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Biography and Scientific Endeavour

I. Out of Africa

Jane Carruthers is a world leader in exploring the social history of national parks. From her "edge" in South Africa, she tells the story of the political and social struggles that resulted in South Africa's biggest and most famous national park becoming Kruger. It was, she argues, a story of 1925 republicanism. Naming the new park after the heroic former President Kruger "was consistent with the Afrikaner view of saluting national heroes by naming monuments or institutions after them."[1] Afrikaner support for the Kruger monument ensured the park's success. As a monument to a particular sort of nationalism, the Kruger National Park also protected the wildlife of the Transvaal.

Through her biography of the park's first warden, James Stevenson-Hamilton, Jane explores the folk history linking Paul Kruger with concern for the fauna of Africa. While Kruger was a famous hunter, and had declared the first state game reserve in the Transvaal "ahead of his time" in the 1880s, this was not crucial to the decision in 1925 to name the park. Rather, this history had been unearthed by Stevenson-Hamilton, some years after the park was declared.[2] The idea that Kruger, the great hunter, was a keen supporter of national parks was retrofitted by Stevenson-Hamilton more than a decade after the Kruger National Park was named, perhaps as a ruse to attract further support for wildlife protection.

Stevenson-Hamilton has not been alone in adopting a life history for another purpose.

II. Scientific Territoriality

In the global context of Big Science today, life histories are being used to brand another sort of territoriality, one that has nothing to do with nationalism. Well-known heroes enable global recognition: they give particular scientific groups a niche in the

1 Jane Carruthers, *The Kruger National Park: A Social and Political History* (Pietermaritzburg: University of Natal Press, 1995), 61.
2 Jane Carruthers, *Wildlife and Warfare: The Life of James Stevenson-Hamilton* (Pietermaritzburg: University of Natal Press, 2001); Carruthers, *The Kruger National Park,* 15.

highly competitive market for scientific authority and research funding.

Climate scientist William Ruddiman commented:

> Hundreds of groups with shorthand acronyms for their names hold meetings every year on one or another aspect of climate. I am certain that there are now more groups with acronyms in the field of climate science than there were people when I began (forty years ago).[3]

Acronyms, more than individual authors' names, brand scientific territory for transnational teams with participants from several continents, who function and publish as a single unit.

Big Science has been growing since the late 1950s, when C. P. Snow declared that "scientists have the future in their bones."[4] Interdisciplinary environmental science, supported by the IT revolution that underpins modelling and forecasting, is now far more common than science undertaken by individuals. Guided by policy directions set by UNESCO and the International Council of Scientific Unions, ICSU, and other organizations best known by their acronyms, the task of any given team is to find recognition among many competitors in order to attract authority and funding.

This new use of life history by science is perhaps part of the effort to find common languages between and across sciences. Lydia and Stephen Pyne have noted that history has proven a "great organising theme" over the era of the Great Acceleration where "even as the two cultures diverged" they seek out "common assumptions about how the world worked and how it might be understood."[5]

III. Charles Elton's Invaders and Their Biology

Charles Elton is regarded as the "father of invasion biology" by a distinct group of twenty-first century conservation biologists, whose work concerns the biology of invasive species. Ecologists Dave Richardson in South Africa, and Daniel Simberloff and

3 William Ruddiman, *Plows, Plagues and Petroleum* (Princeton: Princeton University Press, 2005), 7
4 C. P. Snow, *The Two Cultures* (Cambridge: CUP, 1959), 6
5 Lydia V. Pyne and Stephen J. Pyne, *The Last Lost World: Ice Ages and the Invention of the Pleistocene* (New York: Viking, 2012), 247.

Matthew Chew in North America, have all explored Elton's personal views on invasive species and written biographical studies of him.[6] Elton's name is invoked by each in branding their own science of invasion management.

Elton's original BBC radio lectures featured explosive invasions: "An ecological explosion means the enormous increase in numbers of some kind of living organism—it may be an infectious virus like influenza . . . or a fungus like that of the potato disease, a green plant like the prickly pear, or an animal like the grey squirrel," Elton explained. "I use the word 'explosion' deliberately, because it means the bursting out from control of forces that were previously held in restraint."[7] *The Ecology of Invasions by Animals and Plants* positioned widely-distributed animals and plants as "invaders," as distinct from autochthonous species. Invasive species imply that the ecosystem functioned differently before they arrived. Elton's lectures and his concerns about threats to "control" inspired scientific managers half a century later as they grappled with understanding changed ecosystems.

The new biographers—Chew, Simberloff, and Richardson—have each used Elton's radio broadcasts as a way of explaining invasion biology to a wider public. For Dave Richardson, who uses Elton to hark back to the "isolated islands" of 1950s ecological experiments, Elton's lectures also represent the 1950s era, the onset of a great acceleration in biodiversity loss.[8] Biological invasions themselves have changed in character as the global population has grown 250 percent and the global economy eightfold since the 1950s. Richardson uses Elton's lectures to give invasion biology a long back story for this crucial half century of anthropogenic growth.

Peter Crowcroft's collective biography, *Elton's Ecologists*, is a history of the Bureau of Animal Population in Oxford, where Crowcroft himself trained.[9] It tells of how Elton borrowed the word "bureau" from the United States to signal that the Oxford group's focus would

6 David M. Richardson, ed., *Fifty Years of Invasion Biology: The Legacy of Charles Elton* (New York and Oxford: Wiley-Blackwell, 2011); Matthew K. Chew, "Ending with Elton: Preludes to Invasion Biology" (unpublished thesis, Arizona State University, 2006); Daniel Simberloff, "Charles Elton: Pioneer Conservation Biologist," *Environment and History* 18 (2012): 183–202.

7 Charles Elton, *The Ecology of Invasions by Animals and Plants* (London: Methuen and Co, 1958), 15.

8 Richardson, *Fifty Years of Invasion Biology*, xiii; see also Daniel S. Simberloff and Edward O. Wilson, "Experimental Zoogeography of Islands: The Colonization of Empty Islands," *Ecology* 50, no. 2 (1969): 278–96.

9 Peter Crowcroft, *Elton's Ecologists: A History of the Bureau of Animal Population* (Chicago: University of Chicago Press, 1991).

be applied ecology in broadscale landscapes. In an era when Britain's chief employer of biologists was the Colonial Office, most of the Bureau's graduates worked abroad. Graduates like Francis Ratcliffe came to Australia in 1929 and applied Elton's approach to managing the invasive grey-headed flying fox *Pteropus poliocephalus*. This story of the flying fox—the native mega-bat whose numbers had exploded in fruit-growing districts—was one of the stories Bureau alumni offered to Elton for his later BBC lectures.

The story of invasion biology can of course be told without Elton at all. In *Ecological Imperialism*, environmental historian Alfred Crosby focused on people (Europeans) as invaders. His ecological thesis was that the expansion of Europe was such a success because of the advantages brought by their accompanying invasive biota. Crosby's language echoed Elton's as he described the "explosive" invading biological hordes that accompanied Europeans, but he did not need (or acknowledge) the ecological insights of Elton, perhaps because his focus was imperialism rather than scientific management of the European legacy.[10]

IV. Restoration Ecology and Aldo Leopold

Aldo Leopold's *Sand County Almanac* is a literary touchstone in discussions about the ethical treatment of nature. Eco-centric writers often cite his famous essay, "The Land Ethic," for its attention to the importance of restoring land damaged by poor farming practices. Restoration ecologist William R. Jordan III, however, takes his inspiration from a younger Leopold who, as a newly-arrived professor of wildlife ecology at the University of Wisconsin, planned its Arboretum in 1934 in what Jordan describes as "the earliest experiment in restoration ecology in the world."[11] The Arboretum was a collection of the native ecosystems of Wisconsin before agriculture. It was a reconstructed sample "of what Dane County looked like when our ancestors arrived in the 1840s," as Leopold put it.[12] This was not merely a collection of trees, like other arboreta, but rather a collection of "plant and animal communities."[13] Although Jordan is enthusiastic about his Leopold lineage, "restoration ecology" was not coined in Wis-

10 Alfred Crosby, *Ecological Imperialism* (Cambridge: Cambridge University Press, 1986).
11 William R. Jordan III and George M. Lubick, *Making Nature Whole: A History of Ecological Restoration* (Washington: Island Press, 2011).
12 William R. Jordan III, "Making Nature Whole: Fifty Years of Ecosystem Reconstruction at the University of Wisconsin Arboretum," *Papers From the 1982 Strategy Conference* (1982): 36.
13 Ibid., 37.

consin until the late 1980s. While John Aber and Bill Jordan were the founders of this subdiscipline, Leopold provided its prehistory and its naming rights, and lent authority to this brand of restoration ecology.

Yet ecological restoration (if not restoration ecology) is also a practice in other places. While Jordan's work contributed to the foundation of the Society for Ecological Restoration in 1987, and was acknowledged by the journal *Restoration Ecology* in its first issue in 1993, he is not even cited in the references in the first issue of the journal *Ecological Restoration and Management*, sponsored by the Ecological Society of Australia since 2000. Today, the editors of the two journals of restoration ecology, Richard Hobbs and Tein McDonald, are Australian. Both have pragmatic restoration interests, and a style very much less philosophical and spiritual than Jordan. Australians emphasise long-term management and restoration of ecosystems, linking "the findings of scientific research and the needs and actions of on-ground managers," as Richard Hobbs puts it.[14] While Leopold's Arboretum intensively collected plant communities, restoration ecology in Australia began on a broad-scale, working in production landscapes rather than abandoned farmland. Denis Saunders, Robert Lambeck, and Richard Hobbs honed their style of restoration ecology in the Western Australian wheatbelt. In the east, Ian Lunt and Peter Spooner restore pastoral country using historical documentary sources. They explicitly acknowledge human use, both Aboriginal and settler. Restoration to a "time before humans" is impossible in a place with a history of 50,000 years of fire-stick farming.[15]

Leopold's philosophy and his authority is influential in North America. His elegant musings have a literary quality that reaches beyond practical ecology. Leopold is a good figurehead for Jordan's particular brand of restoration ecology, but his ideas are not so applicable in other cultural contexts. "Restoration" is a place-centred philosophy for Jordan and an applied management strategy in other places. As with its sister concept, "re-

14 Richard J. Hobbs, "Repair Versus Despair: Hope and Reality in Ecological Management and Restoration," *Ecological Management and Restoration* 1, no. 1 (2000): 1–2.

15 Ian D. Lunt and Peter G. Spooner, "Using Historical Ecology to Understand Patterns of Biodiversity in Fragmented Agricultural Landscapes," *Journal of Biogeography* 32, no. 11 (2005): 1859–73. The widely accepted term "fire-stick farming" was coined by archaeologist Rhys Jones in 1969. There are early examples of small-scale restoration in Australia. Jordan himself describes a 1935 project at Lumley Park (near Ballina in northern New South Wales) as "urban restoration," but Australian urban revegetation projects (which are usually in very big cities, rather than rural villages like Ballina) seldom self-describe as "restoration ecology."

wilding," the same word can inform very different practices. In Britain rewilding means restoring wetland by removing trees, but in the USA it may include reintroducing wild animals to fill the niches left by Pleistocene extinctions.[16]

V. Holling's Resilience

Resilience science provides a rather different example of branding a discipline through a scientific "father." In this case its Canadian progenitor, C. S. (Buzz) Holling, is still actively engaged with this new integrated science of ecology and society. The concept of resilience is defined in a foundational paper in 1973. This has subsequently been used by practitioners of resilience science to stake out territory within a broader field of environmental management.

Holling's 1973 paper defined resilience in ecology as "a measure of the persistence of systems and of their ability to absorb change and disturbance and still maintain the same relationships between populations."[17] This paper is still widely cited for its value in differentiating Holling's concept of resilience from others that have emerged since.[18] Resilience is now a word with a popular meaning; this is both its strength and a problem for those who wish to use it to define a science. Resilience science is about ecology and its applications for society: it focuses on "SES" (social-ecological systems), which are defined in ways that ecologists recognise but that psychiatrists (who also use resilience scientifically) would not.

Resilience has now become a great panchreston of our times: it is a word that is used to speak of a complex response to change in many different contexts. Resilience science aims to be of practical use to ecological policy makers without relinquishing the scientific authority conferred by Holling's ecological definition. Using Holling's paper has enabled this group to guard its borders and control its membership. By publishing

16 Marcus Hall, ed., *Restoration and History: The Search for a Usable Environmental Past* (London and New York: Routledge, 2010).

17 C. S. Holling, "Resilience and Stability of Ecological Systems," *Annual Review of Ecology and Systematics* 4 (1973): 14.

18 Li Xu and Dora Marinova, "Resilience Thinking: A Bibliometric Analysis of Socio-ecological Eesearch," *Scientometrics* 96 (2013): 911–27. In their study of 919 publications up to 2011, this 1973 paper was cited 4,216 times, substantially more than any other paper. (The next most cited was cited 2,348 times, and number ten in the list was cited 834 times).

its own journal (*Ecology and Society*), running its own conferences, and continuing to involve Holling himself, resilience science has reinforced its technical definition of the concept and thereby successfully pioneered its own path to policy makers.[19]

Life stories sometimes label scientific groups to distinguish them from competitors. In the case of invasion biology, restoration ecology and resilience science, father figures provide a "prehistory" and authority to the sciences, just as Paul Kruger's name lent authority to the idea of the national park in South Africa.

Postscript: A Heroine at Last

After all these heroes, it is time to turn to a heroine, and a rather different story of "branding." Anyone reading this *RCC Perspectives* series is conscious of the importance of the Rachel Carson Center for Environment and Society. Here in Munich, adopting Rachel Carson's name underscores the center's transnational and global dimensions. Because Rachel Carson is the heroine of environmental social movements, a great writer, a humanitarian, and a fine biologist, she represents much more than science in the study of environment and society, and she speaks to the entire world.

Carson's best known book, *Silent Spring*, had its fiftieth anniversary in 2012. Her work has spurred a half century of both environmental thinking and globalization. Biography can signify inclusiveness, rather than territoriality, and this is what Carson's name invokes for the Rachel Carson Center. Carson is a heroine for divergent views on environmental concerns, rather than for pursuing a narrow discipline, and she is widely celebrated not just in her home country or in marine biology but as a truly international symbol of concern for the relations between people and the environment.

It is apt that this project that explores the many edges of environmental history is nurtured by Rachel Carson's legacy. History, with its heterogeneous methods, also celebrates Carson, not to exclude but rather to draw more readers and writers into the conversation.

19 In 2008 the first Resilience conference was held in Stockholm at the Stockholm Resilience Center (http://www.stockholmresilience.org/) and Buzz Holling won the Volvo Environment Prize. Subsequent Resilience conferences have been held in Tempe, Arizona (2011) and Montpellier, France (2014).