first got written down and then got preserved in libraries and archives, which guided researchers towards political and intellectual history. It almost ruled out consideration of forests, soils, fish, or air pollution as subjects for historical inquiry, or even commentary.

It was against this often dry and staid political and intellectual history that Lucien Febvre and Marc Bloch rebelled, c. 1915–1930, founding *Annales* and gradually legitimizing, for professional historians, new fields of inquiry that had cattle, trees, diseases, and bodily functions (or at least their results) in them. But the *Annales* historians were, many of them, strangely blind to evolving environments. Fernand Braudel saw in Mediterranean landscapes a powerful influence of geography, to which he devoted the first third of *La méditerranée*, but he normally imagined it as an unchanging force. With few exceptions his writing on environments conformed to the spirit of his phrase *l'histoire immobile*.³⁴ His pupil Emmanuel Le Roy Ladurie, however, embraced environmental change in two of his major books, starting in the late 1950s.³⁵ But Braudel himself never outgrew his immersion in the static French human geography of his youth, in which environment served as a constraint on possible paths of history.³⁶ To a very limited extent, then, *Annales* historians were engaged in environmental history *avant la lettre*, although they never adopted the term before 1974 nor, so far as I can tell, thought of themselves in such terms. Their general approach however proved inspirational for many who would become environmental historians, as it did for practitioners in so many genres within the discipline of history.

An additional source of inspiration, mainly for U.S. environmental historians, was and to some extent remains, the frontier history of Frederick Jackson Turner and Walter Prescott Webb, and the explicitly ecological history of the Great Plains of James Malin.³⁷ These were historians fully alive to the environmental transformations of North America's grasslands that came with Euro-american

33. I have in mind Kant and Hegel. Hegel credited geography with some role in the formation of a people's spirit (following Montesquieu) but how that spirit worked itself out over time was a matter of its internal logic, to which geography and environment were wholly irrelevant. My thanks to Hegel scholar Terry Pinkard of Northwestern University for helping me out here.

34. *The Mediterranean and the Mediterranean World in the Age of Philip II* (New York: Harper & Row, 1973), vol I, 23-275. Even late in life, in *The Identity of France*, 2 vols. (New York: Harper & Row, 1988), which included extensive treatment of the environment, he almost never acknowledged the possibility of environmental change, although he did entertain the possibility of climate change (267-275).

35. *Les paysans de Languedoc* (Paris: S.E.V.P.E.N., 1966); *Times of Feast, Times of Famine: A History of Climate since the Year 1000*.

36. For the evolution of French academic geography, Paul Claval, *Histoire de la géographie française de 1870 à nos jours* (Paris: Nathan, 1998).

37. Frederick Jackson Turner, "The Significance of the Frontier in American History" in American Historical Association, *Annual Report for the Year 1893* (Washington, D.C.: AHA, 1893), 199-227; Walter Prescott Webb, *The Great Plains* (Boston: Ginn, 1931) and *The Great Frontier* (Boston: Houghton Mifflin, 1952); James Malin, *The Grassland of North America: Prolegomena to Its History* (Lawrence, Kansas: James C. Malin, 1947).

(and to some extent Afro-american) settlement, and saw in the process of frontier transformation defining forces in American history. Turner and Webb were mainly interested in social aspects of the frontier story, but Malin engaged directly with ecological change. They were all prominent historians whom no one educated in U.S. history was likely to miss.

Equally inspirational to U.S. environmental historians, if much less so elsewhere, was the book of the diplomat and polymath George Perkins Marsh, *Man and Nature*, first published in 1864. Marsh argued, as have many environmental historians since, that human action, mainly farming, degraded environments to the point where agricultural production was threatened. His evidence came mainly from his native Vermont and his travels in Italy and the Ottoman Empire, where he held diplomatic posts. Marsh came into vogue again in the 1960s, at least in scholarly circles, in part thanks to the republication of his work in an edition prepared by the geographer David Lowenthal.³⁸

V. THE EMERGENCE OF ENVIRONMENTAL HISTORY SINCE THE 1970S

While intellectual influences from Turner and Febvre to Malin and Le Roy Ladurie helped inspire and shape environmental history, its strongest stimulus came from outside the academy. The popular ecology movement of the late 1960s and 1970s was decisive in the emergence of environmental history as a self-conscious genre in Europe and North America, and the environmental struggles in India, China, and Latin America drove some scholars in those lands, and elsewhere, to fold environmental perspectives into their work. Together with almost everyone else, historians came to see new sets of problems. Many felt a desire to help find solutions, and saw a chance for moral engagement, a chance to serve humankind by providing a usable past.³⁹ Historians could hope to help by uncovering the origins and history of a given problem, for example. Or they might point the way to a better future by revealing the existence of societies in the past that had managed their relations with the environment more successfully, perhaps even sustainably.⁴⁰

The latter quest usually brought historians to indigenous peoples such as Native Americans, or to distant pasts untroubled by patriarchy, or at the very least to societies unaffected by capitalist rapacity. While perhaps encouraging to those in the environmental movement eager for alternatives to society as they knew it, initial studies in this vein did not hold up well under serious scrutiny. Over time, the weight of environmental history investigation showed that preindustrial soci-

38. *Man and Nature* (Cambridge, Mass.: Belknap Press of Harvard University Press, 1965). See also Lowenthal's *George Perkins Marsh: Prophet of Conservation* (Seattle: University of Washington Press, 2000).

39. Roderick Nash, who in 1970 offered one of the very first courses in environmental history, wrote: "I was responding to cries for environmental responsibility which reached a crescendo in the first months of [1970]." Nash, "American Environmental History: A New Teaching Frontier," *Pacific Historical Review* 363 (1974), 362-372.

40. An explicit interrogation of history in search of sustainable examples is Henk van Zon, *Geschiedenis en duurzame ontwikkeling: Duurzame ontwikkeling in historisch perspectief, enkele verkenningen* (Nijmegen: University Centre for Environmental Sciences, 2002).

eties often had broad environmental consequences. Native Americans, despite the limitations of their technologies and their numbers, engaged in large-scale environmental manipulation, mainly through fire. So did Australian aborigines. Polynesians brought about animal extinctions on the islands they settled. Non-capitalist societies, at least communist ones, could outstrip capitalists when it came to environmental damage.⁴¹ Ecological angels, the environmentalists' equivalent of the Noble Savage, proved hard to find if tempting to imagine. These were disappointing results for those intent on finding in the past the antidote for the present.

The United States

It was in the U.S. that self-conscious environmental history first began to take shape. It initially showed a strong intellectual/cultural bent, drawing on the history of conservation as an ideal and as a social movement.⁴² It also focused sharply on the history of the Great Plains and the West. But it quickly diversified both topically and geographically, and soon both political and material environmental history flourished, and many authors dealt with the eastern third of the country. For example, in what is probably the most widely read environmental history book yet written, *Changes in the Land*, William Cronon took on southern New England c. 1600–1800 and showed more interest in pigs than in Puritanism.⁴³ At the same time, American environmental history grew by leaps and bounds in its ecological sophistication. Authors boned up impressively on water chemistry, forest dynamics, and grassland ecology, aided no doubt by a spate of works in historical ecology written by people trained in the natural sciences.⁴⁴ A further trend, conspicuous by the 1980s, was the attention to urban subjects. Urban environmental history continues to thrive in the U.S., and to my mind has become the most interesting frontier.⁴⁵ After all, since 1920 most Americans have

41. See, for example, Judith Shapiro, *Mao's War against Nature* (New York: Cambridge University Press, 2001); Sergio Díaz-Briquets and Jorge Pérez-López, *Conquering Nature: The Environmental Legacy of Socialism in Cuba* (Pittsburgh: University of Pittsburgh Press, 2000), which is not the work of historians, but considers historical dimensions for some subjects. There is no comparable general work on the Soviet Union or any Soviet satellite as far as I know. Murray Feshbach and Albert Friendly, *Ecocide in the U.S.S.R.* (New York: Basic Books, 1992) is mainly confined to the situation as it stood in the 1980s. Very useful partial pictures of Soviet environmental history are contained in Douglas Weiner, *Models of Nature: Ecology, Conservation and Cultural Revolution in Soviet Russia* (Bloomington: University of Indiana Press, 1988); Weiner, *A Little Corner of Freedom: Russian Nature Protection from Stalin to Gorbachev* (Berkeley: University of California Press, 1999); Paul Josephson, *Industrialized Nature: Brute Force Technology and the Transformation of the Natural World* (Washington, D.C.: Island Books, 2002); Richter B. Stevens, "Nature Mastered by Man: Water and Ideology in the Soviet Union," *Environment and History* 3 (1998), 69-96; *East-central Europe and the Former Soviet Union: Environment and Society*, ed. David Turnock (New York: Oxford University Press, 2001).

42. The most important book in this vein probably was Roderick Nash, *Wilderness and the American Mind* (New Haven: Yale University Press, 1967).

43. (New York: Hill & Wang, 1984).

44. E.g., Emily Russell, *People and the Land through Time: Linking Ecology and History* (New Haven: Yale University Press, 1998); Gordon Whitney, *From Coastal Wilderness to Fruited Plain: A History of Environmental Change in Temperate North America from 1500 to the Present* (New York: Cambridge University Press, 1996).

45. The key early works were by Joel Tarr and Martin Melosi, whose perspectives are recently on display in Tarr, *The Search for the Ultimate Sink* (Akron: University of Akron Press, 1996) and Melosi, *The Sanitary City: Urban Infrastructure in America from Colonial Times to the Present*

lived in cities, and since well before that the knowledge and power of city folk has exerted great influence upon local, and larger, ecosystems.

In the 1990s the new cultural history arrived, propelled by prevailing winds sweeping over academic departments in literature and anthropology. With this the study of how Americans thought and wrote about the environment acquired renewed momentum, together with consideration of nature aesthetics, ethics, and law. The conservation movement, the establishment of parks, concepts of nature and wilderness, the writings of Thoreau, Aldo Leopold, and Rachel Carson all received new analytic treatment, sensitive to race, class, and gender, and to the social construction of knowledge and nature. Personally, while the new sensitivities are welcome as ways to widen the lenses of historians, I find the emphasis upon social construction unenlightening compared to the old cultural/intellectual environmental history of the 1970s. I think the cultural construction of nature just isn't all that important compared to what has happened and is happening to real nature, and how nature has affected and still affects us (there is some reality out there independent of our perception!). Most of my colleagues are more receptive.

At no point in the evolution of American environmental history has anyone seen fit to recognize the prominence of the military in American life since 1941, and its significance in shaping American environments. The general works in U.S. environmental history leave out the military dimension almost entirely.⁴⁶ In this omission, U.S. environmental historians are not out of step with their environmental history colleagues elsewhere, for whom the military dimensions of society are also off-limits.

U.S. environmental historians are exceptional, however, in their reluctance to confront American engagement with the rest of the world, even close neighbors. Sulfur dioxide plumes may waft across borders, geese may fly over them, but U.S. environmental historians have hesitated to follow.⁴⁷ In this respect, U.S.

(Baltimore: Johns Hopkins University Press, 2000). But see also *Common Fields: An Environmental History of St. Louis*, ed. Andrew Hurlley (St. Louis: Missouri Historical Society Press, 1997); Sarah Elkind, *Bay Cities and Water Politics: The Battle for Resources in Boston and Oakland* (Lawrence: University of Kansas Press, 1998); *Transforming New Orleans and Its Environs: Centuries of Change*, ed. Craig Colten (Pittsburgh: University of Pittsburgh Press, 2000); Gary Brechin, *Imperial San Francisco: Earthly Power, Urban Ruin* (Berkeley: University of California Press, 2001); and Ari Kelman, *A River and Its City: The Nature of Landscape in New Orleans* (Berkeley: University of California Press, 2003).

46. John Opie, *Nature's Nation* (Fort Worth, TX: Harcourt Brace, 1998); Ted Steinberg, *Down to Earth: Nature's Role in American History* (New York: Oxford University Press, 2002). Both are intended as textbook surveys of American environmental history. Edmund Russell, *War and Nature: Fighting Humans and Insects with Chemicals from World War I to Silent Spring* (New York: Cambridge University Press, 2001) takes on a small slice of the subject.

47. Consider two justifiably admired books: Cronon's *Nature's Metropolis* and Andrew Isenberg's *The Destruction of the Bison: An Environmental History* (New York: Cambridge University Press, 2000). Cronon details the links between Chicago and midwestern states, between Chicago and the Great Lakes and Great Plains, but not between Chicago and Ontario. Isenberg considers the Canadian contingent of the North American bison herd most cursorily. Some recent welcome exceptions that do recognize the U.S. engagement with the world, especially its neighbors, are: Richard Tucker, *Insatiable Appetite: The United States and the Ecological Degradation of the Tropical World* (Berkeley: University of California Press, 2000); Kurpatrick Dorsey, *The Dawn of Conservation Diplomacy: U.S.–Canadian Wildlife Protection Treaties in the Progressive Era* (Seattle: University of Washington Press, 1998); John Wirth, *Smelter Smoke in North America: The Politics of Transborder*

environmental history looks rather like some American TV weather maps, where everything, including advancing thunderstorms and high pressure cells, stops at the border. Admittedly, it is not easy to get useful information about Canadian environmental history because Canadianists have almost entirely ignored the genre, but there is a smattering of recent and helpful works with more on the way (and Canadian archives are accessible).⁴⁸ Historians of Mexico have been much more engaged with the environment, although their works have to date made scant impression north of the border.⁴⁹ Worster and others have called for an internationalization of environmental history, but Americanists are among the least responsive to this cry.⁵⁰ I will not review the evolution of U.S. environmental history in any greater detail than this; it has been ably done a number of times.⁵¹

The vigor of American environmental history, and the promise of moral engagement, helped inspire historians around the world who were, of their own accord and along their own paths, coming to environmental perspectives. In Europe in particular, the popular environmental movement served as the

Pollution (Lawrence: University of Kansas Press, 2000); Evan Ward, *Border Oasis: Water and the Political Ecology of the Colorado River Delta, 1940–1975* (Tucson: University of Arizona Press, 2003); Samuel Truett, “Neighbors by Nature: Rethinking Region, Nation, and Environmental History in the U.S.-Mexico Borderlands,” *Environmental history* 2 (1997), 160-178; Margaret Bogue, *Fishing the Great Lakes: An Environmental History, 1783–1933* (Madison: University of Wisconsin Press, 2000). The University of Arizona Press recently launched a series in borderlands environmental history, which should go some way towards addressing the problem I see here.

48. *Consuming Canada: Readings in Environmental History*, ed. Chad Gaffield and Pam Gaffield (Toronto: Copp Clark, 1995); Patricia Jasen, *Wild Things: Nature, Culture, and Tourism in Ontario, 1790–1914* (Toronto: University of Toronto Press, 1995); George Colpitts, *Game in the Garden: A Human History of Wildlife in Western Canada to 1940* (Vancouver: University of British Columbia Press, 2002); Clinton Evans, *The War on Weeds in the Prairie West: An Environmental History* (Calgary: University of Calgary Press, 2002); Graeme Wynn, *Timber Colony: A Historical Geography of Early Nineteenth-century New Brunswick* (Toronto: University of Toronto Press, 1981); Alan MacEachern, *Natural Selections: National Parks in Atlantic Canada, 1935–1970* (Montreal: McGill-Queen’s University Press, 2001); a brief review essay on Canadian environmental history is MacEachern, “Voices Crying in the Wilderness: Recent Works in Canadian Environmental History,” *Acadiensis* 31 (2002), 215-226.

49. Some of the work on Mexico’s northern borderlands region is in English: Thomas Sheridan, *Where the Dove Calls: The Political Ecology of A Peasant Corporate Community in Northwestern Mexico* (Tucson: University of Arizona Press, 1988); Cynthia Radding, *Wandering Peoples: Colonialism, Ethnic Spaces and Ecological Frontiers in Northwestern Mexico, 1700–1850* (Durham: Duke University Press, 1997); see also Cynthia Radding, “Ecología y cultura en dos fronteras misionales: Sonora (Nueva España) y Chiquitos (Alto Perú) en la época postjesuitica,” in *Estudios sobre historia y ambiente en América*, ed. Bernardo García Martínez and Alba González Jácome (Mexico City: El Colegio de México, 1999), 265-285.

50. Donald Worster, “World without Borders: The Internationalizing of Environmental History,” *Environmental Review* 6 (1982), 8-13. U.S. environmental historians are well within the mainstream of U.S. historiography in paying so little attention to linkages and comparisons between the U.S. and the rest of the world.

51. For example, White, “Environmental History: The Development of a New Historical Field”; Alfred Crosby, “The Past and Present of Environmental History,” *American Historical Review* 100 (1995), 1177-1189; Mart Stewart, “Environmental History: Profile of a Developing Field,” *The History Teacher* 31 (1998), 351-368; Ted Steinberg, “Down to Earth: Nature, History and Power in History,” *American Historical Review* 107 (2002), 798-820. Steinberg’s and especially Crosby’s essays briefly touch on works pertaining to regions beyond the U.S. See also *The Columbia Guide to American Environmental History*, ed. Carolyn Merchant (New York: Columbia University Press, 2002).

strongest stimulus, but nevertheless the American historians, especially Worster, Cronon, and Crosby, were read almost wherever environmental history aroused interest. It did so most strongly in northern Europe, India, and Australia, but also among Western scholars of Africa and China.

Europe

In northern Europe the main themes of environmental history have been pollution and the costs of industrialization, and the history of forests (until recently mainly the history of forest management). Agro-ecosystems have also attracted attention. In northern Europe the tradition of historical geography is comparatively strong, and many of the authors writing environmental history are by training geographers, especially in Britain. Sweden, Finland, Germany, the Netherlands, and the UK (notably Scotland⁵²) have the most extensive literatures now.⁵³ In the 1980s pollution issues galvanized European environmental historians: Tentatively a small community, and a short-lived newsletter, appeared. But many of the scholars involved turned to other subjects, never to return. Only in the 1990s did European environmental history find its feet.⁵⁴ Some practitioners, such as Franz-Josef Brüggemeier,⁵⁵ consider their field institutionally undernourished and generally underappreciated. That may be. But the quality and range (not the quantity) of works in northern European environmental history strikes me as equal to that for any part of the globe, including the U.S. Some of the most exciting work on northern and central Europe deals with the energy base of agrarian society and the transformations of industrialization.⁵⁶ Scholars are attempting to measure the energy and materials flows—the social metabolism—

52. In addition to many specialized works in Scottish environmental and forest history produced in the last ten years, see T. C. Smout, *Nature Contested: Environmental History in Scotland and Northern England since 1600* (Edinburgh: University of Edinburgh Press, 2000).

53. Overviews of European, mainly northern European, environmental history approaches and literature include: *Umweltgeschichte: Methoden, Themen, Potentiale*, Günter Bayerl, Norman Fuchsloch, and Torsten Meyer (Münster: Waxmann Verlag, 1996); Rolf-Peter Sieferle, “Qué es la historia ecológica?” in *Naturaleza transformada*, ed. Manuel González de Molina and Joan Martínez Alier (Barcelona: Icaria Editorial, 2001), 31-40; Arne Andersen, “Umweltgeschichte. Forschungsstand und Perspektiven,” *Archiv für Sozialgeschichte*, 33 (1993), 672-701; Verena Winiwarter, “Was ist Umweltgeschichte?” Social Ecology Working Paper 54, available at: www.iff.ac.at/socec/ (accessed September 16, 2003); studies on northern Europe are very well represented in the pages of *Environment and History*. There is now a survey of the British Isles: I.G. Simmons, *An Environmental History of Great Britain: From 10,000 Years Ago to the Present* (Edinburgh: Edinburgh University Press, 2001).

54. A landmark publication was the compendium edited by Christian Pfister and Peter Brimblecombe, *The Silent Countdown: Essays in European Environmental History* (Berlin: Springer Verlag, 1990). Recent collections and surveys which give an idea of the scope and range of subjects in European environmental history include *Encountering the Past in Nature: Essays in Environmental History*, ed. Timo Myllylantaus and Mikko Saikku (Athens: Ohio University Press, 2001); Robert Delort and François Walter, *Histoire de l'environnement européen* (Paris: PUF, 2001); *People and Nature in Historical Perspective*, ed. József Laszlovsky and Péter Szabó (Budapest: Central European University, Department of Medieval Studies, 2003); and *Umweltgeschichte: Themen und Perspektiven*, ed. Wolfgang Siemann (Munich: Beck Verlag, 2003).

55. Brüggemeier, “Umweltgeschichte: Erfahrungen, Ergebnisse, Erwartungen,” forthcoming.

56. Rolf-Peter Sieferle, *The Subterranean Forest: Energy Systems and the Industrial Revolution* (Cambridge, Eng.: The White Horse Press, 2001); Christian Pfister, *Das Klima der Schweiz von 1525 bis 1860 und seine Bedeutung in der Geschichte von Bevölkerung und Landwirtschaft* (Bern: Academica Helvetica, 1984).

of entire societies (notably Austria and Britain) in the era of industrialization.⁵⁷ The agricultural revolution of the seventeenth and eighteenth centuries, with its implications for demographic and economic growth, is also acquiring a new look thanks to the work of environmental historians. Even medieval history, for which the sources are scant and rarely oriented towards environmental themes, can, with enough imagination, be recast in an ecological light.⁵⁸ So, even if currently underappreciated by their colleagues, in northern Europe environmental historians are making contributions to European history in general that concern fundamental subjects.⁵⁹

Environmental history also seems to have germinated in the spare soils of southern Europe. Spanish historians took up explicitly ecological frameworks in the 1980s, mainly as an offshoot of agrarian history, which has a strong tradition in Spain. While Spanish environmental history deals with cities and forests to some extent, its main theme has been agrarian ecology in the nineteenth and early twentieth centuries. It shares the radical, anti-capitalist flavor of much of Spanish agrarian historiography. Like the Indian work noted below, Spanish environmental history generally serves as an approach to questions of social and political struggle. In a sense, Spanish environmental historians expanded the land question into the environment question.⁶⁰ Italian environmental historians were perhaps a little later out of the starting gate. Like the Spaniards, they have shown less interest in industrialization than in the transformation of agro-ecosystems, notably drainage and land reclamation in the Po Valley, but also of the impoverished south, the *mezzogiorno*. Piero Bevilacqua, who began his career in rural social and economic history, is the most prolific and wide-ranging author among the Italians.⁶¹ But there is an active younger generation now organizing confer-

57. E.g. Fridolin Krausmann and H. Haberl, "The Process of Industrialization from the Perspective of Energetic Metabolism: Socioeconomic Energy Flows in Austria, 1830–1995," *Ecological Economics* 41 (2002), 177–201; H. Schandl and N. B. Schulz, "Changes in the United Kingdom's Natural Relations in Terms of Society's Metabolism and Land Use from 1850 to the Present day," *Ecological Economics* 41 (2002), 203–221.

58. For example, Richard Hoffman, "Economic Development and Aquatic Ecosystems in Medieval Europe," *American Historical Review* 101 (1996), 631–669; William TeBrake, *Medieval Frontier: Culture and Ecology in Rijnland* (College Station: Texas A & M Press, 1985).

59. Thorkild Kjaergaard, *The Danish Revolution, 1500–1880: An Ecohistorical Interpretation* (New York: Cambridge University Press, 1994), a book which has apparently generated some controversy in Denmark; Mauro Ambrosoli, *The Wild and the Sown: Botany and Agriculture in Europe, 1350–1850* (Cambridge, Eng.: Cambridge University Press, 1996).

60. Two samplers of Spanish work are *Historia y medio ambiente*, ed. Alberto Sabio Alcutén and Iñaki Iriarte Goñi (Huesca: Instituto de Estudios Altoaragoneses, 2001); and *Naturaleza transformada*, ed. Manuel González de Molina and Joan Martínez Alier (Barcelona: Icaria Editorial, 2001), which reviews the evolution of the field in Spain on pp. 7–30. See also Manuel González de Molina, *Historia y medio ambiente* (Madrid: Eudema, 1993), and *Historia y medio ambiente en el territorio almeriense*, ed. Andrés Sánchez Picón (Almería: Universidad de Almería Servicio de Publicaciones, 1996).

61. See Bevilacqua, *Tra nature e storia* (Rome: Donzelli, 1996); Bevilacqua, *Demetra e Clio: uomini e ambiente nella storia* (Rome: Donzelli, 2001); Bevilacqua, *Terre del grano, terre degli alberi: l'ambiente nella storia del Mezzogiorno* (Rionero in Vulture: Calice, 1992); Bevilacqua, *Venezia e le acque: una metafora planetaria* (Rome: Donzelli, 1998); and his contributions to *Storia dell'agricoltura italiana in età contemporanea*, ed. Pietro Bevilacqua (Venice: Marsilio, 1989), especially his "Le rivoluzioni dell'acqua: Irrigazione e trasformazioni dell'agricoltura tra Sette e Novecento," 255–318.

ences and publishing bulletins, and paying heed to issues such as technical change and urban sanitation.⁶²

Closely connected to European environmental history is the burgeoning literature on imperial themes. This unites European history with the environments and histories of South Asia, Latin America, Africa, and Australia. The genre is especially strong for the British Empire and Commonwealth. There is some cohesion to this literature, as it generally emphasizes colonial avarice, ignorance of local ecosystems and of local knowledge, and the like (but sometimes emphasizes stirrings of environmental awareness among colonial officials). However, here I will carve it up and parcel it out to the parts of the world most central to it.⁶³

India

India has developed a flourishing environmental history literature, invigorated by the environmental movement that emerged there in the 1980s. The record base of British India lends itself to studies of land use, forests, and irrigation, all of which have served as the focus of strong work. Most of the Indian contributions, especially those by Indian scholars, embed environmental history thoroughly in the history of social struggles.⁶⁴ That is, their interest in the environment derives mainly from its place in contests for power within Indian society (including British colonial authorities). This is perhaps an outgrowth of the background of several of the authors in peasant and agrarian studies, but surely also of the reality of Indian history, in which land tenure, social inequality, and colonialism all played such prominent roles. Access to resources, and preservation or destruction of resources, were clearly central to the tumultuous political history of the subcontinent. This of course was true elsewhere, and is often so recognized, but rarely with the clarity of focus present in the Indian body of work.⁶⁵

In some respects the early work in Indian environmental history resembled that in the Americas and Africa, positing a pre-conquest, pre-colonial past of ecological harmony. This view was beguilingly expressed by Madhav Gadgil and Ramachandra Guha in their accessible survey, *This Fissured Land*, which took the paucity of evidence for environmental change in pre-British India as evidence for remarkable ecological stability and prudence. Even the Mughals, they

62. See for example *I frutti di Demetra: Bollettino di storia e ambiente*, first published in March 2003 by the Istituto Meridionale di Storia e Scienze Sociali; or the articles of Renato Sansa, e.g. "L'odore del contagio: Ambiente urbano e prevenzione delle epidemie nella prima età contemporanea," *Medicina & Storia* 2 (2002), 83-108. A small number of foreigners have been seduced by the charms of southern European environmental history, including myself: *The Mountains of the Mediterranean World: An Environmental History* (New York: Cambridge University Press, 1992).

63. For a sense of this literature, see the journal *Environment and History*, as well as the works of Richard Grove and John Mackenzie.

64. Perhaps the crucial book here was Ramachandra Guha, *The Unquiet Woods: Ecological Change and Peasant Resistance in the Himalaya* (New Delhi: Oxford University Press, 1989).

65. See, for example, Sumit Guha, *Environment and Ethnicity in India, 1200-1991* (Cambridge: Cambridge University Press, 1999); David Arnold and Ramachandra Guha, *Nature, Culture, Imperialism: Essays on the Environmental History of South Asia* (New Delhi: Oxford University Press, 1995). Outside of India, the rest of South Asia has gotten much less attention, but see James Webb, *Tropical Pioneers: Human Agency and Ecological Change in the Highlands of Sri Lanka, 1800-1900* (Athens: Ohio University Press, 2002).

say, did not do much to change India's environment.⁶⁶ This view is hard to square with the Mughals' record of frontier expansion in Bengal.⁶⁷ Indeed it is likely that, as in the Americas and Africa, further research will do much to undermine the blissful image of the precolonial past. Regrettably, the environmental history of the Mughal period remains almost a complete cipher.⁶⁸

Australia

In Australia too the dramas of colonial experience dominate environmental history, although here the story was one of settler colonialism. Australian historians have long recognized the shaping power of their geography—distant, dry, and for the most part infertile. As elsewhere, the surge in popular environmentalism in the 1960s and 1970s helped a handful of historians find ways to insert environmental change into their work.⁶⁹ Perhaps they were spurred by entertaining environmental history written by people who are not formally historians, such as the farmer Eric Rolls or the mammalogist Tim Flannery.⁷⁰ Moreover, historical geographers, mainly foreigners on sojourns in Australia, have produced excellent works on the evolution of Australian landscapes.⁷¹ Forests, perhaps because of their relative paucity, have attracted notable attention.⁷² Australians have shown less interest in the political or cultural/intellectual approaches to environmental history, but lately have begun to produce strong work in these veins too, which has tempered the prevailing view that white Australians thoughtlessly pillaged a continent after 1788.⁷³ As yet, there is very little work on Australian cities or on industrial themes. Even

66. Madhav Gadgil and Ramachandra Guha, *This Fissured Land: An Ecological History of India* (Berkeley: University of California Press, 1992), 107-108 and 113.

67. Richard Eaton, *The Rise of Islam and the Bengal Frontier, 1204–1760* (Berkeley: University of California Press, 1993).

68. In *Nature and the Orient: The Environmental History of South and Southeast Asia*, ed. Richard Grove, Vinita Damodaran, and Satpal Sangwan (Delhi: Oxford University Press, 1998), by far the most thorough volume on Indian environmental history, the Mughals hardly make an appearance. The record base may not be favorable for Mughal environmental history, but as the ruling elite that derived its sustenance from land revenues, it did generate records of the cadastral sort, especially during Akbar's reign. These have been used by Irfan Habib, among others, for the purposes of social and economic history, but not yet (so far as I know) for environmental history.

69. The first major attempt was Geoffrey Bolton, *Spoils and Spoilers: Australians Make Their Environment, 1788–1980* (Sydney: Allen & Unwin, 1981).

70. Tim Flannery, *The Future Eaters: An Ecological History of the Australasian Land and People* (Chatswood, NSW: Reed, 1994), a book which is full of provocative insight but has attracted some stern criticism from Australian historians; Eric Rolls, *They All Ran Wild: The Story of Pests on the Land in Australia* (Sydney: Angus & Robertson, 1969).

71. Michael Williams, *The Making of the South Australian Landscape* (London: Academic Press, 1974); D. W. Meinig, *On the Margins of the Good Earth: The South Australian Wheat Frontier, 1869–1884* (Adelaide: Rigby, 1962); J. M. Powell, *A Historical Geography of Modern Australia: The Restive Fringe* (Cambridge, Eng.: Cambridge University Press, 1988).

72. Tom Griffiths, *Forests of Ash: An Environmental History* (Cambridge and New York: Cambridge University Press, 2001), which is about Victoria's eucalyptus; John Dargavel, *Fashioning Australia's Forests* (Melbourne: Oxford University Press, 1995).

73. Libby Robin, *Defending the Little Desert: The Rise of Ecological Consciousness in Australia* (Carlton South: Melbourne University Press, 1998); Tim Bonyhady, *The Colonial Earth* (Carlton South: Melbourne University Press, 2000). This is a truly learned book that shows the depth of environmental concern within Australian culture, using art and literature. See also Drew Hutton and Libby Connors, *A History of the Australian Environmental Movement* (Cambridge, Eng.: Cambridge University Press, 1999).

mining, a pillar of the modern Australian economy, has yet to attract environmental historians. Australian environmental historians may sometimes complain of isolation and marginality, but taken as a whole, the corpus of work on Australian environmental history is substantial, accessible, and strong, and deals squarely with issues of interest in other societies, especially other lands of frontier settlement.⁷⁴

Latin America

In Latin America environmental history is less well developed but seems poised for takeoff. Academic traditions are often at least as intellectually conservative there as elsewhere, and discourage the evolution of new fields. As a result outsiders, mainly North Americans, have played a conspicuous role in developing the literature. But increasingly, despite the institutional obstacles, Latin American historians are incorporating environmental history perspectives in their work.

In pre-Columbian history the dominant question—familiar in several other contexts—has been the extent of ecological change caused by Amerindians. Did they live lightly on the land, perhaps as paragons of sustainability? Or did they, despite being uncaptalist, technologically unsophisticated and so forth, alter and degrade landscapes? The research in this area is mainly archeological, and admits wide varieties of interpretation.⁷⁵ The general direction, however, is towards the conclusion that in many regions of Latin America, especially Mesoamerica, pre-Columbian societies radically altered their environments. Some scholars conclude that, as regards soil erosion at least, pre-Columbian societies outdid their successors.⁷⁶ Amazonian peoples apparently painstakingly created their own patches of fertile soil, the so-called “dark earths” that make up as much as ten percent of the rain forest region.⁷⁷

74. General syntheses of Australian environmental history, in addition to Bolton and Flannery, include *Environmental History and Policy: Still Settling Australia*, ed. Stephen Dovers (Melbourne: Oxford University Press, 2000); *Australian Environmental History: Essays and Cases*, ed. Stephen Dovers (Melbourne: Oxford University Press, 1994); and Ann Young, *Environmental Change in Australia since 1788* (Melbourne: Oxford University Press, 1996). See also the papers in the *Proceedings of the Ecological Society of Australia* 16 (1990) collected under the title *Australian Ecosystems: Two Hundred Years of Utilization, Degradation and Reconstruction*.

75. A sample of this literature: Michel Gualich, “Myths of Paradise Lost in Pre-Hispanic Central Mexico,” *Current Anthropology* 24 (1983), 575-588; and the first several articles in the *Annals of the American Association of Geographer*, 82, no. 3 (1992). A quick summary is Elizabeth Dore, “How Sustainable Were Pre-Columbian Civilizations?,” in *Green Guerillas: Environmental Conflicts and Initiatives in Latin America and the Caribbean*, ed. Helen Collinson (Montreal: Black Rose Books, 1997), 47-50. This debate, of course, rages with respect to contemporary indigenous peoples in Amazonia and elsewhere, who are sometimes held up as examples of ecological rectitude.

76. G. H. Endfield, S. L.O’Hara, and S. E. Metcalfe, “Palaeoenvironmental Reconstruction in the Mexican Highlands: A Reappraisal of Traditional Theory,” in *People as Agents of Environmental Change*, ed. R. Nicholson and T. P. O’Connor, Oxbow Monographs 16 (2000), 81-92; Endfield, G. H. Endfield and S. L.O’Hara, “Perception or Deception? Land Degradation in Post-conquest Michoacan, West Central Mexico,” *Land Degradation and Development* 10 (1999), 381-396.

77. W. I. Woods and J. M. McCann, “The Anthropogenic Origins and Persistence of Amazonian Dark Earths,” in *The Yearbook of the Conference of Latin Americanist Geographers*, ed. C. Caviedes (Austin: University of Texas Press, 1999), 7-14. Ancient Amazonians may have transported the biologically teeming black earths to new settings and allowed the micro-life to work its magic for months or years, creating newly cultivable spaces.

The ecological impact of the conquest of the Americas and subsequent centuries of colonial rule proved a fertile subject. Alfred Crosby offered one of the first assessments in *The Columbian Exchange* in 1972, one of the landmark works in environmental history. It charted the biological exchanges of plants, animals, and diseases between the Americas and the rest of the world, chiefly Europe, and attracted a wide readership.⁷⁸ Elinor Melville pursued part of Crosby's theme, studying in detail the ecological impact of sheep on a Mexican valley, concluding that Eurasian livestock were indeed a highly disruptive addition to Latin American ecosystems.⁷⁹

Latin Americans began their foray into environmental history working within leftist traditions of social criticism, usually adopting the general framework of *raubwirtschaft*,⁸⁰ in which, in this context, colonialism and capitalism had organized (or indeed required for their survival) the pillage of Latin America. In the 1970s and 1980s this approach meshed well with "dependency" analysis, which had originated in Argentina and Chile before being exported.⁸¹ Luis Vitale offered the first general study in 1983, thin on research and long on allegation and accusation.⁸² More detailed and focused work slowly emerged, primarily in Mexico and Brazil, but also from Argentina. The Mexican work in particular often took up questions of water use and irrigation,⁸³ while in Argentina, rather like the North American great plains, issues surrounding the agricultural colonization of the pampas attracted special attention.⁸⁴ In Brazil it is probably forests that have held center stage, and served as the focus for the work of Warren Dean. A Latin Americanist but admittedly not a Latin American, Dean was arguably the region's most accomplished environmental historian. His *magnum opus* fell squarely within the *raubwirtschaft* tradition.⁸⁵ Environmental historians of Latin America

78. Alfred Crosby, *The Columbian Exchange: Biological and Cultural Consequences of 1492* [1972] (Westport, Conn.: Greenwood Press, 2003).

79. Elinor Melville, *A Plague of Sheep* (New York: Cambridge University Press, 1994).

80. Roughly speaking, plunder economy, a term and concept developed in German and French academic geography c. 1870–1920.

81. Influential works included Eduardo Galeano, *Las venas abiertas de América Latina* (Mexico City: Siglo XXI, 1972).

82. Luis Vitale, *Hacia una historia del ambiente en América Latina: de las culturas aborígenes a la crisis ecológica actual* (Caracas: Nueva Sociedad, 1983).

83. Alain Musset, *De l'eau vive à l'eau morte: 1492–1992 : enjeux techniques et culturels dans la vallée de Mexico (XVIe-XIXe siècles)* (Paris : Editions recherche sur les civilisations, 1991); Sonya Lipsett-Rivera, *To Defend Our Water with the Blood of Our Veins: The Struggle for Resources in Colonial Puebla* (Albuquerque: University of New Mexico Press, 1999); Georgina H. Endfield and Sarah L. O'Hara, "Conflicts over Water in 'The Little Drought Age' in Central Mexico," *Environment and History* 3 (1997), 255–272; and more generally, Fernando Ortiz Monasterio and Isabel Fernández Tijero, *Tierra profanada: historia ambiental de México* (Mexico City: Instituto Nacional de Antropología e Historia, 1987); Alejandro Tortolero Villaseñor, *Tierra, agua y bosques : historia y medio ambiente en el México central* (Mexico City: Centre français d'études mexicaines et centroaméricaines, 1996).

84. Adrián Gustavo Zarrilli, "Capitalism, Ecology and Agrarian Expansion in the Pampean Region, 1890–1950," *Environment and History* 6 (2001), 561–583. The most influential work on Argentina, produced by a biologist and an economist, is Elio Brailovsky and Dina Foguelman, *Memoria verde: Historia ecológica de la Argentina* (Buenos Aires: Editorial Sudamericana, 1991), which won prizes and went through several editions.

85. Warren Dean, *With Broadax and Firebrand: The Destruction of Brazil's Atlantic Forest* (Berkeley: University of California Press, 1995). See also Dean's *Brazil and the Struggle for Rubber: A Study in Environmental History* (New York: Cambridge University Press, 1987); Shawn Miller, *Fruit-less Trees, Portuguese Conservation and Brazil's Colonial Timber* (Stanford: Stanford University Press, 2000).

also produced a handful of works on the cultural/intellectual side, including some that merge into studies of the politics of modern environmentalism.⁸⁶

Connected to the ideas of colonial exploitation and capitalist *raubwirtschaft* is the notion of “the ecology of the poor,” advanced in particular by the Catalan scholar Joan Martínez-Alier. Based on research chiefly concerning Peru, he posited that the impoverished peasantry, from necessity more than from ideological commitment, pursued ecologically prudent ways of life. His work harmonized with simultaneous studies from India which came to much the same conclusion. This picture of peasant agriculture’s gentle ecological impact contrasts sharply with the standard view of environmental destruction as practiced on the world’s agricultural frontiers, whether Latin American, North American, or Australian. It too is partly a political critique of capitalist practice, although less romantic than some of those based on the ecological angel interpretation of indigenous peoples.⁸⁷

In any case, many yawning lacunae remain in Latin American environmental history, beckoning to researchers with the requisite skills and stamina. The ecological dimensions of the mining economy, for example, or the sugar, tobacco, and coffee plantations, have so far attracted only a few pioneers.⁸⁸ The record base created by the Spanish colonial empire provides good raw material for environmental history of the sixteenth–eighteenth centuries. The comparable records in Lisbon are much weaker (for Brazil). Dutch records, shedding light on the environmental history of Surinam and the Dutch Antilles, also apparently have some promise.⁸⁹ The scale and drama of ecological change and its centrality for social struggles suggest a strong future for environmental historians in Latin America.

Africa

The perspectives of environmental history have found fertile fields in sub-Saharan Africa. Most of the work has been done by outsiders, as has most historical research on Africa generally, because of the decay of academia within Africa since the 1970s. The record base on which Africanist historiography depends, mainly oral traditions and colonial documents, has proved suitable for charting environmental change. Africanist historians, perforce, have relied heavily on oral tradition (because of the paucity of written materials). Thus they have

86. For example, José Augusto Pádua, *Um Sopro de destruição: pensamento político e crítica ambiental no Brasil escravista (1786–1888)* (Rio de Janeiro: Jorge Zahar, 2002); Lane Simonian, *Defending the Land of the Jaguar: A History of Conservation in Mexico* (Austin: University of Texas Press, 1995).

87. See Joan Martínez-Alier, *The Environmentalism of the Poor: A Study of Ecological Conflicts and Valuation* (Cheltenham, Eng.: Edward Elgar 2002) for a collection of relevant essays.

88. Mauricio Folchi Donoso, “La insostenibilidad de la industria del cobre en Chile: los hornos y los bosques durante el siglo XIX,” *Revista Mapocho* 49 (2001), 149–175; Elizabeth Dore, “Environment and Society: Long-Term Trends in Latin American Mining,” *Environment and History* 6 (2000), 1–29. Dean and others have touched on the environmental impact of sugar in Brazil. In the Caribbean it is almost untouched, but see Reinaldo Funes Monzote, “La conquista de Camagüey por el azúcar, 1898–1926: El impacto ambiental de un milagro económico,” *Tiempos de América* 8 (2001), 3–28.

89. Peter Boomgaard, “Exploitation and Management of the Surinam Forests, 1600–1975” in *Changing Tropical Forests*, ed. Harold K. Steen and Richard P. Tucker (Durham, N.C.: Forest History Society, 1992), 252–264.

gained access to what is remembered and are less in thrall to what happened to get written down. This may make them more alive to ecological concerns in history, because the great majority of Africans until very recently lived in rural settings and paid close attention to nature. Colonial authorities sometimes did too, partly because they found it strange and capricious, but partly because they often recognized its significance for African life, and for colonial revenues. With these sources to work with, historians of Africa have gone a long way towards placing environment at the forefront of their work.⁹⁰

As with all forms of African history, getting at the deeper past, before say 1800, remains very difficult.⁹¹ Archeology is the best hope, but it has only scratched the surface in most of sub-Saharan Africa. Linguistic evidence is helpful too, especially in matters such as establishing the provenance of crops. Environmental history concerning the centuries before 1800 in Africa is, and always will be, thinly documented and highly speculative. A more cheerful way to look at it is that these are wide open spaces for imagination and ideas.

The human—or hominid at least—negotiation with nature in Africa goes back a few million years, far longer than anywhere else. In a sense, other African species have had time to get used to human ways, whereas on other continents humanity has in effect been able to take ecosystems by surprise. This, together with recurrent drought and weathered, leached soils, helps to account for the myriad difficulties posed for humans by African environments, something emphasized by one of the most distinguished Africanist historians, John Iliffe: “Africans have been and are the frontiersmen who have colonized an especially hostile region of the world. . . . That has been their chief contribution to history. . . . The central themes of African history are the peopling of the continent, the achievement of human coexistence with nature.”⁹² This, then, is one theme in African environmental history: the especially challenging environment.

Another is the degradation of that environment, either by Africans themselves or by colonial forces. The first “degradation narratives”⁹³ stemmed from colonial Europeans who saw in Africa a spoiled Eden, ruined by African ignorance, particularly in agricultural practices. Later, environmental historians more often placed responsibility for environmental decline, in the form of rampant disease or heightened soil erosion, upon misguided colonial projects or ruthless exploitation of, for example, wildlife.⁹⁴ These portrayals emphasize not the hostility of

90. Two examples that rely heavily on oral traditions are Robert Harms, *Games against Nature: An Eco-cultural History of the Nunu of Equatorial Africa* (New York: Cambridge University Press, 1987) and Tamara Giles-Vernick, *Cutting the Vines of the Past: Environmental Histories of the Central African Rain Forest* (Charlottesville: University of Virginia Press, 2002).

91. But see e.g. David Schoenbrun, *A Green Place, A Good Place: Agrarian Change, Gender, and Social Identity in the Great Lakes Region to the 15th Century* (Portsmouth, N.H.: Heinemann, 1998).

92. John Iliffe, *Africans: The History of a Continent* (Cambridge, Eng.: Cambridge University Press, 1995), 1.

93. This is the term used by James McCann, *Green Land, Brown Land, Black Land: An Environmental History of Africa, 1800–1990* (Portsmouth NH: Heinemann, 1999).

94. Early efforts in this vein include Helge Kjekshus, *Ecology Control and Economic Development in East African History* (Berkeley: University of California Press, 1977); Leroy Vail, “Ecology and History: The Example of Eastern Zambia,” *Journal of Southern African Studies* 3 (1977), 129–155.

the African environment, but its fragility under the impact of colonial ignorance or rapacity.

Two challenges to these themes have recently emerged, each one a rehabilitation of sorts. First, a handful of historians have detected in colonial bureaucracies the first rumblings of environmental awareness, as early as the seventeenth and eighteenth centuries. Colonial South Africa played a major part. And further, during the height of the colonial period in Africa (c.1920–1950) imperial scientists systematically developed ecological knowledge of Africa, sometimes took seriously the “folk wisdom” of Africans, and occasionally sought to put it into practice. This historiographical trend amounts to a partial rehabilitation of colonial bureaucracies, picturing them as something more than accomplices to the degradation of African environments.⁹⁵

The second challenge came in the form of denials of, or at least questions about, the very notion of environmental degradation in Africa. As physical geographers raised doubts about the reality of cumulative desertification, historians raised doubts about the reality of deforestation. Others, meanwhile, found evidence for decreasing soil erosion in modern times despite mounting population densities. These views call into question the apocalyptic approach to African environmental history.⁹⁶

One particularly interesting, although not widely influential, approach to African history emphasizes the changing character of climate. Indeed, one historian has called for a periodization of African history based on climate. The climate data are not yet good enough (and may never be) to make this practical, and in any case climatic rhythms probably varied too much from place to place within Africa. Nonetheless, at least on regional scales, and especially in arid and semi-arid environments where changes in rainfall regime are fundamental, climate-centered history has a lot to recommend it. The best examples concern the desert and Sahel belts of West Africa. There wetter and dryer periods have changed the geography of herding and farming, and of the tsetse fly belt; and because the fly can carry a disease fatal to horses, climate shifts meant changing the geography of horsebreeding, and thereby of military and economic power, state- and empire-building, and much else.⁹⁷

African environmental history generally, whether climate-sensitive or not, is often closely related to disease history. Most important diseases in Africa have

95. Richard Grove, *Green Imperialism* (New York: Cambridge University Press, 1995); Peder Anker, *Imperial Ecology: Environmental Order in the British Empire, 1895–1945* (Cambridge, Mass.: Harvard University Press, 2001); Gregory Barton, *Empire Forestry and the Origins of Environmentalism* (Cambridge, Eng.: Cambridge University Press, 2002). A forthcoming book by William Beinart, *The Rise of Conservation in South Africa: Settlers, Livestock, and the Environment, 1770–1950* (Oxford: Oxford University Press, 2003) will carry this much further.

96. James Fairhead and Melissa Leach, *Misreading the African Landscape* (Cambridge, Eng.: Cambridge University Press, 1996); Mary Tiffen, Michael Mortimer and Francis Gichuki, *More People, Less Erosion: Environmental Recovery in Kenya* (Chichester, Eng.: John Wiley, 1994). See also McCann, *Green Land, Brown Land, Black Land*, chapter 5 on the history of Ethiopian forests.

97. George Brooks, *Landlords and Strangers: Ecology, Society, and Trade in West Africa, 1000–1630* (Boulder: Westview, 1993); James Webb, *Desert Frontier: Ecological and Economic Change along the Western Sahel, 1600–1850* (Madison: University of Wisconsin Press, 1995). Webb’s book, like Sumit Guha’s cited in note 65, draws links between environmental change and the formation of ethnic identities.

complex etiologies involving insects, worms, snails, or other creatures, so that changes to the environment often have implications for disease regimes. These, because of the weakness of public health infrastructure in Africa's past (and present), are less subject to human control than elsewhere. A recurrent example concerns trypanosomiasis, or sleeping sickness, communicated to people by the tsetse fly. The fly has strong habitat preferences, so changes both in climate and in human control over vegetation have made big differences in the prevalence of trypanosomiasis.

By and large I think it fair to say that environmental history has made as large an impression on Africanist history as it has anywhere. This is partly due to the conspicuous role of environment and disease in African history, but also to the quality of the work Africanist environmental historians have produced. One frontier they have yet to explore, however, is urban environmental history. Although most (not all) African cities have short histories, in environmental terms they are often dramatic ones.

China

In China, environmental history is at once fully aloft and barely off the ground. The opening of the imperial archives to foreigners in the 1980s presented a windfall which China historians have used to very good effect in social, economic, and environmental history, mainly of the Qing Dynasty (1644–1911). The provincial gazetteers, which in some cases date back to the sixteenth century, sometimes allow detailed reconstruction of climatic, agricultural, and environmental data. Most of the foreign scholars who migrated into environmental history came from economic or social history. While often influenced by the main figures in U.S. environmental history, their approach tends to be more akin to that of European scholars with backgrounds in economic and agrarian history. They have produced some fine works concerning frontier transformation in both South and North China, detailed studies of peasant agriculture and impacts on the land, and careful appreciations of the role of the state in managing the Chinese environment.⁹⁸ As with India and Africa, there is as yet almost no urban environmental history of China, despite the rich possibilities. Post-imperial (after 1911) Chinese environmental history remains understudied, partly because of difficulties of access to relevant materials.⁹⁹ Chinese historians, on the other hand, have only very lately taken to the approaches of environmental history, essentially in the late 1990s, prompted by observation of the conspicuous ongoing environmental deterioration in China and by increased contact with American, European, and Australian historians.¹⁰⁰

98. Robert Marks, *Tigers, Rice, Silk, and Silt: Environment and Economy in Late Imperial South China* (New York: Cambridge University Press, 1998); Peter Perdue, *Exhausting the Earth: State and Peasant in Hunan, 1550–1850* (Cambridge, Mass.: Harvard University Press, 1987); Kenneth Pomeranz, *The Making of a Hinterland* (Berkeley: University of California Press, 1993).

99. But see Shapiro, *Mao's War against Nature*, and the assessments of geographers such as Vaclav Smil, *The Bad Earth: Environmental Degradation in China* (Armonk, N.Y.: M.E. Sharpe, 1984); and Smil, *China's Environmental Crisis* (Armonk, N.Y.: M.E. Sharpe, 1993).

100. Bao Mahong, "Environmental History in China," forthcoming; and Bao Mahong, personal communication. Historical geography, however, has been a strong field within China for some decades.

Japan and France: Environmental History Manqué

Among countries with strong traditions of historical writing, it is in Japan that environmental history has made the smallest impact. While foreign scholars have applied environmental history perspectives to Japanese subjects, Japanese scholars seem not to have done so themselves, despite admirable sophistication in climate, agrarian, and economic history.¹⁰¹

French scholars came only slowly to environmental history. The 1974 issues of *Annales*, as noted above, led nowhere. Some prominent historians such as Alain Corbin wrote about evolving sensibilities towards and perceptions of nature, while Andrée Corvol and her colleagues produced plentiful works on French forests. Others have lately written on water and urban themes; indeed there were a few pioneering works in this vein in the early 1980s.¹⁰² French historians and geographers have of course written stacks of studies of the peasant landscape—which for them has had a totemic quality almost like that of wilderness for Americans—although generally not considering its ecological changes over time. For French historians, the reigning conception has been more *milieu*, (perhaps best rendered as “setting”) than environment in the ecological sense. In addition, the environmental history of the French overseas empire has received only a tiny fraction of the attention accorded the British. Given the extraordinary record of innovation among French historians in recent generations, it is perhaps surprising to see them poorly represented in the ranks of environmental history. But then again, perhaps the stature of the *Annales* group was such that there seemed, for a long time, no point in trying new approaches to geographical and environmental themes. The masters had spoken.¹⁰³

101. I make this judgment tentatively (I don't read Japanese) on the basis of the sources used in English-language works on Japanese history, and on conversations with a tiny sample of Japanese historians. For Japanese environmental history in English, see Conrad Totman, *Green Archipelago: Forestry in Preindustrial Japan* (Berkeley: University of California Press, 1988), which uses a lot of Japanese works on the history of forestry; Totman, *A History of Japan* (Malden, Mass.: Blackwell, 2000), which, although a general textbook, takes an explicitly ecological approach; and Brett Walker, *The Conquest of the Ainu Lands: Ecology and Culture in Japanese Expansion, 1590–1800* (Berkeley: University of California Press, 2001), which owes much to Richard White's approach to cultural and ecological frontiers.

102. Corbin can be sampled in *The Lure of the Sea: The Discovery of the Seaside in the Western World, 1750–1840* (Berkeley: University of California Press, 1994). Among Corvol's many volumes, perhaps the most influential is *L'homme aux bois: histoire des relations de l'homme et de la forêt, XVIIe-XXe siècle* (Paris: Fayard, 1987), but see also: *L'homme et l'arbre sous l'ancien régime* (Paris: Economica, 1984) and her edited book *La Nature en révolution: 1750–1800* (Paris: L'Harmattan, 1993). On water and urban themes: André Guillerme, *Les temps de l'eau: la cité, l'eau et les techniques: nord de la France: fin IIIe-début XIXe siècle* (Paris: Presses Universitaires de France, 1983); Jean-Pierre Gouber, *La conquête de l'eau: l'avènement de la santé à l'âge industriel* (Paris: R. Laffont, 1986); *The Rise of the Networked City in Europe and America*, ed. Joel A. Tarr and Gabriel Dupuy (Philadelphia: Temple University Press, 1988); Gabriel Dupuy, *L'Urbanisme des réseaux* (Paris: Armand Colin, 1991); *Le démon moderne: La pollution dans les sociétés urbaines et industrielles d'Europe*, ed. Genevieve Massard-Guilbaud and Christian Bernhardt (Clermont-Ferrand: Presses de l'UBP, 2002).

103. The answer to this conundrum might also have to do with the flourishing state of historical geography, or perhaps lesser exposure to American influences in France than elsewhere. For ruminations on this theme see Caroline Ford, “Landscape and Environment in French Historical and Geographical Thought: New Directions,” *French Historical Studies* 24 (2001), 125–134. An insightful review of the emergence of French environmental history is Geneviève Massard-Guilbaud, “De la ‘part du milieu’ à l'histoire de l'environnement,” *Le mouvement social* 200 (2002), 64–72.

Russia and the Middle East

Among world regions that remain almost unexplored by environmental historians, native or foreign, the most salient seem to me to be the Slavic world and the Middle East. Historians of Russia (both Russians and foreigners) have yet to go far exploring environmental history approaches,¹⁰⁴ which in Russian history offer tremendous possibilities. Peter the Great commissioned a forest survey of parts of the country, and from the 1730s extremely detailed military maps, with commentaries that amount to cadasters, were drawn up and still exist in Russian archives. Exploiting these and other sources will be painstaking work, to be sure, but the rewards of bringing an environmental approach to Russian history should be sufficiently alluring. The sweep of Russian frontier expansion, the compressed drama of Stalinist industrialization, the grandiose replumbing of Soviet Central Asia among other themes cry out (at least I can hear them) for the attention of environmental historians. From the early Soviet period it was politically dangerous to emphasize natural factors rather than exclusively social ones, so Russian (and after 1948 East European) historians diligently ignored environmental themes in their work. Since 1991 such concerns have vanished, but Russian and East European historians remain devoted to other themes and approaches, as do almost all foreigners working in Russian or Slavic history.

Similarly, in Arab and Ottoman historiography, almost all researchers remain indifferent to the possibilities of environmental history, although not for reasons of political ideology. Arab and Iranian historiography has its share of works on agriculture and irrigation, but few of them take the further step of considering these subjects in the contexts of environmental change generally. One excellent exception is Peter Christensen, *The Decline of Iranshahr*, which follows 2,000 years of agricultural, irrigation, political, and economic history in the region between the Euphrates and the Syr Dar'ya rivers. The rigors of aridity and successive states' demand for surplus production repeatedly led to efforts to squeeze the most out of Mesopotamia and the Iranian plateau, incurring frequent and sometimes durable environmental costs.¹⁰⁵ In the Ottoman case the imperial bureaucracy kept detailed local records, called *defterler*—roughly equivalent to cadasters—that would allow reconstruction of past environments and tracing their changing character over time, like the Chinese imperial provincial gazetteers. These form the basis for Ottoman social and economic history, but have yet to be examined from an ecological standpoint.

104. So I have been told by Doug Weiner and Paul Josephson, whose works are cited above; by Thomas Barrett, who has a chapter on the environmental changes of the Caucasus frontier in his *At the Edge of Empire: The Terek Cossacks and the North Caucasus Frontier, 1700–1860* (Boulder: Westview, 1999); and by Alexei Karimov, the Russian regional representative for the European Society for Environmental History.

105. Peter Christensen, *The Decline of Iranshahr: Irrigation and Environments in the History of the Middle East 500 B.C. to A.D. 1500* (Copenhagen: Museum Tusulanum Press, 1993). Historical geographers have sometimes taken up environmental change, e.g. Xavier de Planhol, "Le déboisement de l'Iran," *Annales de géographie* 78 (1969), 625–635.

VI. GLOBAL SCALE ENVIRONMENTAL HISTORY

This quick *tour d'horizon* of the state of environmental history in various places around the world neglects countless worthy studies, especially the more local ones, which are legion. Of macro-scale studies there are few. The reasons for this are practical more than intellectual. Given the interconnectedness of all parts of the planet in matters ecological, it makes excellent sense to study environmental history on the global scale. But any form of history on that scale is a daunting prospect, and runs counter to the conditioned reflexes (acquired in graduate school) of most historians. For this reason, perhaps, the first global-scale explicitly environmental histories of the world were not written by trained historians.

Leaving aside a pair of giant compendia¹⁰⁶ and several superficial or misbegotten works, the first spate of global environmental histories appeared in 1989–1992, all from Britain. The geographer Ian Simmons wrote two schematic but data-filled studies, and Neil Roberts, Andrew Goudie, and Antoinette Mannion, geographers all, offered three more. These had the look of school texts, but they were the first to try to synthesize the story of global environmental history. Clive Ponting, a former Foreign Office mandarin, penned a caustic lament distinguished by its passion. Stephen Boyden, an Australian, brought the perspectives of energetics and social metabolism to the subject in an unfairly neglected book. Professional historians were nowhere to be found among those taking a crack at global environmental history.¹⁰⁷

A decade later that changed. Almost simultaneously, Joachim Radkau and J. Donald Hughes brought out surveys of world environmental history that were mixtures of narration and analysis in the style familiar to historians.¹⁰⁸ Hughes used a *pointilliste* technique, presenting a picture that emerged from accumulating detail of his case studies each focused on a specific place, whereas Radkau selected large themes—subsistence, colonialism, globalization, for example—around which to organize his story. Radkau's book probably goes further than any other in tying environmental history to the more familiar subjects of macro-scale history.

106. The compendia, both very worthy efforts, are *Man's Role in Changing the Face of the Earth*, ed. William L. Thomas, 2 vols. (Chicago: University of Chicago Press, 1956), which is mainly the work of anthropologists; and *The Earth as Transformed by Human Action: Global and Regional Changes in the Biosphere over the Past 300 Years*, ed. B. L. Turner, William C. Clark, Robert W. Kates, John F. Richards, Jessica T. Matthews, and William B. Meyer (New York: Cambridge University Press, 1990), still the best such volume in existence.

107. Ian Simmons, *Changing the Face of the Earth: Culture, Environment, History* (Oxford: Blackwell, 1989); Simmons, *Environmental History: A Concise Introduction* (Oxford: Blackwell, 1993); Neil Roberts, *The Holocene: An Environmental History* (Oxford: Blackwell, 1989); Andrew Goudie, *The Human Impact on the Natural Environment* (Cambridge, Mass.: MIT Press, 1990); Annette Mannion, *Global Environmental Change: A Natural and Cultural History* (Harlow, Eng.: Longman, 1991); Clive Ponting, *A Green History of the World* (London: Sinclair-Stevenson, 1991); Stephen Boyden, *Biohistory: The Interplay between Human Society and the Biosphere* (Paris: UNESCO, 1992). Simmons submitted his 1993 book under a different title only to have it rechristened by the publisher, which thought that the words “environmental history” in the title would enhance interest in the book.

108. Joachim Radkau, *Natur und Macht: Eine Weltgeschichte der Umwelt* (Munich: Beck, 2000); J. Donald Hughes, *An Environmental History of the World: Humankind's Changing Role in the Community of Life* (London and New York: Routledge, 2001). See also Sverker Sörlin and Anders Öckerman, *Jorden en ö: En global miljöhistoria* (Stockholm: Bokförlaget Natur och Kultur, 1998), a compact survey of chiefly modern environmental history.

Historians were not alone in following the geographers into global-scale environmental history. Sociologists jumped in too. Sing Chew employed a modified world-systems perspective (see below) in arguing that ecological degradation is among the consequences of core–periphery inequalities. And Bert de Vries and Johan Goudsblom, with (mainly Dutch) colleagues from several natural science disciplines, focused on continuities and transitions in the human career on earth, emphasizing the growing complexity of society and of society–environment linkages.¹⁰⁹ Each of these books attempts to illuminate the environmental history of the globe at least since the dawn of civilization, and in most cases from well before that.

Somewhat less ambitious are two global environmental histories that take on limited slices of time. John Richards, *The Unending Frontier*, tackles the centuries between 1500 and 1800, a globalizing era in which markets and states organized resource use and extraction frontiers all over the world. This is a challenging book that should help historians of the early modern era, whether of Europe or China or Latin America, see their subject in a new light.¹¹⁰ I tried to synthesize the environmental trajectories of the twentieth century, and their social, economic, and political roots.¹¹¹ The nineteenth century, so pivotal because of industrialization and the new linkages it forged, awaits a global environmental treatment.

Just as historians have produced world histories of single themes, such as slavery or war or salt, environmental historians have lately written massive global-scale studies of deforestation and of fire through the ages.¹¹² And, although confined chiefly to the last century, the first global studies of environmentalism as a social and political movement have appeared, both slender volumes that only sketch the structure of their subjects.¹¹³ Perhaps the best-known among the thematically defined global-scale environmental histories is Alfred Crosby's

109. Sing Chew, *World Ecological Degradation: Accumulation, Urbanization, Deforestation, 3000B.C.–A.D. 2000* (Walnut Creek, Calif.: AltaMira Press, 2001). Chew's sweep is somewhat less than global, as he proceeds from Mesopotamian and Indus valley civilizations to Mediterranean to European hegemonies, with only one chapter, mainly about China, on anything else. The organization is reminiscent of Western civilization books. *Mappae Mundi: Humans and their Habitats in a Long-Term Socio-Ecological Perspective*, ed. B. de Vries and J. Goudsblom (Amsterdam: Amsterdam University Press, 2002).

110. John Richards, *The Unending Frontier: An Environmental History of the Early Modern World* (Berkeley: University of California Press, 2003).

111. J. R. McNeill, *Something New Under the Sun: An Environmental History of the 20th-century World* (New York: Norton, 2000).

112. Michael Williams, *Deforesting the Earth: From Prehistory to Global Crisis* (Chicago: University of Chicago Press, 2003). Williams is by training a geographer but I hope he would not reject the title of environmental historian; Stephen Pyne, *World Fire: The Culture of Fire on Earth* (Seattle: University of Washington Press, 1995). See also Pyne's *Vestal Fire: An Environmental History, Told through Fire, of Europe and Europe's Encounter with the World* (Seattle: University of Washington Press, 1997), and *Fire: A Brief History* (Seattle University of Washington Press, 2001). In less flamboyant prose than Pyne prefers, there is the very useful *Fire and Civilization* (New York: Penguin U.S.A., 1995) by Johan Goudsblom.

113. Ramachandra Guha, *Environmentalism: A Global History* (New York: Longman, 2000); John McCormick, *Reclaiming Paradise: The Global Environmental Movement* (Bloomington: Indiana University Press, 1989).

Ecological Imperialism.¹¹⁴ It concerned the biological dimensions of European success at establishing settlement colonies, encompassing disease pathogens, food and fiber crops, domestic animals, and even weeds. It contains one of the most elegant arguments found anywhere in environmental history, to the effect that European imperial success resulted in part from the unconscious teamwork among the biota Europeans brought with them to places such as New Zealand, Australia, Argentina, and (most of) North America. Some readers felt that Crosby had relocated historical agency (and responsibility for genocide and colonialism) from humans to wheat and whooping cough, a species of critique often launched at environmental history (see below).

VII. REGIONAL-SCALE ENVIRONMENTAL HISTORY

Global-scale studies, even of single themes, must inevitably be superficial even if they succeed in providing a sense of the whole. Not so the regional synthesis. So far the most successful of these have been two large anthologies, one on China and East Asia and the other on India, South, and Southeast Asia.¹¹⁵ These include synoptic essays and many more local or thematic pieces, so that each serves as the foundation for environmental history for its part of the world. Dutch scholars have prepared a similar volume for the Indonesian archipelago.¹¹⁶ But works of equal scope and depth do not exist yet for Africa, Europe,¹¹⁷ or the Americas. James McCann's *Green Land, Brown Land, Black Land* is the most synoptic approach yet to African environmental history. It is a useful but slender overview more than an in-depth treatment.¹¹⁸

World regions of course may be defined by seas and oceans rather than continents. So far environmental historians have not gone far in this direction. While there is, for example, a burgeoning literature in the history of the Atlantic world, no one has tried to write the environmental side of that story. The Indian Ocean world, probably the most coherent of all the oceanic spaces,¹¹⁹ has yet to be assessed in its environmental dimensions, whereas the

114. Alfred Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900–1900* (New York: Cambridge University Press, 1986). Crosby had earlier explored questions of biological exchange and biological invasion in *The Columbian Exchange*.

115. *Sediments of Time: Environment and Society in Chinese History*, ed. Mark Elvin and Ts'ui-jung Liu (New York: Cambridge, 1998); *Nature and the Orient: The Environmental History of South and Southeast Asia*, ed. Richard Grove, Vinita Damodaran, and Satpal Sangwan (Delhi: Oxford University Press, 1998).

116. *Paper Landscapes: Explorations in the Environmental History of Indonesia*, ed. Peter Boomgaard, Freek Colombijn, and David Henley (Leiden: KITLV Press, 1997).

117. But see *The Silent Countdown: Essays in European Environmental History*, ed. Peter Brimblecombe and Christian Pfister (Berlin: Springer Verlag, 1990) an early collection that still stands as the best general introduction to European environmental history; and Robert Delort and François Walter, *Histoire de l'environnement européen* (Paris: Presses Universitaires de France, 2001).

118. McCann, *Green Land, Brown Land, Black Land*. A forthcoming volume to watch for is *Social History and African Environments*, ed. William Beinart and JoAnn McGregor (Athens: Ohio University Press, 2003). See also the collection of environmental history papers in *Journal of Southern African Studies* 26 (2000), 595-871.

119. K. N. Chaudhuri, *Asia before Europe: Economy and Civilisation of the Indian Ocean from the Rise of Islam to 1750* (Cambridge, Eng.: Cambridge University Press, 1990); Rene Barendse, *The Arabian Seas: The Indian Ocean World of the Seventeenth Century* (Armonk, N.Y.: M.E. Sharpe, 2002).

Pacific, the least coherent, has inspired a few efforts.¹²⁰ Among sea basins, the Mediterranean is the best served,¹²¹ but several scholars are now working on the Baltic.

VIII. ISSUES IN ENVIRONMENTAL HISTORY

As with some other historical genres, environmental history derived much of its early impetus from political orientations and commitments. Many historians wanted some sort of moral engagement, some sense that they were contributing to the betterment of society. Much of the early work sought to emphasize that the world that we have is not the only one we might have, that other roads might have been taken, and by implication might yet be taken still. Various more ecologically benign societies than our own were located, sometimes rather fancifully, in the past. This political engagement seems to have declined sharply in the U.S. and Europe, while still surviving in India and Latin America. I am not sure just why. Perhaps it partly a matter of the rise of a younger generation in America and Europe less animated by the initial enthusiasms of the 1960s–1970s environmental movement. Perhaps as environmental history has grown more scientifically sophisticated it has grown more neutral in tone. Perhaps some of it, in the U.S. at least, has to do with the firestorm that followed when in 1995 William Cronon explained that there really isn't any wilderness in America, that all ecosystems betray signs of greater or lesser human impact, that the American cult of wilderness is based on misunderstanding.¹²² This struck some as treason to the environmental cause, because it could easily be appropriated by supporters of logging, mining, urban sprawl, and so forth as legitimating further human modification of the environment.¹²³ But my impression is that labor history, social history, and history in general in the U.S. and Europe are less informed by political commitment today than twenty-five years ago. If so, then environmental history may merely be drifting with the tide.

120. Patrick Nunn, *Environmental Change in the Pacific Basin: Chronologies, Causes, and Consequences* (Chichester, Eng. and New York: Wiley, 1999), the work of a geographer in which humans figure only in the latter chapters; *Environmental History in the Pacific World*, ed. J. R. McNeill (Aldershot, Eng.: Ashgate, 2001), which tries to deal with circum-Pacific as well as the islands; Judith Bennett of the University of Otago is preparing an environmental history of World War II in the Pacific. Not explicitly environmental history, but containing a lot of relevant material is Patrick V. Kirch, *On the Road of the Winds: An Archeological History of the Pacific Islands before European Contact* (Berkeley: University of California Press, 2000).

121. Russell Meiggs, *Trees and Timber in the Ancient World* (Oxford: Clarendon Press, 1982) is not conceived as an environmental history but has plenty of material on changes in forests. More explicitly within the genre is J. Donald Hughes, *Pan's Travail: Environmental Problems of the Ancient Greeks and Romans* (Baltimore: Johns Hopkins University Press, 1994); J. V. Thirgood, *Man and the Mediterranean Forest* (London: Academic Press, 1981); J. R. McNeill, *The Mountains of the Mediterranean World: An Environmental History* (New York: Cambridge University Press, 1992); A. T. Grove and Oliver Rackham, *The Nature of Mediterranean Europe: An Ecological History* (New Haven: Yale University Press, 2001).

122. William Cronon, "The Trouble with Wilderness: Or, Getting Back to the Wrong Nature," in Cronon, ed., *Uncommon Ground: Toward Reinventing Nature* (New York: Norton, 1995), 69-90.

123. See the critiques in *Environmental History* 1 (1996), 29-47. A brief review of the flap appears in Char Miller, "An Open Field," *Pacific Historical Review* 70 (2001), 71-73.

One issue that environmental historians have not systematically confronted is that of scale. The historical profession has had for over 100 years a strong tendency to use the nation-state as its preferred unit of analysis. Bureaucratic states were good record-keepers, and maintained archives. But for many sorts of history, including most environmental history, the nation-state is the wrong scale on which to operate. Ecological processes unfold with no regard for borders, and cultural/intellectual trends do so nearly as blithely. The only variety of environmental history for which the nation-state format makes sense is political and policy history. An exception of sorts could be made for island countries, where ecological connections to the wider world are less prominent, especially if the ecological uniformity of the national territory is high. An environmental history of Iceland, or New Zealand,¹²⁴ would be much more logical than one of Germany or Bolivia. But even Iceland and New Zealand had, and have, their ecological (and social, economic, and political) links to other lands. The choice of a scale appropriate to the subject is one that always needs careful consideration. Environmental historians, by virtue of occasionally rubbing shoulders with geographers, who are acutely conscious of issues of scale, are among the best positioned to lead the historical profession away from its reliance on the nation-state format. History can usefully be written on any scale, from the most micro to the global (and beyond!).¹²⁵

A criticism sometimes leveled at environmental history is that its narratives are relentlessly depressing accounts of environmental destruction: just one damn decline after another. Within the community of environmental history, this is sometimes known as the “declensionist” tendency, and is occasionally the subject of self-searching lament. I regard the criticism as misplaced. For one thing, military history, which includes ample accounts of carnage and bumbling, is often made interesting and even uplifting. Even histories of slaughter and genocide attract plentiful readers. So deeply depressing subject matter can still be fashioned into compelling history. For another, environmental history, especially of the industrial world, contains some very cheerful developments. The provision of clean drinking water and sanitation for several hundred million people since 1880 is an environmental success story that revolutionized the human condition, especially city life. Urban air quality (in the industrial world) also improved markedly in the six decades after 1940.¹²⁶ It may be that urban environmental history,

124. A useful collection does exist for New Zealand: *Environmental Histories of New Zealand*, ed. Eric Pawson and Tom Brooking (Melbourne: Oxford University Press, 2002).

125. David Christian, *Maps of Time: An Introduction to Big History* (Berkeley: University of California Press, 2004 forthcoming); Fred Spier, *The Structure of Big History* (Amsterdam: University of Amsterdam Press, 1996).

126. Urban sanitation and air quality history of the industrial world may be sampled in: *Environmental Problems of European Cities of the 19th and 20th Centuries*, ed. Christoph Bernhardt (Münster: Waxmann, 2000); Christopher Hamlin, *Public Health and Social Justice in the Age of Chadwick: Britain, 1800–1854* (Cambridge, Eng.: Cambridge University Press, 1998); Bill Luckin, *Pollution and Control: A Social History of the Thames in the Nineteenth Century* (Bristol, Eng.: Hilger, 1986); Martin Melosi, *Pollution and Reform in American Cities, 1870–1930* (Austin: University of Texas Press, 1980); Melosi, *The Sanitary City* (Baltimore: Johns Hopkins University Press, 2000); Dale Porter, *The Thames Embankment: Environment, Technology and Society in Victorian London* (Akron: University of Akron Press, 1998); John von Simson, *Kanalisation und*

given time, will dilute this declensionist tendency. The most cheerful environmental history that has yet come to my notice, *The Greening of Georgia*, by R. Harold Brown, rests only partly on urban trends.¹²⁷ Brown sees much to be thankful for in the recent history of Georgia's wildlife and soils too (whether he is justified in this I cannot say). And, as noted above, historians have lately provided an interpretation of African landscapes that emphasizes successful human management and poses a stern challenge to former declensionist views.

Environmental history often arouses the indignation of readers who think that it leaves out people, or reduces them to abstractions. Human agency disappears into the shadows, while climate, or viruses, or technology hog the spotlight. This is true of some environmental history, generally including my own, although many other environmental historians write with flesh-and-blood individuals dominating the stage.¹²⁸ It is of course not merely environmental history that can be written this way. Anything conceived in the "anonymous social forces" vein has the same flavor. Some of the *Annaliste* historians regarded this as a virtue and aspired to write *histoire sans noms*. The issue is connected to that of scale. Environmental history on the small scale, like social history, can be written from the bottom up, with real people in the foreground. But macro-scale environmental history inevitably tends to emphasize processes and forces, both cultural and natural, rather than the doings and fates of individuals. In any case, environmental history ought to give us a dose of humility: we ought to accept that we are only one species among many, and should gracefully share top billing at times with bison, tsetse flies, and El Niño.

IX. SOCIAL THEORY AND ENVIRONMENTAL HISTORY

As Ernest Gellner once put it, academia has disciplines with rigorous theory that do not correspond to reality, and disciplines that while corresponding to reality lack rigorous theory. Historians in general are thin on theory. In the eyes of many social-science colleagues, this often appears a limitation, although doubtless most historians prefer it this way, and many became historians as refugees from rigorous theory.

Städthygiene im 19. Jahrhundert (Düsseldorf: VDI Verlag, 1983); Joel Tarr, *The Search for the Ultimate Sink: Urban Pollution in Historical Perspective* (Akron: University of Akron Press, 1996); David Stradling, *Smokestacks and Progressives: Environmentalists, Engineers, and Air Quality in America, 1881–1951* (Baltimore: Johns Hopkins University Press, 1999); Stephen Mosely, *The Chimney of the World: A History of Smoke Pollution in Victorian and Edwardian Manchester* (Cambridge, Eng.: White Horse Press, 2001); Peter Brimblecombe, *The Big Smoke: A History of Air Pollution in London since Medieval Times* (London: Methuen, 1987).

127. *The Greening of Georgia: The Improvement of the Environment in the Twentieth Century* (Macon: Mercer University Press, 2002). Books that use historical data to argue for general environmental improvement in recent decades, at least in the industrial world, include Gregg Easterbrook, *A Moment on Earth: The Coming Age of Environmental Optimism* (New York: Viking, 1995); Bjørn Lomborg, *The Skeptical Environmentalist: Measuring the Real State of the World* (Cambridge, Eng.: Cambridge University Press, 2001); Jack Hollander, *The Real Environmental Crisis* (Berkeley: University of California Press, 2003). None of these three is satisfactory as a history of environmental improvements, and Lomborg's book has attracted sharp (and to my mind mainly justified) criticism.

128. An example is Worster's *Dust Bowl*.

Very few environmental historians have explicitly tried to build theories. Their efforts tend, perhaps necessarily, to be ahistorical formulas aiming to describe the character of nature/society relationships. The most cogent was probably the one elaborated in slightly different versions by both Donald Worster and Arthur McEvoy, in which nature itself, the economy, and human ideas and images of nature form the three building blocks of environmental history. McEvoy sometimes represented this as a triangle, with ecology, production, and cognition at the corners, each one interacting with the others.¹²⁹ To colleagues in the social sciences, this hardly counts as theory. It has no predictive capacity, and by explaining everything in general it explains nothing in particular. In any case, they have sparked no groundswells of enthusiasm nor attracted sizable schools of followers. More influential have been mere models of how to do environmental history. For example Cronon's *Changes in the Land* inspired direct imitation.¹³⁰ Richard White's concept of "middle ground," which he developed in the context of Native American–white relations in North America, struck historians of Japan and medieval Austria as useful for their own studies.¹³¹ Like historians in general, environmental historians have done little to advance the cause of social theory. Perhaps their greatest contribution to date has been (implicitly) to challenge social theory to take nature more fully into account.

In the social sciences, probably the most influential theoretical stance during the lifetime of environmental history has been world-systems theory elaborated by Immanuel Wallerstein among others. It may no longer enjoy the cachet it had in the late 1970s and 1980s, but it still has legions of scholars, especially in sociology, anthropology, and history, but also in geography, contentedly working within its confines. Wallerstein himself was not blind to ecological change, at least with respect to what he regarded as the crisis of feudalism in sixteenth-century Europe. Soil exhaustion and forest depletion played roles in exposing the contradictions of feudal agriculture. But environmental change mattered only occasionally in his scheme of things, and insufficiently for some tastes. More recently, Sing Chew (a sociologist) explicitly sought to recognize the ecological

129. Barbara Leibhardt, "Interpretation and Causal Analysis: Theories in Environmental History," *Environmental Review* 12 (1987), 23-36; Carolyn Merchant, "The Theoretical Structure of Ecological Revolutions," *Environmental Review* 11 (1987), 265-74; Arthur McEvoy, "Toward an Interactive Theory of Nature and Culture: Ecology, Production, and Cognition in the California Fishing Industry," in *The Ends of the Earth: Perspectives on Modern Environmental History*, ed. Donald Worster (New York: Cambridge University Press, 1988), 211-229; McEvoy, *The Fisherman's Problem: Ecology and Law in the California Fisheries, 1850-1980* (New York: Cambridge University Press, 1986); Donald Worster, *History as Natural History: An Essay on Theory and Method*, *Pacific Historical Review* 53 (1984), 1-19; Worster, "Doing Environmental History," in Worster, ed., *The Ends of the Earth*, 289-307.

130. William Cronon, *Changes in the Land: Indians, Colonists, and the Ecology of New England* (New York: Hill and Wang, 1983); Timothy Silver, *A New Face on the Countryside: Indians, Colonists, and Slaves in the South Atlantic Forests, 1500-1800* (New York: Cambridge University Press, 1990).

131. Richard White, *The Middle Ground: Indians, Empires, and Republics in the Great Lakes Region, 1650-1815* (New York: Cambridge University Press, 1991); Brett Walker, *The Conquest of the Ainu Lands: Ecology and Culture in Japanese Expansion, 1590-1800* (Berkeley: University of California Press, 2001). Christoph Sonnlecher is preparing a book on medieval Central European environmental history that will employ White's concept.

dimensions of world-systems history, and Jason Moore (a geographer) attempted to inform world environmental history with a modified world-systems theory.¹³²

So far these brave efforts—and they are very new—seem to me to have foundered because the theoretical framework, derived exclusively from non-environmental history, includes features that are hard to square with the rhythms and patterns of nature. For example, world-systems theory relies on cycles of economic expansion and contraction. These are sometimes of about fifty years' duration (borrowed from the economists' Kondratieff cycles), sometimes as long as 300 years, depending on whether one follows Wallerstein or other apostles of world-systems theory. How can one harmonize this outlook with the rhythms of climate change, which in any case are not uniform around the world, and are surely quite independent from any economic cycles that may derive from human affairs? How can one account for the effects of a random introduction of pathogens or weeds to a new community or landscape? As I see it, environmental history has too much chaos in it to accommodate comfortably the prescribed rhythms of world-systems history. Ecology involves complex overlapping systems that evolve, and affect human affairs, on their own schedules. Folding that into world-systems theory remains an unmet challenge.

A second major theoretical development in the social sciences during the lifetime of environmental history is gender theory. This too has numerous incarnations (I am inexpert in all of them). It has made limited headway in environmental history, although probably more than has world-systems theory. The initial point of entry for gender theory into environmental history was the simple adoption of ecofeminism, which posits that women are especially close to nature and endowed with a special capacity to appreciate and live harmoniously with it; that male quests to dominate nature are linked to oppression of women.¹³³ Historically-minded ecofeminism usually posits a golden age in which women were not yet devalued and various forces of modernity had not yet despoiled nature. Sometimes this is located in early neolithic southwest Asia, where goddess-worship and fertility cults supposedly indicate society exhibiting neither patriarchy nor ecological vandalism. This is a variant of the indigenous people as ecological angel idea, and one which is equally implausible.¹³⁴ Carolyn Merchant has offered a more formal theory that tries to take gender into account, and which avoids the notion that women are inherently closer to nature. It adds another variable to that of the Worster-McEvoy trio, inserting reproduction (meaning both human biological and social reproduc-

132. Sing Chew, *World Ecological Degradation: Accumulation, Urbanization, and Deforestation, 3000 B.C.–A.D. 2000* (Walnut Creek CA: AltaMira Press, 2001); Jason Moore, "The Modern World-System as Environmental History? Ecology and the Rise of Capitalism," *Theory and Society* 32 (2003), 307-377. Publications arising from a conference at Lund University in Sweden (September 2003) will further explore possible links between environmental history and world-systems theory.

133. The term ecofeminism was popularized, and possibly invented, by the literary scholar and novelist Françoise d'Eaubonne, *Le Féminisme ou le mort* (Paris: Horay, 1974).

134. A critique of the romantic simplicities of ecofeminist history is Melissa Leach and Cathy Green, "Gender and Environmental History: From Representation of Women and Nature to Gender Analysis of Ecology and Politics," *Environment and History* 3 (1997), 343-370. Leach and Green do a better job of undermining ecofeminist history than of showing how gender can usefully be employed in environmental history.

tion and non-human biological reproduction) into the mix.¹³⁵ Whatever the merits of this scheme, it has not attracted wide imitation within environmental history. The signal contribution, I think, of Merchant (and others) is to insist that historians consider the variable experiences of males and females, which is not so much a theoretical stance as a statement of obvious, if often neglected, logic.¹³⁶

X. ENVIRONMENTAL HISTORY AND THE NATURAL SCIENCES

Since its emergence in the 1970s, environmental history has struggled to keep abreast of the changes in the natural sciences. On the whole, environmental historians have acquired an estimable scientific sophistication when dealing with pollution or population, if rarely enough to satisfy experts in those fields. Although interesting developments have emerged in astronomy, neurology, information science, and a dozen other fields, it is in biology and what is now called earth system science that environmental history finds the most grist for its mills. And those two have been among the most rapidly evolving of the natural sciences.

In biology by far the most important development over the past thirty years has been the flourishing of microbiology and genetics in particular. So far this has had a very limited effect upon environmental history, partly because microbiology is not something one can swot up in a few days. The most obvious potential here lies with the use of genetic evidence to reconstruct patterns of migration and settlement from the distant past. Genomic analysis is also producing new data and conclusions concerning the antiquity of various diseases among certain human populations. This is a new frontier of research that promises to yield useful information for environmental historians, and historians in general.¹³⁷

A less momentous development in the biological sciences, but one with direct relevance to environmental history, is the gradual rejection of the notion of ecological climax. Formerly, ecologists believed that a given ecosystem or landscape tended toward a specific state, and once there remained there until disturbed somehow—after which it would again tend toward its climax vegetation. This notion fit well with the outlook of some environmental historians, especially those working within the declensionist framework. But from the 1970s, ecologists increasingly adopted a historical rather than cyclical view of their subject, recognizing contingency and chance and de-emphasizing the notion of pre-ordained paths of succession. Environmental historians may have helped, in a small way, to undermine the notion of climax in ecology. The new understanding raises intellectual and political problems for the environmental movements that have staked out positions in terms of presumably pristine lands where “every

135. Merchant's theoretical construct is presented in chapter 1 of *Ecological Revolutions: Nature, Gender, and Science in New England* (Chapel Hill: University of North Carolina Press, 1989).

136. A book that shows how this can be done is Nancy Jacobs, *Environment, Power, and Injustice: A South African History* (New York: Cambridge University Press, 2003); another is Stradling, *Smokestacks and Progressives*.

137. L. L. Cavalli-Sforza, *Genes, Peoples, and Languages* (Berkeley: University of California Press, 2001); Elizabeth Carniel of the Institut Pasteur and her colleagues are doing genomic analysis of the plague pathogen *Yersinia pestis*, and tentatively conclude that the infection in its current genetic form is about 1,500 years old.

prospect pleases and only man is vile.”¹³⁸ If landscapes and ecology are always changing then what is the logic of preservation? Why should one prefer one condition over another? There are, in fact, good answers to such questions, but they complicate the message of environmentalists, especially in the U.S., where popular notions of pristine landscapes long held sway.

In earth system science the most relevant developments for environmental history have probably been those in climatology. I mentioned above the decipherment of the global influence of El Niño, which historians have begun to absorb and relate to economic and political events. Beyond that, the climatologists and atmospheric scientists have detected important human impacts in the form of depletion of stratospheric ozone (which protects life on earth from ultraviolet-B radiation) and in climate change. The warming of the past century or so is widely held to be the result of human actions, chiefly the combustion of carbon-rich fossil fuels and the burning of forests. These scientific findings have begun to focus the attention of some environmental historians on otherwise uninteresting and esoteric things such as chlorofluorocarbons (the destroyers of stratospheric ozone) and the carbon content of various forms of coal.¹³⁹

Applied science too has evolved in directions of interest to environmental historians, especially in its impact upon archeology. In the last twenty years or so the techniques available in archeology have become remarkably sophisticated, and allow new questions to be asked and answered. The geo-archives of the earth itself, and the bio-archives of human remains, for example, are open for consultation as never before.¹⁴⁰ These archives are most often used to help with questions pertaining to the deep past, for which textual evidence is nil or slim, but can also help with the environmental history of the twentieth century. I will mention only two examples.

Palynology, the science of pollen analysis, was developed many decades ago but recently acquired new precision. The relative quantities of various sorts of pollen often makes it easy (if laborious) to detect the arrival of agriculture in a given region, or of specific crops, or the onset of an era of deforestation. Similarly, it is usually simple to recognize land abandonment. In favorable circumstances it is possible to study annual variations of pollen in sediments (usually in lakes or bogs), giving information about changing vegetation patterns and even about the success and failure of harvests. Such high-resolution pollen analysis also provides proxy evidence for weather conditions from year to year. Environmental historians sometimes do, but more often do not, consult the work of palynologists when considering changes in vegetation history. Unfortunately palynology is expensive; historians’ research budgets cannot accommodate the commissioning of palynologists, so they will have to make do with what palynologists undertake of their own accord.

138. This familiar verse comes from a hymn composed by Reginald Heber in 1819 and captures something of the Romantic sensibilities of his time.

139. J. R. McNeill, *Something New Under the Sun: An Environmental History of the 20th-century World* (New York: Norton, 2000), 108-115.

140. This statement must be qualified for the U.S., where courts, respecting religious sensibilities, lately have awarded custody of human remains of earlier generations of Native Americans to current Native Americans, which in practice means they are rarely available for scientific study.

The study of strontium/calcium ratios in human teeth, a method developed since the early 1980s, allows reconstruction of diets among past populations. It can, for example, indicate the ages at which children were weaned, allowing inferences about birth spacing and fertility rates. In favorable circumstances it can even indicate migration patterns among a given population, because the crowns of one's teeth, once formed, are stable and give clues to the chemical character of the food eaten between ages three and twenty, and to the soils in which that food was grown. Soils from different regions have different "signatures" which appear in the crowns. In centuries when most people ate locally-grown food they developed clearer signatures than we have today (at least those of us who eat food produced on several continents). This allows the detection of likely migrants among a given population, and could reveal the emergence or disappearance of trade routes involving foodstuffs. There are several other ways in which applied science has enriched archeology of late, many of which shed light on questions environmental historians would like to answer, but, if faithfully wed to textual evidence, might never think to ask.

XI. PATHS NOT (MUCH) TAKEN

It may be, as I have claimed, that environmental history has begun to reap some of the benefits of maturation. But it still has a number of unexplored frontiers, dark islands if not dark continents. Some of these I have mentioned above: neglect of the military dimensions of human affairs, of Russia, and of southwest Asia. Beyond these there are some other dark islands for historians to explore.

One is soils history. It seems curious that the earth itself should not absorb much attention from environmental historians. They have sometimes focused on soil erosion, but the history of soils requires much more than that. The chemistry and biology of soil fertility is always changing, partly due to human activity, and it always affects human prospects, wherever farming is pursued.¹⁴¹ The environmental history of mining too seems to get less than its due; its ecological significance for Mexico, the Andes, Central Europe, or South Africa—where gold mines reach eight kilometers down into the earth—seems to warrant the sort of attention lavished on the labor history of mining.¹⁴² Social historians for a generation have called for, and provided, what they call "history from the bottom up," meaning beginning with the experience of ordinary people at the bottom of social pyramids. For environmental historians, history from the bottom up might begin with the soil and its history, for that is the real substrate of human affairs over the past few thousand years.

The environmental effects of human migrations also deserve more scrutiny. One of the respects in which ideas and culture most matter, it seems to me, is in

141. On the U.S., there is Steven Stoll, *Larding the Lean Earth: Soil and Society in Nineteenth-century America* (New York: Hill and Wang, 2003), which is an overview based on a few local cases. A general work, still worth consulting, is Edward Hyams, *Soil and Civilization* (New York: Harper & Row, 1975). Hyams was a polymath who wrote about terrorism, Proudhon, the Incas, and sundry other subjects.

142. But see Duane A. Smith, *Mining America: The Industry and the Environment, 1800–1980* (Lawrence: University of Kansas Press, 1987).

shaping the behavior of migrants who travel from one ecosystem to another, carrying in their heads knowledge and beliefs about, for example, agriculture that were formed in one context but are then transplanted to another. Crosby, despite his attention to intercontinental migration, did not have much to say about the transplanting of agronomic practice. What were the effects of Chinese agricultural practices carried by migrants to the Mongolian steppe? Or of Angolan slaves to Brazil? Or of Japanese peasants to California?

Lastly, the field of environmental history maintains a terrestrial bias. Aquatic ecosystems have received very scant attention. Admittedly it is often harder to collect historical data about fish or coral reefs than about trees or pastures. And environmental thinkers and writers, not to mention law and policy, have always had more to say about the land than the sea. But it is feasible, especially for the last century or so, to piece together a picture of the evolving aquatic biota and pollution regimes in some bodies of water. So far rivers have attracted more in-depth treatment from historians than lakes and seas,¹⁴³ but that may change. A large-scale research project, anchored in Denmark, is trying to reconstruct the population history of various marine species, working from fish-catch records, archeological remains, and anything else that might be useful.¹⁴⁴

No doubt there are a hundred or a thousand other subjects in environmental history in search of an author. The above is no more than a list of the books I wish someone would write.

XII. CONCLUSION

The heretical sect of economists who work in ecological economics sometimes calls for an economics “as if nature existed.” Environmental history pleads for recognition that nature not only exists, but changes. Moreover it changes both of its own accord and on account of human actions, and in so doing changes the context in which human history unfolds. The historiography of environmental history, while of course uneven around the world and with respect to various themes, has grown like a weed in the past twenty-five years, to the point where no mortal can keep pace with it. It can claim with justice to have become one of the most vital sub-fields within the historical discipline, at least in a handful of countries. Despite the challenges that it poses for mainstream history (insofar as there is any single such thing), it has in most instances received a benign recep-

143. Mark Cioc, *The Rhine: An Eco-biography, 1815–2000* (Seattle: University of Washington Press, 2002); Bill Luckin, *Pollution and Control: A Social History of the Thames in the Nineteenth Century* (London: Hilger, 1986); Philip Fradkin, *A River No More: The Colorado River and the West* (Berkeley: University of California Press, 1996); Richard White, *The Organic Machine: The Remaking of the Columbia River* (New York: Hill and Wang, 1996); Theodore Steinberg, *Nature Incorporated: Industrialization and the Waters of New England* (New York: Cambridge University Press, 1991); John Afinson, *The River We Have Wrought: A History of the Upper Mississippi* (Minneapolis: University of Minnesota Press, 2003); Matthew Evenden, *Fish vs. Power: An Environmental History of the Fraser River* (New York: Cambridge University Press, 2004 forthcoming).

144. See *The Exploited Seas: New Directions for Marine Environmental History*, ed. Poul Holm, Tim Smith, and David Starkey (St. John’s, Newfoundland: International Maritime Economic History Association, 2001); also see Tom Andersen, *This Fine Piece of Water: An Environmental History of Long Island Sound* (New Haven: Yale University Press, 2002).

tion, and begun to influence the broader discipline. This is evident, among other places, in the college textbooks prepared for the U.S. market, which increasingly include snippets of environmental history. The future of environmental history appears robust, to judge from the age of the participants at conferences.¹⁴⁵ All this is cause for celebration: in general terms because it is an indication of the continuing vitality of professional history, and specifically for environmental historians, because their work has achieved some recognition within their profession (and from the broader public as well). Environmental history is here to stay.

The ultimate reason that it is here to stay offers less cause for celebration. Interest in environmental history depends, in large part, on anxiety about contemporary social problems. In the same way that labor history and women's history acquired new momentum when social upheavals a generation ago emphasized issues of class and gender, environmental history drew its initial momentum from ecological concerns abroad in society. It is less political and partisan now, by and large, than it was in its infancy. But its ability to continue to attract young historians, and its ability to command attention from historians generally, will always rest on the relevance of environmental issues to society at large.

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APPENDIX

The literature in environmental history can most conveniently be approached through a small handful of websites that consist mainly of bibliographies, some of them easily searchable. I recommend:

<http://www.esenvironmentalhistory.org/bibliography.html>

<http://www.lib.duke.edu/forest/biblio.html>

<http://www.stanford.edu/group/LAENVIRONMENTALHISTORY/>

<http://www.h-net.org/~environ/historiography/ausbib.htm>

(all accessed September 16, 2003)

145. The evidence for this assertion I confess is strictly anecdotal. At the AHA meetings the proportion of the gray-headed seems roughly five times as high as at the ASEH or ESEH meetings.