Emancipating Transformations: from controlling 'the transition' to culturing plural radical progress

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Climate Geoengineering Governance (CCG)

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Abstract

Current global environmental policy reverberates with talk of a new "*Anthropocene epoch*" defined by "*human domination*", in which a "*perfect storm*" of catastrophic threats is forcing a singular "*great transition*" towards "*planetary management*". Under growing "*environmental authoritarianism*", democracy is increasingly seen as a "*failure*", a "*luxury*", or even "*an enemy of nature*". If charge is to be taken of the "*control variables of the Earth*", some say democracy must be "*put on hold*". One way of seeing this trend, is that scientific and policy knowledges are becoming increasingly imprinted by the preoccupations of incumbent power with rhetorics of control. Under this growing political mood, it seems there is '*no alternative*' but compliance – or irrational denial and existential doom.

Yet there *are* alternative ways to address the gravity of current ecological and social imperatives. It can be recognised, for instance, that democratic struggle is the principal means by which knowledges and practices of Sustainability were shaped in the first place. In this view, concentrated power and fallacies of control are more problems than solutions. Here, history can show that the greatest ongoing forms of transformative progress (like release from colonialism, racism or patriarchy), owe more to plural knowledges and values and unruly hope-inspired agonistic contention, than to single orderly technical "*transitions*" based on formally-integrated science or fear-driven structured control.

Like other great progressive struggles of history, radical shifts in grassroots culture and anarchically-choreographed flocking behaviours in nature – the most effective modes for radical change often lie in spontaneous collective bottom-up 'culturings' of knowing and doing. These do not depend on rigidly-disciplined '*integrated science*' and monolithically-structured '*planetary management*'. Instead, real hope of radically progressive social transformation may lie more in the mutualities of caring, than in the hierarchies of control. And among the greatest obstacles to this, are ideologies of technocratic transition. Perhaps the deepest necessity lies in emancipating "*transformation*" itself?

Keywords: democracy; Sustainability; transformation; transition; nexus; Anthropocene; planetary boundaries; control; care;

1: Introduction

Under any reasonable notion of 'progress', the most compelling imperatives lie in interlinked challenges of social justice and global environmental degradation [1][2][3][4][5]. But are the necessary social transformations too urgent, deep and pervasive to be reliably achieved by democratic means? Does manifest lack of progress indicate a "*failure of democracy*" [6]? Is critical democratic discourse an obstructive or dispensable "*luxury*" [7]? The iconically influential environmentalist James Lovelock, for instance, suggests that "*it may be necessary to put democracy on hold for a while*" [8]. Indeed, the main European Commission news website has even recently queried whether democracy is actually an "*enemy of nature?*" [9]. If the term 'democracy' is seen as a procedural euphemism, concealing ever more assertively concentrated global power and privilege, then perhaps it is [10][11][12] [13][14]. But maybe history teaches instead, that the **only** sure way to achieve real progressive social

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transformation is through the kinds of open, unruly political struggle that more properly deserve this name [15]? These are the questions on which this paper will focus.

In short, the argument here will lead to a general heuristic distinction between two ideal-typical forms of radical social change [16][17]. On one hand, are what might be called societal '***transitions***': often driven by technological innovation, managed under orderly control, by incumbent structures according to tightly-disciplined frameworks for knowledge, towards a specific known (presumptively shared) end. Put simply for the sake of illustration, currently relevant examples of this kind of change, might include those most closely associated with prospective global transitions to nuclear power in energy production [18], planetary geoengineering in climate change strategies (Shepherd & et_al 2009; Fleming 2010; Ridgwell et al. 2012; Ruddiman 2005) or 'sustainable intensification' of food production using proprietary transgenic monocultures [23].

On the other hand, there are what might be called social '***transformations***'. These entail more plural, emergent and unruly political re-alignments, involving social and technological innovations driven by diversely incommensurable knowledges, challenging incumbent structures and pursuing contending (even unknown) ends. Indeed, they may owe more to critical practice of other values, virtues or social qualities than utilitarian pursuit of ends at all [24][25][26][27][28][29]. Stylised examples might include myriad changes in distributed energy practices – involving service innovations, radical eco-efficiencies, culture change and the massively more extensive harnessing of renewable resources [30]–[37]. Likewise there are multiple innovations in the culture and practice of food production and use, involving ecological farming, open source breeding, local supply chains, collective ownership and greater integration with other activities [38]–[40][41][42].

By reference to historic emancipatory struggles by oppressed classes, ethnicities, colonies, women and sexualities [43], the paper will argue that – contrary to much received wisdom – it is repeatedly unruly, bottom-up 'transformations' rather than top-down structured 'transitions' (in these senses), that typically achieve the most profound (sometimes rapid) radically progressive social changes [44], [45].

So, apparent contention between different meanings and practices of Sustainability and 'democracy' are not so much problems, but crucial parts of solutions [46]–[48][49]. Ecological viability and social justice are not competing ends to be traded off [50], nor a monolithically integrated and depoliticised 'nexus' of technical imperatives [51]–[53]. What makes them seem this way, is

the expedient shaping of knowledge (as well as action), by powerful interests [54]. Just as concentrated power tends to favour controlling actions, so it also fosters knowledges that emphasise associated 'fallacies of control'. But what ecological and social justice challenges arguably actually require instead , is less singular controlled 'transitions' driven by whatever are the incumbent structures in any given area, and more vibrant agonistic political mobilisations towards more open-ended and pervasive 'transformations' [16][17]. Far from democratic struggle being an "*enemy of Nature*" [9] then, they are more likely each other's deepest hopes.

2: Nexus, Necessity and Nudge

A starting point lies in a growing body of science warning that the world is faced with a "*perfect storm*" of environmental threats [55], [56]. Even if not as existential as sometimes implied for the Earth as a whole or humanity in general, there are grave implications for many communities, populations, livelihoods and kinds of societies. The resulting "*nexus*" of new vulnerabilities interacts with multiple prevailing forms of insecurity and injustice [57]–[59]. As in these long-established but socially-remediable patterns, it is typically the least privileged people who remain the most vulnerable [16].

This new scientifically-framed 'nexus' of threats is currently attracting unprecedentedly intense attention in global governance [60][61][62]. In many ways, this exceeds the consideration afforded to older, more directly politically comprehensible vulnerabilities [63] like poverty, inequality, violence and exploitation. The result is unusual high-level willingness to contemplate ostensibly "*radical transformation*" in global practices, institutions and infrastructures for provision of food, water and energy [34]. If the rhetorics are taken at face value, possibilities are opening up for potentially "*revolutionary*" types and scales of change [64], [65]. Indeed, breathless talk of "revolution" is especially pronounced when officially accredited discourse describes the envisaged benefits of favoured technologies [66][67][68][69][70][71]. Tellingly, however, such positive references to "revolution" remain significantly less conspicuous when these same official discourses address the possibilities for more direct social, institutional or cultural transformations. Beyond the field of technology, overt discussion of 'revolutionary' depths or scales of social change seem nowadays to be viewed implicitly as highly impolite – or repudiated as if self-evidently naïve, utopian or malign 'social engineering' [72][73][74][75]. It seems the disruptive connotations of "revolution" are exciting only when aligned and compliant with incumbent interests.

Nonetheless, such is the intensity of growing discussion of this 'nexus' of imperatives for revolutionary transformation, that serious leverage is potentially emerging for unintended collateral implications [76]. So, with the prospect of circumscribed *direct* forms of technological, organisational and discursive change, also arise possibilities for even more substantive and extensive *indirect* political, institutional and cultural dislocations [77]. Yet exactly how this potential wider leverage plays out, is open to modulation. The possible broader changes may act in progressive ways, challenging concentrations of privilege and power [78]. Or they may act more regressively, to further entrench some of the driving incumbent patterns [79]. Crucial here, is that it often remains rather nonspecific what exactly will actually constitute the widely mooted "*great transitions*" [80][81][82], [83], "*green transformations*" [84], [85] or "*transitions to Sustainability*" [86][87][88][89]. Such ambiguity impairs traction on the part of more marginal interests, thus weighing the dice against opportunities for more progressive struggle [16].

For instance, climate-driven pressures for a transformation towards radical "soft energy paths" [30]–[37] (of a kind much proclaimed on the front covers of glossy reports), may instead be redirected more covertly towards a global transition to climate geoengineering [19]–[22]. More particular visions inspired by the potential to harness distributed renewable resources [30]–[37] in ways that align with the grain of local social and ecological contexts, may yield instead a "low carbon transition" based around centralised, standardised, highly concentrated nuclear energy infrastructures [18], with all their global security implications [90], [91]. Likewise, imperatives for transformations towards ecologically-sensitive forms of agriculture respecting the diverse knowledges of farmers as open source innovators in different settings [38]–[40][41], may instead be harnessed towards transitions to 'sustainable intensification' strategies promoting 'monoculture' transgenic crops, that maximise rents on intellectual property and global value chains [23].

Choices between contending institutional and infrastructural pathways like these – each variously claimed to be "green" – are profoundly political [54]. Yet these choices are typically discussed in much existing 'green transition' literatures in rather vague and apolitical ways [92]. There is a shared concern that thinking in 'silos' (like water, energy or food) is problematic. But it is unclear how similar dangers are to be avoided in inevitable new cross-cutting 'silos'. There are, after all, many different ways to structure 'integration'. Too much 'nexus' discourse implies that nonspecific aspirations to 'integration' somehow of themselves automatically transcend the politics of framing [17]. In fact, integrative frameworks are typically no less sensitive to the framing of their constituent elements – and often add many further contingencies of their own [93]. In

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evading such issues, it is as if the key questions are simply about whether to be 'green' or not, rather than about the radically different political understandings and actions that underpin these claims. It is in this depoliticised atmosphere, that it becomes possible to pose the questions with which this paper began – over the relevance of democratic deliberation, contention and struggle, or whether "democracy" might even be negative.

This increasingly disempowering style of debate, is reinforced by a growing climate of "*environmental authoritarianism*" [94]. Despite their more generally progressive roles [95][96][97][98][99][100], interventions by some prominent global NGOs can sometimes help set the mood, for instance by loudly asserting that there are "*one hundred months to save the planet*" [101]. If they are lucky, such polemics will be forgotten before they are refuted [102]. But they are widely repeated. The result is to further polarise politics simply around compliance or rejection of particular apocalyptic assertions. Little space is left for more nuanced scepticism or challenge over all-important details. Crucially, this negative emphasis on uncompromising technical fears, suppresses roles for democratic struggle over contending positive hopes [53].

Growing authoritarianism is also evident in the ways many influential institutions in environmental governance are increasingly deprioritising previous hard-fought duties to be transparent, responsive and accountable to *citizens* and *public interests* [47]*,* in favour of more clandestine strategies for the '*nudging*' [103] of '*users*' and '*consumers*' [104]. Much government activity is devoted to developing ever more sophisticated covert means to control (assert, educate, promote, implement) according to prior established ends, which seem ever less clearly declared [10]. Many businesses pursue increasingly elaborate practices of public relations 'greenwash' [105]–[111][112]. And, rather than actively and openly prioritising the transforming of public interests and values, many large civil society organisations increasingly take a conservative view of established patterns, and treat these as a given in their own communication strategies [113][114][115].

Risk is repeatedly addressed in terms of reputation [116]. Scepticism is regarded as a pathology [117]. Trust is interpreted disproportionately as a desirable virtue on the part of the powerless in favour of the powerful, rather than the other way around [118][119]. 'Participation' is undertaken more as a means to legitimation than legitimacy [120][121][122][123][124]. And accountability is further impaired by moves away from substantive 'thick' principles [125] like 'Sustainability', 'precaution', 'equity', 'justice' and 'liability' – with hard-fought established bodies of practice affording agency to wider interests [54]. Instead, emphasis moves towards more amorphous, 'thin' notions like 'responsibility', where focus merely on asserted virtue can tend to romanticise (and so reinforce)

the narrower agency of incumbents [126][127][128][129]. So, despite the impression given by apparently benign-sounding policy language around minimising 'risk', seeking 'consensus', fostering 'trust', enabling 'participation' or promoting 'responsibility' – collective capacities for open, progressive, plural, critical political discourse are increasingly undermined.

Behind this, the roots of environmental challenges are increasingly located in the 'behaviour' of ordinary people, rather than in the structures and powerful interests that so actively constrain and condition associated growing individualism, consumerism and materialism [80], [130]. The diagnosis increasingly moves away from explicitly political struggle, towards less visible psychological and communicative techniques for securing '*behaviour management*' [131]. By emphasising the centrality of supposedly undifferentiated hard-wired human nature, appreciation is further attenuated for critical argument and democratic struggle. Attention is drawn even further away from the potential for progressive political action to challenge particular incumbent interests. In this '*end of history*' illusion [132], [133], the contrasting environmental and justice implications can be lost, even of relatively modest and proximate '*varieties of capitalism*' [134]. All too often, prospects for more diverse, creative and progressive forms of social and political transformation are conflated into a seemingly amorphous, singular – depoliticised – "way forward" [135], [136][137][138][139]. Suffocated by the oppressive inevitability of "no alternatives" rhetorics, they are thereby rendered quite simply, unimaginable [10][140].

The implicit expectation often seems to be, that the powers doing all the nudging and controlling, will somehow be kept benign simply by the manifest gravity of the professed environmental rationales. Yet, that the ecological threats are real and so much of the advocacy sincere, in no way diminishes the vulnerability to manipulation and diversion. The more assertive and apocalyptic the envisaged threat, the more seemingly desperately necessary the Faustian pact with power [141][142], [143]. And neither history nor current affairs suggest any guarantee that such bargains will be delivered [144], [145]. Many historic examples can be found, where sincerely progressive efforts were made to tolerate temporary concentrations of power, towards ostensible ends of radical social transformation. Yet, time and again these actually reproduce the old incumbent structures in new forms, often more entrenched [146]–[148]. When power is given the opportunity – let alone the mandate – to invoke over-riding missions to control (especially under a climate of fear), the results can be even less positive. The disarming effects of superficial appearances can make the dangers especially acute where initial motivations appear most altruistic.

The world is a big and complex place. Care should therefore be taken with simplified – especially polarised – pictures . So, the ensuing discussion will seek to unfold these arguments in more detail. But there do seem grounds for more careful scrutiny of the current moves documented here towards increasingly technical and managerial forms of 'nexus', 'nudge' and environmental authoritarianism. Crucially, however, such scrutiny does not imply questioning of the underlying ecological and social justice imperatives. The greater the respect for the diagnosis of a need for transformation, the greater the responsibility to be sure about the prescriptions of authoritarianism.

3: Anthropocene Planetary Domination

The authoritarian pressures documented above are also reflected in scientific discourse. Here, even geological history is subject to reinterpretations emphasising the theme of control. For instance, the established epoch of the Holocene is a tiny 11,700 year span, oddly tacked on to the end of the preceding 1.6 million year Pleistocene epoch [149]. Marking the point where Earth moved out of the last of a long series of glaciations, there is little to distinguish the Holocene from previous Pleistocene interglacials, such as to justify a new scientifically-recognised epoch [150]. The sustaining of relative climate stability over such brief periods, is not geologically unique [151]. That all previous formally recognised geological epochs extend to many tens of millions of years, compounds the anomalous exceptionalism [152]. It seems in the naming of the Holocene, that aspirations to synoptic scientific objectivity are trumped by more subjectively parochial anthropocentric concerns. For it is since the most recent 'Ice Age' that specifically human activity has most strikingly intensified – and in which the fleeting span of recorded human history has played out [153].

The relevance of all this to 'control' is many-fold. First, it arises because the subjective human exceptionalism that helps shape this scientific acceptance of an anomalously tiny Holocene epoch, is now being compounded by recent moves to add a further even more eccentrically miniscule 'Anthropocene' epoch of just a few hundred years duration [154]. Crucially, this is defined explicitly by reference to notional "*human control*" and "*domination*" [155]–[157] – variously of "*Earth's ecosystems*" [156] or wider "*biological, chemical and geological processes*"[155]. So, control also becomes the central theme in a recast human history, asserting the setting of a very specific destiny of planetary domination from the time when people first "*learned how to control and manipulate fire*" [158]. And control becomes the elaborate constitutive focus in a commanding new science (sometimes called "*geocybernetics*" [159]) aspiring to "*tak[e]*

control of Nature's realm" [155]. Thus is brought into being "*humanity as a self-conscious control force that has conquered the planet*" [160].

As in environmental authoritarianism, these relations of control are closely associated with an undifferentiated human 'we' [161]. In one sense, the aim here is positively to emphasise collective responsibility and solidarity. But a powerful effect is also to assert an imaginary singularity and homogeneity in human conditions, structures and agencies. There is an implication that the massive planetary impacts in question are exclusive (even necessary) consequences of inherently shared attributes of 'humanity' – instead of far more specific, contingent (and remediable) social, economic, technological and political orders. Indeed, it is intrinsic to the explicit policy prescriptions of this '*Anthropocene domination*' discourse, that there exist institutions and procedures for '*Earth systems management*' under which 'humanity' might cease to exercise such impact. Although (as will be argued) issue might be taken with the underlying understandings, values and prescriptions, this aspect is at least a laudable message of hope. But the fact of the prescribed orders still being 'human', does mean that – even under this '*planetary management*' perspective – the driving forces equally of the negative impacts and the prospective positive responses are not about 'humanity' in some undifferentiated sense. What is at issue is not humanity in general, but particular – critically distinct – economies, institutions, infrastructures and cultures. To obscure this, is to suppress the crucial politics of transformation.

There is a further point resting more directly on control. Given that 'human control' is held to be so diagnostic of the Anthropocene, it is paradoxical that much of this literature also calls urgently "*for identification of mechanisms amenable to human control*" [162]*. If such mechanisms are acknowledged not yet even to have been identified, one wonders how the presumptive current 'control' is already exercised? And why, if 'control' is so negative in retrospect, should it be seen so optimistically in prospect [161]? In a similar way to some ideas around the 'crisis of capitalism' in Marxism [163], or of grace in Christian theology [164], a paradoxical conjunction appears here of diagnosed inevitability and prescribed urgent action. It seems the Anthropocene is framed from the outset as much as a normative doctrine as a scientific analysis? It is a mirror in which can be seen reflected, the aspiringly self-fulfilling vision of a 'human' (or more specific?) destiny to "control".

This leads to a further telling feature of 'the Anthropocene'. As with 'the Nexus' more widely, it is clear that aggregate environmental impacts of diverse global economies are truly devastating. But for humans to exert *unintended impacts* is very different from exercising *collectively intentional control*. Indeed, some Anthropocene literature does acknowledge that even "*self-control of mankind*"

remains a speculative scenario [165]. Serious wider questions are raised over who exactly is doing the controlling; to what ends; how enacted; and on which systems [161]? Beyond this, there are seriously intractable questions over what might even be meant by control in the first place. As with multi-layered webs of genetic relations in genealogy, patterns of influence in the real world are embarrassingly less definitive than is routinely claimed [166]. To reduce complex recursive patterns of causal influence to simple supposedly discrete lines of control, is as obviously a product of cultural contingency and political expediency as reducing genetic relations to linear patronymic chains [167]. But the bottom line is, when has humanity as a whole even undertaken – let alone controlled, still less achieved – any single explicitly and collectively deliberate end? Rhetorics of control seem themselves, ironically 'out of control'.

Perhaps the confusion might be alleviated by redefining the problematic Anthropocene concept in terms of the manifestly massive aggregate human-mediated **impacts** on the world, rather than in asserting notional human '**control**'. Or perhaps the Holocene might be more carefully – and candidly – defined in this crucially more humble way? It certainly seems redundant to retain in geology, two such ambiguously-related instances of human exceptionalism. Whatever the resulting epoch is called, there is anyhow a case for tracing global-scale human impacts back to the very early Holocene [168][169][170]. And the difference between a starting point a few hundred and a few thousand years ago, is well below the chronological resolution for comparable geological epochs. That this rather obvious course has not been adopted, confirms that 'Anthropocene' discourse is fulfilling a rather more particular political function. Preoccupations with "domination" are not a coincidence. The Anthropocene storyline converts implicit subjective interest in humanity and the manifest fact of unintended impacts, into a seemingly objective validation of a political programme. Behind the loose romantic references to humanity as a whole, it is the intrinsic force of this striking rhetoric, that the authority of geological science is being invoked in favour of a far more specific and politically-located destiny to 'control'.

To be fair, a growing "*Earth systems governance*" literature [171] is often more reflective and qualified in its treatment of the political implications of 'Anthropocene' control [172], [173], referring instead to apparently less deterministic notions of "governance" and "stewardship" [174]. And the attribution here of political implications to the Anthropocene Programme, certainly need not imply that this is deliberate [175]. But substitution of more nuanced terms does little to reduce the substantive tensions [161]. Despite its more open possibilities, 'governance' is still frequently addressed in terms of integrated knowledge, formal procedures, coercive instruments and

individualistic leadership. And, implying 'control in absence of overarching authority', even 'stewardship' is arguably not so much about diminished control, as diminished accountability [176]. No matter how much a governance model might emphasise 'polycentric' co-ordination [177] (rather than top-down hierarchy), if it remains subordinated to a particular agency and specific ends, then the process is equally about control. And there are few more effective means invisibly to assert iniquitous managerial control, than by rhetorics of equal collaboration [123][122]. So, superficial shifts in terminology do little to alter the substantive dynamics. Indeed, misleading impressions may compound them.

It is here that preoccupations with "*planetary boundaries*", further illuminate Anthropocene narratives [60]. These define the "*safe operating space*", within which global governance must strive to navigate a path [178]. Despite resting on the supposed indeterminacy of "*catastrophic tipping points*" [179], planetary boundaries are routinely asserted as determinate and precisely known [178], [180]. Indeed, they are typically presented as "*non-negotiable*" imperatives, raising "*absolutely no uncertainty*" and brooking "*no compromise*" [181]. It is on this basis that "*manuals*" are issued [182] for taking charge of the "*control variables of the Earth*" [180] and so achieving not just governance in the loosely co-ordinated sense, but unprecedentedly ambitious forms of "*planetary management*" [165] aimed at optimising global natural cycles [162].

What is occurring here seems not only a presumptive emphasis on control, but its assertive appropriation in particular undeclared interests. The planet as a whole is subordinated as an object, under an overarching undifferentiated 'human' subject. And in this passively static position, the Earth is dispossessed not only of a plurality of agencies, but even of autonomous dynamics. Yet what constitutes the notionally singular dominating human agency, is itself airbrushed of any context or constituting conditionalities – let alone politics. So, in the ostensible name of re-engaging society with environmental imperatives, social diversity is (ironically) actually disembedded from Nature in even more profound ways. And, as ends are further concealed and subjugated to clamouring instrumental means, the discursive constraints on space for democratic struggle seem more restrictive even than the material boundaries.

It is perhaps by appreciating this political dimension, that the paradox may be reconciled that 'control' is viewed retrospectively as negative, but prospectively as positive. For – as in the other ideological and religious doctrines mentioned above – this is how a retrospective diagnosis of 'planetary domination' can be recruited seamlessly into a narrative prescribing prospective 'planetary management'. Of course, such pre-laden politicised implications are not unique to Earth systems governance [183]. Other areas of policy-relevant science and

'*global assessment*' are also widely recognised to be similarly shaped by the cultural conditions under which they are produced [184]. The Anthropocene narrative is just one particularly acute instance of a quite general pattern that emerges into view, only when knowledge itself is recognised as political [185].

So, it is not as if such dynamics are entirely avoidable [123]. Nor is there reason for undue piety or alarm. Such political drivers in science are quite routine and tractable when realised for what they are. They are more reflective of distributed social forces, than of any individually deliberate disingenuity. And they certainly do not necessarily render the implicated science thereby invalid. In particular, these political machinations in no way detract from the need very seriously to address the implications of contemporary Earth science (albeit less hubristically) for radical shifts in technological, economic and social trajectories. Indeed it is precisely where imperatives for political transformation are taken most seriously, that the lesson takes a different form. In short, science for policy holds responsibilities not only to be accurately reflective of the objective systems it is concerned to represent [186]. It is at least equally obliged to be reflexive about the ways these representations are conditioned by the subjective practices in which 'the science' – and knowledge more generally [187] – are co-produced. Without this, there are dangers that Anthropocene rhetorics of singular agency, uncompromising leadership, non-negotiability, certainty and control will be taken much too literally. Planetary management should be careful what it wishes for.

4: Democracy, Sustainability and Emancipation

So what of the queries with which this paper began? Is democracy really an '*enemy*' of transformations towards Sustainability – a '*luxury*' that should be '*put on hold*'? Or is it rather Sustainability that is vulnerable to longstanding powerful forces that find associated transformative emancipations so threatening? If so, maybe the real questions are about whether authoritarian appropriations by incumbent interests, can make environmentalism itself an 'enemy' of the very forms of democratic struggle that gave it birth?

In the above spirit of reflexivity, these queries require careful thought about the forces and conditions under which the answers themselves are shaped. And this is as true of general talk of 'democracy' and 'Sustainability', as of more specific concepts like 'the nexus', 'the Anthropocene' or 'planetary boundaries'. In all these areas, understandings supposedly *informing* practice, are typically at least as much *formed* by it. In other words, knowing and doing are not so much distinct as inseparable – especially when it comes to transformation. One crucial initial reflection, then, concerns how to interpret 'democracy'. It is easy for loose

usage to be misunderstood, appropriated – or strategically subverted – by specific traditions, institutions or interests [188]. Any wider understandings of democracy wishing to transcend such parochialisms [189][190], [191], must relate at root to the general dynamics of power – as featured prominently in the discussion so far. Here, the implications are as profound for knowledge and discourse as for material practice.

These issues are discussed in greater detail elsewhere [192]. Power is not simply about "*control or authority over others*" (OED 2013). As we have seen, it is often a more plural, multidimensional and multiscale structural phenomenon [193][194][195][196], [197][198][199]. But, for all the complexities, a constant common element shared across different historical and cultural settings, is that power is always about '*asymmetrically structured agency*' [192]. Different social actors experience differing patterns of enablement and constraint in the ways they exercise their agency. And a diversity of social norms, institutions and discourses concentrate these disparate flows and contours of social and material agency in varying ways [200][201]. As a reaction to this, 'democracy' in the broadest of senses can be seen not as any formal procedural end-state, but as a complex, distributed process of never-ending **struggle** [15], [202], [203] – for '*access by the least powerful, to the capacities for challenging power*' [192]. Although the self-reinforcing dynamics of power doom any such success to be constantly provisional, the greater this access and the stronger the capacities for challenge, the more effective might be judged the democratic struggle [204] – or any associated pretensions to 'democracy'.

Of course, none of this implies that any particular envisaged exercise of power is somehow necessarily inherently bad. This depends on the interests, values and aims in question. After all, the more challengingly transformative the progressive aspiration, the deeper the need for corresponding generative asymmetries in many kinds of social agency. The issue instead, is that all the diverse forms and contexts for concentrated power tend to display similar self-reinforcing tendencies. And, whatever the initial orientations, this dynamic can itself, come over time to exert its own regressive effects. So, across a range of plural values and interests (and alongside the host of more specific cultural and institutional aims), this is where there arises a generally progressive role for democracy as continually adaptive struggle – challenging the self-reinforcing dynamics of power [192].

Far from being in tension, then, this characterisation of democracy as struggle, displays especially strong affinities with Sustainability. This is so, both as Sustainability is currently formally defined [205] and as it historically came about [206]. After all, Sustainability was not elevated to the present highest levels of global governance by the kinds of integrated, polite, structured,

ostensibly apolitical procedures currently highlighted in elite planetary management literatures [205] [142], [143]. Just as in other ongoing transformative processes of democratic struggle [44], [45] for the emancipation of oppressed classes [207], slaves [208], women [209][210][211], ethnicities [212], castes [213], [214][214], workers [215][216], peasants [217], colonies [218], religions [219], minority cultures [220], sexualities [221] and young [222] and disabled people [223] – this is driven overwhelmingly through diverse, protracted, radically-challenging and overtly-political agonistic forms of contestation of power by subaltern social movements [224].

Take, for instance the development of issues around occupational hazards, resource degradation, consumer chemicals, ionising radiation, atmospheric pollution, water contamination and climate change [225], [226]. All were typically pioneered by particular suppressed communities of workers or affected people, then mobilised by wider social movements [227]. Of course, the resulting political momentum was typically picked up later in various more formal ways in elite circles – often with significant incremental effect. But in each of these cases of environmental harm, it was early recognition of uncertainties that most advanced progressive causes, not assertions of "uncompromising", "non-negotiable" certainties [121], [124]. Indeed, these imperatives were at each stage strongly contested by precisely the hubristic authoritarian language now used by the kinds of mainstream, science and high-level governance institutions, which currently profess to champion Sustainability as 'planetary management'.

The same is typically true not only of the problems highlighted by Sustainability concerns, but also of the prescriptions. This can of course be seen, in the roots of many burgeoning new organisational forms, ideological sensibilities and lifestyle changes in various earlier 'countercultures' [228]. But it is also true of more technologically mediated innovations [229]. For instance, wind turbines, ecological farming, super-efficient buildings, and green chemistry all also owed their pioneering origins and early development to subaltern social movements [230], [231]. All were systematically marginalised, if not actively supressed, by incumbent interests in science, government and industry [232], [233]. As potentially transformative initiatives, then, they were nurtured not so much by controlling management, as by adversarial struggle [234]. That so many of these innovations have now become central elements in prospective transformations to Sustainability, is more despite – rather than because of – 'sound scientific', 'evidence based' elite policy discourse.

It was for all these reasons that early visions of Sustainability went beyond merely highlighting environment and social justice as outcomes. Increasingly forgotten nowadays, is the intimate intertwining of environmental concerns with

wider emancipatory struggle in the pioneering of the Green Movement [235][236][237][222]. By the 1980s, even the elite intergovernmental Brundtland Commission emphasised the key role for democratic struggle in their own vision of Sustainability. For Brundtland, Sustainability was inherently about achieving "*greater democracy*" [206, p. 16] through "*effective citizen participation*" [206, p. 58]. This was picked up and strongly developed in the subsequent international Agenda 21 programme [238][239]. But this theme of democratic struggle has since become increasingly subordinated to local level implementation [240]. Contemporary instruments like the Millennium Development Goals [4], [241] and subsequent Sustainable Development Goals [242], also sideline these crucial processes of democratic agonistic contention, amidst the clamouring instrumental concerns with metrics and outcomes [5].

In conclusion, the links between democracy and Sustainability are not just contingent. At root, both are about emancipation from the concentrated power of incumbent interests [243]. And this is as true of knowledge and discourse as of material practice. It is in this light, that it looks most dissonant, that contemporary high-profile debates about 'Sustainability transitions', should display such increasing preoccupations with contradictory attributes like 'integration', 'certainty', 'leadership' and 'control'. It seems that the greatest need is to emancipate understandings of transformation itself.

5: From Transition to Transformation

So much for the background in the general history and practice of Sustainability. But what has all this got to do with particular real-world prospective 'Sustainability transitions' on the ground? Even if the above account is right, does it really matter that environmental authoritarianism tends to emphasise control over accountability? What is the harm in a little over-egging of notions of Anthropocene 'planetary domination'? Might not a measure of over-assertiveness concerning the "certainty" and "non-negotiability" of planetary boundaries at least help galvanise attention? As has been emphasised, it is not as if existing efforts at transformation to Sustainability have hitherto been so conspicuously successful.

It is crucial to recall that the thrust of all the previously-raised concerns is not to belittle the gravity or urgency of the current nexus of imperatives around social justice and ecological disruption. The essential challenge is **how** to achieve the necessary radical technological, political, economic and cultural changes, not **whether***.* Here, though, particular care needs to be taken in the light of the preceding discussion, because the shaping effects of incumbent power act on

knowledge and discourse as well as more material structures [185]. This means that neither words nor actions are always what they seem. Indeed, they can sometimes entail their apparent opposites. It also means that interventions expressly and sincerely motivated by progressive interests (in the senses defined here by reference to democratic struggle and the countering of concentrated power), may nonetheless sometimes end up being regressively counterproductive in their effects – serving beneath the concealing discourse, rather to reinforce incumbent power and suppress wider social agency. Analysis and action must get below expedient surfaces.

This is where there arises the importance of the distinction introduced at the beginning – between processes of 'transition' and 'transformation' [16][17]. Societal transitions, it may be recalled, are mediated mainly through technological innovation implemented under structured control, presided over by incumbent interests according to tightly-disciplined knowledge, towards a particular known (presumptively shared) end. This typically emphasises integrated multidisciplinary science directed at processes of instrumental management through formal procedures in hierarchical organisations sponsored by the convening power of government [244]. Social transformations, on the other hand, are based more around wider innovations in social practices as well as technologies [245], driven by incommensurable, tacit and embodied knowledges, involving more diverse, emergent and unruly political re-alignments that challenge incumbent structures pursuing contending (even unknown) ends. Here there is a much stronger and more direct role for subaltern interests, social movements and civil society [246] – conditioning in ambiguous and less visible ways the broader normative and cultural climates in which explicitly structured procedures are set [247].

Of course, the utility of this distinction is heuristic (provocative and catalytic), rather than formal or definitive. The real value lies in considering implications on a concrete case by case basis, by reference to real-world examples and settings. Crucial devils will lie in details and positive or negative evaluations in the eyes of beholders. The role of technology, for instance, can in either case vary greatly [248][249][250][251]. And the point here is not to insist on particular definitions for specific words. Much existing usage of either term, often legitimately also implies the other [252]–[254]. It is the contrasting connotations of the differentiated underlying processes that matter more than the words themselves. The contrast between transition and transformation is also not a dualism [255]. Rather it is a duality [255], because even the concepts themselves are not mutually exclusive – there are several ways in which each reflexively depends on (and is constituted by) the other [17]. Nor is it a "*dichotomy trap*" [256], in that it simply defines instead a dimension of

variability for appreciating specific instances of real world dynamics [257]. The central point is rather, that if the distinction is not made (by whatever names), then governance knowledges and discourses (as well as practices) in any given sector, are vulnerable to systematic subversion by incumbent interests to channel more around expediently-controlled transition than inconveniently-emergent transformation.

Explored more thoroughly elsewhere [16], there is sadly not the space here to develop examples in the requisite detail. But the point is nonetheless readily made by considering the radical implications of transformations, potentially displayed (for instance) by ecological agriculture [38]–[40][41], zero carbon energy futures in general and renewable energy in particular [30]–[37]. As already touched on, these can be contrasted with characteristics of transitions towards 'sustainable intensification' based on intellectual property intensive agricultural transgenics [23] – or nuclear power [18] (or even climate geoengineering [19]–[22]) as large-scale responses to climate change. These latter transitions are typically propounded by powerful incumbent interests within existing sectoral regimes [258]. The former possible transformations reflect knowledges, values and interests that are more marginal to the current constituting of their respectively affected regimes [98]. Characterised then, as a contrast between orientations for radical change driven alternatively by powerful incumbent or relatively disempowered subaltern interests, it is only the latter kinds of transformation that depend on clear roles for democratic struggle, that are worthy of the understanding explicated here.

More fine-grain features of this contrast between transformation and transition can be illuminated by considering in more detail the much-proclaimed global 'renaissance' in nuclear power [259], [260]. Of course, when consideration is given to the actual patterns of investment and their relation to other energy technologies, the objective reality of a global nuclear renaissance is rather dubious [261][262]. But the success of this rhetoric is demonstrable [263]. Promulgated at the highest political levels and by scientific authorities ostensibly unrelated to nuclear supply chains, the effect is to condition wider knowledges and expectations in powerful ways [264][265][266][267][268]. The result in many countries, is that political pressures for green transformations in energy services and practices, driven largely by public concerns over nuclear power and sympathy for alternative transformations towards renewable energy and energy efficiency, are in fact systematically channelled by apolitical 'management' discourse, into transitions more towards nuclear power [192].

Of course, general claims that nuclear power is 'green' or 'Sustainable' remain strongly criticised in any sense other than low operational carbon emissions [262]. Nuclear waste, weapons proliferation and accident risks – and their

associated authoritarian control structures – have long made nuclear an iconic target of the green movement [261]. The Brundtland Commission and follow-on intergovernmental processes also generally treat this technology with suspicion [269]. So, the language of 'Sustainability transitions' is typically not used directly or explicitly of nuclear power. Although displaying many key diagnostic features of a controlled transition outlined here, initiatives explicitly identified as 'transition management' in the energy sector are typically linked in overt terms with more popular energy efficiency and renewable energy strategies [92], [270], [271]. But it is precisely the central point here, that it is the attributes of power dynamics in knowledges and practices constituting transition (by contrast with transformation), that lead prospective nuclear transitions in many countries to be the perverse beneficiary of authoritarian inflections of decades of subaltern pressures that were typically formatively forged disproportionately in transformative opposition directly against nuclear power [272].

Further revealing examples of similar dynamics can be found in emerging global governance of climate change – arguably the principal high level arena within which issues of 'green transformation' are currently played out. Key issues arise most acutely in the concluding paragraphs of the recent summary for "policy makers" by Working Group I of the Intergovernmental Panel on Climate Change (IPCC) [273]. That such an influential body chose (tentatively, but nonetheless momentously) to highlight a possible transition involving the diverse technologies of 'climate geoengineering', indicates the depth of the dissonance and contradiction. And assumptions adopted in the underpinning IPCC modelling exercises, further entrench these potentially self-fulfilling presumptions in favour of climate geoengineering [274]. So important is this for understanding the contrast being drawn here, that it is worth briefly recalling the magnitude of this disjuncture.

A 'progressive' global transformation towards genuinely "Sustainable" energy, would involve radical but entirely technically practicable, economically feasible and socially viable shifts in energy practices and services [275]. Although the challenges of such transformations are undoubtedly ambitious and daunting, it is clear that there exists a diversity of possible pathways through which to address them [276]. Repeated detailed assessments show that the energy service needs of a more heavily-populated and equitable world enjoying radically higher levels of wellbeing, can be cost-effectively met (under conducive institutional conditions [277], [278]), entirely and solely through diverse currently-available social, organisational and technological innovations around wind, solar, biomass, hydro, ocean and geothermal power [30]–[37]. Crucially, these strategies offer to provide services beyond carbon reduction alone (including ambient temperature, power, mobility and industrial production) at the same time as

realising other Sustainability benefits [30]–[37]. Yet, the impediments to an entirely renewable global energy system are not – as often claimed [279]–[281] – about intrinsic material limits on resources, technologies or economics [67], [275], [282]–[289]. The obstacles lie more with social and political (rather than physical or technological) obduracies – in intense resistance by incumbent interests, with sunk investments in existing energy sector infrastructures [290].

But the climate geoengineering alternative now highlighted (among others [291][292][293]) by the IPCC [273] is, by contrast, 'regressive' in the sense of being aligned with entrenched existing concentrations of power extending out from the energy sector. This would use an array of entirely novel (often speculative) technologies and unprecedented global institutions aimed (in most cases, solely) at assuming directly intentional 'human' 'control' over the planetary climate (Shepherd & et_al 2009; Fleming 2010; Ridgwell et al. 2012; Ruddiman 2005). As with other such aspirations, this requires heroic simplifications and reductions in what is notionally controlled – in this case, global average temperature [294]. So, even if these strategies are successful, a host of radical uncertainties, ambiguities, variabilities and collateral vulnerabilities are thereby neglected [274], [295]. In many instances this would require economic and political investment on a scale similar to that required for direct transformation of energy infrastructures [296][297]. Even on those few occasions where 'the costs' of climate geoengineering are claimed to be lower than those associated with direct carbon emissions mitigation [291][298], such a case is typically made in terms of direct costs to the operator, rather than the total costs to society [299]. The scale of the economic externalities is potentially enormous [300]. Yet, perhaps most crucially, most forms of climate geoengineering would leave energy (or other service) needs entirely unaddressed [292], [301] – thus continuing to require likely additional capital turnover that is in any case comparable in scale with that which would have been associated with the kind of renewable energy transformation with which this kind of resource commitment would compete.

Beyond this, climate geoengineering entails a further crucial transition in global governance. Whether the envisaged technologies are successful or not, the underlying explicit intentionality alone, would introduce massive expansions in political aspirations – on the truly epic 'Anthropocene' scale of "*controlling the global weather*" [302]. The scale, extent and intensity of these entirely novel forms of intractability, responsibility and accountability are of a kind and degree that is unprecedented in human history [303]. So, when looked at dispassionately, this contrasts starkly with the far less pronounced uncertainties and ambiguities associated with foreseeable processes of substituting new innovations and practices for climate emissions mitigation within particular

sectors, like renewable energy transformations [304]. Yet it is the manifestly more speculative and uncertain alternative of climate geoengineering, that is currently gaining such striking high-level worldwide attention within and beyond the IPCC [274]. That a regressive transition built around climate geoengineering is asserted in some quarters to be somehow self-evidently more tractable than a progressive transformation based on renewable energy [291], [305], is an indication not only of the strength of entrenched vested interests in this sector, but of their impact on wider structures, knowledges and expectations alike [306], [307].

Crucially, it seems more in the energy than climate arenas, that there exist powerful incumbent interests with large sunk investments in existing material infrastructures. And it is this 'subjective' condition of knowledge production that seems to exert a greater influence on the shaping of understandings of the prospects for transformative change, than the 'objective' conditions of the implicated social, technological and environmental systems themselves. In short, there exists no current entrenched 'climate management regime' with conservative commitments to existing practices, of a kind that would insist that new ideas and practices in this sector are 'unrealistic'. So the entrenched inertia of incumbent power concentrations goes under-countered. And this conservatism is reinforced by the general propensities of wider political incumbency of many kinds, to favour rhetorics of technical control over narratives of broader social transformation. It is this fundamental political asymmetry that is arguably responsible for increasing interest in much climate change governance debate in inherently conservative (but extremely uncertain) technologically-mediated transitions over more socially radical (but technically and physically feasible) institutional transformations. The effects are clearly very practical. But the stakes could hardly be higher.

6: Control, Care and 'Knowing Doings'

These examples illuminate a general pattern of enormous importance for considering the contrasting dynamics of transition and transformation. This concerns the near-ubiquity of "*fallacies of control*" [308]. As discussed earlier, the intentionality of 'control', makes it a very different thing to 'impact'. So also do the colloquial (and technical) connotations of 'determination', 'domination' and 'command' make 'control' quite distinct from, say, 'influence' [176][309][310][234]. That this routine elision of domination and influence constitutes a fallacy, lies in the implication that social agency can be as unqualified and exclusively and comprehensively determining as suggested by the everyday meaning of 'control'.

Yet, reflecting the fantasies of linear causal genealogies mentioned earlier, exaggerations of control are well documented in various areas of psychology [311], organisational studies [119][312] and politics [313]. In all these fields, deterministic understandings are widely recognised as problematic. Indeed, idealisations of control are often better understood in these areas, more as instrumental fictions necessary for assertion of privilege, than as disinterested accounts of actuality [314]–[318]. For all the noisy ritual, the actual maintenance of social, institutional and economic privilege arguably depends more on rhetorical surfing of uncontrollable waves of contingency – of former UK Prime Minister MacMillan's apocryphal "*events, dear boy, events*" [319] – than on the actual exercise of material control itself [320]. So, it is the political expediencies of discursive claims-making and appropriation of credit for agency, rather than any substantive efficacies of associated material practices, that most explains the prevalence of control ideologies [321]. And what is widely recognised to be true of organizations, is even more apposite in the greater complexities and indeterminacies of wider governance [317], [322].

Recognition of this general pattern, throws further light on narratives associated with efforts at 'Anthropocene domination' through climate geoengineering. These extend expedient control discourse beyond narrowly explicitly-political domains and into broader, ostensibly independent, scientific understandings of the Earth itself. Yet, when we think about it, the weakness, contradictions and dissonance associated with this idealisation of control are obvious. Everyday experience of seeking to exercise control over even the most specific aspects of life, can teach a salutary lesson [323]. Often, the more intensely that control is conceived or enacted, the more it tends to evaporate – or itself become subordinated to circumstance [324][325]. Even the paradigmatic archetype of control – the engineered machine – displays this paradox [326]. The more exquisite the desired fidelity of control, the greater the necessity for reciprocal compliance with conditions for tractability [327]. This is so, even of the most simple, specific and finely-crafted tool – which typically works only if designed and operated strictly in accordance with its inherent (contingent and recalcitrant) material qualities, constraints and propensities [328].

As attention extends into the wider and more open, complexities and indeterminacies of 'real-world' – especially social – settings, the limits of idealised notions of control become ever more clear [234]. Indeed, that this is a basic feature of technological dynamics, is not necessarily a negative observation – even from self-identified technophile perspectives [329]. But the lessons are more equivocal from many of the most canonical instances of engineering 'control' – for instance, in nuclear technology [330], chemicals [331], military systems [332] and genomics [333][334]. All these areas provide

many examples of failures of control [335][336][337][338][339]. And these limits become even more obvious, where the systems supposedly under control are not seen as subject to deliberate design [340]. Then, it is not tenable even to assert claims to authorship of the controlled systems. Indeed, perhaps it is a sensitivity to the rhetorical importance of such authorial claims, that helps drive Anthropocene emphasis of human control of contemporary planetary dynamics? Yet, in 'Earth systems' (as elsewhere), it remains the case that multiple alternative accountings of causality among proliferating arrays of mutually nested and reflexively co-conditioning factors, leaves any particular tracing of 'control' in any given instance, significantly open to contestation [341]. Adding further discursive Ptolemaic epicycles does nothing to escape this general fallacy of control [342].

When stripped of their instrumentality, then, claimed instances of control in interactions between societies and Nature, typically decompose into far more complex conditions of diverse mutually-adapting intentionalities and (in)tractabilities [343][344]. 'Subjects' and 'objects' of control are typically more ambiguous, volatile, overlapping and reflexively inter-related than suggested [17]. The supposed objects of control assert – and are afforded – their own countervailing agency [345]. And even the subjects of control are themselves acknowledged to be more conditioned by, than dominating, their own contexts [346][347][348][349]. The knowledges ostensibly informing control are recognised to be as much shaped by, as shaping of, action [350]. So, scope for problematizing control moves from merely 'means' alone, through the professed overarching 'ends' – to the deeper and wider relations that co-constitute and pluralise both [351]. It is in the light of these kinds of decompositions of 'control', that elaborately-integrated interdisciplinary science and monolithic hierarchically-organised programmes of 'planetary management' appear as little more than courtly etiquettes – projecting narrowly-aspired political structure into generally-imposed cosmology [352].

Under these circumstances, interactions are arguably better understood as mutual relations of 'care' than of dominating 'control' [353][354][355][356][357][128]. And deliberately enacted this way, knowing practices of *care* can transcend the context-free absolutes, assertive dualisms and idealised subjugations of control [358] – of neatly-subordinated 'scales' and 'levels'; subjects over objects; relations after categories; actions based on knowledge; effects determined by causes; ends driving means; structure over agency (or vice versa!) [359][28]. The obdurate realities of the world remain. But in its rebalancing of relations between subjects and objects of practice, a *caring* approach accommodates better than control, the ways in which understandings and actualities are symmetrically co-produced by action [360]. It

is not only physical, but also social, materialities that shape knowledge. Embodiments of social and natural are in this sense reciprocal and recursive [361]. Likewise, it is in *caring* for the authentic autonomous propensities of 'objects', that resistance is garnered against the subjective instrumental political and disciplinary pressures noted here, to configure understandings in the most expedient ways [362]. Thus struggling more sincerely with the imprints of power in knowledge through the more reflexive sensibilities of care [356] [360], human and planetary processes are no longer represented or engaged with as objectified, hierarchically-categorised structures. Instead, both in understanding and action, the social and the ecological can be openly experienced more realistically: as inter-subjective, mutually-relational dances [363].

But this *caring* disposition does share one thing in common with Anthropocene commitments. The social and planetary processes are engaged with as intensely interconnected [364]. Indeed, this is arguably even more so with a caring approach than in a more controlling 'Earth systems management' paradigm [157][365]. For the intimately co-producing dynamics between the human and the natural must be cared for not just in the 'objective' domains of societies, technologies and ecological systems. Some of their most formative effects take place subjectively, in enacting the knowledge relations that shape the understandings of these systems. So, the key issues lie in the depth and openness with which these epistemic politics and knowledge power relations are acknowledged, deliberated and critically challenged in action [366]. In this way, it is perhaps the most restrictive feature of control ideologies, that the associated one-way determinacies of knowledge over action, preclude even the thought of this kind of contention. It is thus in recognising and caring for the implications of what are in reality the more complex and symmetrical entanglements between action and knowledge, that the possibilities of care – rather than control – arguably become most salient.

But what does all this mean for more specific areas of practice? In energy pathways, agricultural futures and climate change strategies (as elsewhere), care must be taken that analysis of social dynamics does not – under instrumental pressure of patronage to '*see like a state*' some particular favoured 'transition' [367] – simply entrench and perpetuate these misleading fallacies of control. As the examples earlier in this paper suggest, such self-reinforcing channelling by incumbency can all-too-easily lead to the opposite of the envisaged transformation. Instead, what occurs can sometimes fall short even of 'transition' as defined here (which at least involves some kind of substantive change). Where existing deeply established structures persist, concealed in merely superficial novel forms of representation or discourse, a better term might be 'transduction' [16].

Be that as it may, this point applies crucially as much when contemplating the exercise of nominally democratic, as of autocratic, power in 'social control' [368]. The difference lies not in the notional source of legitimacy, but in the contrasting materialities of social agency enacted as 'care' or 'control' [369]. Building pathways to Sustainable energy is about distributed social mobilisation, more than technological innovation [370]. Ecological agriculture is about enabling cultural and environmental diversity, not imposing 'intensified' agronomic and institutional monocultures [371]. And respecting the global climate is about exercising humility and responsibility in mitigating human perturbations of an acknowledged dynamic and uncertain system [25][372], not about assuming assertively confident control towards some assertedly 'non-negotiable', notionally static, idealised global 'optimum' [61].

Of course, the diverse, complex, multidimensional, fractal dynamics of power, mean that specific concrete implications of this distinction between 'controlling' and 'caring' approaches are not self-evident in any given context. Again, devils are in details and beauties in eyes of beholders. But a clear general implication of care (in these terms – as distinct from control), is active acknowledgement of the plural and political nature both of knowledges and practices of Sustainability [373]. This follows from the explicitly normative and relational connotations of caring – *for* values, virtues and visions that (albeit still politically contestable), transcend categorical 'givers' and 'receivers' [25]. This contrasts with the technical instrumentalism of a presumptively singular and isolated controlling agent according to their own individual ends.

So, engaged with as care rather than control, critical creativity and action may be recognised as better invested in diverse, unruly, agonistic explicitly-political interventions, than in the orderly structures and discourses which suppress them and which they themselves subvert [374]. Entwining knowledge and action in ways that are not as separate and sequential as prescribed in notions of control, a caring disposition recognises that transformative interventions are best undertaken as combining both. Doing is not necessarily predicated on knowing. And knowing is anyhow itself constituted by doing. Openly caring engagements allow each to be undertaken as more distributed and relational than commonly represented in heroic narratives of control.

None of this is new – especially where experience is conditioned by subaltern exclusions from power. For instance, more mutualistic – caring – entanglements of knowing and doing [356], are quite well established in traditional repertoires of social movements [375]. Relatively free from the instrumental mythologizing of power etiquettes, the formative energy of these overtly entangled 'knowing doings', lies not in their internal purported direct controlling force, but in the combined effects with their co-implicated reflexive reactions in their wider social

environments [17]. In this sense, dynamics enacted like care and control are not exclusive, but co-constituting. It is arguably the more liminal provenance of care, that helps lead this side of the balance to be under-documented in the expediently codified structures of academic and policy knowledge. The less tangible nature of the associated relations and relative absence of accounting institutions and procedures compound the invisibility [341]. It is by these means, that dynamics of disciplinary appropriation and cliental pressures to "see like a state", pressure compliance with hegemonic discourses of control [367]. And, as has been argued, it is often as much through the discursive assertion of these fictions, as through their attempted performance, that the realities of political privilege are actually maintained. So, a key factor in effecting transition rather than transformation, may partly lie in the very 'knowing doing' that helps constitute this distinction itself.

But examples of other particular (potentially transformative), 'knowing doings' are not entirely invisible. They might include, for instance, '*Trojan horses*' [17]. This is where an exercise in subaltern policy analysis or political action which ostensibly takes one form, actually exerts its effects in entirely different ways. Or – learning from past experience of insurgent struggle – there are various forms of '*political judo*' [376], where it is the very strength of incumbency that offers the principal opportunity for less powerful actors successfully to contend against it. Also relevant is the potential for '*civilising hypocrisies'* [377]*.* This is where incumbent power is conditioned reluctantly to re-orient itself in new directions, by the incremental ratcheting of tensions between discourse and practice.

Now is not the place fully to detail the kinds of distributed bottom-up political moves that help constitute social transformation, as distinct from transition [16]. The point is, that just as orientation by gridlines or fences, differs from steering by compasses, these kinds of laterally transformative 'knowing doings' are not subject to the objectified categorical forces of a controlled transition. Actions are not oriented by the transcendent authority of synoptic structured grids for knowledge and practice – like controlling lines of longitude and latitude on some notionally objective and definitively-imposed map. Instead, they are steered more relationally, by the distributed spontaneously-aligning emergent interactions of myriad subjective orientations, each one centred in a polar fashion, on a different autonomously-caring subject.

It is here that the parallels between ecology and society also strike another chord. For the potential conjunction of radical and rapid realignment in social transformation is quite graphically illustrated in the abrupt shifts in direction performed every day so exquisitely (and apparently effortlessly) by the anarchistically-choreographed flocking behaviours displayed by so many other

social animals. By caring equally for autonomous agency and the social collectivity within which this is embedded and constituted, flocking dispositions offer what may be more than graphic metaphor [378], [379]. For similar patterns are not alien to human societies. Indeed, it is perhaps here, where the political structuring of knowledge often renders greatest blindness. Beyond the central domains of interest to power, collective autonomies of care are arguably visible in many areas of 'grassroots culture' [380]. And comparably rapid and radical alterations of direction can also occur here, without overarching designs, integrated codifications of knowledge or power-structured programmes for action – simply by emergent lateral mutual co-ordination between autonomous subjects.

It is these dynamics of care rather than control (often agonistic), that were arguably most formative in the most impressively progressive of historical transformations mentioned earlier in this paper – in struggles for emancipating excluded classes, ethnicities, slaves, workers, colonies, women, young people and sexualities [43]. But it is inherent to this sensibility, that such caring dynamics must recognise themselves not to exist in isolation. It would be contradictory to deny the inevitable persistence of instances of concentrated power – with all the associated necessary fallacies of control. Indeed, there is nothing in the present analysis that precludes that this may in some degree and fashion, conditionally be contingently desirable. But the very reason for the efficacy of diverse knowing doings such as those mentioned above, is that continued presence is thereby afforded for rigid structures to serve as pivots and fulcra for more reflexive social action [17][192]. So, whatever the intentions, what emerges in reality are messy, rumbustuous articulations of caring and controlling. And the resulting under-coherent and incommensurably structured turbulence is more like the dynamics of informal culture than the idealised formalities of policy [313]. So, dynamic processes of progressive transformation might be thought of not as the controlling of determinate transitions – nor even as hubristic prescriptions to some singular normativity like that of 'care' described here – but as a more a more complex, open, multivalent and deeply plural 'culturing' [381][382] of radical social change.

7: Conclusions

This paper took its cue from growing tendencies for high profile actors in Sustainability governance debates to question (and not only implicitly), the value of 'democracy'. Emphasising multiple kinds of catastrophe, with apparently unfeasibly short periods to "*save the planet*", active participation is seen as a threat. Acknowledging uncertainty becomes a weakness. Scepticism is a

pathology, dissent an unaffordable "*luxury*". As virtues of 'responsibility' are claimed in ever narrower ways, culpabilities are increasingly externalised away from particular political structures and economic incentives, and towards 'human behaviour' in general – or humanity in an undifferentiated sense. Trust is a quality imposed by the powerful onto the powerless, not the other way around. It is in this light, that it looks like time "*to put democracy on hold*" [8].

This chimes with emerging scientific discourses that emphasise a vision – and assert a need – for various kinds of domination and control. The Anthropocene is expressly defined to highlight these themes. Associated '*planetary boundaries*' are addressed through the "*control variables*" of the Earth. This is a world of "*non-negotiable*" imperatives, raising "*absolutely no uncertainty*", brooking "*no compromise*" and requiring strong leadership. Governance is addressed not as a distributed political process, but as a more instrumentally located responsibility for "*planetary management*" … "*taking control of Nature's realm*". Democracy, in this light, can become the "*enemy of nature*".

But this emerging picture is strikingly at odds with the realities both of Sustainability and democracy – and the agonistic progressive social dynamics which gave rise to both. Equally in its prioritised outcomes and its constituting processes, Sustainability has always been centrally about democratic struggle. And though the two are mutually conditioning – this is more about rudely unruly political contention **against** power, than the kinds of power-driven (and -constrained) 'integrated knowledges', 'invited engagements' [383] and polite policy etiquettes of "*transitions management*" or "*planetary stewardship*". Just as it was arguably only in agonistic contention by social movements that high-level recognition of environmental and social justice imperatives ever came about, so too is this the best hope for sustaining them towards their promised aims.

It is this crucial lesson that current planetary management initiatives are most in danger of forgetting. Without it, there is a serious (if unintended) vulnerability to "*fallacies of control".* These exaggerate the efficacy of intentionally structured determinism – not because it is particularly effective in achieving radical social change, but because merely the idea helps sustain existing patterns of privilege. The prevalence of this fallacy is thus a particular example of how knowledge not only informs power, but is profoundly shaped by it. If aspirations to radical social change are to have real prospects for success, actions must be as transformative of these regressive patterns in knowledge as of more material relations. This points to engagements of care, rather than control.

In this 'caring' mode, the knowing and doing of transformation are not separate, but intimately interlinked. Neither alone is sufficient. As in the exquisite changes

of direction seen in flocking behaviours in nature – and in rapid realignments in 'grassroots culture' – truly progressive social transformation is arguably only truly achieved through crucial roles by mutualistic caring dispositions – for diversity, creativity and democratic struggle, equally in knowledge and action. It is this resulting unruly horizontal interaction between contending forces of care and control that is far more like the general dynamics of grassroots culture, than the idealised vertical orderings of government – or even orderly accounts of governance more generally. Radical social change is therefore not about controlled Cartesian structures – either in knowing or doing. Instead it arises in far more incoherent, fractal, multipolar, processes emergent from myriad flocks of 'knowing doings' (like 'political judo', 'Trojan horses' and 'civilizing hypocrisies'). In the resulting turbulent flows, the cultural interplay between loudly-proclaimed deterministic efforts at control and far less visible mutualities and agonisms of care, is best thought of not as a noun (a categorical domain of activity) but as a verb (multiple, pervasive social processes) – of distributed *culturings* of radical political change [381][382].

Where instead 'Sustainability' is addressed as a determinate technical end, rather than as an emancipatory process for determining plural human and ecological ends, it betrays its own foundations [54], [92]. Hope for genuinely progressive 'green transformations' are not about fear-driven technical compliance, but hope-inspired democratic struggle and choice. This is the challenge of 'emancipating transformation'.

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