

A scientist among the sandstorms: Drought and the discursive contexts of Francis Ratcliffe's popular ecology

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Flying Fox and Drifting Sand, British zoologist Francis Ratcliffe's popular 1938 account of his ecological study of the problem of the fruit bat problem in Queensland and soil erosion in the arid pastoral areas of South Australia, is a prominent instance of an influential form of cultural critique in which scientists reflect publicly on the social, political and cultural interrelations and impacts of their disciplines. Notable in this genre are Aldo Leopold's essay 'The Land Ethic', Rachel Carson's *Silent Spring*, Paul Ehrlich's *The Population Bomb* and, in the Australian context, Tim Flannery's *The Future Eaters*. These texts are significant because they mix up the natural, social and cultural, and play a part in the emergence of ecocentric models of culture and society. Focusing on the ecological revision of the problem and concept of drought, this paper examines Ratcliffe's popular ecology in relation to a significant articulation of scientific, literary, and political discursive practices at the time. Then, by establishing the international connections of this local instance, a picture is presented of the wider dispersal of this new articulation. It is argued that by specifying these practices and their interrelationship we can track a particular instance of the early emergence of ecologically inflected social theory.

The discursive function of popular ecology

In order to explain the function of such texts, it is tempting to follow Latour's critique of the modern disciplinary partition—initiated in *We Have Never Been Modern* (1993) and refined

1

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in *Politics of Nature* (2004)—and observe that they exemplify the way that ‘everything happens by way of mediation, translation and networks’ (Latour 1993, p. 37). Ironically, given his aim to reconnect the intradisciplinary politics of science with those of the wider society, Latour’s approach is hamstrung by his sociological preoccupation with disciplinary communities’ strategies of exclusion, and the difficulties facing non-scientists wanting to overcome those strategies. This is most interestingly and productively explored in *Science in Action* (1987), and it is there that his concern about the difficulty of popularising science highlights his theory’s limited applicability to analysis of scientists’ longstanding and important tradition of popular cultural critique. This is most clearly evident when Latour states his concern about

the accumulation of resources in the hands of a few scientists. It is hard to popularize science because it is designed to force out most people in the first place. (1987, p. 52)

What, then, of the scientist who speaks directly to those outside disciplinary boundaries, and about topics that are at the cutting edge of that discipline? Latour’s very conception of disciplinarity is a problem that must be overcome on the way to analysing and producing hybrids of nature, culture and society.

Foucault’s first move, on the other hand, was to remap disciplines and reconstitute them as discourse, thereby undoing the very idea of bounded disciplinary communities that is so central to Latour and, before him, to Thomas Kuhn. To explain the discursive function of Ratcliffe’s popular science, it is useful to revisit *The Archaeology of Knowledge* and extract Foucault’s core reconception of disciplinarity. The concept discourse makes us see that the important new work of disciplines is performed at and beyond what might customarily be viewed as their limits, and at the points of articulation with other disciplines. For instance, Foucault (1972, p. 179) describes the 19th century emergence of the discipline of psychiatry



as a discursive formation that reached ‘well beyond the boundaries of psychiatry’ to law, literature, philosophy and politics. Even though their linguistic, institutional and technological practices are clearly observable, disciplines thus reconceived are mobile and dispersed sets of practices which function within and engage productively with ‘*a field of non-discursive practices*’—that is, practices that have not yet been conceptualised or theorised (Foucault 1972, p. 68; italics in original). Similarly, the relation between discursive and pre-discursive practices is crucial to understanding the emergence of statements and the formation of concepts and objects. As used here, the term pre-discursive denotes established practices from other disciplines which are appropriated, used in new ways, in the process of producing new knowledge, usually in response to a new problem. These interrelations of the discursive with the non- and pre-discursive characterise the formation of the discipline of ecology in the 1920s and 1930s, for example, new articulations of discursive practices on newly revised concepts like population.

Transforming the concept of drought

Through the agency of Ratcliffe and others, the persistent problem of Australia’s unreliable rainfall was redefined in ecological terms. As a consequence, the concept of drought was transformed, taking on a meaning relating to the concepts of population distribution and variation which were central to the new sub-discipline of animal ecology. Francis Ratcliffe’s specialist and popular texts of the 1930s exemplify the articulation of scientific, literary, and political-administrative discursive practices in this ecological redefinition of the concept of drought, particularly in its relation to the problem of soil erosion and consequent loss of productivity of the pastoral industry in the arid regions of South Australia. Ratcliffe was an English zoologist who worked in Australia initially as a ‘biological scout’ for the Council for Scientific and Industrial Research (CSIR) in the 1930s. The fact that Ratcliffe played a key role in instituting the Australian Conservation Foundation in 1965, and was its honorary



secretary until 1969, illustrates his important role in the persistent and productive interplay between ecological and other discourses.

In 1935 Ratcliffe conducted a field study of the soil erosion problem for CSIR, and the following year produced his report, *Soil Drift in the Arid Pastoral Areas of South Australia*. His rhetorical-linguistic practice is integral to the articulation of scientific and political-administrative discourses. In his introduction to the report Ratcliffe draws attention to his avoidance of technical language, and extensive use of photographs, in order that the report 'should be properly appreciated by laymen and administrators as well as by scientists' (1936, p. 9). Ratcliffe's rhetorical-linguistic practice directs us to think beyond the distinction, and translation, between expert and ordinary languages. Instead, in this case, we can see the popular as an extension of the specialist, and, in turn, an everyday instance of the interplay between the discourse of ecology and a range of other discursive or non-discursive practices.

In 1938 Ratcliffe published a popular account of his fieldwork in the second section of *Flying Fox and Drifting Sand*. This text was published again in 1947 and 1963. Historian of science Libby Robin (1995, p. 70) notes that Ratcliffe's text was used widely in schools; further, Robin attributes to its uptake the rise of environmental consciousness in Australia in the 1950s and 1960s, in particular, the growing awareness of ecological limits to the sustainability of farming practices. It is significant that the limits to growth and concerns for ecological sustainability were, in 1938, already clearly expressed by Julian Huxley in his introduction, where he observes that Ratcliffe's book 'will make the general public more conscious of the assault of civilization on its own basis' (Ratcliffe 1938, p. ix). In adopting the popular genre of the scientific travel or adventure narrative—a tradition that stretches back at least as far as Darwin's *Beagle* diary—Ratcliffe's literary discursive practice is pre-discursive. It is discursive in that it fits established genres of popular science writing, including, it should be added, the important science-and-society genre of the 1930s.



However, its appropriation by the scientist in this particular instance, integral to formation of an ecologically informed cultural critique, is pre-discursive in that it was, as a genre near at hand, a discursive practice put to new use in the formation of ecological and social concepts.

In the epilogue to *Flying Fox and Drifting Sand*, Ratcliffe spells out for a wider audience the conceptual shift that his science has made in its understanding of drought, and observes that,

One of the most extraordinary and . . . most discouraging aspects is the reluctance, amounting almost to stubborn refusal, on the part of the Australian people, to recognize the inevitability of drought. (1963, p. 329)

The important point Ratcliffe makes here is that proper policy decisions and sustainable farming practice require an understanding of drought as normal, rather than anomalous. Significantly, at the core of this transformation of the drought concept is an ecological understanding of the distribution of the sheep population and the limits to its abundance. In turn, central to this conception was the recognition of the need for equilibrium between stocking levels and the vegetation. In a sentence that encapsulates the role of vegetation, animals and the soil in this new ecological model, Ratcliffe observes that pastoralists were beginning to grasp that the pasture loss was

nothing more nor less than a revolt of the vegetation and the soil against a treatment that asked too much of the plants when their very survival was in the balance. (1963, p. 330)

Notably, this description animates, gives agency to, the vegetation and soil, and thus brings into popular language the ecological understanding of the dynamic interrelationship between living and non-living elements of the environment. To drive this concept home he



adds an anthropomorphic dimension to his argument, employing a complex social-biological analogy between a person facing a 'creeping mortal sickness' and Australia facing the 'progressive deterioration of her inland pastoral country' (1963, p. 327-328).

Ratcliffe's employment of the anthropomorphic analogy is no mere rhetorical flourish. Internationally, the 1920s and 1930s were key decades in the analysis of population, both animal (animal ecology) and human (demography). Elucidating further the concept of population equilibrium for the popular audience, Ratcliffe warns that,

If settlement was to be on a permanent and stable basis, stocking must be in equilibrium with the vegetation . . . [,] plants that have evolved to suit the ruling half-desert conditions. (1963, p. 316)

Already, in his report for CSIR, Ratcliffe had suggested that Australia might follow the overseas example and make changes to the distribution of population of humans (pastoralists) as well as sheep (1936, p. 51). On this note, it is the function of the popular text to bring to the fore the human element. Considered discursively this has the important function of extending the ecological understanding to include human society and culture. Thus, Ratcliffe's descriptions of the extraordinary adaptability of the pastoralists and others in the extraordinarily harsh conditions of drought need to be read in terms of his analysis of the distribution of the human population. Throughout, the lives of the people of arid South Australia are represented as determined ecologically and economically, and integral to the ecosystem and engaged in struggle. He observes aspects of cultural adaptation, including the abandonment of religion, or a modification to suit the conditions, and the importance of wireless radio. Following Foucault, in his elaboration of the interrelations of knowledge and power in his later work *Discipline and Punish*, particularly as it addresses the disciplining of populations, we can observe in Ratcliffe's popular text and scientific report the emergence



of ecological knowledge as integral to the management of populations, both human and non-human.

Ecological discourse and the social-biological analogy

The analogy between the biological and the social that is a defining regularity of ecological discourse in this formative period is a rhetorical practice integral to the extension and articulation of the scientific discourse. The result is a new popular discursive hybrid of the scientific and sociological that is productive of ecocentric models of society and culture. In describing this particular instance of the international dispersal of ecological discourse, it is significant that Adelaide was an important hub for the development of ecological theory. In this context, Ratcliffe provided an important international connection, in that he was a student under Huxley at Oxford with Charles Elton. Elton's text *Animal Ecology* (1927) was foundational to the sub-discipline, and its influence was strong in Adelaide. Further, in 1932 Ratcliffe published his scientific account of the Queensland fruit bat population in the first issue of the *Journal of Animal Ecology*, edited by Elton.

During his fieldwork in South Australia, Ratcliffe had extensive contact with two important scientists, the University of Adelaide plant ecologist JG Wood, and the animal ecologist James Davidson, based at the Waite Institute. At the core of plant ecology was the concept of 'plant community', developed by one of the founders of the discipline, Frederic Clements. In his seminal text, *Plant Succession* (1916), Clements labelled his science the 'sociology of plants'. Ratcliffe's CSIR report drew heavily on Wood's study of the vegetation of arid South Australia. Ratcliffe also acknowledged Wood's generous assistance and interest (1936, p. 71). Like Ratcliffe, Wood recognised the important function of popular writing in the expansion of the discipline. He published popular articles in the *Adelaide Advertiser*, including a lucid piece titled, 'Saltbush Resists Drought: Why It Succeeds in an Arid Region Where Other Plants Die' (1937). In this popular vein, Wood also published the accessible



handbook, *The Vegetation of South Australia* (1937). A passage from this text, elaborating the plant community concept for a general readership, serves to illustrate the currency and centrality of the analogy between the social and biological in ecological discourse:

In this respect analogies have been drawn between Plant Ecology and Human Sociology. The latter is concerned not so much with individuals as with groups of individuals and ecology is concerned not so much with species as with plant communities. In human society it has been pointed out that it is difficult to say how an individual will react under given conditions but it is possible to determine accurately the way in which a crowd would react under the same conditions. And the same is true of a plant population. (1937, p. 14)

Although dwelling on the possibilities of revegetation of the overstocked pastoral country, the core of Ratcliffe's specialist and popular text is the animal ecologist's concern with the problem of the overpopulation of the land with sheep, and the management practices and land policies that put them there. Davidson, whom Ratcliffe counted as a 'friend and fellow biologist' accompanied him on one of his field trips (1963, p. 223). Davidson was engaged in internationally significant application of statistical method and population theory to the population distribution and abundance of insects and sheep. Most notably, he applied the Verhulst-Pearl logistic curve (previously used only in laboratory studies and in demographic studies in the USA) to sheep populations.

It is useful to place animal ecology's population focus in the international context of a scientific and political preoccupation with the management and health of human populations. This question of the application of ecology and other sciences to human society brings us back to the Huxley connection. It was Huxley who commissioned Elton to write *Animal Ecology* (1927), which provided the first coherent theoretical statement for the field,



for his series Textbooks of Animal Biology. In his introduction, Elton yokes his discipline to disciplines customarily applied to human society when he describes his field as the 'sociology and economics of animals' (1927, p. vii). Elton's innovation was his model for study of the causes of the distribution and fluctuations in numbers of animals in nature (Elton 1927, p. 34). Elton developed an abstract ecological model which was intended to be applied universally to animal populations, in which any of a range of animals could fill the 'niche' or function in a community. Elton's food chain concept was central to ecology well into the 20th century. Significant is a passage in Elton's preface (1927, p. viii), where he draws attention to his use of the analogy between human and animal communities. Importantly, he claims it is no more than an analogy; that he uses it to simply to signify the complexity of animal interrelationships, and that they are subject to economic laws.

Elton conducted field study in the Arctic, where, as Huxley observes in his introduction, 'the ecological web of life is reduced to its simplest' (Elton 1927, p. xvii). Ratcliffe's study of the simplified ecology of the arid pastoral zone could be seen to be modelled on Elton's study of the Arctic, with the added dimension of human society and culture; an example of the social extension of the ecological performed by the popular text. From the mid-1920s, Huxley used ecology as the focus of his efforts to reshape the disciplinary hierarchy of biology and to extend the application of biological theory. In his introduction to Elton's book, he pressed the claims of genetics and other new sub-disciplines, and promoted ecology as a unifying discipline (Elton 1927, p. xvi). Illustrating the role of popular texts in extending the reach of ecological discourse, Huxley—with HG Wells and GP Wells, in their popular text *The Science of Life* (1931)—appealed to a broader audience as he set out to extend the reach of ecology to subsume economics, a move that could be viewed as the early emergence of an ecocentric model of human society:

Ecology broadens out this inquiry into a general study of the give and take, the effort, the accumulation and consumption in every province of life.



Economics, therefore, is merely . . . the narrow and very special study of the ecology of the very extraordinary community in which we live (H G Wells, Huxley & G P Wells 1931, p. 578).

My paper title alludes to Huxley's 1932 travelogue, *A Scientist among the Soviets*. There, on one of the many invited tours by British intellectuals, he describes the revolutionary new Soviet society in terms of the concepts of another key science of the 1930s, genetics. The concept of mutation had just acquired revolutionary new meaning in the discipline of genetics. Thus, Huxley describes Soviet society as a 'wholly new kind of organism' (1932, p. 2). Further, it is a society characterised by 'hybridity' (1932, p. 29) and the contradictions associated with the 'growth and travail of the whole vast organism' (1932, p. 45). I conclude with this note to illustrate the reach and efficacy of the social-biological analogy, in particular its literal extension into social planning. Genetics, the other flourishing biological science of the time, had its own implications for the management of human populations, in particular its misuse in eugenic policies in the USA, Europe and Australia in the 1930s.

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