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Essay Review

Empires of ecology

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Imperial ecology: Environmental order in the British Empire, 1895–1945
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To an ecologist, her discipline is about species and ecosystems, examined in terms of very specific topics, such as the photosynthetic behaviour of Arctic evergreens, the vulnerability of ecological communities to invasion by nonindigenous species, or the competition between different forms of a single species of fish (to take some examples from a recent issue of *Ecology*, the journal of the Ecological Society of America). Others, however, often see the discipline as something else: a guide to "green" living, a holistic perspective on nature, an alternative to ideologies of domination. Deep ecologists see ecological science as the foundation of respect for the intrinsic values of nature, while bioregionalists assert the need to base our decisions on how ecology has chosen to demarcate the landscape. Such views are the product of efforts to use science to draw order and meaning from our anxieties about the place of humans on the planet—assertions, in effect, that ecology, understood as a source of objective knowledge about nature, has political implications. Numerous studies of the history of ecology have approached this from another direction, showing how political assumptions may be written into ecological insights. This has been demonstrated, for example, by the role of marine ecology in providing justification for excluding natives from the California fisheries (McEvoy, 1986); or by the claims of Chicago ecologists that ecology demonstrates the pervasiveness of cooperation, not competition, in nature—and that human society should from this draw the appropriate, pacifist conclusion (Mitman, 1992).

The notion that ecology can be fertile ground for both scientific insights and political conclusions was especially inescapable in European empires. Building

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and maintaining orderly and profitable empires demanded knowledge of people and resources; this generated opportunities for scientists to travel widely, observing, collecting, and revising theories to accommodate the astounding natural diversity opened up by exploration. Ecologists were among those who seized these opportunities. In 1895 ecology was seemingly ill-equipped to provide the expertise demanded by the British Empire. But ecologists were ambitious, and by the 1940s they had won a substantial role in advising on how to manage the empire's resources. In effect, ecology has become a chief instrument by which the empire asserted its authority over both nature and natives. In *Imperial ecology* Peder Anker explains how and why this happened, and what this can tell us about the relations between ecologists and power.

British ecology came of age in the first half of the twentieth century. Several historians have traced its origins in systematics, natural history study, and vegetation surveys, and in the influence of scientists elsewhere, such as the Dutch ecologist Eugenius Warming and the American ecologist Frederic Clements. British ecologists established several institutions as part of their efforts to assert their distinctive disciplinary status: the British Ecological Society (formed in 1913), Charles Elton's Bureau of Animal Population at Oxford University (taking shape in the 1930s), and, most crucially, the Nature Conservancy, established in 1949 (Bocking, 1997; Crowcroft, 1991; Sheail, 1987). But institutional insecurities translated into a continual struggle for patronage. This was expressed, often enough, by arguments for the practical relevance of ecology: to forestry, pasture management, pest control, or nature conservation. No ecologist struggled harder to gain a secure basis for ecology, or more firmly asserted its practical possibilities, than Arthur Tansley, the doyen of early British ecology. When in 1927 he finally obtained an Oxford professorship (at the age of 53), he emphasized in his inaugural lecture that the future of ecology depended on demonstrating its "public utility". And the best prospects for such a demonstration lay in the empire, and satisfying its appetite for expertise in agriculture, forestry, and other areas essential to colonial economic development and political control.

Tansley pursued imperial patronage because he was aware of something historians have emphasized only in recent decades: that empires were as much about ecology as exploration. Discovered continents were transformed by the deliberate and accidental exchange of biodiversity: livestock and seeds were transported across oceans, useful in reconstituting in a foreign land a European agricultural economy; rats, weeds and other pests came along for the ride. Species served as instruments of imperial policy; they transformed exotic ecosystems into domesticated, profitable landscapes, while their competitive vigor buttressed assumptions regarding the superiority of European biological imports. Such was the account that Alfred Crosby provided in *Ecological imperialism* (Crosby, 1986): a historical synthesis that subsequent scholars have both extended and revised, not least by questioning Crosby's emphasis on the species disseminated from Europe over those making the return passage.

Empire-building entailed not only the transfer of species, but the transformation of landscapes for both commercial and political ends. This transformation was

profitable, as sugar plantations in the Caribbean and tea plantations in India testified. It was also politically efficacious: control over colonial nature was a means of asserting imperial authority. Damming and channeling rivers, managing and restricting access to forest and nature reserves, transforming shifting cultivation into settled farming, outlawing traditional uses of fire (Pyne, 1997)—by such means peoples were converted into subjects of empire.

Scientific knowledge underpinned this control and transformation of imperial ecologies. Scientists accompanied explorers, surveying and classifying nature: geographical features, minerals, species and peoples, bringing order to unimagined diversity. They also ignited European fascination with the wider world, provoking new theories and ways of thinking about natural variation and geographic phenomena, while filling curio cabinets with rare and exotic specimens. Then, as exploration gave way to exploitation, scientists became essential to imperial governance, through mapping transportation routes, surveying land (vital to converting territory into taxable property), developing forest and agricultural research programs, advising on the efficient administration of resources and peoples, helping to protect the interests of the empire or of white settlers, and assisting in the imposition of order and the assurance of profitability. Empires tended to be seen as technocratic challenges, amenable to expert, efficient management—British India equipped itself with more expertise than did the British Civil Service.

This nexus of order, profitability and science was epitomized by imperial forestry, a transnational practice combining ideas and methods from several countries—Germany, France, Britain—to impose order on colonial nature. Imperial forestry science defined traditional practices, including the use of fire, as primitive and destructive, to be necessarily displaced by modern, rational science-based management. Forestry also epitomized the oppressive tendencies of colonial science-based administration, with local people excluded from forests that had been set aside to supply timber for ships, railway sleepers, or other imperial purposes (Gadgil & Guha, 1992).

But as Richard Grove and other historians have demonstrated, scientists could critique, as well as advance, imperial imperatives. They urged reforms in land use practices both in the interests of environmental conservation and to safeguard colonial economic and political security. On the island of Mauritius, Pierre Poivre developed a sophisticated environmental perspective on colonial practices, eventually convincing authorities to enact laws controlling deforestation. Such environmental reforms tended to occur first on tropical islands, whose small size and status as symbols of paradise enhanced scientists' persuasiveness. Alexander von Humboldt also contributed, by demonstrating that forest loss and resulting climate change was of continental significance, buttressing the "desiccationist" theory linking forest cover to climate (and ultimately to the economic security of the colonies). In India, medical officers expressed parallel concerns about drought and deforestation. In South Africa, John Croumbie Brown, exhibiting the preeminence of Scottish environmental critiques of imperial practices, warned in the 1860s that pasture lands were at risk from overgrazing and degradation. Veterinary surgeons reiterated his claims, linking the health of livestock to the state of the environment.

Joseph Hooker, Director of Kew Gardens, eventually took up his ideas, disseminating a critique of colonial forest policies throughout the world (Grove, 1995; Griffiths & Robin, 1997).

These critiques carried political as well as scientific freight, reflecting an association between science, environmentalism, and calls for social reform. Critics of colonial policies on environmental grounds—because such policies contributed to deforestation, erosion or species loss—also tended to be critical of the oppression of indigenous peoples. Environmental ideas were often linked to eighteenth century radical politics, generating demands for the release of slaves, or for better treatment of colonized peoples (Grove, 1995).

Such critiques demonstrated the decentralized and heterogeneous nature of empires—as John MacKenzie said of the British Empire, it was not so much a monolith as a 'ramshackle conglomerate' (MacKenzie, 1997, p. 222). Empires sustained transnational networks of scientists who exchanged ideas about environmental and social conditions and debated appropriate scientific and political responses. Ideas often originated in the extremities of empires, eventually shaping perspectives back in Europe. The most significant product of the periphery, according to Grove, was environmentalism itself: originating in fragile island environments, scientific networks relayed awareness of environmental damage to other colonies and to imperial centres.

Such was the historical context, then, in which Tansley and other British ecologists pursued the possibilities of imperial patronage. As Anker explains, they were eager to seize the opportunities presented by imperial demands for expertise. Tansley began his study of ecology in 1895, when it was a promising, but obscure branch of research considered by some to be akin to amateur natural history study. Fifty years later it had become, according to Anker, an organizing principle for imperial perspectives and initiatives, both in terms of its environmental challenges—such as deforestation, soil erosion, and loss of fisheries—and, more generally, in its efforts to manage resources and peoples. And for ecologists in South Africa, ecology became something more: a means of expressing a vision of national destiny. To explain how all this came about Anker intertwines two stories: of British ecology and its imperial entanglements; and of South African ecology, and its ties to an emerging nationalism.

Anker's account begins with an account of Tansley's early life and work, embedded within a sketch of the formative decades of British plant ecology. Tansley studied botany at University College London and at Cambridge, while absorbing, especially from F.W. Oliver, the belief that scientists have a responsibility to contribute to the progress of society. Inspired by Warming's book on plant societies, he set out to build the status of ecology as a distinct discipline, engaging in debate with Scottish ecologists over whether ecology should be grounded in the geographic distribution of species (as Tansley believed) or in their morphology (as ecologists in Edinburgh argued). Most importantly, he build a community of scholars focused on ecology, through teaching at Cambridge, editing the *New Phytologist* and the *Journal of Ecology*, organizing an ambitious survey of British vegetation in 1911, and creating organizations (including the British Ecological

Society). By the 1920s Tansley was advocating, particularly with Thomas Ford Chipp, the relevance of ecological research to exploitation and management of the colonies, formulating the essential purpose of imperial ecology: to ensure its living resources would contribute to the empire's economic and political objectives.

However, Tansley still lacked a research position of his own. Denied an Oxford professorship, Tansley temporarily left ecology, traveling to Vienna to study psychology with Freud. On his return, he wrote the popular text *New psychology and its relation to life* (Tansley, 1920). This psychological interlude, Anker argues, is a key to understanding Tansley's ecology. He drew on his theories of mental networks and equilibrium to develop both his ecosystem concept and his views of the relations between ecology and human society.

When Tansley finally became Sherardian Professor of Botany at Oxford in 1927, the university was just becoming a center for ecology. Much of the initiative came from Charles Elton, an ambitious student of animal ecology. He and others at Oxford turned ecology into an adventure, organizing expeditions to distant places: Spitzbergen, Greenland, British, Guiana, Sarawak and elsewhere, expanding ecological practices and ideas from the enclosed spaces of rural England to the entire world, and in so doing redefining ecology as a global science. Elton's own research was similarly ambitious: sketching diagrams of the food relations between species, he aimed to portray not just the relations between predators and prey, but a vision of ecology as a way of organizing knowledge from many disciplines into a synoptic understanding of nature's economy. For Elton, there was no better way of understanding how everything fit together than by looking at it from a height, and so he drew on aerial surveys and maps in developing an overall perspective on nature and knowledge. This "master perspective from above" became a leitmotif of British ecology.

Support for ecology was scarce in the interwar period, and so the colonial office, which viewed imperial development as a biological problem, presented attractive possibilities for Oxford ecologists. Ultimately, Elton and his colleagues presented ecology as the foundation for a three-fold perspective: a new environmental order, in which relations between species would be understood in terms of the perspective from above; a new social order, in which ecology would guide imperial management, and a new order of knowledge, in which the sciences would be arranged and synthesized on an ecological template. This perspective tied together diverse work at Oxford: in animal ecology by Elton and his students, in colonial forestry by Ray Bourne and Robert Troup, and in human populations by the sociologist Alexander Carr-Saunders. In the 1930s the circle expanded further, to include those attracted by the promise of building on the basis of ecology a better society. H.G. Wells sketched in his novels future worlds in which scientists engineer an ecological utopia. Max Nicholson and Julian Huxley applied human ecology to the design of a new, planned social economy for Britain. E. Barton Worthington's research was of particular interest, for it exemplified the application of ecology to creating a new environmental and social order. Beginning with a study of the fisheries of Lake Victoria, in which he transformed local knowledge into information useful for imperial resource management, Worthington eventually produced *Science in*

Africa, a continental-scale scheme for managing both ecosystems and ecological knowledge in the service of colonial authorities (Worthington, 1938). Tansley, in *The British islands and their vegetation* (Tansley, 1939), and Huxley, in his postwar work as first Director-General of UNESCO, developed similar arguments for ecology as a guide to human affairs and the management of nature.

South African ecologists were, however, following a different path. During the 1930s they erected a more idealistic, almost spiritual, ecological and political order. Jan Smuts—general, politician, botanist—pursued his vision of a united South African nation. He drew up a comprehensive political and scientific program of ecological research, based on a philosophy of holism that was inspired by his study of the poet Walt Whitman, and which was based (like Tansley's ecological outlook), on psychological grounds: the evolution of the mind became for Smuts the basis for understanding the evolution of plants, races, and civilizations. This schema, Anker explains, is the key to making sense (if that is the right word) of the basic contradiction in Smuts's political thinking: while he pursued international harmony through the League of Nations, and wrote the first draft of the Preamble of the United Nations' Charter of Human Rights, at home he pursued a policy of racial segregation and political oppression. In Smuts's view, races deserved respect, and rights, according to the level to which they had evolved. They also had to respect their allotted positions—by force when necessary.

Smuts was fascinated by botany, but he was too busy, as both politician and visionary, to pursue his own career in racist ecology. Instead, South Africa ecological research developed within a patronage system that was centered on Smuts, but driven by two scientists: John Philips, and J. W. Bews. For Phillips, Smuts's philosophy of holism provided the basis for understanding the natural world, and he derived from it a "biotic community" approach to ecology. According to Bews, human diversity could be understood in ecological terms. Races had achieved different levels of development: while some were still affected by local climate and ecology, others had evolved to be more independent of their environment. It was necessary, therefore, for them to live separately, each according to their particular level of development and their appropriate relation to the environment. Racial segregation was therefore a natural and legitimate response to the diverse ecologies of races, ensuring ecological and social harmony within a nation unified by a holistic political vision. In the 1920s Bews and Phillips expressed these ideas of racial division and national unity through a Botanical Survey of South Africa, symbolically unifying the country into a single environmental order. Phillips also promoted an ecological survey of Africa, grounded in a holistic approach that viewed humans as part of a biotic community: ecological and social harmony would come through humans living within the limits of their ecological homelands.

By the 1930s, then, two divergent approaches to ecology had emerged along the north/south axis linking Britain and South Africa. At Oxford nature was understood in terms of mechanisms such as the food relations between species and the impact of climate and geology on the distribution of biota; this understanding was framed by the master perspective provided by maps and aerial surveys, providing thereby an appropriate basis for managing imperial resources. South African ecol-

ogist pursued a more idealistic vision: one of holism and biotic communities—concepts suited to keeping races in their appointed places. These divergent approaches to ecological research illustrate the value of this comparative analysis: it stems not so much from the impact of these ecologists on the overall development of ecology (although Tansley and Elton were highly influential), but from how the contrast between British and South African ecology exemplifies the significance of local circumstances in shaping scientific ideas within the British Empire.

Overall, this is a fine analysis of an important aspect of the history of twentieth century ecology, as valuable for the questions it raises as for its conclusions. It is particularly rich in the possibilities it suggests for comparative study of ecology elsewhere in the empire, such as in Australia, Canada and India, as well as in the United States and other European empires. Anker fulfills three chief objectives: to explore the origins of the reasoning of British and South African ecologists; to describe how these ecologists understood the relations between their own research and other ways of understanding landscapes; and to uncover the relations between ecology and imperial or national authority. He has intriguing, and sometimes controversial things to say relating to each of these objectives.

For example, his claims about the origins of ecological reasoning have already provoked debate, particularly regarding the relation between ecology and psychology. According to Anker, Tansley drew extensively on Freudian psychology in developing his ideas about ecosystems, while Smuts drew on psychological principles in developing his ideas of ecological holism. More generally, Anker suggests, the links between ecology and psychology gave ecologists confidence that their discipline could be expanded to include humans. The evidence for these links is sometimes more conjectural than convincing. In particular, his argument that Tansley's ecosystem concept was inspired by his theories of mental networks and mental equilibrium neglects the extent to which it stemmed from his knowledge of the recent development of British ecology, as well as his goal of providing a unifying concept for ecologists. Nevertheless, Anker's exploration of these psychological dimensions of ecology is original and overdue: few have examined in any detail the historical links between psychology and ecology, and Tansley the psychologist has received far less attention from historians than Tansley the ecologist—although Laura Cameron and John Forrester have recently provided valuable insights into this (Cameron & Forrester, 1999).

Anker's arguments concerning the relations between ecology and other disciplines might also be the basis for debate. As I have noted, Anker described the strategies whereby ecologists asserted their approach as the integrative basis for a variety of other disciplines at Oxford and in South Africa. This claim needs to be placed within the context of the development of other imperial field sciences, such as forestry and pasture management, that had a longer history, and a stronger institutional basis. How did ecologists work themselves into a position of synthesizing other disciplines, given that ecology was a relative latecomer to imperial resource management? Similarly, Anker's analysis of the ecological basis for concerns about environmental degradation in South Africa needs to be placed within the context of the history of these concerns, extending back to Brown's cri-

tiques of the 1860s, and forwards to, for example, the work of the South African Drought Commission of the 1920s. More generally, his claim regarding the primacy of ecology, particularly at Oxford, needs to be placed in the context of the increasing prestige of the laboratory sciences—a prestige that was by mid-century viewed as a distinct threat by British ecologists.

As Anker concludes, imperial ecology was a "tangled web" of both exploitative and romantic views, unified by a shared critique of urban life and culture. While South African idealistic ecologists thought of nature's economy as fixed, and sought to demonstrate that the existing ecological segregation of their country was merely a reflection of nature's order, British mechanistic ecologists thought that the economy of nature could and should be planned, and that society, nature and knowledge should be subjected to an ecological re-ordering. In both cases, ecologists did not seek merely to represent nature, and to advise on the replication of nature's order in society. In fact, it was the reverse. Rather than seeing themselves as part of nature's economy, ecologists superimposed their social views onto an environmental order: the "master perspective from above" describes their approach both to securing knowledge, and to interpreting relations between humans and nature. This has often been a tempting prospect for ecologists, intent, for the best of reasons, on saving humanity from itself. Failure to recognize this, however, renders one vulnerable to the oppressive potential of ecologists' advice to integrate humanity into nature's order.

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