

THE CLOUD OF UNKNOWING

Policy, rhetoric and public bewilderment

2. Consign it to the flames

Ladies and gentlemen, The climate change debate is much more than just a battle over scientific theories and environmental statistics. At its core is the question of which approach our societies should take in view of a serious concern that could possibly turn out to be a real problem some time in [the] future. What rational societies and policy makers need to ask is: what are the most reasonable and the most cost-effective policies that neither ignore a potential problem that may possibly materialise in the distant future nor the actual economic costs of such policies here and now. Fundamentally these are social, ethical and economic questions that cannot be answered by science alone but require careful consideration by economists and social commentators.¹

Those aren't my words but the words of Dr Benny Peiser introducing the Global Warming Policy Foundation's Annual Lecture in October 2011. Dr Peiser is a social anthropologist who is also the Director of the Foundation. The Chairman is the former Conservative Chancellor, Nigel Lawson.

Let's begin by taking a good look at this passage. At first, what comes across is the judicious tone. Climate change is a 'serious concern' which might turn into a 'real problem.' What 'rational societies and policy makers' have to do is to arrive at policy responses which are both 'reasonable' and also 'cost-effective.' *Serious, rational, reasonable.*

If we look a little closer, we notice a little rhetorical filigree: within a couple of sentences, that 'serious concern' begins to get pushed linguistically away from us with a triad of qualifications—it turns out that it's a *potential* problem that may only *possibly* happen in a *distant* future; whereas staring us in the face is another triad which is only too immediately present—the *actual* and specifically *economic* costs which we will have to pay *here and now*. These contrasting triads are a rhetorical trope which was used, studied and defined thousands of years ago.

Having thus contextualised and 'fixed' climate change, Benny Peiser then turns to science's role in formulating a response. Here's comes another triad: 'fundamentally' these are '*social, ethical and economic* questions' which 'cannot be answered by science alone' but require careful consideration by 'economists and social commentators'. That word 'fundamentally' is important. What it implies is that the layer of policy consideration which addresses social, ethical and economic questions is somehow weightier or

more critical than the scientific layer. It's as if the science were a necessary but insufficient precursor to the *real* debate. In support of this, let me quote Dr Peiser from a few months earlier:

The global warming hysteria is well and truly over. How do we know? Because all the relevant indicators – polls, news coverage, government u-turns and a manifest lack of interest among policy makers – show a steep decline in public concern about climate change.ⁱⁱ

There is considerable polling evidence to support Dr Peiser's contention that, by 2011, public anxiety about climate change was receding. This was a period when, in almost all western countries, anxiety about the economy was growing—and there may be an inverse relationship between economic fear and fear for the environment.

But what this second quote again implies is that there are *two* layers of discourse about climate change: a scientific layer whose 'relevant indicators' are atmospheric temperature readings and so on; and a separate layer of public perception, policy and politics with its own quasi-scientific metrics—opinion-polls, news coverage and that, presumably slightly harder to measure, 'manifest lack of interest among policy makers.' The good news, at least as far as Dr Peiser is concerned, is that in this second layer the metrics are going his way. But of course none of *that* tells us anything at all about the first layer. The planet could be heating up even as public interest in climate change cools.

The subordination implied by that 'fundamentally' in Dr Peiser's first quote is not just of the science of climate change but of science as whole. When it comes to policy discussions and the assessment of possible responses and mitigations, whatever science comes up with will require 'careful consideration by economists and social commentators.'

Now I know what economists are, but who are these 'social commentators'? What training and qualifications do you need to become one? Or is *social commentator* like *community leader*, an office which involves an element of self-election? If you read through the names on the board of trustees of the Global Warming Policy Foundation and indeed some of the authors of its reports, you're left with the impression that in practice 'social commentators' means retired politicians and civil servants, academics in the social sciences and—I'm sorry to have to break it to you—journalists.

Let's try dropping that into Professor Peiser's last sentence. *These are [...] questions that cannot be answered by science alone but require careful consideration by journalists.*

It doesn't work, does it? That's because of the stark difference in authority between scientists and journalists. A 2005 MORI surveyⁱⁱⁱ asked 2000

respondents to what extent they would trust people from different professions to tell them truth. For scientists, the resulting 'net trust' score was +52%, for professors +67%. For politicians generally, the score was -53% and for journalists as a class -61%.

In a straight fight for credibility between scientists and journalists then, journalists are going to be massacred, and retired politicians won't fare much better. Much safer to make them kneel, be anointed and arise as members of the splendidly new and untainted category of *social commentator*.

Yesterday evening I talked about language. This evening I want to talk about *argument*—and specifically about what the rhetoricians call the argument from authority, the *argumentum ad verecundiam*.

Professor Peiser's remarks are all about authority—and specifically about *which* authority takes precedence when it comes to weighing public policy choices. Indeed the Global Warming Policy Foundation's website is itself a kind of shrine to authority or at least an imitation of it.

The Foundation, the site tells us, is all about 'restoring balance and trust to the climate debate', which again sounds suitably measured and grown-up. Who, after all, can be against 'balance' and 'trust'? To a former public service broadcaster like me, the word 'balance' suggests an even-handed debate, but that isn't what the founders of the GWPF have in mind. The site is an anthology of straightforward and thorough-going climate scepticism, much of it from familiar voices. Let's let one author and one title stand for many: *Christopher Booker: The BBC and Climate Change: A Triple Betrayal*.^{iv} 'Only triple?', I want to say. We must be slipping.

But in one sense, I think the GWPF really *is* an attempt to restore balance in the debate. Faced with the formidable scientific institutions backing the case for dangerous climate change—the Inter-Governmental Panel on Climate Change, or IPCC, the Royal Society and so on—the Foundation is an attempt to put a heavy paw in the *other* scale by gathering together a group of committed climate sceptics, many with long and distinguished careers in government, business and academia. Professor Peiser's remarks are best seen as a demand that these authorities, generally from other disciplines, should be taken as seriously, and when it comes to policy-formulation, perhaps *more* seriously, than the scientists.

I'm going to explore the present state of the *argument from authority* through a single prism—namely the way in which science is handled in argumentation about public policy. And I'm going to attempt to tease apart a paradox which genuinely perplexes most of the scientists that I know, which is this: almost everyone accepts that science gives us our most secure understanding of the physical world—so why doesn't it always carry the day?

Surely, if anything can, science can pierce what I've called the *cloud of unknowing* and replace public *bewilderment* with public *enlightenment*. So why is it so often questioned and challenged by non-scientists without anyone accusing them of stupidity or absurdity? Why, when it comes to public policy formulation or media discussions, is science typically regarded as *one* of the considerations rather than the card that trumps every other card?

The distinction between speculation and opinion on the one hand and true understanding on the other is an ancient one: in Greek the first is *δοξα*, the second *επιστημη*. Throughout the whole history of western thought, but especially from the Enlightenment onwards, philosophers have claimed a special role for science in the search for that true understanding.

Here, in a well-known passage from *An Enquiry Concerning Human Understanding*, David Hume contrasts the knowledge which can be derived from mathematics and science from what he takes to be the idle and groundless speculation of scholastic theology:

If we take into our hand any volume; of divinity or school metaphysics, for instance; let us ask, Does it contain any abstract reasoning concerning quantity or number? No. Does it contain any experimental reasoning concerning matter of fact and existence? No. Consign it then to the flames: For it can contain nothing but sophistry and illusion.^v

Hume's sense that science represents an epistemological gold standard is almost universal today. Like most non-scientists of my age and background, I accept that fundamental authority completely and—whenever it comes to an argument—I usually find myself instinctively on the side of mainstream science. I *don't* do that because I have personally checked the evidence which underpins *The Origin of Species* or examined Bohr's or Schrödinger's equations: I haven't the expertise to do either. No, I back science because I find Popper's account of the scientific method and its falsifiability intellectually compelling and because, at the level of common sense, the explanatory and predictive success of science is so overwhelming. Moreover, I've spent enough time with scientists to be wholly convinced that the culture and practice of science genuinely aim at truth.

As non-scientists then, our acceptance of the primacy of science is based less on our own scientific training than on a mixture of cultural, social and philosophical factors. This is exactly what is implied by the *argumentum ad verecundiam*—if you can work out the equation for yourself, after all, you don't have to take it on trust.

At the same time, many of us know that it's too simplistic to say that science is always and immediately right. Sometimes there's not enough data, or the puzzle of what the data means has yet to be cracked, or the whole thing is still a work in progress: sometimes, in other words, the science is or at least appears *unfinished*.

On other occasions, scientists disagree—there are rival explanations, or there's one candidate explanation which some scientists back but others oppose: in these cases, the science is *disputed*.

On still other occasions, someone may call into question the good faith of the scientists—they're in the pay of the government or Big Pharma or they're committed to some cause and therefore their work may lack impartiality and thus reliability: we might call this *corrupted* or even *perverted* science.

We also know that, on a few very rare occasions, there have been dramatic revolutions in the history of science when a consensus view has been overturned in favour of a radical new theory—Copernicus, Einstein—and that, before such revolutions, scientific group-think is possible; this is what Lee Smolin alleged about contemporary American physics and M-theory and string theory in his 2006 book *The Trouble with Physics*^{vi}, though one would need to understand the science rather better than I do to judge whether he's right or not.

So as we listen to a given scientific debate, in theory any number of doubts can appear. Yes, of course we still believe in the authority of good, finished, honest science—but maybe in *this* case it's not quite ready; or maybe we're in the middle of a he-says-she-says wrangle and God only knows who's right; or maybe there *is* something fishy about the way that report was paid for; or maybe that lone scientist I heard on the radio is right and it's the other 99% of physicists who will be proven wrong in the end. In an age of pervasive suspicion and uncertainty, it doesn't take much for the weevils to get to work.

And there's something else. Let's imagine a conversation between two characters, you can call them stereotypes, though I've met plenty of living examples of both of them. The first is a business-person. They don't dismiss the green agenda out of hand, but they think there's a lot of bullshit and political correctness involved in it and they're genuinely terrified about the cost and bureaucracy involved in some of the proposed solutions. To them, what the Global Warming Policy Foundation says probably makes a lot of sense. The second person I'll call the environmentalist. They're someone who worries at every level—from moral as well as practical—about the damage they believe humanity is doing to our eco-system. They fear that policy-makers are doing not too much, but far too little and too slowly.

The conversation begins with climate change and, unsurprisingly, the business-person says they've got grave doubts about the so-called science behind global warming. Didn't those scientists in East Anglia do something wrong and didn't even the IPCC drop a clanger about Himalayan glaciers? *Are you a scientist?* asks the environmentalist; *and, if not, who are you to*

doubt the conclusions reached by the overwhelming majority of the world's climatologists?

Then the conversation switches to genetically modified food. Now it's the environmentalist who voices doubts about the science: perhaps it's not ready and we don't yet understand the potential risks. Or perhaps, because of the commercial interests involved, the science isn't truly independent. And now it's the business-person who makes the case for simply backing the experts.

In other words, our preconceptions—our world-view—can be key in determining how far we're prepared to accept the authority of science or to turn up the dial on all the available doubts. How can we predict whether someone is convinced or not convinced by the scientific case for anthropogenic global warming? It turns out that, although there are no doubt numerous exceptions, a good place to start is to ask them how they vote. Numerous polls both here and in America have suggested that people to the left of the political spectrum are far more likely to believe the case than those on the right^{vii}. One's response to a piece of hard, technical science turns out, to a significant degree, to be a matter of political taste.

We tend to see science, like everything else, through the lens of our own beliefs and prejudices and—although scientific uncertainty is itself a technical field which requires scientific expertise fully to understand—we can easily find ourselves treating the reliability of a given scientific claim as it was like any other debate in which our own and other people's lay opinions are as good as anyone else's. And we pick and choose. We probably won't argue the toss when a hospital consultant offers a diagnosis. We may very well believe we have something useful to add—something we've read in paper or on the web, say, or just the benefit of our own generic common sense—as a scientist explains the the case for or against culling badgers.

When we consider this background—of preconception and expectation, of doubt and suspicion—against which science enters the arena of public debate, our paradox becomes easier to explain. But we need to add to all this another issue which relates to the structure and character of argument itself.

Public debates about science represent a messy clash between two, not just different, but diametrically opposed approaches to argument: *scientific argument* and *advocacy*.

Scientific argument—if we imagine it idealised in a perfect scientific paper—seeks to state its case not just as *clearly* as possible, but in a sense as *weakly* as possible. Every objection, every area of doubt should be flagged up. Suppose there is a rival theory, which our paper intends to argue against: it should be presented as strongly as possible. All of its good points should be set out before counter-points are brought to bear.

Advocacy does the opposite. Advocacy prefers to ignore or skate over the weak points in its own case and to focus on those in its opponent's. It feels less of an obligation to clarity and comprehensiveness and it is quite happy to rely on rhetorical effects to win the day. Advocacy can itself be part of a systematic search for the truth—in the context of a law court, for instance, where each side can make their own case and challenge the other's—but it is a quite different way of seeking the truth.

So what happens when you mix science and advocacy? Let's take the example of the UK's most distinguished scientific body, the Royal Society. In 2007, Channel 4 broadcast a documentary called *The Great Global Warming Swindle*^{viii} which, as its title suggests, aired strongly sceptical views. It was the most high profile part of a wave of vocal scepticism which many scientists feared might be turning public opinion against the case for anthropogenic climate change. In June that year, the Royal Society weighed in with a paper called *Climate Change Controversies: a simple guide*. It begins with these words:

The Royal Society has produced this overview of the current state of scientific understanding of climate change to help non-experts better understand some of the debates in this complex area of science.^{ix}

Then it lays its cards on the table. The paper it says is not intended

to provide exhaustive answers to every contentious argument that has been put forward by those who seek to distort and undermine the science of climate change and deny the seriousness of the potential consequences of global warming. Instead, the Society—as the UK's national academy of science—responds here to eight key arguments that are currently in circulation by setting out where the weight of scientific evidence lies.

There then follows punchy ripostes to each of eight arguments put forward by the climate sceptics on pages headed 'Misleading argument 1', 'Misleading argument 2' and so on.

This passage is almost a rhetorical mirror-image of the remarks by Benny Peiser with which I opened. Now the 'weight of scientific evidence' and 'the UK's national academy of science' in all their sober might are ranged against 'those who seek to distort and undermine the science of climate change.' The only real caveat offered is that the 'consequences of global warming' are only 'potential'. Note also the withdrawal of the assumption of good faith. Those on the other side of the argument are *seeking* to distort and undermine the science: this is not an honest argument between honest people but a battle between enlightened science and people who actually want to distort and undermine. The same claim can be found in a letter to the journal *Science* in

2010 from hundreds of members of the American National Academy of Sciences: 'many recent assaults on climate science and, more disturbingly, on climate scientists by climate change deniers are typically driven by special interests or dogma, not by an honest effort to provide an alternative theory that credibly satisfies the evidence.'^x

We're never told in either case what the precise evidence is of this malign intentionality but I think we can be pretty sure that, to quote Hume, it does not directly arise from either 'quantity or number' or 'experimental reasoning'. This is advocacy, clearly and strongly expressed. This is how the Royal Society guide ends:

We must also prepare for the impacts of climate change, some of which are already inevitable.^{xi}

Not *probably inevitable* but *inevitable*. Now as a piece of advocacy, this is pretty formidable. It uses the extraordinary authority of the Royal Society to full effect and it sets out its case in plain language and with far fewer conditions and qualifications than one would normally expect to see in a communication from scientists.

Well, you can guess what happened. Forty-three members of the Royal Society complained about the tone of *Climate Change Controversies* and in particular about its alleged *stridency* and failure to acknowledge fully areas of *uncertainty* in the science. Accordingly, the Royal Society commissioned a new guide which was eventually published in the autumn of 2010^{xii}.

The rhetorical flavour of this second guide is very different from the first. It is called *Climate Change: a summary of the science* and, at least to my layman's eye and ear, it is exactly that. Now the question of scientific uncertainty is dealt with at length. Indeed the guide is partly structured along a spectrum of certainty in sections with titles like 'Aspects of climate change where there is a wide consensus but continuing debate and discussion' and 'Aspects that are not well understood.'

As far as I can tell, the underlying scientific evidence on which the two guides rely is almost identical. I've no doubt that the majority of the scientists who signed off on the second guide were just as convinced that the weight of the evidence points to a high probability of serious anthropogenic warming as the authors of the first. The difference between the two guides is in the character of the argumentation: the second draws back from the techniques and language of advocacy towards something which is much closer to straightforward scientific exposition.

Reaction to this second guide was predictable. BBC News^{xiii} reported Professor Anthony Kelly, one of the Fellows who had criticised the first paper, and who happens to be a member of the academic advisory board of the Global Warming Policy Foundation, as saying that this new guide had 'gone a

long way to meeting our concerns.’ Some on the other side of the argument were less happy. Indeed Bob Ward of the Grantham Research Institute on Climate Change and the Environment said he doubted whether membership of both the Royal Society and the Global Warming Policy Foundation was even reconcilable.

Now, depending on your own position, you may well feel considerable sympathy with scientists who believe the climate is almost certainly changing in a dangerous way, who further believe that disinformation is causing public scepticism and confusion to grow, and who therefore decide to put their case with the forcefulness which advocacy offers.

As I suggested earlier, that growth in scepticism is demonstrable: a *Populus* poll^{xiv} suggested that even between the autumn of 2009 and the spring of 2010, the numbers of those who said they did *not* believe that global warming was taking place had jumped from 15% to 25% and those who agreed with the statement ‘man-made climate change is environmentalist propaganda for which there is little or no evidence’ from 9% to 14%. By contrast, one survey^{xv} suggested that no fewer than 97% of atmospheric scientists believed that man-made climate change is happening. So: a perceived threat to the planet, a widening gap between experts and public, a live policy debate—one can easily see how advocacy can seem like a duty.

Nor do I claim that a scientist who goes down that path is doing anything wrong. What I *am* suggesting is that the admixture of advocacy and dispassionate scientific exposition makes the question of *authority* a good deal more complex.

The governing body of the BBC, the BBC Trust, recently commissioned the eminent British scientist Professor Steve Jones to report on the impartiality and accuracy of the way in which the BBC covers science. They published his review in August last year^{xvi}.

Steve Jones’ report is a serious piece of work which was welcomed and accepted almost in its entirety by the BBC and by me as its Editor-in-Chief. But if you read the report, you’ll come across an argument—a rather civilised argument, it must be said, but an argument nonetheless—between Steve Jones and some of his BBC interlocutors which goes to the heart of this question of authority.

When it comes to impartiality, to what extent should the BBC treat science like everything else—politics, religion, the arts—and to what extent should it treat it differently because of science’s unique epistemological claims? To caricature the two extremes, the first would suggest that science should climb into the boxing ring like every other interest and submit to all the usual rules of adversarial debate, the second that the role of the broadcaster when a scientist wishes to speak is to turn on the microphone at the start and to say thank you at the end.

The actual debate was a good deal subtler than that, but Professor Jones was definitely on the side of a privileged position for science. He was consequently very nervous of the idea of impartiality, if impartiality meant balance and balance meant a 50/50 balance between mainstream science on the one hand and marginal or downright unscientific or anti-scientific opinion on the other.

Against that, some BBC senior editors argued that, given how integral science is to so many policy debates, given that there *are* sometimes genuine disagreements between scientists, that there are real editorial dangers in putting science into a wholly protected category—not least that, if the public do not hear science being scrutinised and challenged in the way that everything else is, they may actually believe scientists *less* rather than *more*.

So what's the way through this? For me, the key is in the phrase the BBC uses to describe its obligation to treat controversies fairly: what is required beyond party politics is often not mathematical balance checked with a stopwatch, but *due* impartiality.

The dangers to health from smoking are so clearly established that it would be not impartial, but irresponsible to give a smoking enthusiast equal time with the Chief Medical Officer. In the BBC's coverage of climate change—that 'triple betrayal' according to Christopher Booker—we have tried progressively to adjust the balance of the debate to reflect shifts in the underlying science and the developing findings of the IPCC and other scientific bodies over time.

Professor Jones says that some of his BBC interlocutors suggested that impartiality implies 'equality of voice'. That's not my view. For me, it's important that editors ask themselves how much scientific support a given position has and adjust the prominence they give that position accordingly. Fundamental climate scepticism is now very much a minority view. There remain a few serious sceptics within science and I believe that it would be wrong to do what some scientists call for, which is effectively to ban them from the airwaves: censorship is a way of undermining, rather than building, public trust. I *do* however believe that their arguments and the amount of time they have to expound upon them should broadly reflect the support they enjoy within science—and that is low.

Unfortunately, the media both here and abroad have often failed to apply this weighting to the way they cover scientific and medical stories. There's the danger of what one could call *good horse-race bias*—a tendency to ignore a disproportion of underlying scientific support in order to run a more evenly-matched and therefore more satisfying debate. Andrew Wakefield's claims, initially aired in the 1998 *Lancet* paper, that there was a link between the MMR vaccine and autism would ultimately be described in another learned medical journalism as 'perhaps [...] the most damaging medical hoax of the last 100 years'^{xvii}. Mr Wakefield was struck off the medical register for serious professional misconduct in 2010. The evidence that there was no demonstrable link between the vaccine and autism would mount over the

years but authoritative studies cast grave doubt on the Wakefield claims very early on and official medical advice about the net benefits of the vaccine never wavered.

But when the story played out around a decade ago, it was covered in the UK media and sometimes on the BBC as if the argument was in fact evenly balanced. The *Today* programme, for instance, which covered the story assiduously, often mounted on-air debates in which, for instance, the medically untrained representation of a parents' pressure group on vaccines would be given equal time with a government medical expert^{xviii}. Britain's newspapers also often treated the story as if it was a good even-handed talking point—though they soon became distracted by the fascinating *ad hominem* question of whether the then Prime Minister Tony Blair's son Leo had been given the vaccine.

All this credence given to the Wakefield theory had its effect. A *Today* programme poll in 2001 commissioned discovered that no fewer than 79% of respondents thought there should be public enquiry into the topic^{xix} and many parents simply decided not to allow their children to be given the vaccine. Irresponsible repetition of unwarranted doubts about the MMR vaccine had caused actual damage to public health. To me, this is not impartial journalism, but ignorant and shallow journalism.

Coverage of the MMR controversy is a cautionary tale about how unwise it can be to apply the same approach to balance in science that one might to political debate. As Professor Jones says in his report, checks and balances and impartiality are already built into the scientific method and it is not difficult for responsible specialist journalists to establish the view of the science community on a given claim or controversy. That is what the BBC strives to do at its best—and I believe that it has got much better in its coverage of science in both journalism and documentary in recent years.

But what happens if supporters of the majority scientific view cross the line into advocacy and, for instance, over-state the actual level of scientific certainty or accuse their opponents of bad faith? In covering that *specific* argument—about the first Royal Society guide, say—does the core authority of science stretch so far that there should still be nine people saying the guide is completely fine for every one who says it is flawed?

And suppose the discussion turns to possible policy responses to climate change, responses that raise a host of political and economic questions which are—perhaps unlike the underlying science—under-determined and fully open to political debate? We may not agree with Dr Peiser's implied ordering of the relative importance of science, economics and social commentary, but we probably do have to accept that in that discussion our approach to impartiality will have to be somewhat different.

Now you might say: why not keep the two separate—why not deal with the pure science, let's call it Sphere A, over *here* and then deal with the debate about the policy implications, Sphere B, over *there*. And it *is* useful, wherever possible, to distinguish in the presentation of such stories to the public *what the science is* from the discussion of *what it means and what we should do about it*.

But in the real world, the two spheres are often jumbled together. The whole point of Dr Peiser's remarks are to claim that the costs of the proposed mitigations to climate change—B—are not justified by the probability of its actually happening—A. And, as we've seen, there are many scientists and scientific bodies which are not content to restrict their public utterances to Sphere A and who also seek to combine, sometimes even to blur the two.

In practice, the ubiquitous admixture of opinion, *δοξα*, to established scientific fact or at least widespread consensus, *επιστημη*, means that the type and strength of authority that is being brought to bear in the argument and therefore how it should be treated is often far from straightforward.

For David Hume, the decision to keep the works of Sir Isaac Newton and to throw the works of St Thomas Aquinas into the fire is an easy one. But let's imagine him going through a pile of contemporary materials about climate change: that first Royal Society guide, Sir Nick Stern's report, even the promulgations of the IPCC. When it comes to public policy formulation, it's probably not just impossible, but undesirable, to attempt to keep science *qua* science separate from the discussion of political and economic responses. But how far then does the special writ of scientific authority run?

And that's only the start of our problems. Because in the hurly-burly of public discourse, all sorts of other authorities are also at work. Anita Howarth, in her paper *Contested processes, contested influence*^{xx}, looks at how the GM debate played out in the UK mass media from the mid-90s to the early 2000s. She identifies a key moment in 1998 when a new voice of authority entered the debate:

The catalyst for the *Daily Mail's* entry into the debate was an article in the *Daily Telegraph* by Prince Charles which enabled them to frame the debate in terms of ethics/religion, uncertain science and unknown effects. They also highlighted the associations made by Prince Charles between GMO and BSE in terms of unpredictable consequences, unknown effects and uncertain science. [...]^{xxi}

By the autumn of that year, she claims, the debate had swung decisively towards uncertainty and the unacceptability of that uncertainty to the public—and one of the things that may have tipped the balance was an intervention by the Heir to the Throne. Prince Charles used a quite different sort of authority to shift the centre of gravity of that debate away from the science—where he had no expertise to offer—towards ethics and religion

where his own authority, both by dint of his status and the reputation he has built up with the public over many years, could really count.

Ethical considerations, atavistic fears, including the fear of science, stray images and preconceptions can all play a part in the battle for authority. In their study of biotechnology and the popular press in Flanders, *Knowledge culture and power*^{xxii}, Peter Maesele and Dimitri Schuurman include an intriguing table of the metaphors used in the Flemish popular press between 2000 and 2004 to describe the debate about different kinds of bio-tech. And there were a lot of them: of the 506 articles they examined, 202 contained metaphors, often multiple metaphors, so that there was a total of 400 metaphors used:

- GMOs: use of the 'Frankenstein' metaphor - 22 times.
- GMOs are pollutants - 4 times.
- The battle against GMOs is a crusade – twice.
- Cloning is Jurassic Park - 6 times
- Cloning means eternal life - 26 times
- Genetic manipulation is a Nazi practice - 10 times
- Genetic manipulation is 'Brave New World' - 6 times
- Genetic manipulation is an activity pursued by Saddam Hussein - once.

And so on. Although a few are positive, the overwhelming majority of the metaphors are negative, and many nightmarish. The powerful and—crucially—readily comprehensible narratives evoked by the use of words like *Frankenstein*, *Jurassic Park* or *Nazi*, all of them redolent of science gone wrong or perverted to evil ends, have the effect of setting up an incoherent, but nonetheless potent anti-authority which some members of the public may find more persuasive than scientific authority itself. Maesele and Schuurman conclude that, in Flanders at least, what they call 'the science-industrial complex' has either lost or is losing 'the interpretive struggle'^{xxiii}.

Beneath the surface, all sorts of beliefs and influences are at work in that 'interpretive struggle'. Rachel Carson's 1962 book about the use of pesticides, *Silent Spring*, set out a substantial body of empirical evidence, but what made the book resonate was its elegaic tone and the way it cast the issue of our stewardship of nature into a language of moral responsibility which has remained an important element in the debate about the environment ever since.

Bjørn Lomborg has written, convincingly in my view, about how the Club of Rome's famous 1972 report, *The Limits to Growth*, created a paradigm about economic growth and the exhaustion of the world's natural resources which remains extraordinarily influential forty years later, even though virtually every one of the specific predictions on which it was based has turned out to be wrong^{xxiv}.

With these themes of stewardship, moral responsibility and the fragile and threatened integrity, it's hardly surprising that in the middle of arguments about science and the environment, one often stumbles on language which has a quasi-religious quality. Nor is this restricted to those who are arguing *against* science: when it comes to topics like climate change, one sometimes hears it from scientists themselves. I'm not suggesting that the green movement is religious as such, simply that multiple paradigms and cultural themes are at work in the language we can find ourselves using about nature and science and the feelings we have about them.

Scientific authority finds itself having to make its case not in a rhetorical vacuum but in a jostling crowd of rival influences and allusions. Inevitably there are some who wish it were not so. Writing recently in *Nature*, Dan Kahan, a professor at Yale Law School who comments on the climate change debate, suggested that the problem with successfully communicating information to the public about the science lies not with the public's reasoning capacity but with what he calls 'the polluted science communication environment that drives people apart'. He goes on to say:

Overcoming this dilemma requires collective strategies to protect the quality of the science-communication environment from the pollution of divisive cultural meanings.^{xxv}

So now, rather brilliantly, we have an ecology of language itself and, instead of pesticides, a 'pollution of divisive cultural meanings'.

But, although we might sympathise with Professor Kahan's frustration, surely those 'divisive cultural meanings' are an inevitable part of post-Enlightenment pluralism and open democratic debate and, even if we could imagine any 'collective strategies' which could protect us from them, would we really want to employ them? And who would decide which of the cultural meanings was divisive? That too would be a question of authority. Once again we can hear the ghost of Plato stirring.

Meanwhile I think we should expect the role of authority in public discourse to continue to evolve and be contested. We live in an age of heroic brand extension and we can see something similar when it comes to authority. So it is no surprise to us when many papers and the BBC website reported the following urgent headline in 2010:

STEVEN HAWKING: GOD DID NOT CREATE UNIVERSE^{xxvi}

It's a headline because Professor Hawking is an eminent scientist, perhaps the most famous scientist in the world, but how much scientific authority

should we assign to this statement? Does it contain reasoning about number or experiment? Well, not exactly—indeed it seems to have been largely prompted by the discovery that Professor Hawking had a new book coming out.

A scientist explaining that the evidence for Darwinian evolution means that a fundamentalist interpretation of Genesis must be wrong *does* in my view pass the Hume test. Someone who told us that we should rely on their authority as a scientist when they offer us personal financial advice does not. Professor Hawking's remarks about God seem to lie somewhere in the middle.

The extension of authority is not always a risky enterprise. Years ago I commissioned a leading zoologist, Aubrey Manning, to make a series about geology for BBC Two^{xxvii}. Aubrey only had a general knowledge of geology but had always been intrigued by the geological context for his own biological studies and the resulting programmes were an effective combination of the presenter as authority figure, fully conversant with the scientific method, and the presenter as vicarious viewer, finding things out alongside us in the course of the series.

But, it's not hard to think of examples in television or elsewhere in the media of authority been stretched so far that the elastic eventually snaps. In our newspapers you'll find examples of every kind of translated authority, from the film star who has suddenly become an expert in nutrition or eastern mysticism to the notable retired politician who feels fully equipped to sound off on pretty much everything.

Sometimes one comes across a letter about some matter of public concern signed by a long list of notables from many different and unconnected backgrounds: this is authority sliced and diced and repackaged like the Collateralised Debt Obligations which precipitated the financial crisis, authority each piece of which may be far from its point of origin and justification, but where it's still hoped that the whole can be greater than the parts.

We might have hoped that authority might be one sure way of piercing the *cloud of unknowing*. Instead, we find that even the most clear-cut authority, that derived from science, can find itself in the most opaque, impenetrable regions of the cloud. And if what I've said this evening is true of science, it is probably even more true of economics and the other social sciences, indeed of any area of professional expertise which intersects with the world of public debate and policy.

Misrepresentation is undoubtedly often part of the problem but, as I've tried to demonstrate this evening, it's too easy to blame the public's lack of knowledge of, or unwillingness to trust science entirely on the dark forces of misrepresentation. When science enters the public arena, it almost always ends up having to play by at least some of the rules of that arena, rules which often confuse the question of authority. It also finds itself in competition with radically asymmetrical rhetorical forces which derive their power from the spheres of morality, culture, superstition, even the mystic.

But to wish we could eliminate those ‘divisive cultural meanings’ is to wish away the freedom and openness on which modern democracies are built—and, short of dictatorship, it’s impossible to achieve anyway. In my view our task rather is to find practical ways of helping the public to pick their *own way* through this difficult, cluttered landscape. I’ve tried this evening to give some examples of how it *is* possible to parse public statements about science and disentangle them so that one can analyse and understand the different elements: exposition, assertion, opinion and advocacy. It takes time and, in its own way, a little training. Our challenge is how to encourage more people to take the time and acquire the skills to do this for themselves.

I will return to that theme tomorrow, but I want to leave you with a parting thought which is particularly relevant to this professorship. I’ve spent the whole of this afternoon talking about science but, in doing that, I’ve relied on a sensibility and a set of techniques that absolutely derive from the humanities. People sometimes talk about the humanities as if they are an indulgence we no longer need or can afford, but without them, who is going to be able to address problems like the one I’ve explored this evening?

Science is the most formidable intellectual force of our age, perhaps any age. The irony is that, without the insights of the humanities, it may still find itself without words.

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- ⁱ Introduction to Global Warming Policy Foundation Annual Lecture 2011, October 2011
ⁱⁱ Benny Peiser, March 23 2011 [need reference]
ⁱⁱⁱ MORI/BMA survey, February 2005
^{iv} [need reference]
^v David Hume, *An Enquiry Concerning Human Understanding*, Section XII
^{vi} Lee Smolin, *The Trouble with Physics*, Allen Lane 2006
^{vii} [needs research back-up and reference]
^{viii} Channel 4, March 8 2007
^{ix} Royal Society, *Climate Change Controversies: a simple guide*, June 30 2007
^x Reported in *The Guardian*, May 6 2010: <http://www.guardian.co.uk/environment/2010/may/06/climate-science-open-letter>
^{xi} Royal Society *ibid.*
^{xii} http://royalsociety.org/uploadedFiles/Society_Content/policy/publications/2010/4294972962.pdf
^{xiii} <http://www.bbc.co.uk/news/science-environment-11438570>
^{xiv} http://news.bbc.co.uk/nol/shared/bsp/hi/pdfs/05_02_10climatechange.pdf
^{xv} Published in *Eos*, 2009, see http://tigger.uic.edu/~pdoran/012009_Doran_final.pdf, quoted by Prof Steve Jones in the BBC Trust report below
^{xvi} BBC Trust: Professor Steve Jones, *BBC Trust review of the impartiality and accuracy of the BBC’s coverage of science*, July 2011
^{xvii} *The Annals of Pharmacotherapy*, see <http://www.theannals.com/content/45/10/1302>
^{xviii} [need reference – or other example]

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- ^{xix} ICM Research/Today MMR poll August 2001, see http://www.icmresearch.com/pdfs/2001_august_today_programme_mmr.pdf
- ^{xx} Collected in Routledge, *Public Policy and Mass Media*, 2010, p 143 ff.
- ^{xxi} Ibid, p. 152, other references removed.
- ^{xxii} Also collected in Routledge, *Public Policy and Mass Media*, 2010, p 86 ff. The table I refer to is Table 5.1 on p. 101.
- ^{xxiii} Ibid, pp 102-3.
- ^{xxiv} *Foreign Affairs* Volume 91 No. 4 (July/August 2012) p 24 ff.
- ^{xxv} *Nature*, 15 August 2012, see <http://www.nature.com/news/why-we-are-poles-apart-on-climate-change-1.11166>
- ^{xxvi} <http://www.bbc.co.uk/news/uk-11161493>
- ^{xxvii} *Earth Story*, BBC Two, 1998.