Sandra Bell and
Hugo Reinert

On the Outside Looking In:

Biodiversity and the Algebra of Life

Introduction

In December 2003, in a letter published in the journal Conservation Biology, two natural scientists examined the popularity of biodiversity. Using an internet search engine, they had compared page-hits for the term to a range of other terms, including "climate change", "molecular biology", "relativity", "Tiger Woods", "George W. Bush", "Arnold Schwarzenegger" and "the Beatles". As it turned out, measured in raw page numbers, biodiversity was more "popular" than all of these – including the Beatles. To the authors, these numbers indicated the "cultural prominence" of biodiversity, its "market penetration" and "global buzz" – and thus, its role as a source of solace for "discouraged" conservation biologists who thought that "nobody is listening" (Norse and Carlton 2003). Whether or not we follow their interpretation, the numbers do speak of the powerful proliferation that the concept of biodiversity has undergone, in the short decade and a half since its emergence. Until the Rio Conference in 1992, the term was scarcely known outside the specialized lexicon of particular groups such as scientists, conservation activists and diplomats. Since then, however, it has become ubiquitous: an intuitive, familiar and naturalized element of popular discourses on nature, ecology and the environment.

Originally, the term was a contraction of "biological diversity", an expression that first gained currency in the USA in the mid-1980s. The second article of the UN Convention on Biological Diversity, signed in Rio in 1992, defines "biological diversity" as:

> the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems.

The contracted phrase received its first public outing in 1986, at the National Forum on BioDiversity (Takacs 1996: 41). The origins of the term are closely linked to emergence of conservation biology as a discipline, and to the efforts of a cadre of high-profile scientists – particularly Paul Ehrlich, Norman Myers and E.O. Wilson. These were iconic scientific figures, who possessed the prestige, symbolic capital and authority to enrol powerful scientific institutions and merge scientific activism with a clear, practical and political agenda. From its inception, Wilson argued that the aim of biodiversity was to protect the intellectual study of whole organisms against the radical reductionism that was current at the time, expressed particularly in the ascendancy of molecular biology (Guyer and Richards 1996: 5). The historian David Takacs goes further, to claim that the term was coined with a conscious aim "to change science, conservation, cultural habits, human values, our ideas about nature, and ultimately nature itself" (1996: 1–2). In other words, the concept linked scientific thinking more or less directly to political action. The term diffused swiftly, spreading far and wide beyond its original circles to become, effectively, a "boundary object" (Star and Griesemer 1989): a flexible concept that migrates between the discourses of ecologists, geneticists, economists, statisticians, politicians, conservationists, journalists and a host of other groups and communities – possessing different meanings and interpretations in each, yet also providing a shared point of reference and a common language (Guyer and Richards 1996). As a result of its "deliberate vagueness", its agendas – and the uses to which it is put by different actors – have multiplied in line with its dissemination.

One proof of its success comes through its predominance within the field of European environmental policy. The UK, like other EU member states, has a national Biodiversity Action Plan, or BAP for short. The plan was devised as a response to the Convention on Biodiversity and it is managed jointly by the UK Biodiversity Partnership

and the UK government. The UK BAP is embedded in an overarching European Union BAP. The national BAP, in turn, produces a nested hierarchy of BAPs at a number of levels: each administrative unit within the UK has its own biodiversity action plan – including counties, boroughs, cities – as do institutions such as national parks. Businesses, schools and other organisations may also sometimes have their own action plans. Such plans can include a variety of "conservation actions"; one thing these plans all have in common is a list of species or habitats, specifying those deemed most in need of conservation and setting improvement targets for them. Between them, the existence of all these BAPS thus brings into being a great deal of concerted effort – on an enormous scale – to survey, monitor and record (Joint Nature Conservation Committee 2008).

Generally speaking, the enormous task of comprehensive biodiversity monitoring demands an equally enormous assembling of people – scientists, activists, volunteers – to collect the necessary data (Bell, Marzano and Podjed forthcoming; Ellis and Waterton 2004). The local multiplication of effort reflects the epistemological appetite of the biodiversity industry in general – a field in which, some argue, the scientific drive to collect data is reaching its apogee (Bowker 2000). Ironically perhaps, given the discipline's constant need for information, such mass efforts produce an *excess* of data – a glut that exceeds the processing capacity of the analytical communities, creating "bottlenecks" (Kim and Byrne 2006) and "data graveyards" where information languishes unexamined, sometimes until it becomes obsolete. This is particularly a problem with the more popular, accessible and charismatic species – say, birds or butterflies. As a result of this, the data professionals who select and compile data – database designers and managers, as well as statisticians and analysts – acquire importance that goes under-recognized and powers that go unacknowledged: by filtering and organizing data, creating taxonomies, defining parameters of access and otherwise translating raw data into actionable information, they mediate between communities and disciplines that utilise the data. Whether or not this is in itself problematic, the objectivity that is often granted to scientific data effectively creates the data managers as an invisible but powerful caste in the field of biodiversity management – a "missing layer" between science and politics that is often ignored by writers on the subject (Bowker 2000: 649).

Biodiversity thus operates politically, as a construct with political effects – both as a driver for concerted action, creating new structures and forms of organization while modifying existing ones, and as a new set of demands that subtly reorganize scientific practice, enhanc-

ing the powers of data managers. These two minor examples only begin to scratch the surface of its various operations – operations that others have charted in more detail to examine, for example, its implications in the context of neo-colonial geopolitics (Sawyer and Agrawal 2000) or the pharmaceutical expropriation of indigenous knowledge (Hayden 2003). Our main concern here lies elsewhere, however: biodiversity operates politically, but also *ontologically* – as a framing metaphor that organizes nature itself under its own rubric, structures human engagements with non-human life and establishes new *conditions of existence* for the latter. In this capacity, it marks out and highlights certain things while effacing or obscuring others. Our aim in the next section is to unpack some of these 'things'.

The Lonely Tortoise

In 1971, an American snail biologist spotted a tortoise on Pinta Island, in the Galapagos – the only one left, on an island where tortoises were assumed to have been hunted to extinction. This was more of a loss than one might think: over millions of years, separated by water, each island in the archipelago had evolved its own, morphologically distinct variant of tortoise. Over time, differences in factors such as local vegetation types engendered morphological adaptations – where food lay further from the ground, tortoises evolved long necks and distinctive saddle-shaped shells. Tortoises were assumed to have initially migrated from the south American mainland by accident, crossing the ocean on seaworthy carapaces and sustained by their ability to subsist for weeks or months without food or water – ironically, the latter ability was precisely what led them, in more recent years, to the brink of extinction. From the 17th century onwards, the islands served as a stop-over for buccaneers, merchants, whalers and seal-hunters, who would rest, repair their ships and re-supply for their long ocean crossings. Tortoises were not only edible, but convenient. Due to their slow metabolism, they could survive almost indefinitely in the bowels of a ship – often, stacked several tortoises deep – and be taken out slaughtered as needed. As a result of this, the tortoise population of the Galapagos was decimated: after centuries of depredation, the Pinta island tortoise population had dwindled to the point of extinction. George, as he came to be known – Lonesome George – was the last known specimen. The year after he was sighted, he was captured by goat hunters and brought in to the Charles Darwin research station on Santa Cruz. This is where he lives now, with two female tortoises

from the neighbouring island of Isabela – with whom George has, so far, singularly failed to mate. Even if another genetically compatible individual were found, it may be too late – George may have grown up in isolation, orphaned, without learning the skills and behaviours of tortoise mating. With his death, the Pinta island sub-species will probably be lost forever (Nicholls 2006).

In his genetic solitude, George has become something of an icon – his image is printed on Galapagos currency, and he has been adopted as a symbol and a living cautionary tale by conservationists worldwide. Qua species, the Pinta island tortoise is already extinct – unbreeding, George inhabits the aftermath of its extinction: wake, coda, living obituary. In biodiversity terms, he vividly exemplifies the individual as the *tragic limit point* of the species – the spectre that haunts any threatened population, of an irreversible collapse into non-viable singularity. In his lonely and advancing age, he has become a most concrete metonym of the constant terrors – collapse, extinction, catastrophe – invoked by environmental and conservationist discourse: living reminder of extinctions past, ominous shade of extinctions yet to come. Quite literally, he embodies the *crisis consciousness* of biodiversity discourse – as journalist put it, "a voiceless victim of human progress" ('The Fire in Lonesome George's Loins', *The Guardian* 13.05.2006).

Takacs argues that the concept of biodiversity is "a tool for a zealous defense of a particular social construction of nature that recognizes, analyzes, and rues [the] furious destruction of life on Earth" (1996: 1). In essence, what this construction amounts to is a view of nature in crisis, wounded: seriously, even mortally threatened by human agency. Biodiversity comes with a built-in crisis and a diagnosis – both of which are posed in terms amenable to rational, technical solutions. It encodes not only aims, such as preventing extinction and the loss of diversity, but also modes of achieving them – that is, shaping specific forms of human agency, distributed among classes of agents that possess the necessary skills, capabilities and knowledge. Like any narrative of loss, it implicates a *temporal* dimension: a diachronic succession of events leading from plenitude to the deplenished present. This latter point is perhaps where it shows most clearly its roots in conservation biology – or rather, through this, its links to evolutionary thinking.

Consider a faux naive question: What exactly *is it* that is lost when a species becomes extinct, a habitat succumbs, a genetic trait disappears? What is mourned, why is the loss important? Framed in evolutionary terms, the loss of any of these is the loss of an irreplaceable piece of planetary history – the unique, singular, expression of

millions of years of gradual evolutionary change. Over the course of planetary evolution, the genetic and morphological diversity of biological life has emerged slowly, in small increments, over incredible spans of time. The extinction of any species is thus a loss of *the living past* – a momentous loss, with unknown and unforeseeable consequences, irreversible outside the still-utopian realms of emergent genetic technologies. Evolutionary thinking thus provides biodiversity with an understanding of biological *change* – slow, gradual, accreting over immeasurable spans of time – and, consequently, with an understanding of *loss* that is rooted in the temporal. Through this link, biodiversity inserts itself in the grand trajectory of the evolutionary paradigm, and of its powerful cultural impact over the last two centuries. (Myerson and Rydin 1996).

Seen in a certain light, evolution operates as a sort of secular cosmology: supplying an overarching narrative of the emergence of life and its development over time, an account of morphological change and a place where humans fit into the story. One of its aims, in the end, is to provide comprehensive account of the emergence and unfolding of life on earth. Insofar as it seeks this, it also becomes one of the discourses by means of which the earth itself is constituted – represented, discussed, analyzed, produced, constructed – *qua* planet. It is a planetarizing discipline. Biodiversity inherits this global or planetary as a frame of reference and enacts it, by articulating local problems against a global – or planetary – backdrop and configuring them as elements of a crisis that affects not only humanity as a whole, but the entire planet. The diagnosis of a truly global crisis interrogates and challenges humanity as a species; the rallying calls of biodiversity activists are, in this sense, attempts to produce humanity itself as a cohesive planetary agent, capable of concerted action. So far, despite a degree of mobilization, most would agree that the success of this has been rather limited.

The narrative of critical and ongoing extinction is a powerful metaphor, a trope for conceptualizing the overall state of the planet. Metaphors are, of course, a key element of conservationist and environmentalist discourse, as well as playing an important role both in scientific discourse and science communication (Harre et al. 1999). As a device for seeing something in terms of something else, they provide common ground for the exchange of meaning between social groups and contexts, including academic disciplines and communities; similarly, as connecting tropes, they serve to create bridges between disciplines, discourses and levels of argument. This is more or less the definition of a boundary object – which, as we noted earlier, fits biodiversity very well. As an 'activist concept'

– with an explicit purpose – it was never intended for purely scientific circulation: rather, it was to bridge the world of science with those of other publics, including politicians and policy-makers. Of course, its multiple social existence carries its own problems – semantic drift, for one; the risk of ambiguity, imprecision, and vulnerability to being "co-opted" by specific agendas; and last but not least, perhaps, the threat of over-simplification. Despite flexible meanings and bridging functions, however, biodiversity remains a largely technical concept, with a relatively circumscribed range of significations that perform a finite number of operations – particularly if contrasted with concepts such as "nature" or the "environment" (Macnaughton and Urry 1998: 45).

Accountants of Life

Biodiversity is, first and foremost, a matter of *numbers* – numbers of species, numbers of populations, and the numbers of individuals required to sustain these as viable. At heart, it is a science of counting – numbers can be projected and extrapolated, but such inferences are still rooted in observation and the collection of raw data. Importantly, a vast proportion of these numbers are *unknown* – perhaps even unknowable. For each species that is monitored, there are many that evade supervision, whether for practical reasons or because they are not sufficiently charismatic to command attention. Perhaps even more significantly, for each species that is *known*, an unspecified number remains unknown – unclassified, undiscovered. The production of complete and accurate numerical data requires work, and a degree of supervision and control that can be difficult, even impossible to achieve – particularly with wild populations. Scientific conservation is not a laboratory science: observation is circumscribed by practical constraints, and numbers fluctuate constantly. Knowledge has its demonstrable limits. As a concept, biodiversity is thus "quantitative without necessarily being quantifiable" – it marks out a vast and shadowy "zone of ignorance" (Guyer and Richards 1996: 1). This zone, in turn, operates as a powerful narrative trope, evoking an ongoing and vertiginous decimation that is permanently unfolding "out there", beyond the flickering camp-fire of scientific knowledge. With its narrative potency, the existence of this "zone" serves to mobilize the limit points of observation itself – politically, as incentives to urgent action. Life itself, and the biosphere, exceed the scope for comprehensive human observation or surveillance. Known losses pale against the fact that uncounted species are be-

ing lost, irreversibly, even before they are discovered. In this sense, biodiversity is perhaps an unusual science: knowledge generally authorizes practical interventions, enabling and underwriting them. Its absence creates a vacuum of legitimate or effective agency: in the case of biodiversity, however, ignorance serves the same function of knowledge.

Biodiversity is also concerned with *difference*. One of its basic operations, as a concept, is to *segment nature* – localizing significant difference, partitioning the world into discrete entities and placing relative value on these according to their distinctiveness. In theory at least, the definition of difference – its scale and its phenomenal resolution – is wide open. Roughly speaking, however, biodiversity definitions tend to isolate relevant difference at three principal scales or levels of organization: genes, species and habitats. There are other measures that operate at a more abstract and esoteric scale – measuring biodiversity at the level of assemblages and entire ecosystems, for example, or breaking it down according to compositional, functional and structural factors (Gaston 1996). In general usage, however, species tend to receive the most attention – among other things, fauna is charismatic and "species richness" is an easily communicated concept (Gaston and Spicer 2004). Taking into account the "zone of ignorance" and the structural limitations of observational practice, the language of conservation biology deploys concepts that enable it to manage its ignorance, and operate efficiently in the shadowy reality beyond available data: concepts such as *keystone* species – that is, species like carnivores, whose significance for a large range of other local species is out of proportion to their density or biomass – or *umbrella* species, species whose habitat and feed requirements are so extensive that their preservation will almost certainly also preserve a range of other species (Simberloff 1999). Addressing the overwhelming data limitations, such concepts also afford an efficient economy of action – an economy that is highly necessary, given finite manpower, time and resources. This last point is key – the finitude of available human resources immediately forces biodiversity conservation into the realm of *calculations*.

In biodiversity terms, individual specimens acquire their value primarily in *relational terms*, contextualized against the backdrop of aggregates – insofar as they express a distinctive genetic differential. More specifically, they become more valuable in inverse proportion to the density of the aggregate they form part of. The more genetically similar individuals there are, "out there", the less valuable each of them becomes. Conversely, as a population dwindles, the threat of extinction escalates and each individual becomes increasingly

precious. As in the case of Lonesome George, this escalation of individual value reaches its apex – and its point of reversal, the point where value becomes literally *invaluable* – in the last survivor of a species, alive but positioned on the other side of extinction. Of course, emergent technologies hold out the promise of *reconstituting* the species – even from its collapse in the solitary individual. Still, for the vast majority of species at least, this option remains firmly in the territory of science fiction (Franklin 2007). All this is to say that in strict Foucaltian terms – bracketing possible objections to the application of his terms to non-human animals (Wadivel 2002) – species-oriented biodiversity management is perhaps the paradigm of a *biopolitical* discipline (Foucault 2004). It subordinates the individual to the requirements of the population, constituting the latter as "a political problem" and a problem of human management. It generates *populations* – and species, sub-species, analogous aggregates – as its primary objects of intervention, management and surveillance. In this regard, it is often formulated as a discipline of *safeguarding*: aimed at preserving life, protecting diversity, preventing extinction or loss. This is only half of the story, however: it is worth keeping in mind that the protection of biodiversity also authorizes and legitimizes the destruction of life, at aggregate and sometimes very large scales. Briefly, an example.

Back in the Galapagos, as we described, centuries of human depredation have driven George's tortoise kin to the brink of extinction. Recently, one of the key threats to their survival *qua* species has been the local population of feral goats, *capra hircus* – introduced for their meat by waves of sailors, whalers and colonists, then abandoned to breed uncontrollably (and rather successfully). Once established on the islands, these 'alien' goats impacted radically on the local ecosystems: degrading the vegetation through overgrazing, displacing 'native' fauna and entering into direct ecological competition for food resources with local species, including George's giant tortoise kin. To restore pre-human pristine grace and ensure tortoise survival, the goats had to be eliminated from the ecosystem – that is to say, they had to be exterminated. On Pinta island, the local goat genocide was finally completed in 2003: "final" success was declared, after a 30-year killing campaign using hunters, "ground-based methods" and "Judas goats" – specially trained goats fitted with radio-transmitters and released to seek out their kin, enabling hunters to locate populations of feral goats (Campbell et al 2004).

The local example of the Pinta Island goats does several things. For one, it illustrates how misleading the term 'conservation' can be: as in this case, the proposition to *conserve* can conceal a powerful

impulse to *transform* – to restore the local ecology to a pristine and pre-human state of grace, to an imagined past Eden that lay before human meddling. In the name of this goal, entire populations of living creatures could – and must – be hunted down to extinction. In this, the story also offers a vivid example of how biodiversity discourse, through the creation of particular forms of value, operates to frame and contain life hierarchically: ranking the life and death of individual animals – and entire populations – according to human criteria. Globally ubiquitous as they were, the Galapagos goats could be exterminated freely at the local level – through biodiversity, their lives and deaths were reduced to the level of a problem, subject to technical, rational, human solutions. A matter of technical ingenuity, not ethics – as Heidegger might say, they had been "enframed" by technical rationality (Heidegger 1977). The example of a campaign to exterminate goats to save tortoises expresses a more general dynamic: the larger a population is, the more widespread and genetically robust, the less the death of an individual – or of a local population – will threaten global biodiversity. More than biopolitically expendable, the destruction of the goats was *necessary* – the outcome of an abstract calculation, made with living bodies. The tortoises were rarer and more endangered, and therefore more valuable. In this sense, biodiversity frames the individual *as a means to the species* – or to the global aggregate.

Whether we consider this a problem or not, it is a fact that biodiversity discourse and practices thus operate in a constant register of *sacrificial calculation* – the death of one, for the life of another (Reinert 2007). Life and death are reformulated within the optic of a form of technical accountancy that weighs species up against each other, assessing their relative merits to decide on their fate within a matrix of quantitative valuations (Gowdy 1997). A particularly clear and vivid formulation of this comes in the form of the "Noah's Ark problem". Originally, this problem was formulated by Weitzman, in a seminal and eponymous article (Weitzman 1998). Using statistical modelling, the article poses the problem of biodiversity conservation in terms of cost efficiency, as a question of maximizing "utility" given a finite set of resources. Within a rational optimization framework, the calculation of whether to attempt to save a particular species or not is broken down into four quantifiable key variables: "distinctiveness", "utility", "survivability" and "cost" (1998: 1297). Weighing these against each other provides, for the prospective decision-maker, a clear way of representing – and discovering – the optimal course of action in any situation that can be rephrased as a problem in the "economics of diversity".

In an optic of genetic diversity that encompasses the entire globe, and uses this as the frame of reference for its calculations, forms of life become interchangeable – and expendable – in new ways. This problem of expendability within a global frame of calculation is vital. For one, it creates an important fracture between biodiversity management and any ethos that foregrounds the personhood of non-humans, or relations between humans and individual animals; a fracture that may have subtle but problematic implications, for example, for the enrolment of indigenous people in conservation efforts. Beyond this, however, the problem affects us all: it begs the pivotal question of where, when, how and by whom the precise value of a life, of any life – its utility, its comparative worth, its sacrificial equivalence – can be determined. Who decides on the value of a life, of lives, of life itself – on what grounds, and in what way?

Conclusion

Whether in its species-oriented "folk versions" or in the more complex multi-variate calculations of ecosystem management, the paradigm of biodiversity articulates – both in theory and in its application – a powerful form of human sovereignty over non-human nature. It may displace the *aims* of human action, relative to the paradigms of exploitation that it decries – but the assumptions, the methods and the fundamental authority that it grants remain similar. In its name, humans are granted rule over life itself, the power to designate for death and exterminate according to the values they assign. Put simply, biodiversity discourse allocates to humans the legitimate authority – in fact, the *responsibility* – to manage, control, supervise, breed, protect, relocate, restore, cull, exterminate, even where possible to *resurrect* (e.g. using emergent genetic technologies) all other species and forms of non-human life. It extends this elemental mandate of human sovereignty *to the entire planet*: as a form of benevolent stewardship, exercised in atonement, but sovereign nonetheless – imbued with the power to control life and, where deemed necessary, to kill (Mbembe 2003). In this, in the exercise of this mandate, biodiversity becomes a positively Adamic discipline. As a paradigm of calculations and trade-offs, accountancy and probabilities, biodiversity sees eye to eye only with the aggregate, at the level of the *species*. The individual animal remains a means to an end, permanently subordinate to the necessity of ensuring the persistence of the species. Taking certain liberties with Levinas, we could say that biodiversity *conceals* the face of the animal as Other – or at least,

that it fails to reveal or uncover it (Atterton and Calarco 2004). In this, it stands in contrast to any ethos or regime that seeks relation with individual animals, or which foregrounds the personhood of non-humans: indigenous cosmologies, for example (Descola and Pálsson 1996), or the post-human ontologies articulated by Donna Haraway (2003) or Bruno Latour (2004). Earlier we discussed the link between biodiversity and evolutionary theory. This link has other implications as well. In popularised form at least, the principles of evolutionary thinking often take the form of a mythical destiny narrative – a pyramid, with a human-shaped apex – that lead from the emergence of organic life from the primeval soup to its culmination in modern humans. This position at the apex is complex. It allocates to humans a tremendous responsibility, exercised in atonement for exploitations past and present: to steward the earth, restore balance and ameliorate damage. For all that the discourse and practices of biodiversity management *nominally* acknowledge humans as part of the ecosystems they inhabit, there is an interesting ambivalence in this recognition. In their preference for "pristine" environments, and their treatment of "feral" or "alien" species such as the Pinta Island goats – often species introduced by humans, and therefore marked by human association – biodiversity advocates often manifest strong value judgements concerning human beings: reducible, at times, to a "straightforward opposition between people and biodiversity" (Kandeh and Richards 1996: 1). Such value judgements reiterate a familiar ontological dualism that locates human beings *outside* "nature" (Latour 2004). Interestingly, the space of this human exteriority to nature – which mirrors, in a certain sense, the structure of the original theological exile, the expulsion from Eden – articulates with the space of the globe, and of the global frame of calculation that enables biopolitical decisions. Reflecting on questions of dwelling and embodiment, Tim Ingold distinguishes two ways of imagining the world: as globe, or as sphere (2000: 209–18). The former, to Ingold, is a trope of *expulsion*: it consigns humanity to the surface of the world, positioned on its outside rather than immersed in its fabric, and reproduces a fundamental alienation from the matrix of lived experience. Envisioned as globe, the world becomes a radical abstraction – and humanity, an abstraction separate to it. The globe metaphor thus engenders a relationship to the world as object, external to an abstracted human subject – a relation that easily becomes exploitative: "conceived as a globe, [the world] can become an object of appropriation for a collective humanity" (Ingold 2000: 214). The image of the world *qua* globe – apprehended from the outside, as an abstracted totality – produces the "ontology of detachment" (Ingold

2000: 216) that enables the impersonal calculations of biodiversity discourse – of utility, value, expendability – and makes them meaningful. This view of the world is, in a sense, the "view from nowhere" (Nagel 1989): a visual metaphor of exteriority which spatialises the plane of abstraction – of superior vision and knowledge – that constitutes the assumed privilege of humanity. From the vantage point of this disembodied exteriority, interventions "into" the environment can be launched and entire species transformed into cyphers to be manipulated, controlled, regulated (Ingold 2000). Following Ingold's line of argument, there is a sort of centrifugal force at work in biodiversity management discourse – a vector that seeks to take humans out of the equation and position them instead at the blackboard, chalk in hand, solving the same equation. This position of exteriority may be imperfectly realized, for a number of reasons – curtailed by the limitations of embodiment, the zone of ignorance – but in the near-constant pull of its attraction, biodiversity remains a modern, profoundly anthropocentric project. To many, of course, this may not be a problem – after all, aren't we saving the world here? Is biodiversity not a good thing? What else are we supposed to do? What is the alternative? Certainly, we would not contest the efficacy, or for that matter the importance, of biodiversity management – still, structures of power and authority are always worth interrogating, whether their subjects are human or non-human, and all the more so for being naturalised and widely recognized as "for the good". Where might we start looking for alternatives? Echoing Ingold, Gayatri Spivak considers the globe a space of disembodied abstraction: it "is on our computers. No one lives there. It allows us to think that we can aim to control it" (2003: 72). Her alternative to the globe, however, is the planet – imagined not as the restoration of a "local ontology of engagement" (Ingold 2000: 216) but rather, and more cautiously, as the site of a continued but re-articulated difference. While the globe homogenizes, Spivak argues, the figure of the planet is "in the species of alterity, belonging to another system; and yet we inhabit it, on loan" (2003: 72). She asks of us that we "imagine ourselves as planetary subjects rather than global agents, planetary creatures rather than global entities" – because in so doing, "alterity remains underived from us; it is not our dialectical negation, it contains us as much as it flings us away" (2003: 73). That is to say, her plea is for a reformulated notion of difference itself. While Ingold attacks the very premise of human difference, and thus exteriority to the environment, Spivak instead seeks to preserve this difference – but rephrase it, at the same time, as a relationship of containment rather than brute exteriority; of humility and co-exist-

ence, rather than control. Perhaps, in this more delicate figure of a temporary enfolding, we might start looking for future alternatives to sovereignty and exteriority – alternatives that could, if not replace, at least supplement the exercise of human control over non-human nature. Stewardship may be preferable to open war, but it still falls far short of a partnership.

References

Atterton, Peter and Matthew Calarco, eds.
2004 *Animal Philosophies*. London: Continuum.

Bell, Sandra, Mariella Marzano and Dan Podjed
Forthcoming 'Inside Monitoring: A comparison of Bird Monitoring Groups in Slovenia and the United Kingdom.' In: *Taking Stock of Nature*. Lawrence, Anna, ed. Cambridge: Cambridge University Press.

Bowker, Geoffrey
2000 'Biodiversity Datadiversity.' *Social Studies of Science* 30(5): 643–83.

Campbell, Karl, Josh Donlan, Felipe Cruz and Victor Carrio
2004 'Eradication of Feral Goats Capra Hircus from Pinta Island, Galapagos, Ecuador.' *Oryx* 38: 328–33.

Descola, Philippe and Gisli Pálsson, eds.
1996 *Nature and Society - Anthropological Perspectives.* London: Routledge.

Ellis, Rebecca and Claire Waterton
2004 'Environmental Citizenship in the Making: The Participation of Volunteer Naturalists in UK Biological Recording.' *Science & Public Policy* 31(2): 95–105.

Foucault, Michel
2004 *Society Must be Defended*. London: Penguin.

Franklin, Sara
2007 *Dolly Mixtures: The Remaking of Genealogy.* London: Duke University Press.

Gaston, Kevin, ed.
1996 *Biodiversity: A Biology of Numbers and Difference.* London: Blackwell.

Gaston, Kevin and John Spicer
2004 *Biodiversity - An Introduction.* London: Blackwell.

Gowdy, John
1997 'The Value of Biodiversity: Markets, Society and Ecosystems.' *Land Economics* 73(1): 25–41.

Guyer, Jane and Paul Richards
1996 'The Invention of Biodiversity: Social Perspectives on the Manage-

ment of Biological Variation in Africa.' *Africa: Journal of the International African Institute* 66(1): 1–13.

Haraway, Donna
2003 *The Companion Species Manifesto.* Chicago: Prickly Paradigm Press.

Harre, Rom, Jens Brockheimer and Peter Mulhausler
1999 *Greenspeak: A study of environmental discourse.* London: Sage.

Hayden, Corinne
2003 *When Nature Goes Public.* Princeton: Princeton University Press.

Heidegger, Martin
1977 'The Question concerning Technology.' In: *The Question Concerning Technology and Other Essays.* Lovitt, William, ed. New York: Harper.

Ingold, Tim
2000 *The Perception of the Environment.* London: Routledge.

Joint Nature Conservation Committee
2008 <http://www.ukbap.org> Accessed March 2008.

Kandeh, H.B.S. and Paul Richards
1996 'Rural People as Conservationists: Querying Neo-Malthusian Assumptions about Biodiversity in Sierra Leone.' *Africa: Journal of the International African Institute* 66(1): 90–103.

Kim, Ke Chun and Loren Byrne
2006 'Biodiversity Loss and the Taxonomic Bottleneck: Emerging Biodiversity Science.' *Ecological Research* 21(6): 794–810.

Latour, Bruno
2004 *The Politics of Nature.* London: Harvard University Press.

Macnaughton, Phil and John Urry
1998 *Contested Natures*. London: Sage.

Mbembe, Achille
2003 'Necropolitics.' *Public Culture* 15(1): 11–40.

Myerson, George and Yvonne Rydin
1996 *The Language of Environment.* London: Routledge .

Nagel, Thomas
1989 *The View from Nowhere.* Oxford: Oxford University Press.

Nicholls, Henry
2006 *Lonesome George: The Life and Loves of a Conservation Icon.* London: Palgrave Macmillan.

Norse, Elliott and James Carlton
2003 'Letter.' *Conservation Biology* 17(6): 1475.

Reinert, Hugo
2007 'The Pertinence of Sacrifice.' *Borderlands* 6(3).

Sawyer, Suzana and Arun Agrawal
2000 'Environmental Orientalisms.' *Cultural Critique* (45): 71–108.

Simberloff, Daniel
1999 'Biodiversity and Bears: A Conservation Paradigm Shift.' *Ursus* 11: 21–7.

Spivak, Gayatri Chakravorty
2003 *Death of a Discipline.* New York: Columbia University Press.

Star, Susan and James Griesemer
1989 'Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907–1939.' *Social Studies of Science* 19: 387–420.

Takacs, David
1996 *The Idea of Biodiversity*. London: Johns Hopkins University Press.

Wadivel, Dinesh
2002 'Cows and Sovereignty: Biopower and Animal Life.' *Borderlands* 1(2).

Weitzman, Martin
1998 'The Noah's Ark Problem.' *Econometrica* 66(6): 1279–98.

***Sandra Bell**, Department of Anthropology, University of Durham, UK.*
E-mail: sandra.bell@durham.ac.uk.

***Hugo Reinert**, Department of Anthropology, University of Durham, UK.*
E-mail: hreinert@gmail.com.