Technology, inclusivity and the rogue: bats and the war against the 'invisible enemy'

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ABSTRACT

Although tempting to envisage the emerging violence in conservation as either against nature or in defence of it, this paper argues that such violence is increasingly between 'the included' and 'rogues' in ways that transcend the nature : society binary. The paper traces how the emergence of these battle lines is associated with the digital information revolution that is producing discourses and practices of 'inclusion' that embrace social and natural worlds, whilst recasting a hitherto knowable and governable 'excluded' as more unknowable and threatening 'rogues'. Accordingly, the paper then illustrates how the battle against the 'invisible enemy' of Ebola was fought not just against rogue viruses but against rogue bats, rogue deforesters and rogue patients, transcending the nature : human binary, and similarly that sustainable solutions are being sought in rearranging landscapes within an inclusive 'One Health' approach.

KEY WORDS

Conservation, violence, inclusion, rogue, bats, Ebola

1. **INTRODUCTION**

This collection responds to an observation, as Büscher and Fletcher (2017) write, that we are witnessing an intensification of violence both against nature and in defence of it. Yet several trends in contemporary social science have been collapsing the human / nature binary on which such an analysis turns to produce an understanding of the natural world that is more inclusive of human social order, and of the social order that is more inclusive of the natural world. So is this emerging violence still best conceived of in relation to this binary?

There are several reasons to be wary. First, as Haraway suggests, in the human desire to know 'nature', nature is becoming increasingly cyborg (1995: xii). Through a combination of human scientific curiosity, self-preservation and the new possibilities enabled especially by the digital revolution, the internet has expanded not only to become an internet 'of things', but given the sensors in space, sky and earth an 'internet of planetary processes,' and now as we increasingly microchip the living world to monitor its ways, also an 'internet of animals' (Dlodlo 2012; Maffey et al. 2014; Sandbrook 2015); or 'of life'. A digital inclusion of nature is happening through the uncoordinated actions of all those involved; scientists, tech firms, NGOs, conservation agencies, donors and so on. This is providing enormous insight into hitherto inaccessible life-worlds, and new fields of biological, ecological and earth systems inquiry are being driven by every new technological possibility. It is part of a decentralised digital revolution that can rightfully be heralded also for the liberties it enables (e.g. Benkler 2016). Yet an effect of this effusion of liberty is that human sociality has insinuated itself into planetary self-regulation and is rendering our world digitally reflexive. Through what Foucault might have described as 'capillary' action (Foucault 1980), it is becoming impossible to conceive of the planet's (Gaia's) 'self-regulating system' without human mediated, digital reflexivity. So whilst the human impact on nature has generated much debate concerning the 'anthropocene' and when it began, as digital technologies are becoming part of our planet's reflexive processes, we appear already to be entering a rather different Anthropocene - an 'Anthropocene 2.0' - that transcends the human : nature binary.

A second reason to be wary in conceiving of emerging conflicts as between humans and nature is prompted by a more inclusive understandings of human sociality that appreciates the 'more than human' as integral even to human social relationships (e.g. Kirksey and Helmreich 2010). This forces us to examine the human as imbricated in 'multi-species'

complexes entwined with more or less symbiotic viruses, bacteria and insects, plants, domestic animals and indeed the wilder animal world that build relations with us. This has forced many to question the 'anthro' of anthropology: by some readings, relations among humans which we are accustomed to calling 'social' are 'but a sub-set of ecological relations' (Ingold 2000: 5). Thirdly, interpreting the current violence within this human / nature binary might be called into question by moves in security studies itself towards a more inclusive understanding of security that acknowledges not just social and political boundaries, but planetary ones too (Rockstrom et al. 2009).

All these are moves towards an understanding of nature that is more inclusive of humans or of humans that is more inclusive of nature. Moreover, this analytic of inclusivity can itself be considered as part of a broader political, policy and analytical discourses of 'inclusivity'. International development discourse exemplifies this, with the trope of inclusion pervading most policy arenas: 'inclusive' development; 'social inclusion', 'financial inclusion', 'digital inclusion', 'inclusive economics' and so on. Here, however, we are observing that such inclusion now also extends into natural world: financial inclusion extends not only to 'the poor', but to poor nature that has now become included, economically as the natural world is no longer the neglected 'externality' that it used to be, but it is 'natural capital', and a valued 'ecosystem service provider' in the emerging carbon, biodiversity and other offset markets. Market-based approaches to environmental policy and conservation are including and embracing nature as both capital and commodity, and financialising it (Sullivan 2012, Buscher et al. 2012, Fairhead et. al. 2012).

Such mutual inclusivity, however, has its limits. Those involved in the struggle to address the Ebola epidemic in West Africa, as this paper later reflects on, certainly sought its elimination. Inclusivity did not extend to this rogue virus or its carriers. In emerging political discourse, those beyond 'inclusion' are increasingly cast as rogues. There seem to be such rogues all around, some 'natural' and some 'social'. In the views of one contributor to a recent *Military Review*, the thinking arm of the US military:

> 'it is apparent that rogue groups, individuals, subnational entities, and criminals whose actions have a significant impact continue to exist, along with a few nation-states that do not *share the same values or participate in the community of nations as positive contributors to stability and peace*. There is no magic antidote for this global

> infection. We must be prepared to fight against these enemies with appropriate force (Hughes 2016: 45, my emphasis).'

The rogue has become the new enemy: rogue states, rogue traders, rogue viruses, rogue cells, rogue waves, rogue software, rogue migrants, rogue ideas. It is the rogue that is now unpredictable; 'untamed'; 'under the radar'; 'off line'; 'off grid'; 'invisible'; underground, vagrant, unprincipled, solitary – quite literally antisocial. Indeed, if we want to comprehend our ancestors' supposed fear of 'the wild', we need look less to any 'nature' 'red in tooth and claw' that to our modern fear of 'the rogue'. Yet rogues can be human, but they can be other living beings, part of the non-living materiality, or indeed, in the case of rogue ideas, simply conceptual.

Somehow, as the *Military Review* evidences, it has become possible to envisage social rogues as an 'infection' requiring elimination. Yet battles against these rogues also extend into the natural world beyond metaphor. The fight in 2014 and 2015 was not only against the 'invisible enemy' of Ebola, but against the natural world that harboured it as well as the infected people whose health seeking and mortuary practices outside of official strictures were criminalised. And to fight it, many called not only upon the humanitarian medical response but also on the power of tropical forests that, through better conservation in a 'one health' approach, might somehow assist in preventing Ebola's re-emergence and spread.

This paper develops an argument that to understand the place of nature in contemporary violence, we might frame it less in relation to human violence for (or against) nature, but subsume an understanding of such violence within what appears to be an increasingly potent distinction between 'the included' and 'rogues'. We can see the salience of this framing when observing, as Fletcher (2017 infra) shows so eloquently, that among those apparently fighting 'for nature' some are cast as conservation heroes struggling against poachers in Africa whereas others become cast as eco-terrorist rogues disrupting animal experiments in Europe. And it is not just humans who fall on either side of the 'included : rogue' divide. 'Nature' herself can fall on both sides too: some bats are conservation heroes, pollinating the plant world, distributing its seeds and consuming its insect pests, whereas others are rogues, supposedly carrying the Ebolavirus that evokes such terror, necessitating containment or elimination. What we include as 'positive contributors to stability and peace' and the rogues we fight both transcend natural and social distinctions.

2. **METHODOLOGY**

Having observed this by way of an introduction, this paper first probes the archaeology of the current expansion of the included : rogue distinction and its transcendence of the 'human : nature' binary. I want to ask not just why discourses of inclusivity are becoming so prevalent, but why now? Is it simply because we have finally (eventually) realised the errors of past exclusions and appreciated the significance of our entwined relations with the natural world? Or is it perhaps (as I want to suggest here) also an effect of our new technological age and the particular modes of inclusiveness that it is now engendering?

In seeking answers I am going to take an analytical lens that considers the place of science and technology in configuring this conceptual field and the presuppositions to be found within it. Indeed I am going to respect arguments that pay more attention to technological determinism and in particular to the determining forces of technologies that facilitate inclusion – not just the internet and global communication that the technological revolution offers for example, but also the technologies that now facilitate increased financial inclusion of people, extending its reach, for example, through mobile phone banking and financial inclusion programmes for the poor, and that expand the financial inclusion of parts of the natural world, such as in the technologies that permit (however imperfectly) the emergence of markets for carbon, biodiversity and all other 'ecosystem services'. Such inclusivity rendered possible through this technology is rapidly drawing global society and global nature into an intensifying neoliberal political-economic order. That this order increasingly capitalises 'nature' in conservation has been outlined by Büscher and Fletcher (2015), yet here I want to develop the argument further to examine (a) how this process is as much technologically driven as it is by economics, politics and policy, and (b) how living our new socio-technical lives has been gradually reshaping the categories through which we interpret and prosecute violence. It is thus an argument in the Durkheimian tradition that examines how categories of thought can be traced to modes of social live; of the 'natural' categories through which we understand the world are shaped by social orders (Douglas 1970, Schmaus 2004). Following this theoretical development, the paper analyses policy discourse and practice concerning viral zoonotic spillover in general, and of Ebola virus in particular, and the place of bats within them.

3.0 ARGUMENT

3.1 Technological forcing

Several recent works theorise the powerful place of remote digital technology in transforming patterns of inclusivity in the governance of nature, such as those of Büscher (2016, forthcoming) who discerns how interactive new media shape modes of inclusion and exclusion surrounding National Parks. Such works suggest a more determinant force of technology in assemblages of inclusion, a consideration that I now want to pursue a little more systematically.

This line of reasoning derives from observations that the history of environmental conservation has been inextricably linked to the histories of technologies that (a) render environmental problems visible (b) enable modes of intervention; and (c) shape dispositions between those involved in policy and those subject to it. There is nothing new in observing that the development of the technologies that rendered nature and society manifest and legible has been critical to understanding modes of its governance. Considering how natural and human sciences (and their technologies) unfolded in association with new forms of power was Foucault's overarching project (Foucault 1980; Gordon 1980), and the relationship between science, technology and governance continues to echo around the social sciences, for example in Scott's *Seeing like a state* which casts technologies of mapping and land sciences as central to governance in 'high modernism' (1998). Turnbull (2000) shows that state, science and cartography coproduced one another, and Vandergeest and Peluso show the central place of technology in the conceptualisation of knowable 'Political forests' as distinct from a wilder jungle (2015). All these works reveal how 'it is a project of power… to make individuals and resources legible, knowable and controllable' (Millar 2016: 210).

These works all foreground how, even though the era of colonial land conquest may have been driven in part by the logic of capital, it's assemblages were enabled and shaped too by scientific and technological developments - in communication, surveying, social surveying, mapping, air photography and so on. These technologies were key to colonial environmental science and the demarcation and management of national parks. From the 1960s the assemblages of the more remote power of neo-colonialism (whether Western or Soviet) included technological developments of more remote control: in stratospheric spy-craft, intercontinental weaponry, and space-based monitoring and communication; in the remote sensing and remote acting technologies which further gave shape to the environmental

sciences and monitoring.[1] So if we are entering a new era of environmental governance and a related escalation in conflict, is it not incumbent on us to ask how this relates also to technological developments? This question is all-the-more important given the profusion of technologies that help us to know the environment, discern anthropogenic pressures upon it, and support policies addressing these. As mass digitization transcends the social/natural divide it is also being made legible in new ways as the 'big data' it generates can be machine read and mined for meanings and profit. It is heralding a new intelligence revolution – and a new commercial-political order focused on monopolising and directing digital traffic (Newman 2015). Yet we must consider also how technological developments are also entangled with political thought. Euro-American racist ideologies that were part of colonization assemblages were rooted in the self-aggrandizing discourses concerning technical and scientific pre-eminence and which gave life to the 'sciences' of phrenology and eugenics, and to exclusionary policies enforcing segregation and curtailing 'miscegenation'. What has been the place of digital technology in shaping more contemporary social distinctions associated with the neoliberalism that it is supporting?

3.2 Technology, the included and the rogue

How might emerging technology be reshaping perceptions of a dualism between nature and society into one of inclusion and rogue? To address this, I will forward two main arguments. The first is that it is the possibilities of the digital revolution that is enabling 'market based solutions' to environmental governance to be envisaged; a commodification of an economically and digitally included nature. The second is that the technology has produced the profusion of 'big data' concerning earth and social systems that now enables us to think and theorise differently about natural and social orders.

Technology, Inclusion and the market

The most fundamental shift in current environmental policy has been towards the emergence of 'market based solutions' that threaten to eclipse existing regulatory practices. The establishment of markets for all ecosystem services, sometimes alluded to as the 'commodification of nature' or the 'neoliberalisation of conservation', is fast moving and has enormous ramifications that are only now being researched (e.g. Castree 2008; Büscher et al.

[1] See Light, J. for a wider analysis of the civilian application of military technologies

2014). There is currently a boom in the development of private protected areas and Land Degradation Neutrality corporate investments that is associated with the emergence of offsetting and markets for carbon, biodiversity and other ecosystem services, and the payments, tax breaks and subsidies that these can attract (Kay 2017; The LDN fund 2017). Conservation has fast become part of an enormous growth industry as it develops from less lucrative regulatory 'protection' to a much more active 'economy of repair' in order that there might be destruction in one place, repair in another, but 'no net loss' (Fairhead et al. 2012).

Forests in West Africa, for example, have acquired new value as part of this global economy, attracting payments for their role in repairing the global climate from fossil fuel emission of greenhouse gases in the 'global north', and for the repair of biodiversity loss wrought by industrial expansion and habitat destruction. This is providing enormous income opportunities to conservation organisations, many of which have consequently become compromised in their new partnerships with the extractive industries (Leach and Scoones 2015). This new profitability given the financial flows associated with offsetting has also attracted new entrants. This includes corporate investors developing investment funds that become profitable through the credits, offsets and public financial support that they can attract, such as the carbon, land and water credits and REDD+ payments, conservation easements, tax reductions, subsidies, protected area fees – all in addition to leasing and sustainable production (Kay 2017, The LDN Fund 2017). Such investments in turn attract a critical literature concerning 'green grabbing' (e.g. Fairhead et al. 2012).

These markets driving these investments are only made possible by technologies that can affordably identify, quantify and ascribe financial value to the ecosystem services in question. For the markets to operate, they require monitoring, reporting and verification to be accurate, feasible and affordable. Thus the potential for integrating the ecosystem services they offer into payments schemes depends upon whether technologies of surveillance can render them operable. Moreover, ecosystem service markets are not markets in straightforward commodities, but in ideas (carbon, biodiversity, aquifers, amenity). They are 'discursive commodities' that depend on technologies of surveillance to make them manifest, to measure affordably (Sullivan 2012). The possibility of such markets is thus co-produced with the development of the technologies that make them possible –with the development of LIDAR for sensing the forest for its carbon content; with new methods for sensing the soil for its stable carbon forms and so on. The environmental sciences that develop such technologies become part of (and often co-produced with) these emerging ecosystem service markets.

Bringing environmental services into the market has long been expressed in environmental economics as 'internalising externalities'. Externalities are extraneous – outside of our economic calculus at least. Historically, conservation can be best understood as part of gifting relations – a gift to other species, however self-interested - but by internalising such 'externalities' an enclosure expressed as bringing them into the market so that human interdependence on them is 'properly valued', there is a form of domestication. Conservation thus decreasingly reflects a benevolence towards other species (a gift). Our economy and survival depends on the services of a nature that we trade with. Such trading depends on technology.

We can envisage this as a form of financial inclusion, not of people, but of ecosystems. But it is similar to modes of 'financial inclusion' that now enable much poorer people in global society too, to access financial services (to access bank accounts, insurance, credit and financial social support etc.). Technology is enabling the 'bottom billion' who (like much of 'nature') have been outside of the financial grid to become drawn into it. Many people have been invisible when it comes to finance. But they are now coming into the fold through the use of mobile phone banking and smart credit and identity card technology – only made affordably possible through the information technology revolution. In short, new digital technologies are permitting the financial inclusion of both the hitherto unbankable poor and a hitherto unpriced and unbankable nature.

An associated arena of 'inclusion' concerns internet inclusion; the massive expansion of internet inclusivity and the new ways of communicating at a distance that smart phones now offer. The mobile phone penetration rate (the ratio of active subscriptions to the population) is now more than 120% globally and there are over half a billion mobile subscribers across Africa, equivalent to half the continent's population, young, adult and old (GSMA 2016). Yet it is not just humanity that is hooking up to the net, as the animal, plant and geological worlds are now subscribers and penetration ratios in the natural world are increasing apace. Domestic cattle were early pioneers in the digital revolution as their digital enhancement permitted individualised diets to be automated to maximise milk yields. But the 'internet of animals' has expanded to enabling remote 'real time' fish, bird and animal surveillance (Dlodlo 2012; Sandbrook 2015; Maffey 2014). Possibilities are developing rapidly with miniaturisation; with space as well as terrestrial reception, and with falling prices, enabling ever more animals to become digitally active. This is especially the case in conservation conflict zones and in commercial, private protected areas across East and Southern Africa

where most rhinos and many elephants have geolocation devices. More than 3 million cyborg fish are released in to the Columbia River basin every year to help monitor fish stocks, movements and migration patterns (PTAGIS 2017). Such monitoring is being co-produced by the emerging economic order that it enables and sustains.

Arguably, this is a new mode not only of inclusion but also of 'domestication'. In a very real sense such cyborg animals and those under intense surveillance become 'domestic'. They become of value to us in biodiversity markets and pleasure markets even if they themselves may not appreciate their changed domesticated predicament. There is an appreciation of this by those who declaim modern National Parks as glorified zoos, and who, for example, object to tourists in South Africa locating cyber-animals digitally to enable them to guarantee the 'big five' within a day. Such practices are now being restricted not only because they undermine animal privacy but also because they undermine human experience of 'the wild'. This domestication has produced a nostalgia for an un-produced 'wildernesses' for which, in Baudrillard's (1994) sense, these parks now stand as a simulacrum. The existence of such nostalgia itself reaffirms the animal's regimentation, domestication, and ultimately their inclusion into a grid of managerial governance and finance.

The surveillance associated with human digital inclusion has parallels with animal domestication. The digital financial instruments, marketing and social networking sites that work to promote financial and social connection deliver valuable social legibility. Whilst many may uphold ideas of personal agency, freedom and privacy as lives are embroiled ever more closely with digital technology, latent anxieties become explicit as debates unfold concerning how the 'big data' produced is accessed for security surveillance and commercial ends. That 'big data' can be machine read and mined for meanings and profit produces a 'digital panopticon', a new surveillance and intelligence revolution – and a new commercial-political order focused on monopolising and directing digital traffic. Inclusion is producing forms of sociality: debates now unfold about how subjectivities are ever-more 'produced' by personalised digital traffic.

Technology, big data and social/natural orders

In addition to facilitating these new modes of commodification and inclusion, a second effect of the digital revolution concerns how we understand ecological and social orders

themselves. Might the technology that has produced the profusion of big data on earth and of social systems be enabling us to think differently society and nature?

In particular, technological developments in environmental monitoring and now the emergence of big data analysis has been contributing to a paradigmatic shift from ecological and social analytics that make working assumptions concerning stable orders, to those that embrace more dynamic complexity theory, ushering in lexicons of path dependency such as 'complex adaptive systems', 'emergent properties,' 'non-equilibrium dynamics'.

This shift is manifest across the social and natural sciences. It is exemplified, for example, in relation to changing US military doctrine in their move from the lexicon of 'knowability' to 'complexity'; from the former doctrine of 'Intelligence Preparation of the Battlefield' (IPB) which presumed it was 'knowable', to the so called 'wicked problems' of today (Carter 2015: 37). In the words of one analyst this is the switch from 'the systematic process of analyzing the mission variables of enemy, terrain, weather, and civil considerations in an area of interest and their effect on operations', to discerning 'emergent forces'; of switching from 'the mechanics of the clock' to the 'fuzziness of a cloud'; of switching from ideals of 'full preparation' to those of 'improvisation' and complex, non-linear causation; of switching from equilibrium to non-equilibrium, and from convergence to emergence (Carter 2015: 37-40). It is reasoning such as this that now drives calls within the US military for a 'Manhattan Project-style effort' in 'information gathering and assessment.' Dissenting US military thinkers retort that it is not the world that has *actually* become any more 'emergent' or more complex. It is simply that a new informational world has enabled it to be understood and addressed in this way (Mountcastle 2016). US military doctrines have thus not entirely changed: the two paradigms 'complement each other and together are a great one-two punch' (Carter 2016: 40).

I use US military thinking as just one manifestation of the ways that the profusion of data associated with digital information technology is facilitating new possibilities and languages of analysis within social and ecological sciences that all now draw on similar lexicons. These transformations are equivalent across the social and ecological sciences. Both sociology and ecology, for example, were once dominated by structural functionalist paradigms with a premise of stability. In these, the whole society or whole forest was envisaged as an organic being that was 'more than the sum of its parts'. Such paradigms 'massified' the objects of their inquiry: they subordinated any individual person or plant to a more massive social

whole that was knowable, predictable and could be typified. Marxist class analysis did much the same. In hindsight, we might come to see these paradigms in relation to the technologies and possibilities of their time. The big data of the digital era is now permitting a very different kind of individuated, path-dependent, social and ecological inquiry.

This dichotomy is important because of its implications for governance in response to this switch from a premise of a broad 'knowability' to one that tracks forever-emergent unknowns. Fundamentally it alters how we understand relations between knowledge and power. Brian Massumi (2015) and Bram Büscher (2016) both argue that the Foucauldian concept of 'biopower' that captures the relationship between modes of governance and the human sciences is itself premised on a paradigm of 'knowability' - in Büscher's words 'a knowable population that could be governed through planning, incentive mechanisms and standardisation of processes and procedures' (2017 infra).[1] Yet, as Büscher argues, this is proving inadequate to conceptualising the social and governance implications of an infinity of emergent unknowns, which in security studies is manifesting in the 'ever presence of indiscriminate threat, riddled with the anywhere-anytime potential' (Massumi, in Büscher 2016 infra). Again in the context of security studies, rather than taking action against knowable 'actual' threats, there comes a need to take pre-emptive action in relation to incipient emergent threats – an observation that has been examined particularly in relation to biosecurity (Cooper 2006, Hinchliffe 200x). In Büscher's words there is a change from 'building of systemic forms of governmentality to ensure life's optimisation' to 'processually pre-empting incipient tendencies towards unknown but certain future threats to life (2017: infra).' So rather than inhabiting a 'knowable world', we now find ourselves living in a 'threat environment'. And ironically whilst this generates a voracious need for data (exemplified in the new '"Manhattan Project" style effort' (Carter 2915:40), empirical facts become 'considered too complex and changing to be reliably accounted for.' In Massumi's view, this instils an emotional or 'affective' politics of threat and one that favours pre-emptive intervention. Massumi casts this as a shift from modes of 'biopower' to what he calls 'ontopower', arguing that the focus on emergent properties in 'ontopower' is supporting (justifying) the practice and ethics of using pre-emptive force, whether in nature conservation (Büscher 2016) or more widely (Massumi 2015).

In this way, I want to suggest, the digital revolution is not only producing the modes of social and natural 'inclusion' that I have discussed earlier but, also new ideas of its antithesis. The antithesis to the included is less those somehow actively 'excluded' than those who are in

some way are envisaged as excluding themselves - antisocial 'rogues'. One can gain a sense of this by considering how, in a not so distant past, the social and natural sciences were contributing to modes of social and ecological exclusion - reproducing forms of social exclusions associated with racism (segregation and apartheid), colonial power, male power, heteronormativity and so on, and created categorical exclusive separation, too, between the human and the other-than-human animal world – that permitted dominion over it. Its normalising set of discourses was emergent from a very narrow inclusive community, that existed implicitly. The current, and explicitly inclusive discursive order now produces a very different antithesis; one that is cast as a more threatening 'rogue' - that attracts this pre-emptive ethic of ontopower by producing a 'threat society'.

What I am arguing, then, is not only the idea of the contemporary rogue is produced in contra-distinction to the 'included' and so shaped by the emerging technologies and practices of inclusivity, but also that 'the rogue' connotes qualities of being beyond knowability, and that this is, ironically, also an effect of digital technological profusion, and is associated with the emotionally laden pre-emptive ethic that is captured (not very well) in the concept of ontopower. The emerging centrality of the 'rogue' differs from existing conceptualisations of the 'excluded.' Rogues connote not only the age-old threat that the excluded pose to power, but also its new, emergent unknowability. Put simply, biopower is to ontopower as excluded is to rogue.

Masumi deploys his analysis of ontopower to understand the 'war on terror'. Buscher extends it to understand wars against poacher-insurgents to prevent poacher terrorists in southern Africa, but one can extend it, too, to examine the use of emotive, preemptive power in wars on the terrors in nature; in driving calls for bat culls to prevent lethal virus outbreaks, for example. Culling is a 'Fear-based management response' not a research-based one, as it 'counterintuitively increased the prevalence of pathogens in the target host population' (Bat Conservation Africa 2014; see also Amman et al. 2014).

Dialectical Forcing

There are many processes extending 'inclusion' ever more widely and dialectically in relation to its rogues. Take the 'cybersecurity paradox', for example. Those on the digital margins are the most vulnerable to cybersecurity threats, and the presence of rogue malware and rogue

actors itself drives people to improve and update ICT connectivity. Conflict zones are associated with vulnerable cyberspace, that as Kolton remarks, makes them ripe for exploitation… 'After the 2010 Haiti earthquake, cybercriminals immediately published web portals for fake charities to bilk donors (Kolton 2016: 78).' Further inclusion is the only option.

Similar dialectics drive other dimensions of inclusion. The emerging internet of animals and the digitization of environmental monitoring is being driven in some of the poorest parts of East and Southern Africa where 'rogue' poachers abound. It is here in the national but especially the private parks that elephants, rhinos and other megafauna are hooked up most with micro-emitters in a move to smarter and more remote forms of conservation (Sandbrook 2015; Duffy 2016). Duffy (2016) examines the increased use of drones in conservation, for example, and how the balance is beginning to tip in the war against poachers in these areas from 'boots on the ground' answerable to a state, to the invisible hands that control surveillance and drones, answerable to shareholders. The problem of poaching is being addressed less by globalised social processes regulating demand than by such self-augmenting technical developments.[2] And it is through the trope of the rogue that, as Duffy (2016) observes, the conservation and security discourses are conjoining and have come to speak of terrorist and poacher in the same breath even without evidence. It somehow 'makes sense' that the two are associated, feeding and financing off each other. Technology is central to the emergence of this new assemblage and important in altering the ways that poachers are becoming envisaged.

A third dialectic process drives inclusionary processes in relation to rogues. It is on the margins that personal and global insecurity are depicted as the most pronounced. Post 9-11, global governance endeavoured to close down the anonymous moving of funds off-line. Only rogues need do this – tax avoiders, terrorists and criminals. It is on the margins, too, that there is the greatest need for financial inclusion – not only for accessing the security that banking offers against robbery, but also for accessing credit and social support that can now be channelled digitally. As money and social security becomes digital, inclusion extends. There is a categorical difference between digital financial transfers and earlier forms of financial transfer and transaction – one leaves a valuable digital trace whereas the other is anonymous. Inclusivity is thus now into a categorically different, digitally-mediated economic order. Yet whilst digital technology is central to the intensification of these processes, the argument

being developed here is that it is also driving conceptual transformations across both the social and the natural worlds.

The experience of many of 'the included' (whether people or nature) is often one of intensified extraction and exploitation. Alarm bells are already ringing even among conservationists. As Michael Gross observes: 'Too much emphasis on the utilitarian aspects of these new capabilities [hooking up animals to the net] could of course raise concerns. Using wildlife as ruthlessly as we now use domesticated species would run counter to the philosophy of a sustainable, environmentally friendly future (2015: R587).' Such an observation reveals a concern with the ruthlessness of this emerging economic order; a candid admission and acceptance of the ruthless exploitation of so-called 'domestic' animals which we are not supposed to care about (and which are usually defended only by 'rogue' conservationists). Gross captures, too, how the distinction between wild and domestic is dissolving as the internet of animals and of life expands as 'Anthropocene 2.0' emerges. But is it that the wild need be protected from our technological age? Or is it that protection from our technological age is the way we hang on to the idea of 'the wild'.

As inclusion into this ruthless world crosses the human/nature divide, we might consider whether included people might be being used as ruthlessly as domestic animals. With the falling cost of digital technology, and state and aid programmes supporting the rapid extension of internet and financial inclusion for the very poor, are such inclusionary processes outstripping the production of poverty associated with capitalist penetration and proletarianisation? Dissenters from inclusion can now easily be placed into the category of rogues. To requote the *Military Review*, 'as those who do not *share the same values or participate in the community of nations as positive contributors to stability and peace* (Hughes 2016: 45, my emphasis).' Such rogues might include equally unruly (rogue) ecologies and unruly (rogue) people who do not agree to their land being taken. And the worst rogues of all would subvert digital inclusion – hacking to hunt, turning drones to poaching or terrorist ends, or trading on the dark net paying in untraceable digital bitcoins.

3.3 Bats, viruses and rogues in the West African Ebola epidemic

Until now, the paper has endeavoured to trace a more general archaeology to the emergence of the included : rogue distinction, and its relation to the collapsing significance of the nature-

society dualism amidst neo-liberalism. I now turn to illustrate its salience when examining contradictory discourses concerning violence in bat conservation or elimination in the context of zoonotic disease spillover.

Among the 1,300 species of bat, a limited few have become implicated in the reservoirs and transmission of highly virulent zoonotic diseases, although in many cases the evidence is far from conclusive. Some species of fruit bat are hosts of Henipaviruses (of Hendra virus especially in Australia and of Nipah virus especially in Bangladesh); coronaviruses, and (some suggest), of Filoviruses - of Marburg and possibly of Ebola, especially in Central and West Africa) (Schneeberger and Voigt 2016), although the reservoir for Ebola is still unknown.

In epidemics, questions arise concerning the fate of bats implicated in the reservoir. Culling domestic animals and wildlife populations has been a key institutional response in face of heightened zoonotic risk. Just as poultry were culled in H5N1 outbreaks, so were all domestic animals in Meliandou, the Guinean village in which the child identified as the 'patient zero' of the West African Ebola epidemic lived. But what to do about the bats?

The idea of preemptive culling of bats has been floated around many zoonotic outbreaks. Following fifty outbreaks of the Hendra virus in Australia that killed horses, owners, trainers and vets, strong political lobbying from the horse industry has called for a national cull of certain fruit bats. This was 'to check the southward spread of the lethal Hendra virus' (The Australian 2011). Escalating outbreaks have been damaging the multi-billion-dollar horse breeding and racing industry. Eventually, local councils were granted extra power to kill and move bat colonies (Condon 2014). Following several Marburg virus outbreaks in Uganda that have been associated with caves and the fruit bats inhabiting them, and which killed tourists as well as Ugandans, the Ugandan Ministry of Tourism instituted a cull in 2007. When foreign tourists began to cancel trips to Uganda during the more recent Ebola and Marburg outbreaks, the Minister declared that : 'We shall eliminate animals suspected to be carrying viruses of Ebola and Marburg' in efforts to safeguard the 10% of GDP that tourism brings (Born Free 2012; Africa Report 2014). In many Latin American countries, since the 1970s, governments' answer to rabies outbreaks has also been to cull the vampire bats implicated in its transmission. Culling can be envisaged as authorised, preemptive violence against rogue nature.

There is, however, little evidence of cull effectiveness. Not only do bats usually escape, but culling itself raises the risk of human contact and disperses bat colonies that distribute the disease geographically, and can lead to an outbreak pulse when the dispersed bats infect new roosts that have not recently had active transmission, and where the virus sheds and spreads. Culling can thus increase the likelihood of human zoonotic infection. An alternative is suggested by more inclusionary discourses in several ways, and in particular, in the inclusive approach to human-animal relations captured in the emerging concept of 'One Health' (Zinsstag et al. 2011). In this paradigm, human, animal and ecological health is explicitly interlinked. This is the health equivalent of a 'multispecies' approach, and highlights the role of fruit bats in pollination and seed dispersal, and of insectivorous bats in controlling insect pests. Indeed this enables bats to be financially included: 'Whether eating their body weights in insects every night, or dispersing seeds from fruit trees across large areas, bats provide services to local economies worth billions of dollars across the world' (Kamins et al. 2014, see also Boyales et al. 2011). 'Silent and often unnoticed, bats work the graveyard shift and help keep our world pest-free and biodiverse' (Olival 2016).

It is technology that is helping bring bats into more inclusive human relations. It is the science and technology of night vision, of remote cameras, of minituarised emitters, of eco-location recording that has permitted the counterintuitive and counterproductive effects of culling to be appreciated. Such research has altered approaches to culling rabid bats in South America. Rabies spread by vampire bats can now be tracked: 'the movement of these waves of rabies can now be predicted…, making it possible to forecast. … With this information, the authorities will now have the option of vaccinating animals and people before any outbreak' (I News 2016). The technology also produces closer researcher affinity, too. Those researching bat behaviour encounter bats' sophisticated social world that has hitherto been elusive. Such proximity also evokes a strong seam of passion running through the bat research and conservation community that a long-overdue ethnography would reveal. This more inclusive disposition provides a counterpoint to an earlier exclusionary one: the 'old-fashioned bat phobia that long linked bats to witches, vampires, demons and cobwebs' (Angier 2015).

In this new, inclusive perspective on bats within a 'One Health' approach, 'rogue' status is deferred from the virus and the bat to the people and processes that endanger ecosystem health: to the Ministers authorising a counterproductive cull, the citizens calling for it, or to the hunters and to the habitat destroyers that alter bat (and viral) habits. Culls were not

publically called for during the Ebola outbreak. Instead, the outbreak of Ebola has prompted a call to strengthen forest and bat conservation measures. Thus instead of a state of exception that would be the lifting of usual conservation restrictions necessary for a bat cull, the argument was for securing habitat. Guyton and Brook are clear:

> 'Many of the same anthropogenic stressors that are threatening bat populations, such as habitat loss and hunting, are also likely drivers of zoonotic pathogen emergence. Given this, and given that reducing bat populations can increase rather than decrease pathogen prevalence, we argue that conservation measures for bats should be strengthened in this time of Ebola (2015, see also EFA and ERM 2015).'

That the 'rogue' was not the virus, nor the bat but was the hunter, the bush meat trader and the deforester quickly became a powerful trope in the West African Ebola outbreak. The hunting of bats (and other bush-meat) was immediately forbidden following the disease's identification and was prevalent in journalism around the West African epidemic. Coen and Henk exemplify this: 'The human hunted the megabat down, dissected it, digested it. The virus did not invade the habitat of humans. Quite the contrary: humans invaded the habitat of the virus' (Coen and Henk 2014).

Whether this human invasion was by hunters or others has been the subject of many further commentaries, with some suggesting that habitats were destroyed by refugees from the civil wars in Sierra Leone and Liberia (Coen and Henk 2014), by foreign mining and timber operations (WHO 2015), or by poverty and a stalled economy and government (Bausch and Schwarz 2014). It conforms with much research suggesting that anthropogenic drivers are the primary cause of zoonotic disease emergence globally (Morse et al. 2012; Murray and Daszak 2013). Here the rogues are thus not the bats, but the habitat destroyers. The solution is to rearrange the landscape to better fulfil its provision of ecosystem services; to enhance conservation practice for health security. Only an inclusive 'One Health' will address rogue zoonoses (e.g. EFA and ERM 2015).

As the epidemic unfolded, the 'rogue' status quickly deferred also to the ill themselves: to those who travelled with Ebola (a Liberian to Nigeria, another to the US, a nurse to England) who media and policy rapidly cast as irresponsible, not as health-seekers. Those with symptoms of Ebola (often initially a wide range of non-specific symptoms) who did not attend Ebola Treatment Centres, but who fled them were cast as dangerous, self-serving (or deluded) rogues. Those who conducted funerals in the way they saw fit were cast similarly.

Local readings of these things were radically different (Fairhead 2016, Pailey 2017). And newspapers in the UK and US began to fill with the fear of more agentive rogues airing the possibility that rogue organisations such as ISIL would deploy rogue Ebola with terrorist intent.

That bats may have little, if anything to do with the Ebola reservoir (Leendertz 2016), and that the supposed deforestation was mythic (Fairhead 2017) was drowned out. Inhabitants of Meliandou even question whether patient zero was from Meliandou, adamant that the disease was brought to their village by an ill woman visiting its well-known healer. The West African outbreak may have had little to do with a spillover from nature, let along one to do with bats. And yet many rogues have been identified and are being acted upon. Calls are being made for pre-emptive steps to expand forest conservation initiatives.

4. CONCLUSION

This paper has argued that the digital information revolution is driving two linked transformations: first, the production and intensification of discourses and practices of inclusion, and second, the reshaping of earlier biopolitical discourses concerning the 'excluded' once premised on their knowability, into ontopolitical discourses premised on their unknowability and threat – and that is better captured by the concept of the 'rogue'. The paper traces how the digital revolution has extended the reach of economic and technological inclusion not only across global human society but in ways that transcend into what has conventionally been called the 'natural' world. The intensified grip of the included : rogue binary thus transcends nature/society distinctions.

By placing the digital technological revolution more centrally in the emerging processes of neoliberal nature it is possible to reframe the conceptual terrain in which to understand 'green violence' more broadly. The paper thus argues that conservation battle lines are best envisaged not within the human : nature binary (as those against or in defence of nature) but as between the included and the rogue. Taking the case of Ebola further helps decentre interpretations of current green violence. The battle against the 'invisible enemy' of Ebola (that saw major military deployment by French, US and UK forces) was against rogue foes that clearly transcended the nature : human binary and might be averted in the future by a

'One Health' that is similarly transcendent in its inclusivity to preempts the emergence of rogues.

This approach thus helps us to re-envisage the escalating violence that implicates the more-than-human world not as an escalation between attacks on it, and its defence, nor as an effect of the incorporation of conservation into existing, overarching geopolitical machinations. Rather, we can understand these as an intensification of processes of inclusivity; an intensification associated with a digital revolution that has only just begun. In line with other papers in this collection (especially Büscher 2017) such reasoning leads one to discern not simply a novel form of neoliberalism, but a novel era. If the ideas of intellectual and technological supremacy (and its attendant racism) that were a product of the industrial revolution are associated with the era of exclusionary objectification - slavery, colonialism and the objectification of nature driving the Anthropocene, we can begin to discern how the technologies of the digital revolution are now shaping modes of inclusivity (but with its attendant rogues), and an 'Anthropocene 2.0' that is intimately entangled with this emerging economic order.

Given the place of technology suggested here, questions emerge concerning the extent to which this process is technologically determined - the significance of technology to the assemblage. Instead of envisaging there to be a policy debate between more 'market based' approaches to conservation, and those that are more regulatory, the argument emerges here that it is technology that is in the driving seat. Several recent traditions in the social sciences attribute some agency to technologies, most notably within the actor-network analytic within which the clusters of actors that make meaning include the material as well as the semiotic (Latour 2005). Yet this analytic can be more descriptive than explanatory and less discerning of broader analytics of power (Whittle and Spicer 2008). The earlier French theorist, Ellul (1964, 1967), takes a more provocative, technologically deterministic link to analyse the dynamics of unfolding sociotechnical worlds. He observed that in industrial societies social, economic and by extension environmental problems tend to be analysed and addressed as a technical (not social) challenges and for him this was driving a process of technicization. To take a modern example, the challenges of CO_2 emissions will be addressed by new green technologies, not socially driven demand reduction. Technological development, by his analysis, becomes self-augmenting and beyond social control for two reasons: first, every technical solution generates new problems that require further technical developments to solve (as in the dialectical processes driving technical inclusion that we have observed here),

and second, a multitude of actors vie to deliver these optimally.[3] In the social formation that these produce, Ellul argues, the discourse and logic of 'the technical order' become deterministic, or dominant at least in the assemblage.

Technological determinism and its implications are present in an effusion of recent works that discern the emergence dystopian futures hitherto envisaged only in science fiction. Martin Ford's (2015) *Rise of the robots* grapples like many others with the social and political fallout of technology-driven unemployment and the threat of a jobless future. In Shaw's (2016) reading of a machine-intensive *Predator Empire*, we are witnessing the emergence of a system of totalitarian rule by 'Nobody' as changes in military strategy, domestic policing, and state surveillance come together to enclose us in a robotic system of control. These works, however, reproduce an older analytic of economic and social exclusion, and overlook how these emerging technological orders have also been producing an ideological and practical order of economic and social inclusion. Such works are also rooted in a human : nature binary that overlooks how natural orders are part of these inclusions. Such questions need to be addressed if we are to understand the emerging social orders of which they are a part and the patterns of violence they produce.

Some critics of works taking a technological deterministic line suggest that conceiving of the self-augmenting autonomy of science and technology in such assemblages is defeatist, and that there are assorted forms of social reflexivity that can exert control and govern it; forms that Stirling (2008) lists as inclusive, discursive, deliberative, pluralistic, reflexive, participatory and so on. Against the pessimism of technological determinism, Stirling observe in any unfolding of technological pathways not only the place of contingency and path dependency, but also of social shaping and co-construction that moderate the instances of technological momentum, 'lock in' and entrapment. Accordingly, he argues, 'the form and orientation taken by science and technology are no longer seen as inevitable, unitary and awaiting discovery in Nature. Instead they are increasingly recognized to be open to individual creativity, institutional interests, stakeholder negotiation, and the exercise of power' (Stirling 2008: 263). By his reading, any processes of self-augmentation would be shaped by social values (commitments) – and accordingly that it could and (and will) unfold along many different value-shaped 'pathways'. In particular, if we render the social commitments in technology visible we can perhaps reshape the paths that technological development follows. The problem arises if the social values (commitments) that come to dominate are themselves shaped by socio-technical processes and are thus not such an

independent variable (e.g. Jasanof 2006). This paper endeavours to reveal how this is the case, in an effort to reclaim opportunities for social reflexivity, in keeping with a wider critical school that exposes the implicit political-ecological commitments of those heralding this era as somehow 'post-political' (e.g. Wilson and Swyngedouw 2014).

Other theorists also grapple with the place of technology in social and conceptual change. For Marx, technological development was fundamentally important to industrial capitalism as it transforms the means of production into fixed capital (as machines etc.) and thus permits the increasing ownership of the means of production by capitalists. We can extend this to the sciences and technologies that have enabled nature to become fixed capital - that render visible and quantify the ecosystem services that nature provides; the carbon credits and fish quotas that permit capitalist accumulation. Yet the literature on Marx reveals conflicting claims about the determinant role of technology in social change; on whether technology is causal on human history in a logically unfolding sequence (in which social worlds adapt predictably to technical change and its regular effects), or whether the 'social consequences' (intended and unintended) are not so predictable in their outcomes and thus should not therefore be attributed to features of technology (e.g. Bimber 1990)? Again, debates hinge on whether people can keep technology in its place and exert *sovereignty* over technological conditions of life and thus whether technologies themselves shape values and the production of subjectivities? Put crudely, if technology shapes us, then just because we might exert 'sovereignty' over technological development does not mean that technology is not determinant. Recalling that technological developments not only permitted colonialism materially, but also the embodied living of technological 'supremacy' that shaped the paternalistic, cognitive racism that justified it and its violence. Here we have been examining how the embodied experiences of the modern technological order now shapes how we conceive of social and natural orders, social values and violence occluding a the multiplicity of alternative human perspectives (Sullivan 2013).

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[2] As Gross writes, the use of the space station will enable researchers to track the moves of many thousands of small animals, such as migrating songbirds equipped with a miniaturised radio chip, simultaneously and on a large scale (Gross 2015).

[3] My thanks are due to Etienne Compagnon for alerting me to the significance of Ellul's work.