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Science and Technology Studies, Ecocriticism and Climate Change

A mapping of the environmental humanities would have more trouble drawing some borders than others. Multidisciplinary critical animal studies overlaps ecocriticism of an activist orientation, whereas environmental history thrives nearby with relatively little commerce. Science and Technology Studies (STS), another agglomeration, might seem to share interests with ecocriticism, such as the cultural place of scientific knowledge, and yet there have been few systematic attempts at interdisciplinary study to date. In a 2001 article, STS scholar Bruce Clarke critiques ecocriticism's at times unquestioned use of scientific theories as objective truth and explains the work of Bruno Latour and Michel Serres as models of a more socially complex understanding of the sciences. Similarly, ecocritic Ursula Heise asserts that ecocriticism must at some point confront 'science's claim that it delivers descriptions of nature that are essentially value-neutral' (4). A few figures from STS, notably Donna Haraway, Bruno Latour and Karen Barad, feature in ecocritical texts of a 'new materialist' bent, but the fundamental epistemological challenges have seldom registered.

Climate change, in particular, is a given in ecocriticism; the main question is how literature might help raise awareness and deepen consciousness of climatic risks. While it might be true to say, in an ideal world, that 'ecocriticism is not the literary critical department of the IPCC' (Garrard 186), that is how researchers in the field have largely behaved. STS scholars, as we will see, treat the IPCC as an object of study, seeking to improve its effectiveness with their analyses. This chapter, then, brings an agnostic STS perspective to bear on climate science, eliciting contrasts with ecocriticism that may nudge the latter in new directions.

Fearful symmetries and false equivalence

In the course of our research, we noticed many symmetrical claims made by both warmists and sceptics:

- *Ad hominem* attacks on the integrity or intellectual capacity of opponents.
- Allegations of conspiracy on the other side, such as Oreskes and Conway's *Merchants of Doubt* and James Delingpole's *Watermelons*; Claude Allègre's *L'Imposture climatique* [The Climate Imposture] and Sylvestre Huet's *L'Imposteur, c'est lui* [The Imposter, It's Him].
- Claims of motivated reasoning against opponents. Myanna Lahsen notes, 'Like their contrarian counterparts, advocates point to the extra-scientific factors propelling their opponents while shunning recognition of the fact that they themselves are similarly influenced by values, beliefs, and interests' (550). Each side believes in their own devotion to rationality and to rigorous science while the other slides into emotionalism, ideology and fear.
- Representation of one's own position as 'David' battling the 'Goliath' of Big Oil/Big Eco, as claimed by British motoring journalist Jeremy Clarkson: 'The eco-ists have the ear of the prime minister, the leader of the opposition, the whole of the BBC, most of the country's newspapers, every single university campus and nearly every government in the world. Whereas I have the ear of the Ford Capri Owners Club. Which is comprised of half a dozen men in Dennis Waterman-style leather bomber jackets' (77).
- Complaints of severe harassment heard from warmists (Powell), sceptics (Booker loc. 6608) and 'moderates' like Hans von Storch: 'As a scientist, I strive for independence from vested interests. I am in the pocket of neither Exxon nor Greenpeace, and for this I come under fire from both sides – the skeptics and the alarmists – who have fiercely opposing views but are otherwise siblings in their methods and contempt' (Storch).
- Accusations of anthropocentric arrogance, long levelled by environmentalists against Christians and humanists, are now fired back by sceptics (see Chapter 4). Marc Morano quotes geologist Robert Giegengack: 'The Earth is fine. It has been around for four and a half billion years. It was here before we were here. We can't save the Earth' (59).
- Reality of a knowledge-action gap, albeit one that sceptics celebrate: 'Fortunately, the gap between rhetoric and reality ... is far greater than I can recall with any other issue' (Lawson 103).

- Satirical representation of ‘carbon offsets’ as equivalent to medieval indulgences (Delingpole loc. 3710; Monbiot ‘Selling Indulgences’); of ‘eco-asceticism’ as a form of *macération* [scourging of the flesh] (Bruckner).
- Acceptance of an idealized conception of science, as seen in responses to the ‘Climategate’ emails (discussed below): ‘Scientists and their critics alike interpreted the stolen emails as embarrassing deviations from the alleged social demands of a consensual, objective, and accessible science. They referred to “dogma” and “interests” as sources of corruption in science and appealed to “openness” and “transparency” as a means to resolve disagreement’ (Ramírez-i-Ollé 402).
- Dismissal of the IPCC as ‘political’, either because it is run by socialists or because its consensus-seeking mandate marginalizes more alarming projections; the ‘grande erreur’ of the Nobel committee when deciding to award the 2007 Peace Prize to the IPCC (Foucart).
- Claims from both sides that if we but ‘follow the money’, we can identify the economic motivations for concerns or doubts about climate change.

Claims may be symmetrical simply because contending parties agree – that carbon offsets assuage guilt without reducing emissions, for example. Moreover, such symmetries may be characteristic of impassioned debate in general; it is human nature to claim that *my* views are informed by logic and evidence, whereas *yours* reflect naked self-interest (Haidt 98–99). Symmetrical accusations of anthropocentric *hubris* probably reflect little more than poor definition of the terms involved. The knowledge-action gap and the sense that opponents are fantastically well-resourced, as well as conspiratorial, seem quite distinctive, though. Both warmists and sceptics expend significant effort quantifying the financial resources ranged against them, which are taken in the first place to encompass the fossil fuels industry and in the second, climate activism and publicly funded climate science in their entirety. Thus, an academic study of the role of Conservative Think Tanks (CTTs) in supporting climate scepticism claims that ‘the self-portrayal of sceptics as marginalised “Davids” battling the powerful “Goliath” of environmentalists and environmental scientists is a charade, as sceptics are supported by politically powerful CTTs funded by wealthy foundations and corporations’ (Jacques, Dunlap and Freeman 364). James Delingpole acknowledges the role of CTTs, but claims the vast funding of universities, environmental organizations and the United Nations shows that “‘Big Eco’ is a rather more significant player in the AGW propaganda game than anything Big Carbon can muster’ (loc. 1174). Is there anything to choose between these symmetrical claims?

We address the question of competing *interests* below, but there is clearly a risk of false equivalence here. Tenured academics (i.e. not British scholars) are not *employees* in the way that Heartland Institute advisors are; they ought in principle to be more independent. Furthermore, direct funding of advocacy organizations (warmist or sceptic) is very different to expenditure on satellites and ice-core studies, all of which gets lumped into the 'Big Eco' category. *Pace* conservative American suspicion of 'government-funded research', the latter is distributed by means of highly competitive anonymous peer review, which is imperfect insurance against bias but still distinct from political lobbying. Having said that, both sides have reason to think themselves underdogs: we are all reliant on a fossil-fuelled economy, giving us good reason to ignore the 'inconvenient truth', and there is, at the same time, a strong *cultural* bias against corporations, as Delingpole observes:

However independent-minded and politically acute we may think we are, we're all prey to certain cultural attitudes so deeply ingrained that we're probably not even aware of them. One of these is the popular notion that funding from Big Business (Big Oil, Big Carbon, Big Koch ...) is tainted, compromised and almost inevitably corrupting, while funding from a nature charity, or even from a government agency with a nice-sounding concept like 'Environmental Protection' in its title must be well over 3,500 times nicer.

(loc. 1228–32)

Modern culture, especially the sector ironically dubbed 'social' media, facilitates cycles of outrage and harassment that make everyone involved in the debate feel like a 'persecuted minority'. The crucial question for climate politics is how to counteract that damaging tendency.

A small contribution would be to question *apparent* symmetries that conceal objective differences, such as Big Oil versus Big Eco, but acknowledge genuine symmetries, such as the universality of motivated reasoning, group dynamics and the cultural cognition of risks. Dan Kahan and colleagues, who have demonstrated that improved science literacy actually *increased* political polarization in an American study group, emphasize that

a hierarchical individualist who expresses anxiety about climate change might well be shunned by his co-workers at an oil refinery in Oklahoma City. A similar fate will probably befall an egalitarian communitarian English professor who reveals to colleagues in Boston that she thinks the scientific consensus on climate change is a hoax.

(734)

The risk of ostracism, in each case, is far greater and more salient than any probable, immediate climatic or economic risk to the individual – especially if stigmatizing, polarizing language continues to be the norm in climate activism and sceptical counter-activism.

Scholarship can make a contribution by addressing obvious biases. As discussed in the Introduction, warmism is so seldom questioned as a social, psychological or cultural phenomenon that symmetrical treatment is striking when it does occur, as in Lorraine Whitmarsh's observation: 'It should also be noted ... that this research equally highlights the ideological basis of belief in (as well as denial of) climate change, since high proenvironmental values and left-of-centre political views predispose individuals to believe in the reality and severity of climate change' (698). To take an example from our own field, ecocritics are fully aware of the limitations of apocalyptic rhetoric; in the name of symmetrical analysis and depolarization we ought to explore openly our agreement with climate sceptics when they criticize 'climate alarmism'.

Perhaps the most persistent symmetrical claim is that the opposition has been corrupted by interests. If it were true, it could seriously distort both climate science and politics. Luckily, such claims can be checked, to a reasonable degree, to see if the apparent symmetry is real. The warmist claim is supported by research that tracks the relationship of specific authors (most of them American or British) to CTTs (Dunlap and McCright; Dunlap and Jacques; Oreskes and Conway), although the correlation has weakened in recent years and the conspiracist argument itself has been sharply criticized (Grundmann). It doesn't seem to be considered that individuals with sceptical views are invited to work or publish with CTTs, rather than having developed their views as a result of such relationships.

As regards the credibility of the IPCC, Sonja Boehmer-Christiansen, a rare example of an openly sceptical STS scholar, argues that scholarship should attend to the question: 'Who is likely to gain from emission reduction?' (70). Her answer claims that climate scientists, environmental organizations, government and inter-governmental bureaucracies, and renewable and nuclear energy corporations used the IPCC to universalize their sectional interests:

The global warming threat was constructed in the 1980s by a coalition of interested parties offering expertise and technologies to solve the problem. The climate threat, like the limits to growth scare beforehand, offered new opportunities to environmental bureaucracies and professionals who found the proposed solutions empowering. A belief system was provided by

environmental religiosity, while science, engineering, and economics provided the rationalizations from which global and selected national bureaucracies would derive authority for promoting technological change, 'greenmailing' opponents, and raising revenue.

(88)

In particular, she presents evidence that the IPCC's representation of scientific uncertainty has consistently been driven by political, not scientific, considerations.

Boehmer-Christiansen's assertions should be taken seriously, even if her rhetoric (such as referring to funding agencies as scientists' 'paymasters' (402)) sometimes undermines her diagnostic purpose. Simon Shackley and Tora Skodvin go one better, taking the question of interests seriously enough to look closely at both Boehmer-Christiansen's argument and the processes of the IPCC. They point out that:

There is a serious circularity in the argument. How do we know that increased funding is the driving force? Because there has been an increase in funding!

(Shackley and Skodvin 176)

In fact, funding to specific institutions and organizations fluctuates, just as one would expect in a competitive environment. Moreover, it is unclear from Boehmer-Christiansen's analysis whether self-interested scientists are the driving force of the IPCC, or 'pawns in a battle of political heavyweights' (177). Shackley and Skodvin respond to her uncertainty manipulation claim by narrating a fascinating argument among scientists and governmental representatives about the Global Warming Potential (GWP, a key numerical quantity used in climate models) of methane during the development of the Second Assessment Report (1994). Crucially, their detailed analysis does not dismiss the notion that interests were in play, but it does highlight the heterogeneity and mutability of those interests (see also Sismondo 50–52). For example, there were participants who opposed a more 'politically useful', less conspicuously uncertain, representation, as well as those who supported it. The arguments presented at the meeting traversed matters of technical science, policy representation and IPCC process. Shackley and Skodvin's judgement on the methane GWP episode is more nuanced than Boehmer-Christiansen's assertion that homogenous, unidirectional interests bias the IPCC towards greater certainty:

Clearly, the boundary between what was an issue for science and what was an issue for policy was not at all obvious and subject to negotiation. In fact the position of that boundary depended to an extent on how scientists thought policy makers

distinguished between science and policy themselves and in the implications of that for the use of GWPs in policy making in certain industrialized countries. In making these judgements the scientists acted themselves as unofficial policy makers.

Paul N. Edwards's fascinating history of climate modelling, *A Vast Machine* (2010), reveals in still greater detail how computer models, far from manipulating data in the service of political interests, are required to *elicit* usable data from vast reams of patchy, heterogeneous weather records:

All modern climate data are modeled in a variety of ways to correct systematic errors, interpolate readings to grids, and render readings from various instrument types commensurable. *If we cannot trust models without evidence, neither can we trust evidence without models.*

(412)

Given the complexity, recursivity, global interconnectedness and intense scrutiny of the climate knowledge infrastructure Edwards describes, and the '*proliferation within convergence*' (436) of climate images (including, crucially, climate sensitivity estimates) it yields, the notion of 'science' obediently yielding 'rationalizations' for environmental religiosity is frankly absurd.

These scholarly depictions of climatological knowledge production do, admittedly, contravene the fiction of the disinterested scientist, as well as the clear distinction between hypothesis and evidence required by Karl Popper's influential falsificationist philosophy of science. They are also more complex (and interesting) than the simplistic, *ex post facto*, conspiratorial narrative constructed by Boehmer-Christiansen and borrowed by many other sceptics. Detailed, questioning attention to the IPCC must honestly acknowledge *both* its hybrid scientifico-political character *and* the ways it has changed in response to fair criticism over successive iterations. Edwards, who has studied the IPCC more closely than any sceptical writer, concludes:

Despite its imperfections, [the IPCC's] exhaustive, multiple-level, highly transparent review process remains the best approach we have for evaluating climate knowledge. It brings controversy within consensus, it limits bias, and it connects the world's far-flung climate science communities in an ongoing process.

(429)

Given important differences between the scientific and lay understanding of 'uncertainty' (Shackley and Wynne; Zehr), as well as the inherent complexity of earth systems science, conveying the present state of knowledge is fiendishly

difficult. Nevertheless, the IPCC process has continually revised both its processes and its conclusions, and not always towards greater alarm: AR5, for instance, revises the lower bound of *likely* equilibrium climate sensitivity downward from 2°C to 1.5°, which is hard to comprehend if warmist interests rule supreme ('IPCC, Intergovernmental Panel on Climate Change').

The truth is, as we have sought to show here, that conspiracist and *ad hominem* attacks, of whatever orientation, consistently underplay internal dissension and conflicting interests. Even the 'fossil fuel industry' is fractured between coal, oil and gas, between traditional and 'tough' sources of oil, and between the differing priorities of state oil companies and their transnational private competitors, not to mention the seemingly contradictory behaviour of players in the fossil fuel industry who invest in renewable energy or promote large-scale sustainable developments. STS research tends to emphasize the 'external' factors that shape scientific enquiry, including economic and political interests, but does not, for the most part, deny the importance of 'internal' disputation and consensus regarding data, models, physical laws and research methods (Hacking 90–91). Our methodological agnosticism towards climate scepticism likewise brackets 'internalist' scientific issues, such as 'the problem of the mode of existence [...] of neutrinos, genes, fossils, ['global climate'] or other scientific creatures' (Stengers 25), paying attention instead to external matters of rhetoric and framing that could equally well be applied to warmist literature. By contrast, popular exposés of climate scepticism, such as *Merchants of Doubt*, critique it in externalist terms, while accepting internalist arguments for the warmist position. STS-informed scholarship would be symmetrical, unlike most ecocritical and environmental communications research to date, *and* more attentive and sceptical than most 'sceptical' treatments of the influence of external factors on climate science.

A related, and equally tenacious, sceptical claim is that the climate issue has *politicized science* in favour of warmism, memorably captured by Nigel Lawson as 'the PC [political correctness] at the heart of the IPCC' (105). Contrarily, there is evidence, highlighted by climate activists, that the IPCC's consensus-building approach, combined with its embedded science-policy interface, introduces a bias *against* acceptance of extreme climatic risks ('Climate Science Glossary – IPCC Consensus'). A similar bias may affect the media, contrary to sceptical claims of doom-mongering: a US study found news outlets were reluctant to credit 'worst-case scenarios', and concluded that 'if reporters wish to discuss "both sides" of the climate issue, the scientifically legitimate "other side" is that, if anything, global climate disruption may prove to be significantly worse than has been suggested in scientific consensus estimates to date' (Freudenburg

and Muselli 483). More interesting, for our purposes, are the arguments from STS scholars and environmental humanists that climate change is eroding a boundary between science and politics that was always fictitious, and that a challenge to the 'scientification' of environmental issues was long overdue. At stake in both the critique and the celebration of politicization is Robert Merton's influential delineation of the ideal scientific ethos in 1942, with its norms of 'universalism, commun[al]ism, disinterestedness, and organized scepticism' (Sismondo 23). The sceptical politicization claim is, in this instance, the *inverse* of the STS position, which welcomes open acknowledgement of the politics of science.

In the Anglophone world, the popular stereotype of climate sceptics is that they are uniformly 'anti-scientific', but our research reveals a far more complex picture.¹ As Ted Nordhaus and Michael Shellenburger point out:

The conventional wisdom is that environmentalists and global warming deniers like best-selling novelist Michael Crichton disagree over the value of science. But both share most of the same beliefs about Science and the need for it to stay clear of values and politics. This statement – 'Because in the end, science offers us the only way out of politics. And if we allow science to become politicized, then we are lost' – was uttered by Michael Crichton, but it could just as easily have been uttered by most environmental scientists.

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Crichton's idealism can be criticized for only seeing bias on one side of the argument, but we must still ask whether or not scientific objectivity is either achievable or desirable. Crichton's view is shared by many working scientists, which has made it more difficult for the IPCC to recruit to its working groups (Shackley and Skodvin 177). Moreover, despite the pervasive commercialization of American university science in the wake of the 1980 Bayh-Dole Act, the norm of disinterestedness remains a strong, if remote, regulative ideal in American science, as Sheila Jasanoff has argued:

Pure science is another American Eden. Its loss is perpetually mourned; attempts to regain the forsaken state of grace are a recurrent national project, even an obsession. In the politics of science, the rhetoric of the fall harmonizes with that of restoring science's purity, especially when scientific knowledge is imported into complex social and political contexts. Notions of science's platonic specialness abound in the discourse of public policy, expressed in binary oppositions between good or sound science and science that is substandard because it is biased, not objective, or tainted by interests.

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All the while though, STS scholars like Bruno Latour have questioned the 'modern constitution' that divides science and politics, matters of fact and matters of value, truth and opinion. From this perspective, the problem is not the advent of politicized science, but the mistaken belief that there was ever any other kind, and Merton's norms represent a disreputable *ancien régime* in which idealized Science (as opposed to the messy, diverse business of the sciences) was empowered to inform and regulate politics without ever being contaminated by it in return. Environmentalism accepted too easily this regulatory role for Science as a way to short-circuit democratic debate, 'introduc[ing] nature into political preoccupations that had earlier been too exclusively oriented toward humans' but '*continu[ing], alas, to use nature to abort politics*' (Latour, *Politics of Nature* 19).

The problem with the IPCC, especially in its first few iterations, was that it aimed to 'scientificate'² climate change by *feeding* supposedly value-free scientific knowledge into an intensely political international process of negotiation. The failure of that effort to deliver the desired outcomes is seen as confirming what STS scholars like Latour already suspected:

Conceptions of politics and conceptions of nature have always formed a pair as firmly united as the two seats on a seesaw, where one goes down when the other goes up, and vice versa. There has never been any other politics than the politics of nature, and there has never been any other nature than the nature of politics.

(*Politics of Nature* 28)

This view does not imply that scientific knowledge is *reducible* to political preference; rather it means that the science-policy nexus must be sliced and diced in different, less dualistic, ways. For one thing, Latour's analysis demands that we come to terms with the *irreducibility* of dissensus:

Every ecological crisis opens up a controversy among experts, and these controversies generally preclude the establishment of a common front of indubitable matters of fact that politicians could subsequently use in support of their decisions. In the face of this familiar situation ... two attitudes are possible: we can wait for the sciences to come up with additional proofs that will put an end to the uncertainties, or we can consider uncertainty as the inevitable ingredient of crises in the environment ... The second attitude has the advantage of replacing something that is not open to discussion with something that can be debated, and of binding together the two notions of objective science and controversy: the more realities there are, the more arguments there are.

(*Politics of Nature* 63)

While climate scientists continue to seek 'additional proofs' (though, really, how many more Assessment Reports do we need?), it must also be accepted that 'climate change' has a broad range of meanings that cannot be determined or constrained by geophysical sciences alone.

Mike Hulme, founding director of the Tyndall Centre for Climate Change Research, comes to this very conclusion in *Why We Disagree about Climate Change*, a wide-ranging critique of scientification from an influential climate scientist. Hulme avows that 'the idea of climate exists as much in human mind and in the matrices of cultural practices as it exists as an independent and objective physical category' (28). He contrasts the 'wicked problem' of climate change with the superficially similar issue of stratospheric ozone depletion: where the latter was eminently suited to scientification and political resolution by the 1987 Montreal Protocol, the former is strikingly different in terms of 'the causes, consequences and actors involved' (292). The IPCC/COP process, which aimed to introduce a similar intergovernmental protocol in Kyoto, underestimated the pre-existing salience of climate:

Humanity has a very long cultural history of understanding the idea of climate and of experiencing its sensual intimacy. There is no such cultural or sensual history of relating to stratospheric ozone. While both phenomena are largely invisible to our senses, revealed through the constructions of environmental science, climate and ozone occupy radically different sites and fulfil quite different roles in our cultural imaginations.

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From the STS-informed perspective Hulme adopts, climate change is a perfect example of what Silvio Funtowicz and Jerome Ravetz call 'post-normal science' (PNS), where 'facts are uncertain, values in dispute, stakes high and decisions urgent' (744). By contrast with 'normal science', as described by Thomas Kuhn, PNS is guided by a new methodology in which

uncertainty is not banished but is managed, and values are not presupposed but are made explicit. The model for scientific argument is not a formalized deduction but an interactive dialogue. The paradigmatic science is no longer one in which location (in place and time) and process are irrelevant to explanations. The historical dimension, including reflection on humanity's past and future, is becoming an integral part of a scientific characterization of Nature.

(740)

Funtowicz and Ravetz recommend that, under the increased pressures of PNS, it will be vital to *extend* legitimating processes such as peer review to

a broader constituency, albeit with the proviso that ‘with mutual respect among various perspectives and forms of knowing, there is a possibility for the development of a genuine and effective element in the life of science’ (741). As we have seen in our studies of climate scepticism, respect is rather thin on the ground.

It is particularly ironic that PNS, which was precisely intended to integrate incommensurate perspectives, itself became embroiled in the polarized debate. James Delingpole’s *Watermelons* goes out of its way to attack Funtowicz, Ravetz and Hulme for supposedly admitting that

‘Climate change’ ... has little if anything to do with ‘science’ as you or I might understand the concept. It’s not a genuine problem to be solved, but a handy excuse – with a fashionable green patina – to advance a particular social and political agenda under the cloak of ecological righteousness and scientific authority.

(loc. 1816–19)

This from an author whose whole thesis is that Anthropogenic Global Warming (AGW) theory has little or nothing to do with science (loc. 1966). The honest effort to turn down the rhetorical temperature and move beyond a narrowly scientified argument is depicted as a sneaky attempt to dispense with Mertonian norms of scientific probity. Ah well, it was worth a try.

Ravetz himself posted a discussion of PNS on the sceptical website *wattsupwiththat*, and was shocked by the fury of some of the responses. Ravetz’s post in fact challenges the validity of climate models and agrees that the ‘Climategate’ emails, hacked or filched from the Climate Research Unit at the University of East Anglia in 2009, reveal ‘the contradictions between scientific probity and campaigning zeal’ (Ravetz 150). But where Ravetz claims that ‘the combination of non-critical “normal science” with anti-critical “evangelical science” was lethal’ (151) – in other words, climate science was not post-normal *enough* – his sharpest critics allege that ‘post-normal science is one of the manipulative arts that Machiavelli would have been proud of’ (154). In a reflective essay on the exchange, Ravetz acknowledges how PNS might be seen as extenuating scientific fraud:

This [sceptical attack on his own work] does not deny that much or most of climate science, recognising and coping with deep scientific uncertainties, is sound; it’s the policy-relevant core, that we might call ‘global-warming science’, that is perceived as rotten. So all of my methodologising, Mike Hulme’s sociologising ... are quite beside the point. The damning facts are in, and they

are either recognised or denied. On that basis it is easy to suppose that I am a sophisticated apologist for the enemy, and that all my uncertainty-mongering effectively provides a licence for those bad people to dissemble and deceive.

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The more expert committees exonerate the UEA Climate Research Unit (CRU) scientists (there have now been nine investigations in total ('Climate Science Glossary')) the wider the supposed 'whitewash' of nefarious activity extends, according to sceptics. In their strongest forms, such claims are indefensible: the main allegations of conspiracy and fraud depend on highly selective quotation and interpretation of a tiny proportion of the 1,073 emails. Even so, the CRU scientists' reluctance to release data sets and their efforts to marginalize divergent perspectives are obvious, and the toe-curling exchange about how they could secure prizes for one another is deeply unedifying. In that context, it is not surprising, although it is disappointing, that Climategate continues to be rehearsed endlessly as a 'smoking gun' rather than a teachable moment for all concerned.

The climate science community took heed of the episode, making more data sets publicly available and reconsidering peer-review policies, in what science journalist Fred Pearce calls 'a sea-change from the days in the CRU bunker'. Climate geeks of whatever persuasion can now create their own graphs of temperature change and Arctic ice from the data sets, thanks to www.woodfortrees.org, a self-funded, independent website created by a British software developer. STS scholars who took the opportunity to review their relationship to climate science concluded that social scientists had been too unwilling to subject it to critique for fear of 'abetting distorting backlash campaigns that often depart from indications of weaknesses in climate science and associated institutions, however big or small' (Lahsen 551). Myanna Lahsen's detailed examination of *Merchants of Doubt*, for instance, pointedly argues that Conway and Oreskes dismiss criticisms of climate models by sceptics that, in more scholarly contexts, the latter author has explored in detail (Lahsen 553; Oreskes, Shrader-Frechette and Belitz; Oreskes, Stainforth and Smith). She presents a persuasive argument that the *lack* of STS discussion of climate science could help to engender mistrust in sceptical (in the broad sense) publics:

The US public is right to believe that scientific experts still are arguing about ACC in terms of its likely extent and impacts. They are even smart to believe that, because they see beyond what they are being told by powerful and prestigious scientists and analysts; they may rightly perceive logical inconsistency when

advocates of concern [admit] that scientific research always involves doubt, that scientists by nature are inclined to question, that scientific findings involve evidence the details of which remain unclear and can be falsified by new discoveries and, on the other hand, suggest that the science is settled and that scientists all agree about ACC – as if dissent does not exist, also outside of the small faction of contrarians. They may even have read scientific analyses of how the dynamics of decision making and consensus formation processes can tend to engender belief polarization, overconfidence and marginalization of skeptical arguments, and how this also happens within the IPCC ... and around the science it assesses.

(554)

Scholars such as Roger A. Pielke Jr., Stéfan Aykut, Werner Krauss and Héléne Guillemot analyse climate scepticism within the larger context of climate change as an evolving public controversy. Identifying the science/politics nexus as their object of study, they consider a wide variety of actors whose positions cannot be reduced to 'for' or 'against' climate science (though Pielke himself has been labelled a denier). As Guillemot concludes at the end of her study of the reshaping of scientific fields and epistemic cultures brought about by climate change controversies, 'Ce n'est pas la confiance dans la réalité du changement climatique, mais le cadrage même du problème qui est en cause ici' (349) ['It is not confidence in the reality of climate change that is called into question here, but the framing of the problem itself.'] Their approach clearly counters the polarized positions of those who reveal the 'falsehoods' of climate scepticism and also those who chastise climate change science for getting too 'mixed up' with environmental politics (Foucart).

We discuss the '97% consensus' claim in the last chapter. For the moment, we need only agree with Lahsen that scepticism is actually *sustained* by an idealized conception of climate science, which is then all too vulnerable to disruption by evidence of competing interests, modelling limitations, science-policy negotiations, vexed uncertainty judgements and so on (see also Wynne). As in our discussion of Boehmer-Christiansen's critique of the IPCC above, we suggest that the solution is not to assert, ever more stridently, 'settled science, nothing to see here', in the hope of fending off or silencing sceptics. Rather, it lies in detailed, agnostic and symmetrical treatment of both warmist and sceptical positions, so as to, in Lahsen's words, 'open up [climate change] to broader public debate and decision-making in ways that give proper weight to scientific reason and evidence while also recognizing the political and economic dimensions that [scientification] obfuscates, but which are inescapable' (556) As we have argued,

notably in Chapter 4, such an approach also helps us to talk more openly about the implicit values and cosmologies that are brought to bear in the *interpretation* of climate change, including by ecocritics who seem unwilling to acknowledge the contingency of their own spiritual and political worldviews. Climate change is ‘inescapably’ a literary and cultural phenomenon, as well as a political and economic one, but ecocritical treatments have always been asymmetrical and unselfconsciously committed, until now.

Sceptics, of course, quoted hacked CRU emails selectively to emphasize transgressions of Mertonian norms. One particular email, from Professor Phil Jones, was recycled endlessly: ‘I’ve just completed Mike’s Nature trick of adding in the real temps to each series for the last 20 years (ie from 1981 onwards) [and] from 1961 for Keith’s to hide the decline’ (cited in Ryghaug and Skjølsvold 300). There were numerous responses from the scientific community, predominant among them some acknowledgement of ‘shortcomings’ or ‘human failings’ combined with *re-assertion* of climate science as ‘ideally resulting from an accumulative consensus generated by socially detached individuals who strive to make data available to non-scientists’ (Ramírez-i-Ollé 401) – the Mertonian ideal, in short. What both attackers and defenders of the CRU miss is that the hacked emails *themselves* reflect considerable debate about the legitimacy of combining a mix of pre-1961 and proxy records with the ‘real temps’ (i.e. modern instrumental record). Again, detailed attention by STS scholars highlights a more plausible and intriguing process than the simplistic conspiracy ‘revealed’ by sceptics, in which ‘consensus’ – a public performance of unanimity – had to be painstakingly constructed through a complex, recursive set of methodological and rhetorical arguments among a group of scientists with clearly divergent views (Ryghaug and Skjølsvold 302). Marianne Ryghaug and Tomas Moe Skjølsvold conclude not that lay publics are ‘ignorant fools’ who ought to be patronized and ignored but that we can all learn from the Climategate emails how science in-the-making actually works:

[Climate] debates are performed in much the same way as is reported in many ethnographic studies of scientific work. Unfortunately, many journalists seem unaware of such work and have judged the e-mail conversations on a kind of Boy Scout image of science. Thus, they appear to be surprised that scientific facts are made and not just discovered, that they emerge as products of deliberation and persuasion, that methodological doubts may be resilient, and that scientists’ trustworthiness is important. Thus, in the long run scientists may be better served by greater openness with respect to the actual practice of science, rather than upholding the conventional image of cool, restricted display of instrumental rationality.

The central question for STS, and for ecocritical practice attuned to it, is how to question the 'Boy Scout image of science' in such a way as to secure broader respect for, and participation in, climate knowledge-making.

STS scholarship has vacillated, all along, between celebration of its own irreverence towards the idol of Science and tetchy explanation of why it is not, after all, 'anti-science' (let alone anti-Reality). Bruno Latour's mournful, defensive reflections in 'Why Has Critique Run Out of Steam?' acknowledge the pleasure of subversion, but focus on answering the more serious charge:

While we spent years trying to detect the real prejudices hidden behind the appearance of objective statements, do we now have to reveal the real objective and incontrovertible facts hidden behind the illusion of prejudices? And yet entire Ph.D. programs are still running to make sure that good American kids are learning the hard way that facts are made up, that there is no such thing as natural, unmediated, unbiased access to truth, that we are always prisoners of language, that we always speak from a particular standpoint, and so on, while dangerous extremists [i.e. climate sceptics] are using the very same argument of social construction to destroy hard-won evidence that could save our lives.

(227)

Latour laments that 'no matter what we do [in STS], when we try to reconnect scientific objects with their aura, their crown, their web of associations ... we always appear to weaken them, not to strengthen their claim to reality' (237). Why, in principle, should reuniting science and society be understood in terms of contamination, rather than celebration? Well, Latour is being a little disingenuous about STS, which has overwhelmingly preferred 'debunking' to boosting scientific prestige (Hacking 35–62). More frankly, Isabelle Stengers acknowledges: 'Nothing is more difficult than to accept the necessity of complicating a struggle that is already so uncertain, grappling with an adversary able to profit from any weakness, from any naïve goodwill' (23). Our procedure in this book consciously extends goodwill to climate sceptics – some will say too much – but not, given our extensive acquaintance with its canon, naïveté.

Perhaps ecocriticism, which nailed its green colours to the mast from the outset, should steer clear of STS for fear of recapitulating its seeming complicity with 'dangerous extremists'. In other contexts, scholars have pushed back against scientification and technocratic framing of environmental issues:

Questions of value, difference, and competing worldviews must be *re-enlivened* as crucial parts of the conversation. We need a politics of environmental difference.

(Åsberg, Neimanis and Hedrén 76)

Indeed, but will this conversation include conservatives and climate sceptics?

We suspect that ecocritics will share our willingness to complicate the 'Boy Scout image of science', and we recall that our study has elicited the diversity concealed behind stigmatizing monikers. Were ecocriticism to ally itself with STS, it would attend symmetrically to anti-environmental and environmental cultures, validating conservative perspectives and critiquing alarmism where appropriate. Where, for example, are the ecocritical treatments of Naomi Oreskes and Erick Conway's *The Decline of Western Civilization*, which proclaims its scientific plausibility despite projecting a climate sensitivity higher than at least 95 per cent of the model runs used by the IPCC? STS-informed scholarship would, moreover, invite questioning of the ways ecocritics tend to align activism and research, suggesting instead that ethical commitments ought to be kept at a self-conscious distance from cognitive efforts to understand and interpret diverse cultures of nature. Moreover, such agnosticism ought to alter our pedagogy, especially but not only in institutions with a politically diverse population. What would happen if we taught *The Heretic* alongside *Flight Behaviour*? Given the reality of polarization, perhaps we should leave jokes about Donald Trump at the door? Just as STS profitably turned Climategate into a teachable moment that told us more about climatology than either the sceptics or scientific Eagle Scouts supposed, climate change scepticism could be an opportunity for ecocriticism to reconsider, and reconfigure, its relationship with teaching, activism and environmental science.