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WHAT SORTS OF KNOWLEDGE FOR WHAT SORT OF POLITICS? SCIENCE, CLIMATE CHANGE AND THE CHALLENGE OF DEMOCRACY

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ABSTRACT

There are two propositions about knowledge, society and policy-making which – if true – are troubling in the context of climate change. First, policy-making seems ever more reliant on knowledge and yet science seems to deliver knowledge (at least in this context) with ever less certainty or authority. And second, and here I quote Dan Sarewitz (1996): "If humanity is unable or unwilling to make wise use of *existing* technical knowledge … is there any reason to believe that *new* knowledge will succeed where old knowledge has failed?" In this paper I will analyse recent calls for enhanced knowledge-making around climate change – for example from the Intergovernmental Panel on Climate Change and the Earth System Science Partnership – by asking and answering three specific questions: What sorts of knowledge are needed to understand climate change? How are gaps in knowledge framed? And why does more knowledge matter? I suggest that the frequently heard calls for 'action' on climate change emanating from the science community fail to engage adequately with normative dimensions of political decision-making and hence fail to reflect on recent work in science studies, political philosophy and democratic theory. In the end, the design of environmental knowledge cannot be divorced from the styles of democracy being assumed.

Keywords: Climate change, Science, Knowledge, Politics, Democracy

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MORE KNOWLEDGE FOR WHAT?

In December 2011, atmospheric scientist Ken Caldeira of the Carnegie Institution of Washington, surprisingly resigned from his Lead Author position in the Intergovernmental Panel on Climate Change (IPCC) 5th Assessment Report (AR5). In explaining his resignation Caldeira raised the following question:

> "I am all for scientific reviews and assessments … however, it is not clear how much additional benefit there is to having a huge bureaucratic scientific review effort under UN auspices ... can anybody point to any important positive outcomes resulting from the IPCC AR4 process? Is there reason to expect a greater positive impact from the IPCC AR5 process?"[1]

This is indeed a question worth asking. What *will* be the impact of the four years of effort by over 800 scientists, social scientists and scholars when AR5 is published in autumn of 2013 and spring of 2014? At the same time that Caldeira was resigning from the IPCC, Ban Ki-Moon, Secretary-General of the UN, was addressing the policy community at the 17th Conference of the Parties in Durban and raising the same question, but more obliquely:

> "It would be difficult to overstate the gravity of this moment. Without exaggeration, we can say: the future of our planet is at stake. The science is clear. The WMO [World Meteorological Organisation] has reported that carbon emissions are at their highest in history and rising. The IPCC tells us, unequivocally, that greenhouse gas emissions must be reduced by half by 2050 – if we are to keep the rise in global temperatures to 2 degrees [Celsius] since pre-industrial times. You are the people who can bring us from the edge. The world is looking to you for leadership."[2]

The science is clear. The politics is not. Knowing facts is not the same as enacting change. In which case, why more knowledge? Why another IPCC report?

Not only do we have climate change, but we have other hot-button issues such as biodiversity loss and, more broadly, the challenges of global sustainability. All three issues have spawned - or are possibly in the process of spawning – new forms of global knowledge assessments. The IPCC – now long in the tooth and battle-scarred; IPBES (the Intergovernmental Panel on Biodiversity and Ecosystem Services) which was approved by governments in Panama in April 2012; and a proposed Intergovernmental Panel on Global Sustainability - for example here is Owen Gaffney of the International Geosphere-Biosphere Programme Secretariat commenting in January 2012:[3] "If evidence supports the notion that sustainable development is a necessity rather than an ideal to aim towards ... then a regular state of the planet assessment carried out by an Intergovernmental Panel on Global Sustainability is a must." And then we have the recent move to coalesce a global change knowledge community through the Future Earth Initiative, launched at the Planet under Pressure Conference in March 2012 in London.

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[1] Dot Earth blog, 21 December 2011: http://dotearth.blogs.nytimes.com/2011/12/21/new-directions-for-the-intergovernmental-climate-panel/

[2] Statement by Mr.Ban Ki-Moon, 6 December 2011, Durban, South Africa

[3] http://www.earthsummit2012.org/blog/item/269-ipgs-owen-2. Gaffney went on to write: "At the core of such an assessment, which must have political legitimacy, should be policy-relevant information relating to systemic risk management at the planetary level"

But there is a problem with this proliferation of new knowledge-making/assessing activities around the challenges of climate change and sustainability. It is, simply put, that there is a surfeit of knowledge. Dan Sarewitz captured the problem well a few years ago: "If humanity is unable or unwilling to make wise use of *existing* technical knowledge ... is there any reason to believe that *new* knowledge will succeed where old knowledge has failed?" (Sarewitz, 1996: 142; emphases added). The tone of London's Planet under Pressure Conference epitomises the frustration of many in the scientific community concerned about sustainability: there seems no shortage of technical knowledge, but little evidence of reduced or smarter consumption. The pressures on the physical fabric of the planet, and its material flows, remain. Climate scientist Jim Hansen laments the reticence of scientists to speak out (Hansen, 2007); climate and energy analysts Kevin Anderson and Alice Bows urgently call upon scientists to communicate their science 'without fear' (Anderson and Bows, 2012).

This frustration then leads to perhaps unwelcome interventions, as in Jim Lovelock's suggestion a couple of years ago that "It may be necessary to put democracy on hold for a while" (Lovelock, 2010), or more recently Mark Stafford-Smith's claim that: "Achieving a sustainable world will require ... research ... to build the consensus required for effective action at national and global scales. *There is no other viable way forward*" (Stafford-Smith et al., 2012: 6; emphasis added). There is 'no other way'.

In this paper I want to reflect on what I see lies at the heart of this frustration with politics and democracy in the context of climate change knowledge: namely, how do we understand the relationship between science and policy (more broadly, between knowledge and politics. There seem three main positions that can be adopted:

- A managed boundary, which separates knowledge from politics - as in the rhetoric of policy-relevant, but policy neutral knowledge: in which case where is this boundary to be drawn, who establishes it, how does it change?

- Or else knowledge is seen, perhaps implicitly, as driving – if not determining – environmental policy: in which case what is the role of politics?

- Or, conversely, politics is recognised – and hence welcomed - as intruding into the making of environmental knowledge: in which case who is entitled representation?

It is this last position which I wish to advance here.

KNOWLEDGE AND POLITICS

So let me lay out my core argument: which is that insufficient attention is paid by the global change knowledge community to the multiple ways in which knowledge *is* political; and, the corollary, that there is insufficient recognition that questions of representation in knowledge-making are just as important as questions of representation in politics. This means paying attention to what Clark Miller has called 'epistemic constitutionalism' (i.e., how knowledge is governed), especially in relation to global concerns such as climate change and biodiversity loss (Miller, 2009). More precisely, my point is that *how* knowledge is made, assessed and presented carries normative and political implications. The oft-repeated phrase 'Policy-relevant, yet policy neutral' obscures these implications. Such masking leads to the covert – rather than the

overt - politicisation of science, a criticism to which the IPCC, for example, has at times been vulnerable. Far better is to reveal and contest the normative dimensions of knowledge-making. Knowledge and politics *are* intrinsically linked: Plato and Aristotle recognised this two and a half thousand years ago; so too 400 years ago did Francis Bacon. Fifty years ago we saw it with Cold War science and today, too I argue, with global change science. Making and assessing knowledge is inevitably a political project.[4] And so the global change knowledge community needs to be reflexive about what this means for representation and knowledge governance.

The key questions - whether about climate change or global sustainability - then become such as these: How is the knowledge of 'experts' accommodated with the wishes of 'the people' (or how are the wishes of the 'experts' accommodated with the knowledge of 'the people'?) How are different versions of 'the good life' evaluated? Should cultural norms be deliberately changed on the basis of science? What is the right balance between volunteerism and coercion? What forms of democracy – representative, participatory, centralised - are most desirable for dealing with climate change? What is wrong with authoritarian environmentalism?

Elements of this debate have been joined by science and technology studies (STS) scholars in the pages of the journal *Social Studies of Science* (and elsewhere of course; amongst many texts one could point to are Latour, 1999; and more recently, Jasanoff, 2012; Leuschner, 2012; Stehr and Grundmann, 2012). To give a flavour of this, let me contrast the positions of two leading STS scholars - Harry Collins and Sheila Jasanoff - as summarised recently by Darrin Durant (Durant, 2011). In essence, the question is: 'How should liberal democracies structure public discussion and organise decision-making on matters which have a knowledge content?' Collins' so-called '3rd wave' of science studies would bracket-out personal and cultural value commitments from knowledge claims, demarcating political from technical questions and thereby authorising experts to be unchallenged experts (Collins and Evans, 2002). Jasanoff is critical of such a stance, arguing for deliberation and participation across *all* relevant questions and for co-production between science and society from upstream to downstream concerns (Jasanoff, 2003). Durant then suggests these two positions can be somewhat caricatured by Rawlsian public reason and by Habermasian discourse ethics.

I will not claim any easy resolution to this debate (see Owens, 2011, for a further reflection on why this is so): there are weaknesses and dangers in both positions – capture by hegemons and elites on the one hand; dissolution into relativism and identity politics on the other. But no-one seriously concerned about climate change – whether scientist, citizen, citizen scientist or scientist citizen – should avoid these questions. To do so is to be against politics. However one approaches the question of relating knowledge to politics, there remain these normative questions, which are questions of science and public interest: What sort of political representation do we wish in knowledge-making processes? Who is entitled to determine this? And who governs this representation? Whether dealing with climate change, biodiversity or more widely with global sustainability these questions should remain in the foreground.

[4] To illustrate, consider how the framing of knowledge has implications for the types of policy interventions likely to be considered. For example, the IPCC adopts the device of 'global temperature' as the definitive descriptor of 'the climate problem'; whether emissions are calculated in terms of carbon dioxide or carbon dioxide-equivalent, or the use of Global Warming Potentials, alters the focus of policy deliberation; or when climate adaptation is placed into an analytical framework alongside mitigation ... all of these scientific manoeuvres 'direct' the policy gaze in specific directions than cannot be claimed to be policy-neutral.

KNOWLEDGE GAPS

Let me turn to the question of knowledge itself before exploring these questions a little further. What sorts of knowledge are we dealing with; and how do we conceptualise gaps or deficiencies in knowledge? In his 1959 Cambridge University Rede Lecture 'The Two Cultures and the Scientific Revolution', C P Snow famously contrasted two knowledge cultures: namely, the sciences and the humanities. Snow lamented the widening gulf he saw developing between these two traditions of knowledge, even while he argued strongly – in that ascendant post-War, modernising era - that it was the sciences which held out the greatest prospect of benefiting humanity. Yet despite his valorisation of science, Snow would certainly have resisted the claims of 'scientism' – i.e., the claim that scientific knowledge is the only valid and necessary form of knowledge (e.g. Dawkins, 2012).

To Snow's two cultures we must then add a third in the form of the social sciences – a grouping of disciplines which Snow ignored completely, but which Harvard psychologist Jerome Kagan helpfully juxtaposes with the sciences and humanities in his book 'The Three Cultures' (Kagan, 2009). One of the motivations for Kagan's book was his recognition of the danger to society when the ideological hand of a dominant perspective becomes too heavy. For Kagan, this ideological danger was the dominance of scientism. And we can push this typology further by calling upon Matt Nisbet's argument, made a couple of years ago with ecological colleagues, in which he recognised *four* knowledge cultures, with the creative arts and professions sitting alongside philosophy and religion. To do justice to the human experience of reality, he argued, we need "to bridge the great wellsprings of human understanding – the natural and social sciences, philosophy, religion and the creative arts – to 're-imagine' how we live on Earth" (Nisbet et al., 2010: 331).

So in recognising the different sorts of knowledge which matter with respect to global sustainability, I would want to lay out this set of (at least) four knowledge categories:

- Scientific and social scientific knowledge : method-centred, mobile
- 'Local' (or indigenous) knowledge : place-centred, holistic
- Tacit knowledge : implicit, embodied
- Self-knowledge : reflective, spiritual

I include self-knowledge here specifically because it may be seen as one of the goals of reflection and learning promoted by humanities disciplines. 'Know thyself' was the ancient inscription at the Temple of Apollo at Delphi, an aphorism widely used by Plato in his soliloquies on Socrates in the 5th century BCE. It is also a central idea in Melissa Lane's recent book 'Eco-republic: Ancient Thinking for a Green Age' (Lane, 2011) in which she explores the classical idea of virtue, both individual and civic, and its relevance to climate change and sustainability.

But we also need to reflect not just on knowledge, but on knowledge gaps. How *do* we (or how *should* we) think about and define gaps in knowledge? Here, let me also suggest four different frameworks which might be used to think about knowledge gaps.

Knowledge as linear

The first of these is the linear view of knowledge. This heuristic emerges from a particular view of science and is epitomised by the IPCC and its desire to 'reduce the uncertainties in predictions'. Knowledge here is

progressive, ignorance is finite and *discovery* leads to ever more complete understanding. Interestingly, this view parallels the 'God of the gaps' thinking in theology: as humans know more and more about the physical world, there is less and less need, so the argument goes, for any causal agency for God, until eventually the deity is discredited altogether. It is a popular heuristic which religious apologists have worked hard to dislodge: it assumes a particular view of God, just as in science the equivalent heuristic assumes a particular view of knowledge.

Knowledge as contingent

A second view of knowledge gaps is that they are contingent. That is, knowledge is *constructed* as a result of social processes and imperatives. As these change over time so the credibility of what is known, and the urgency of what is not known, also changes. Rather than knowledge progressing in a straight line – ever onward and upward – processes and products of knowledge are often convoluted and entangled. As Sheila Jasanoff has more than once remarked, it is certainty that is the anomaly in human experience and which needs explanation, not uncertainty.

Knowledge as fragmented

A third view might approach knowledge gaps as a result of poor connectivity. What is needed is better *integration* of existing knowledge. Integrating different knowledge is a form of gap-filling as we seek to build ever more faithful replicas of reality in our minds or in our models. The recent Planet under Pressure Declaration places huge faith in this form of gap-filling, desiring to 'integrate across all disciplines, domains and regions'.

Knowledge as brittle

A final approach to gaps in knowledge might be to cover them with layers of meaning. This heuristic is most likely to be adopted by the humanities and may be seen, metaphorically, as a *thickening* of knowledge: adding layers of meaning and significance to our understanding of reality. The humanities are not on a search to discover new knowledge, or even to connect together existing knowledge. Rather the humanities are engaged with issues which will never admit a technical solution – issues like justice, goodness, humility and democracy. They frequently involve normative questions which can only be differently or more deeply understood ... not solved. In this approach, knowledge 'accumulates' rather than 'progresses', or as philosopher Nicholas Davey puts it: "It does not progress by overcoming the problems of previous generations, but rather thickens and extends an understanding of the issues involved" (Davey, 2011: 305).

We will see shortly why I think this latter approach is so important for the challenges of climate change, but let me summarise thus far. Not only are there multiple sorts of knowledge which have a bearing on our understanding of global change, there are also multiple ways of conceiving of deficiencies in knowledge. I have suggested that the conceptions which are dominant in the IPCC and Future Earth are either about linear processes of discovery – e.g. 'narrowing uncertainties' – or are about connecting (all!) disciplines together – universal integration for a 'knowledge of everything'. However, there are other ways of thinking about knowledge gaps: either in terms of blind spots which are socially constructed, or else as sites for the thickening of human understanding of normative concepts such as justice, equity, goodness, democracy, well-being. And it is here that I come back to the questions I posed at the start: how do we conceive of the relationship between knowledge and politics in the context of climate change?

'ACTING' ON CLIMATE CHANGE

To put this question more broadly: Is the problem of responding to climate change (or biodiversity loss, etc.) that we do not have enough knowledge *in toto* (the linear view). Or maybe it is that the knowledge that we *do* have is not sufficiently connected (the integrationist view)? Or rather – and this is what I want to suggest - is the problem that we have not attended sufficiently to the difficult normative and cultural dimensions of the relationship between knowledge and politics?

Of course, many calls for new knowledge-making have alluded to this relationship. The original mandate from the British Government for the establishing of the Tyndall Centre, which I founded in 2000, claimed "This research will help us find sustainable solutions to the challenges of climate change" ('actionable knowledge' in other words); or Mark Stafford-Smith's recent call at Planet Under Pressure for "a rapid step change in the evolving relationship between science and decision-making" again alludes to actionable knowledge (Stafford-Smith, 2012). But too infrequently is there any direct questioning of *how* knowledge does and should relate to political debate and decision-making (cf. Sutherland et al., 2012). Instead, the implicit assumption too often seems to be that: (i) knowledge leads to action; (ii) more certain knowledge leads to more definite action; and (iii) more integrated knowledge leads to more joined-up action. These assumptions reveal the linear model of science-policy interaction at work (also see, for example, Scoones (2009) and his critique of the International Assessment of Agricultural Knowledge, Science and Technology for Development).

This linear thinking is perfectly captured in the headline from *The Guardian* newspaper on 27 January 2007 following the publication of the IPCC AR4 Working Group I report: "UN's vast report will end the scientific argument. *Now* will the world act" (emphasis added) and also in the Danish Prime Minister's call at the March 2009 Copenhagen Climate Change Congress: "Politicians can only act on what we know, and therefore your contribution is central" (Baer and Kamman, 2009). The linear model asserts that if researchers could fill the gaps in knowledge, decision-making and policy enactment would be an easier thing to do – and the world would be a better and more sustainable place. Development geographer Kathleen O'Reilly summarises this fallacy succinctly in the context of knowledge for sustainable development: "... if we knew just a bit more, success would be imminent ... there will come a point when we *will* know enough and then development interventions will deliver on their promised positive outcomes" (O'Reilly, 2011: 2795).

Confidence in the power of 'new knowledge' to enable wise choices to be made was expressed back in 1990 by Sir John Houghton on the publication of the IPCC First Assessment Report: "I am confident that the [IPCC] Assessment and its Summary will provide the necessary *firm scientific foundation* for the forthcoming discussions and negotiations on the appropriate strategy for response and action regarding the issue of climate change" (IPCC, 1990: vi; emphasis added). But Sarewitz's challenge is to turn our gaze away from making firmer and newer scientific knowledge and ask questions about why enacting change is so hard to accomplish, particularly on the scales of action we are dealing with in climate change. Jean Goodwin, Professor of Rhetoric at Iowa State University, has a different take on 'firm foundations' to that of Houghton: "Maybe those of us who favour doing something about climate change should admit that our policies aren't

going to have a "*firm foundation*" ... and start arguing about values and solutions instead"[5] (emphasis added).

So, what *does* it mean to act on climate change? By whom; for what ends; by what means; and with what legitimacy? When the Planet Under Pressure call goes out "Integrated science at the international level is certainly the way to go. This is urgent: the planet calls for action now" (Artaxo, 2012), or when the Copenhagen Climate Change Congress declares "Inaction is inexcusable" (Copenhagen Diagnosis, 2009) - what forms of (in)action are being foreseen? The critical issue is what forms of political actions are authorised by the different sorts of knowledge that we have (now) or hope to have (in the future)? The problems of making an adequate response to climate change have little to do with gaps or disconnects in knowledge which can be filled or integrated. The problems are procedural and deliberative: *How* to decide about what to do when worldviews and value systems clash, whatever knowledge we may possess at any given moment. Addressing these problems is a task of democratic theory and political philosophy. These problems ask difficult questions about how democracies should be ordered and, if not democracy, then what other forms of political organisation and representation are desirable for the Anthropocene.

The Planet Under Pressure Declaration calls for *one* integrated knowledge system, serving *one* over-arching goal, to be delivered by a *unitary* global governance system. But what conceptions of power, knowledge and human rights are being expressed in such a totalising vision? The danger in such a singular conception of 'knowledge for policy' is well expressed in the words, again, of Kathleen O'Reilly:

> "If the will to know is deployed to gain knowledge for controlling others, then the will to know is also a will to power. Although the will to power may be couched in terms of 'doing good', it remains a desire to know the world in order to manipulate people's behaviour" (O'Reilly, 2011: 2795).

The Earth System governance proposal of Planet Under Pressure offers one form of (global) politics drawing upon one form of (global) knowledge. But how is assent and legitimacy to be given to such a vision in an increasingly expressive, connected and plural world? There is a need for more open arguments about the forms of governance and politics – and hence the sorts of knowledge – that best serve the diverse and diverging human projects that proliferate around the world (Rip, 2006). This cannot be 'discovered' through more knowledge. Such confrontations cannot escape dealing with the normative issues where, I have suggested, knowledge-thickening rather than mere gap-filling is essential: richer and more contested engagements with ideas such as goodness, justice, well-being, democracy and teleology. Reasoning together in public (cf. Jasanoff, 2012) to make 'actionable knowledge' must allow for the expression of contrasting value commitments, and working with them, however inconvenient this may be.

THE CASE OF IPBES

So how might this argument translate into something practical and immediate? Let me finish with the example of IPBES. The presenting challenge for IPBES is how to create authorised knowledge connected to human values in an increasingly diverse and yet enduringly common world (Turnhout et al., 2012)? How to

[5] Goodwin,J. (2009) What firm foundation? http://rogerpielkejr.blogspot.co.uk/2009/12/guest-post-by-jean-goodwin-what-firm.html, 10 December

work with plural ontologies, cultures and ethics through multiple modes of expert, non-expert and political representation? IPBES should not adopt an IPCC-like singular scientific framing of the biodiversity problem with a focus on standardized assessments and peer-reviewed science. Yet as some have already recognised, the notion of 'biodiversity' itself as it is currently being framed within IPBES has problematic overtones. This framing involves three elements: first, it promotes a science-based understanding of biodiversity that requires the standardization of biodiversity knowledge; second, through the use of the concept of ecosystem services it makes the value of biodiversity apparent to economists; and third, it aims to make these values commensurable (and thus exchangeable and commodifiable) as units for larger market and policy transactions.

This framing will be meaningful only to some of the potential range of actors and the implicit model of policy in this approach assumes that all the key actors will assent to top-down, standardised instrumental science tailored to the idea of global institutions as being synonymous with 'the policy world'. If this path is followed, the danger is that IPBES, like the IPCC, could omit large, diverse, and important sectors of global society and stakeholders. Instead, I would wish to offer these three linked principles for IPBES which are more in keeping with the argument I have made here:

- *Building trust* between key knowledge holders and knowledge brokers and motivated stakeholders is more important than building a knowledge consensus.
- Rather than designing an assessment process to drive knowledge convergence, deliberative processes should *recognise, welcome and enshrine divergence and plurality*. Less integration and more dissensus allowing conflicting values and norms to reflect the messiness of the world. Ambiguity, ignorance and disagreement - rather than consensus and quantified uncertainties - become operating principles.
- The scale- and context-dependency of relevant knowledge must be built into the operating and governance structures of IPBES. This implies a *move away from a global-centric knowledge paradigm*.

If the political nature of assessments such as IPBES is not explicitly recognised, then knowledge will become contested on ostensibly non-political grounds. Better to be up-front about the politics of representation in knowledge-making institutions, than to find a proxy political contest taking place using the language of science. As political theorist Chantel Mouffe put it in her book 'On the Political':

> ". . . the belief in the possibility of a universal, rational consensus has put democratic thinking on the wrong track. Instead of trying to design the institutions which, through supposedly 'impartial' procedures, would reconcile conflicting interests and values, the task for democratic theorists and politicians should be to envisage the creation of a vibrant 'agonistic' public sphere of contestation where different hegemonic political projects can be confronted" (Mouffe, 2005: 3).

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