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Pawson, Eric; Christensen, Andreas Aagaard

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Eric Pawson

University of Canterbury

[eric.pawson@canterbury.ac.nz](mailto:eric.pawson@canterbury.ac.nz)

Andreas Aagaard Christensen

University of Copenhagen

[anaach@ign.ku.dk](mailto:anaach@ign.ku.dk)

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### **Abstract:**

Environmental history is an interdisciplinary pursuit that has developed as a form of conscience to counter an increasingly powerful, forward-looking liberal theory of the environment. It deals with the relations between environmental ideas and materialities, from the work of the geographers George Perkins Marsh, Carl Sauer, and Clarence Glacken, to more recent global-scale assessments of the impact of the “great acceleration” since 1950. Today’s “runaway world” paradoxically embraces risk management in an attempt to determine its own future whilst generating a whole new category of “manufactured risks”. These are exposed by environmental history’s focus on long-run analysis and its narrative form that identifies the stories that we tell ourselves about nature. How a better understanding of past environmental transformations helps to analyse society and agency, and what this can mean for solutions and policies, is the agenda for an engaged environmental history from now on.

### **Introduction**

The term “environmental history” has come into widespread use since the 1970s, initially amongst historians in the United States, and more recently in continental Europe and elsewhere. The first World Congress in Environmental History was held at Copenhagen in Denmark in 2009 to explore “the historic

relationship of people and the environment over time". The breadth of this ambition indicates that the practice of environmental history cannot be, and never has been, the purview of one discipline, and arguably history itself came late to the scene. Rather environmental history is an interdisciplinary pursuit, with roots in geographical writing and contributions from a wide range of other subjects, such as anthropology, ecology, ecological economics, and environmental philosophy. It has developed as a form of environmental conscience that seeks to counter an increasingly powerful, forward-looking liberal theory of the environment.

The opening section explores some of the early contributions to the field from geographers, and shows how these opened up the now-recognised themes of environmental history: the human impact on the earth and the ways in which this has been shaped by human understandings of nature and land, in other words, the relations between environmental ideas and materialities. The prophetic overtones of environmental history have however rarely been assembled into a coherent global-scale assessment of the accelerating environmental impact of people over the last sixty years. The second section sketches how this might be achieved, whilst the third discusses the types of manufactured environmental risks that have become widespread as a result. The sort of narratives employed to explain changing people-environment relations are then discussed, before considering what environmental history can contribute in the future.

### **Geographical foundations**

In 1955, as the pace and extent of environmental impacts in the post-war world were becoming clear, a now-famous symposium was held at Princeton, New Jersey in the United States. It brought together seventy scholars from the social, earth and natural sciences to discuss the theme of "Man's role in changing the face of the earth". One of the symposium chairs was the eminent cultural geographer Carl O. Sauer; also participating was Clarence J. Glacken, a colleague of Sauer's from the Berkeley campus of the University of California. Glacken was later to come to prominence as the author of one of geography's seminal books, about nature and culture in two thousand years of western thought. Towering

above the Princeton meeting, however, was the figure of the nineteenth century American geographer, George Perkins Marsh: indeed Sauer's hope was for a "Marsh Festival" (Thomas 1955, 49).

Marsh, who had been born in Vermont in 1801, was a nineteenth-century polymath and legislator, who also served the American government overseas, in Turkey and in Italy. In 1864, he published *Man and Nature; or, Physical Geography as Modified by Human Action*. Another edition, ten years later, was retitled *The Earth as Modified by Human Action*. The book remained in print for prolonged periods. It first appeared at the height of colonial resource optimism, and through force of evidence and example argued against the prevailing belief that nature existed for people to use at will. Marsh's experience of the degradation of Mediterranean environments made him anxious for America's future. "Man has too long forgotten" he wrote, "that the earth was given to him for usufruct alone, not for consumption, still less for profligate waste" (Marsh 1965, 36). His practical impact at the time was on forest policy and watershed protection in his homeland and in British India; his broader intellectual contribution was to shift the perspective from humans endowed with a limitless nature to a longer-term understanding of their use and abuse of, and need to care for, the earth.

Carl Sauer's admiration of Marsh owed much to this latter point. Sauer's early experience with the Michigan Economic Land Survey revealed that land use was not always wise and that people could damage as much as improve an area. His subsequent fieldwork in Mexico was driven by curiosity to discover the ways in which, in different times and places, culturally differentiated landscapes were produced. He worked closely with anthropologists at Berkeley to achieve a greater understanding of place, process and period. His perspective was shaped by a strong anti-utilitarian sensibility; he believed that the variety and wealth of human inventiveness manifest in the landscape was in danger of being sacrificed to the short-term growth agenda of a modern liberal economy. His involvement in the Princeton meeting gave him the opportunity to frame the debate not in terms of technical solutions for the future but to ask "How did we get to where we are?" and "How can we construct an intelligible description of where we are?" (Williams 2014, 155).

Clarence Glacken's great work, *Traces on the Rhodian Shore* (1967), also took the long view into the past. It is the most complete survey that we have of three persistent ideas that have characterized human thinking about nature since the time of Classical Greece. The first is the one that Marsh challenged, that of a "designed earth" purposively made for human use. The second is the influence of the environment in molding the nature of individuals and the character of culture. This was a perspective once popular in American geography as "environmental determinism", and roundly rejected by the young Sauer. The third, which Glacken concluded was not as well formulated in antiquity as the other two, was that which motivated both Marsh and Sauer: charting the human transformation of the world.

These three ideas were for long not seen as contradictory, which is why each persisted with varying emphases through time. A designed earth could also be one in which all life was understood to shape itself to purposefully created harmonious conditions, just as human beings also fulfill their role of finishing creation, bringing order to nature as God's stewards. Marsh saw that human actions need do no such thing, with his *cri de coeur* that the "earth is fast becoming an unfit home for its noblest inhabitant" (1965, 43). But his choice of words is consistent with Glacken's observation that as early as the Hellenistic period "the fundamental cleavage of human from other forms of life" (1967, 708) was recognized. Over time this cleavage came to legitimate the role of people as supreme in creation. It fashioned seventeenth and eighteenth century Enlightenment thinking that to understand the world is the way to re-shaping it for our own ends. The anthropocentrism that underlies the ambition of human activity and its designs on nature thus has deep cultural roots in the west, even if its destabilizing potential has been realized more recently.

### **The great acceleration**

The sense of crisis that pervades writing in environmental history reflects concerns in a growing number of disciplines that there have been both qualitative and quantitative shifts in human impacts on the earth during the Anthropocene period. This term was coined around the turn of the present century to describe the recent era of environmental change in which people have

become global change agents in their own right. There is some debate about an appropriate starting date for the Anthropocene. But there is broad agreement that it was during the late eighteenth century that fundamental alterations in the relationship between people and the environment were set in place, as the Enlightenment encouraged the development of scientific and technical knowledge, and industrial culture. It is in the second half of the twentieth century, however, that levels of resource use took off, with every indicator of human activity undergoing a sharp rise from about 1950. This increase is known as the “great acceleration” (Steffen et al, 2011).

Human population reached a billion about 1820, but over the next two centuries it climbed precipitously to more than seven billion, with energy use growing about 40 times and economic production about 50 times. The upturn began in northern Europe in the eighteenth century with the development of capitalist forms of production and spread of private means of land ownership. Agricultural experiments in food production allowed more people to be supported in rapidly growing towns, and gradually improving nutrition enabled them to survive and live longer. Simultaneously, the energy bottlenecks of the pre-industrial world were broken with the widespread adoption of fossil fuels. Pre-industrial enterprises had relied on the power of human and animal bodies and inefficiently harnessed wind and water; new capitalist firms were powered by machines capable of converting into mechanical power the biomass energy stocks which had accumulated over millions of years of geological time (McNeill 2000).

These changes depended upon a new conception of land and ownership of resources. As formulated by English liberal writers, but usually ascribed to the late seventeenth author John Locke, the right to property depended not on custom but on human toil. Resources held in common, or for which no ownership regime was deemed to apply, such as indigenous territory, were considered by the application of personal labor to be “improved”, or removed from a state of nature. They passed thereby into exclusive private ownership, marked on the ground by the process of enclosure, and protected in the legal domain by right of personal security. English law, in contrast to Roman law or Chinese and Islamic custom, did not subject these rights of ownership to

countervailing social rules; instead it gave liberty to use the land's resources and legal protection to the private owner (Linklater 2014). In these ways, the holders of enclosed lands were guaranteed the yield of their agricultural improvements as well as the right to exploit the energy stocks that lay beneath them. The resulting surplus enabled the spatial extension of capital beyond Europe into the neo-Europes of the Americas and Australasia. New fields of resources from which to profit were opened up to produce huge new quantities of food and oil. The private property calculus thereby underwrote an immense expansion of enclosure, "improvement", energy exploitation, and population growth.

This dynamic explains how the drivers of the Anthropocene initially occurred in very uneven ways across the globe. But if the surge in human numbers began with European populations, by the 1950s these had passed through a demographic transition from high to low fertility and mortality rates. Paradoxically it is at this point that the great acceleration begins. Consumption levels soared, and with it demands for natural resources and levels of waste generation. The western model of development was exported to other parts of the world as surplus capital sought wider arenas for investment, along with modern health care systems and a "green revolution" in food production in Asia, Latin America and Africa. As populations began to age in Europe and North America, the numbers of human beings in the world surged as developing nations moved into the expansionary stages of the demographic transition. In 1950, the population of Africa was about half that of Europe, whereas today they are about equal and by 2050, Africa's is projected to be three times Europe's size.

If it was the industrial revolution and the international expansion of capital that set in place the dramatic shift in human relations with the natural world, then it was the "great acceleration" after 1950 that normalized it. An ever-expanding global population has expressed both growing wants as well as needs, consuming resources and generating wastes in ways never before seen. The rise in use of means of inanimate energy, notably fossil fuels, illustrates this. It has tracked a more than fivefold increase in gross world product since 1960, and is directly reflected in the rise of carbon dioxide in the atmosphere. Emissions of methane, an even more potent greenhouse gas, have risen faster still. It is no coincidence that the term "Anthropocene" was popularized by Paul Crutzen, an

atmospheric chemist (Steffen et al 2011). In parallel, carbon sinks have been undermined as tropical rain forests are converted to farm and plantation land to supply products such as palm oil that are ubiquitous components of food manufactured on industrial scales. Today therefore we “live in a global system in which our most critical problems go well beyond regional and national borders” (Costanza et al 2007, 522).

It is climate change that has brought into focus the ability of humans to reshape their environments not just in immediate and discernible ways but, rather as George Perkins Marsh feared, at the scale of the earth as a whole. Humans have significantly altered other biogeochemical cycles, such as those for nitrogen and phosphorous, strongly modified the terrestrial water cycle through intercepting river flows to the sea and widespread land cover change, and are “likely driving the sixth major extinction event in Earth history” (Steffen et al 2011, 843). These changes are a product of the need for food and resources for growing populations that are simultaneously increasingly urban. In 2007, the numbers of people living in towns and cities worldwide moved into a majority for the first time. The logistical and infrastructure networks of city systems have been built to supply the growing appetite for material consumption that often accompanies urbanization.

The imprint of human enterprise on the earth-atmosphere system is therefore now unmistakable, and shows no signs of moderating as the locus of growth in economic activity shifts from Europe and what were its overseas settlements to the countries of east, south east and south Asia in particular. China’s carbon emissions exceeded those of America in about 2007, and by most measures its economy will be larger of the two within a few years. But such observations are still usually made outside of an environmental frame of reference, and “much discussion of human-environmental interactions continues to lack a long-term, temporal dimension” (Costanza et al 2007, 522). One environmental historian summed up the history of the twentieth century in saying that the “human race, without intending anything of the sort, has undertaken a gigantic uncontrolled experiment on the earth” (McNeill 2000, 4).

### **Environmental risk and hazard**

It is a paradox that as people have seemed to move further from nature, with the making of what is sometimes called “second nature”, or nature reshaped by human action, we have created what Anthony Giddens (1999) has termed “a runaway world”. The economic, cultural and technological processes of globalization simultaneously generate highly interconnected problems. This is an essential difference between social experience today and that before the Anthropocene. In the past when civilizations were threatened or collapsed, they did so with few if any implications for people living elsewhere on the planet. That is no longer the case. The distinguishing feature of industrial culture is that it has been framed by risk and opportunity. The embracing of risk has been the driving force for the creation of wealth in modern economies. Risk management has been the means by which industrial societies have endeavored to determine their own futures, rather than leaving things to the forces of tradition or of nature. They have invested in future opportunity, through calculations of profit and loss, at the same time as seeking trade, resources, and capital accumulation in distant places. With this has come a new set of regional and even global environmental risks.

This forward-looking, interdependent world has therefore not eliminated risk. Rather the nature of risk has changed, from what Giddens describes as “the predominance of external risk to that of manufactured risk” (1999, 26). If external risks are those coming from nature, then manufactured risks are those generated by the increasingly assertive and widespread patterns of capitalist activity that so concerned Marsh. A good example comes from studies of nineteenth century western agricultural expansion into the lands of the European new world. Often such areas, in the western United States, Canada, and Australia, were re-settled by people driven from Europe by external risks such as famine, hunger, and disease. In these new environments, they faced new risks. The story of the American Dust Bowl in the 1930s, for instance, “is less about the failures of nature than about the failures of human beings to accommodate themselves to nature” (Cronon 1992, 1348). The progressive assumptions of a forward-looking people, that the “wilderness” would inevitably yield to linear “improvement”, came into conflict with the cyclical environmental rhythms of these dry, grassland areas.

A classic of geographical writing in this vein is Donald Meinig's (1962) study of the wheat frontier in South Australia, *On the Margins of the Good Earth*. Much of the area inland from Adelaide was "mallee country", a scrub forest with thick shallow roots and a low to medium height canopy. Mallee clearance required a big investment of time and work: that is, taking the chance that the effort would pay off into the future. The environment however was uncertain and unpredictable, and in 1865 the Surveyor-General G.M. Goyder was sent through the outlying districts to identify and demarcate those pastoral areas then in drought. What became known as "Goyder's Line" was taken subsequently to represent and formalize the outer limit of agriculture, and came under severe pressure from settlers wanting to move beyond it when wetter years returned in the 1870s. But they were confounded by the recurrence of severe drought in the 1880s.

Attempts to transform climatically volatile regions into crop producers were driven by the opportunities of feeding new industrial cities. A prominent theme in environmental history has been the problems and politics of urban pollution from industrial and infrastructure development. This is a clear case of manufactured risk. There have been increasing attempts to manage pollution in western, and now Asian, cities during the great acceleration. These have been characterized as the product of a change in environmental values as higher standards of living have prompted a search for improved environmental quality and higher levels of amenity (Hays 1987). The search has had varied outcomes, not least a growing focus on air and water management, and the paradox of highly consumptive but outwardly clean suburbanization.

Urban environmental issues of this sort, although experienced by cities throughout the world, are essentially the product of local-scale activities and are amenable to local solutions. The more intractable sources of manufactured risk are those expressed at much bigger spatial scales. A good example is the threat to coastal cities from tidal flooding and extreme weather events as climate change becomes more pronounced, at the same time as more people seek to live or develop trading facilities by the sea. The cities most in jeopardy are those in Asia, such as Shanghai and Mumbai, and those on the Gulf and East Coasts of the United States. Hurricane Katrina, which devastated New Orleans in 2005, and

Hurricane Sandy, which badly affected New York City in 2012, are widely seen as warnings. Often this is imagined to be a case of external risk, rather than one of manufactured risk on coastlines made vulnerable through human action.

In an analysis of the New Orleans situation, Freudenburg et al (2009) take a particular view of this issue. For them, Hurricane Katrina was “a catastrophe in the making”, in which the “Growth Machine” of industrial capitalism set in train destructive processes that led to an inevitable outcome. These included the extension of the city into low lying, flood vulnerable districts, the driving of the main export canal through the Mississippi delta into the teeth of Gulf hurricanes and, critically, the damaging intrusion of oil industry infrastructure and wastes across the deltaic wetlands, undermining their buffering functions to storms. For them, “New Orleans is by no means unique in the ways in which local leaders have increased their communities’ vulnerability to ‘natural’ disasters”. They see the story of Katrina as a parable of the consequences of manufactured risk. It also highlights the key difference between the modern preoccupation with short-term decision-making and environmental history’s focus on long-term analysis.

### **Stories in environmental history**

The most common form of environmental history is narrative, or the organization of understandings about people and environment into story form. Storytellers select certain events, processes and places to emphasize, and particular relations to highlight. At the same time, other players and connections are silenced and “the discontinuities, ellipses, and contradictory experiences that would undermine the intended meaning” of the story are hidden (Cronon 1992, 1349-50). The most effective environmental history works by telling stories about stories about nature.

The analysis of the impact of Hurricane Katrina on New Orleans illustrates this point. Freudenburg et al (2009) argue that engineering evaluations of the causes of that extreme event, including that of the US Corps of Engineers which had built the walls and levees that failed, avoided any attribution of blame to the construction of the main canal through the delta. The consequences for the wetlands were ignored, including the destruction of large areas of swamp cypress that had earlier mediated the impact of floods, as was

the “levee effect”, or the acceleration of construction behind flood defenses that were assumed to give greater security than could ever be so. Instead, for the engineers, the disaster was the result of structures that performed inadequately. The larger point is that the story that frames this engineering perspective is one that, like the “Growth Machine” that supports it, embodies Enlightenment notions of progress and “improvement”.

William Cronon (1992) identified two main “plot lines” for stories in environmental history, illustrating these with a range of narrative accounts of the settler encounters with the Great Plains. The most famous of the progressive narratives in this context is the frontier thesis of Frederick Jackson Turner, which described a rising arc of landscape transformation from wilderness to trading post, farm and boomtown. Turner’s account, unproblematic in that it did not highlight struggles and setbacks, was followed by many other progressive story lines that did, in which the narrative role of such problems was “to play foil the heroes who overcame them” (Cronon 1992, 1353). At the same time, there have been competing stories that trace more negative outcomes, stories that are tragic or declensionist in form. Meinig’s interpretation of the South Australian frontier is a story about both types of story: about eager settlers in times of rain, and anxious administrators aware of cyclical drought.

Such narratives often silence other human or non-human actors. In the last thirty years there has been some correction of the omission of indigenous voices from these accounts: experiences from the other side of the frontier are now more conspicuous than before, as are environmental histories of non-European parts of the world. This has been matched by the use of different forms of narrative, including critical engagements with cartography and photography. There have been experiments with re-photography to illustrate the nature and extent of change over time, and also with environmental art. The *Strata* project, about Puritjarra in western central Australia, engaged Aboriginal artists with an artist of Australian settler meanings, alongside an archaeologist and an environmental historian. Their purpose was to uncover different kinds of knowledge and ways of knowing place and, through co-understanding, to access something of the deep time that is lost in Eurocentric stories of colonizer experience (Martin, Robin, and Smith 2004).

### **The future**

In his reflection on the value of stories, William Cronon suggests that it is “the task of environmental history is to assert that stories about the past are better ... if they increase our attention to nature and to the place of people within it” and encourage us to look at these in new ways (Cronon 1992, 1375). Such stories are told at a range of scales, from local place to the global. The canvas is both ideas and materialities, or how people know nature as well as the material outcomes of their interactions with it. The aim is understanding of environmental changes in the long run, such as the great acceleration, and analysis of how past variability in natural systems exposes the assumption that has held sway for much of the Anthropocene that conditions favorable to human activity will always prevail.

The best environmental history therefore reveals the consequences of the spread of liberal capitalism and the unexpected opposition that its short-term futurism has prompted from the planet itself. At this juncture, rather than “grit our teeth and hope for a miracle”, as Bruno Latour puts it, “we could inquire into what this modern project has meant so as to find out how it can be begun again on a new footing” (2013). This raises two points that only a few environmental historians (eg Dovers 2000) have attempted to explore. First, what does an understanding of past environmental transformations mean for analysis of society today, its priorities, structure, and agency? And second, how can such knowledge be translated into solutions and policies? These questions pose extended interdisciplinary challenges for environmental history. But doing the work towards answering them might encourage a wider and more reflective social engagement with nature, in keeping with Marsh’s view of the human being as earth’s “noblest inhabitant”.

**SEE ALSO:** Anthropocene; Capitalism; Climate Change; Globalization; Historical Geography; Imperialism; Landscape; Population

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