

Science & Public Affairs

*Media strategy:
The case of foot
and mouth*



Avoiding the
supermarkets



Blogging at the
Food Standards
Agency



Foot and mouth, science and the media p6

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Science and the media

How should the media report science? Various pieces in this issue tackle this question from different points of view.

No sooner had a High Court judge spelled out inaccuracies in Al Gore's film, *An Inconvenient Truth*, than Gore himself shared the Nobel Peace Prize (jointly with the Intergovernmental Panel on Climate Change, IPCC) for his work alerting the public to climate change and what they might do about it. Against this background, Bob Ward and David Whitehouse (pp 16-17) launch into a furious debate about reporting science. Should all shades of opinion be reported, irrespective of whether they misrepresent the evidence? Bob Ward argues that the press should be responsible in its science reporting. David Whitehouse plumps for freedom of speech – even if that means being wrong.

Michael Norton and his co-authors (p 18) are worried about the same issue. In the face of the IPCC's consensus on climate change, they say, some UK media still help sceptics misrepresent their contrarian opinions as science. The authors look to learned societies to protect the integrity of scientific information, and to scientists with media-friendly faces to present their findings to the public.

Tom Lowe, on the other hand, thinks that climate scientists who cross the threshold between science and the media, politics and public decision-making, are losing credibility (p 11). He fears they are turning a legitimate, complex and long-term concern into something of a fad, while failing to inspire the masses into action. He argues that science should be separated from policy.

When a scientific story becomes political, dealing with the media is inevitably stressful. During the foot and mouth outbreak this summer, Monica Winstanley and Matt Goode (pp 6-7) experienced what happened when the science's time-scales failed to meet the journalists' demands. Any aspect of the Institute for Animal Health at Pirbright was subject to scrutiny, and the media's interest has persisted well after the publication of the independent reports.

Science and politics are inextricably intertwined in another question we take up in this issue: whether or not to replace Trident, the UK nuclear submarine. The government has voted in principle to replace it. However, the specifics of the weapons delivery system have not yet been decided, nor has a detailed budget been worked out for the replacement.

Critics of the system have demanded more public debate on the issue. In the SPATalk (pp 4-5), Steven Haines, arguing for replacement, maintains that nuclear weapons have had a stabilising effect on international relations; whereas Nick Ritchie believes Britain's decision to renew the system will do more harm than good.

Nuclear matters – civilian, this time – feature in another argument on pp 14-15. At issue is the quality of the government's public consultation on the future of nuclear power. Malcolm Wicks asserts that it was open, fair and full, while Pete Roche charges the government with misleading the public.

The government's desire to revitalise public engagement through citizens' juries takes a knock from Matt Qvortrup (p 27), who alleges that there is no evidence that they work. It is, he writes, 'not surprising that citizens' juries recently have received the stamp of approval by the Communist Party in the People's Republic of China!'

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Should the UK go ahead with Trident?

Nick Ritchie and Steven Haines disagree

The government has voted in principle to replace Trident, the UK's nuclear submarine system. However, the specifics of the weapons delivery system have not yet been decided, nor has a detailed budget been worked out for the replacement. Critics of the system have demanded more public debate on the issue.



Vanguard Class submarine

Dear **Steven**,

In December 2006 the government decided to retain a British nuclear arsenal for the foreseeable future by electing to replace the current fleet of four nuclear-powered submarines that carry our Trident nuclear missiles with new submarines over the next 10–20 years.

Britain's decision to preserve a nuclear capability well into the second half of this century comes at a time when we, and others, are trying to convince other governments in far more precarious strategic environments,

such as Iran, that nuclear weapons are not the answer and that their security needs can be met without resorting to nuclear threats.

Whilst these issues are far from black and white, Britain's decision to keep nuclear weapons will do more harm than good. The government's justifications for retaining nuclear weapons are rooted in the logic of the Cold War and have little relevance to the threats we face today. Nuclear weapons are of no use against terrorism, they are not a benign 'insurance policy' as is often claimed, they add little to our security, and if we did

not already have them we would not now procure them.

Our strength lies not in aggrandising these weapons but in securing their further marginalisation by practising what we preach and relinquishing a nuclear capability we do not need.

Yours, **Nick**

Dear **Nick**,

Unlike you, I do not believe that the government's decision to replace the Vanguard Class nuclear submarines was an

unfortunate one. Far from it, in fact. It is my contention that it would have been premature for Britain to have relinquished these weapons at this time.

There is a danger that we regard the end of the Cold War as the end of the sort of strategic rivalry that led to the profoundly destructive wars of the twentieth century. In the modern era, as those wars amply demonstrated, war between the great powers would surely be catastrophic. With the exception of the two atomic bombs dropped on Japan at the end of the Second World War, all the death and destruction resulting from great power war was a consequence of so-called conventional weaponry. A conventional war today between, say, Russia and China, would be far, far worse in its consequences than anything that has happened since 1945.

I believe that nuclear weapons have had a stabilising effect on great power relations. Let us not forget that nuclear weapons don't only deter other states from using nuclear weapons – they make any war potentially more catastrophic and, as a consequence, reduce its likelihood. We experienced the positive effects of nuclear weapons in Europe during the Cold War. And we are experiencing their positive effects today as we continue to live in a world without great power conflict.

Yours, **Steven**

Dear **Steven,**

It is a mistake to conflate arguments for Britain to relinquish its nuclear arsenal with arguments for global nuclear disarmament.

Britain, specifically, does not need these weapons. Since the USSR was consigned to history, the UK has faced no major strategic threats that can be ameliorated through British possession, use, or threat of use of nuclear weapons. Nuclear deterrent threats are of little utility against 'rogue' regional adversaries or terrorist groups armed with weapons of mass destruction. Britain is not engaged in a nuclear deterrent relationship with the likes of Russia or China, nor is it likely to be. Even if one believes in the stabilising nature of nuclear weapons at the great power level (and that is disputed), how and why does this apply to Britain?

I believe that strategic rationales for continued British possession of these weapons are hollow. The decision to retain them is fundamentally political. Furthermore, the continued possession of nuclear weapons by the 'great powers' cannot be separated from their proliferation to other countries, such as North Korea.

It is in the interests of all states that the major powers work to reduce the salience of

nuclear weapons in international politics. The British government should take an active role in this process by not replacing Trident.

Yours, **Nick**

Dear **Nick,**

Great powers have responsibilities beyond their own immediate defence needs. Britain emphatically is a great power. On any objective assessment – economically, militarily and in soft power terms – Britain is in the top five or six powers globally, having a substantial and influential role in all key global institutions. To suggest otherwise is to ignore the facts.

Neither of us can be certain whether or not nuclear weapons have helped maintain stability between the great powers – but, on the balance of probability, I believe I am correct. For these reasons, we should be extremely careful not to take ourselves out of the nuclear equation. Britain is a responsible nuclear power whose decision to reduce its overall capability places it in a good position positively to influence both great power relations and counter proliferation.

You say that Britain is not likely to be in a nuclear relationship with Russia and China. An extraordinary statement – your confidence worries me. I have no idea what our relationship with a resurgent Russia, for example, is going to be in twenty or thirty years. I am inclined to be cautious; changing our nuclear status now would be the risky – not the cautious – option.

Yours, **Steven**

Dear **Steven,**

The logic of your argument leads to a permanently nuclear-armed world. It justifies possession of nuclear weapons by any country that feels threatened and wishes to enhance stability, according to its own definition, at the regional or international level, or by any country that thinks it might be threatened in the future.

Further proliferation of nuclear weapons cannot be separated from their indefinite possession by 'responsible nuclear powers'. I do not share your apparent confidence that the world can safely navigate the risks inherent in nuclear proliferation for the indefinite future and that a permanently nuclear-armed world is a stable one. Britain's actions have consequences. Retention of nuclear weapons can only reinforce their salience in international politics.

Nuclear weapons remain a powerful part of Britain's self-identity as a 'responsible' internationalist power and as Washington's primary military ally, an identity that was

forged in the Cold War. A non-nuclear defence strategy would pose a major challenge to the British defence establishment's identity and has therefore been resisted. But the argument becomes tautological: we are a major nuclear power and we must keep nuclear weapons because we are a major nuclear power. The role of nuclear weapons in Britain's self-identity instead needs to be reconceptualised; hollow strategic rationales need to be stripped away and the wider implications for nuclear proliferation accepted.

Yours, **Nick**

Dear **Nick,**

I never said we will certainly live permanently in a nuclear-armed world. I merely suggest that at this point, and for a while to come, nuclear weapons are a vital factor in deterring great power war – something we both wish to avoid.

The international system is changing. Globalisation, increasing interdependence, the growth of global and regional institutions – all are contributing to the absence of great power war. The success of political cooperation within Europe shows there is considerable potential for peaceful interaction. Unfortunately, while Europe seems to have succeeded in this respect, the rest of the world is not so fortunate.

Great power rivalry continues. Russia is resurgent, China and India have a geo-strategic rivalry – we are not yet able to regard great power conflict as a thing of the past. Nuclear weapons have the positive effect of restraining powers (as they did in South Asia, preventing crisis over Kashmir leading to an Indo-Pakistani war).

This is the positive effect of nuclear weapons – a positive effect that we will continue to need for some time yet. Britain, as a great power, has a responsibility to remain engaged in this way. Now is emphatically not the time to abdicate that responsibility.

Yours, **Steven**

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Foot and mouth, science and the media

Monica Winstanley and Matt Goode on the view from the lab



The media camped outside the Institute for Animal Health

For scientists who have dedicated their careers to combating livestock diseases there can be few, if any, worse scenarios than suspicion that an outbreak of foot and mouth disease (FMD) has been caused by a laboratory strain of the virus originating from their research site.

Add to that, that they are working into the night to conduct tests to reveal the provenance of the disease and face the prospect of seven-day working to test thousands of samples from potentially infected farms. Within hours, their biosecurity procedures will be subject to two major independent reviews; news crews with satellite trucks and long-range cameras will be at the gates; and the story will make national and international headlines in all sections of the media.

For the scientists at the Institute for Animal Health (IAH) laboratory at Pirbright, these were the conditions they were working under in August 2007.

Events

Late on Friday 3 August, the Department for Environment, Food and Rural Affairs (Defra) announced the first case of FMD in the UK since 2001. Through that day, IAH Pirbright scientists had worked on the farm with the suspected case to provide Defra with the scientific data.

From that moment, the Institute and its sponsoring body, the Biotechnology and Biological Sciences Research Council (BBSRC), worked closely together to provide as much up-to-date information to the media as quickly as possible. Initially we prepared to respond about a possible new FMD outbreak. But by the evening of Saturday 4 August, a different story was breaking.

Work at IAH to determine the genetic sequence of the FMD virus responsible showed that the strain was 01BFS67: one that had not circulated in Europe in the wild since 1967 and which was used on the Pirbright site. Institute scientists had recently used small quantities of the strain in their research. During the same timeframe, Merial Animal Health, the animal vaccine company that shares the Pirbright complex, had prepared around 10,000 litres of virus to make vaccine.

If ever this had been solely an agricultural or science story, it wasn't now. By that evening a sizeable media contingent was at

the IAH gate. We decided that our most effective way to communicate would be for the Institute Director to provide updates direct to camera. We followed this strategy for the week of the media encampment. When, and only when, significant new information emerged we quickly arranged press calls at the gate where the Director, Professor Martin Shirley, delivered statements – several of which were broadcast live on rolling news channels.

Media presence at Pirbright peaked in the middle of the first week, with up to ten satellite trucks and many journalists' cars lining the entrance to the site and nearby verges. BBC News used a camera mounted on a high telescopic mast to film over the perimeter fence. Surrey Police kept watch to maintain safety.

Over the following weeks, engagement between IAH and the media changed, with more emphasis on interviews and response to specific queries. We paid particular attention to important stakeholder groups, for example reserving time for local media.

Several factors combined to make the process complicated and challenging.

Timescales

Since 2001, IAH Pirbright scientists have greatly accelerated diagnostic and strain typing techniques for FMD. But it still takes around six hours to make a diagnosis on a sample. This meant that after an initial flurry there was little new to report to a voracious media machine eager for frequent updates. In particular, IAH had no news to report while tests were being conducted and, most significantly, while the two reviews of IAH and Merial led by the Health and Safety Executive and Professor Brian Spratt were in progress and their findings unpublished.

Despite this, media interest in IAH was unrelenting. The Institute was the backdrop for the main evening TV news bulletins whether that day's news was relevant to the lab or not. Perhaps because there was little to report on the technical side, the story broadened to include unnecessary speculation about deliberate release and accidental transmission off-site by scientific staff.

We now faced an increasingly diverse range of media comment and questioning. To help resolve widespread misunderstanding of biosecurity procedures, we invited the BBC Science Unit to conduct an interview on biosecurity with a senior researcher inside the lab but outside the biosecure area. Site access had become a storyline in its own right. However, while some press ran critical reports on the perceived ease of access to the site,

others pressed persistently for access.

The independent reports were published on 7 September, although part of the content was anticipated by the media. Since publication, further issues have been raised by the media, and through Parliamentary Questions and other avenues, and have been replied to as appropriate by the Institute.

BBC News used a camera mounted on a high telescopic mast to film over the perimeter fence. Surrey Police kept watch to maintain safety

Politics versus science

Only a handful of science correspondents were involved. However, the implication of virus escape from a publicly-funded research lab or a company making vaccines for Defra, both licensed by Defra, made this a political story. This changed the nature of media questioning and understanding of IAH.

Among the angles we were asked to address were the views of a contractor who had worked on the site in an inactive building and was critical of biosecurity procedures. His opinions were reported even though the article stated, 'As a plumber [he] is not an expert in biosafety.' It was reported that he thought he had contracted Legionnaire's Disease at Pirbright. By the time tests showed that neither did IAH have above background levels of *Legionella* nor the strain that infected the contractor, the story was, of course, old news.

Journalists questioned whether IAH's technical training courses, which it must offer to the scientific community in its role as the FMD World Reference Laboratory and advertises on its website, were open to the general public. Some even wondered whether people were allowed to handle virus in exchange for payment.

Journalists trawled through recent job advertisements for IAH and asked about the timings and significance of particular vacancies. Were they due to under-staffing or the quiet sacking of complicit staff?

We maintained our strategy of responding as quickly and as fully as possible, and understood that any aspect of IAH was subject to media scrutiny.

We are extremely grateful to everyone at the IAH who provided information to answer these enquiries.

The serious and immediate impact of this virus escape on UK farming and the need for

immediate containment, control and eradication measures by Defra meant that several storylines ran in parallel.

The pressing issues were the consequences for farmers and how Defra was controlling the disease. While the cause of the outbreak remained a key part of the story – especially for IAH which, from the start, had reported no evidence of any breaches in the way it handled live virus in its laboratories – the variety and nature of work conducted on the Pirbright site also generated different media leads.

At the time of writing (October) we are still receiving a steady stream of increasingly detailed questions from the media as journalists explore new avenues, including some apparently opened up by briefings from a former contractor to IAH, and comment by politicians.

Issues include information about companies working on the site, who knew what when, and general health and safety practices at other BBSRC-sponsored sites.

The legal dimension

It is possible that individuals affected by the FMD outbreak will seek compensation, and in theory IAH might be a target for claims.

We need to bear this in mind, as well as the need to avoid jeopardising the personal safety of named individuals working on an animal research site. Under considerable pressure to respond quickly on so many aspects and to frequent news deadlines, we benefit from advice from our lawyers, which helps to ensure that our statements are always consistent with our legal position.

This mix of factors continues to pose challenges as we continue to provide as much information as we can to the media. Throughout, our emphasis has been on the underlying science of both the virus escape and the route of its transmission, and the diagnostic and epidemiological work. We believe that much of the detail is still awaiting publication, possibly through formal research papers. A fascinating science story of how sequence data enable scientists to trace the most likely route and timescale of infection is still to be told.

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Shorts

In brief

Full support for women at York

The Chemistry Department at the University of York has become the first to receive an Athena SWAN golden award for its commitment to furthering the careers of women in science. Three other departments at York have silver awards; the university also provided this year's Rosalind Franklin award winner, Professor Ottoline Leyser from the Department of Biology. www.york.ac.uk

Not enough support for the seas

Marine research is under-appreciated, uncoordinated and under-funded, according to the Science and Technology Select Committee's report *Investigating the Oceans*. It calls for a new marine science agency to raise public awareness of marine issues and to bring together public sector funders of marine research, universities and other organisations benefiting from such work. www.publications.parliament.uk/pa/cm/c/msstech.htm

YouTube for scientists

A content-sharing web portal that enables scientists to present technical papers and videos is up and running thanks to three US partners: the Public Library of Science, the National Science Foundation and the San Diego Supercomputer Center. 'SciVee is about the free and widespread dissemination and comprehension of science,' explains the portal. www.scivee.tv

Consulting on European research

The Europe-wide public consultation on the European Research Area (ERA) has revealed widespread support for the concept and its priorities. However, some felt excluded by the narrow framework of the consultation, including a group called European Action on Global Life Sciences (EAGLES). It wants a focus within the European research agenda on the needs of developing countries. http://ec.europa.eu/research/era/index_en.html and www.efb-central.org/eagles/

Equating cash for science with public benefits

The new round of government spending on national science is intended to help the UK compete globally in science and technology, confront environmental challenges such as climate change, and revive the country's science education base, according to the Department for Innovation, Universities and Skills (DIUS). The government's 2007 Comprehensive Spending Review (CSR) announced an average annual increase of 2.5 per cent in the budget for the public science base over the next three financial years, to reach an annual figure of £6.3 billion by 2010–11.

The 2007 CSR supports full implementation of the recommendations of the Cooksey Review, which proposes a single, integrated strategy and fund for all health research, to amount to £1.7 billion by 2010. It also specifies £1 billion for a programme of business innovation, which will be led by the Technology Strategy Board in partnership with the Research Councils and the Regional Development Agencies.



Energy and environmental change: more research funded

No public input

While the spending review claims in its title to be 'meeting the aspirations of the British people', sources suggest it did not draw explicitly on public input. However, a coincident report from Research Councils UK claims that investment in science can help improve the quality of life for the public.

Excellence with Impact, which sets out the effects of past investments, finds that the Research Councils' annual expenditure of around £2.8 billion 'translates into world-class research, which leads to profitable breakthroughs, improved health and public policy, and a better quality of life for British people.' These quality of life benefits, says the report, take the form of healthcare, the prediction of environmental impacts, social welfare benefits and cultural advances.

The Research Councils welcomed the science budget allocations. Speaking on behalf of RCUK, Professor Ian Diamond said: 'The Research Councils believe that multidisciplinary research is needed to solve many of the next decade's major research challenges. Extra funding will allow us to continue our collaborative work to address the emerging problems of the 21st century.' The Councils expect the research focus to be on the areas of energy; living with environmental change; global security; ageing research; nanoscience and the digital economy.

Plaudits and brickbats

Elsewhere, responses to the science spending boost were largely positive, including those from the Royal Society, the Medical Research Council and the Campaign for Science and Engineering (CaSE).

However the UK Resource Centre for Women in Science, Engineering and Technology (UKRC) expressed disappointment that the government had missed an opportunity to bring together other science priorities, particularly the aim of increasing the participation and progression of women within science, engineering and technology careers. CaSE had its concerns too: 'While the science budget for Research Councils and higher education has increased over the last ten years, funding for science commissioned by government departments ... has decreased by a comparable amount.'

A new horizon for public engagement with science?



Public engagement reveals enthusiasms and concerns

The two-year, nationwide public engagement programme 'sciencehorizons' has concluded and reported on its findings. The next part of the process, underway as *Science & Public Affairs* goes to press, opens up possibilities for its conclusions to be incorporated into science and technology policy-making in a way as yet unseen.

Drawing on extensive data from three types of public engagement activity, the sciencehorizons programme was the first UK public engagement exercise to focus on people's opinions of the potential future uses of science and technology. It used a set of fictitious potential scenarios set in 2025 and covered subjects such as climate change, health and genetics, as well as light-hearted issues such as the future of fridges.

Positive about science

The conclusions of sciencehorizons show that participants are broadly positive about the potential of science and technology, particularly its capacity to help improve our health, environment and lifestyle, but are concerned about society becoming over-dependent on technology, about its potential risks – including relating to privacy, and about the possibility that technologies might not be distributed in a way that benefits ordinary people.

These conclusions, together with those from a parallel stakeholder-consultation exercise called Wider Implications of Science and Technology (WIST), will have been synthesised and presented in a report to government by the time *Science & Public Affairs* goes to press.

Minister for Science and Innovation Ian Pearson described the exercise as '... a new, different way of talking with the public about science and technology [...]. It also represents a test model for evaluating

how effectively different styles of public engagement might work.'

Informing policy

Pippa Hyam, Director of Dialogue by Design, the company at the helm of the sciencehorizons programme, explained: 'The outcomes of sciencehorizons and WIST will go for internal consultation within government. This will help identify any gaps in policies and the relevant policy owners who can address them.' An important aim at the beginning, she pointed out, was that the issues raised should not just go into a 'black hole' but that they should be correlated with the emerging technologies to which they relate and the people responsible for the relevant policies.

A spokesperson at DIUS confirmed there were plans to review the findings internally with a view to informing policy where necessary, adding that the overarching programme, Sciencewise, is geared to bringing public engagement to the fore in science policy-making.

The sciencehorizons exercise was run by Dialogue by Design in partnership with the Graphic Science Unit, BBC Worldwide Interactive Learning and Shared Practice.

The programme was funded by Sciencewise, a DIUS programme designed to equip government to engage in successful two-way communication with the public.

www.sciencewise.org.uk; www.sciencehorizons.org.uk.
More about WIST is at: www.foresight.gov.uk/horizon_scanning_centre/WIST/Index.html

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In brief

Public opinions on energy

The Parliamentary Office of Science and Technology has published the note *Public Opinion of Electricity Options*. The polls and studies upon which it drew suggest a widespread desire for energy efficiency and demand reduction measures. They also stressed public awareness of the need for long-term lifestyle changes and the possible benefits of a public policy debate.
www.parliament.uk/documents/upload/p_ostpn294.pdf

Voluntary code for nanobusiness

An initiative to develop a set of principles outlining good practice for businesses that work with nanotechnologies and their applications has been instigated by the Royal Society and three other partners. *The Responsible Nanocode*, a draft of which was available for public consultation through autumn, will be published early in 2008.
www.responsiblenanocode.org.

Final words on embryos and tissues

The government has taken into account a Scrutiny Committee report on its draft Human Tissue and Embryology Bill. The bill will not replace the Human Fertilisation and Embryology Authority (HFEA) and Human Tissue Authority with a new regulatory body but will allow inter-species embryos under HFEA license. This aligns with the majority public view: an earlier survey showed that 61 per cent think that human-animal embryos should be permitted.
www.dh.gov.uk

One side of synthetic biology

A report on the governance of synthetic biology released by the US-based J. Craig Venter Institute, one of its strongest proponents, fails to address societal concerns and failed properly to consult civil society, according to campaign organisations the ETC Group and the Sunshine Project. See www.sunshine-project.org, www.etcgroup.org and, for the report, www.jcvi.org

The police DNA database

We have gone too far, argues Hugh Whittall

DNA profiling is a valuable tool for detecting and prosecuting offenders, but more safeguards are needed to protect the liberty and privacy of the innocent, according to the Nuffield Council on Bioethics.

The UK now has by far the largest forensic DNA database in the world, per head of population, with its 4 million samples representing six per cent of the population. Many criminals have been, and will continue to be, caught and convicted through the forensic use of DNA. The crime detection rate increases from 26 to 40 percent when DNA evidence is available.

However, the establishment of the National DNA Database and subsequent extensions to police powers were effected without any meaningful public debate. It was for this reason that the Nuffield Council on Bioethics, an independent body, decided that a critical examination of the subject was needed. It published a report, *The forensic use of bioinformation: ethical issues*,¹ in September 2007.

As part of its inquiry, the Council held a public consultation, which elicited over 135 responses, and meetings with a range of interested stakeholders. These revealed a wide range of views, from those who wholeheartedly welcomed the expansion of forensic databases, to those who viewed the increase in police powers with deep suspicion.

Ethical values and human rights

The Council broadly endorses a rights-based approach, which both recognises the importance to human beings of respect for their individual liberty, autonomy and privacy, and the need, in appropriate circumstances, to restrict these rights either in the general interest or to protect the rights of others.

The principle of 'proportionality' is at the heart of the recommendations in the report. This means that any interference with legally enforceable human rights, such as the right to respect for private and family life, must be proportionate to the need to fight crime.

The use of DNA in criminal investigation

DNA can currently be taken, without consent, from any person arrested for a 'recordable' offence (mostly offences that can lead to a prison sentence). Since 2003, the police in England and Wales have been able to permanently store this DNA on the National



People now going onto the database are too often not the ones committing crimes

DNA Database even if the individual is never charged, or is later found to be innocent. Indeed, up to 25 per cent of the profiles on the database are from people who have never been convicted of any offence.

Many people are concerned about their DNA being on the Database. They are worried that they may be more likely to be implicated in a crime with which they had no involvement. They are worried about the stigma attached to being on a 'criminal database'. They are worried about how their DNA might be used in future without their knowledge or consent, for example for research which may reveal other personal information about them.

Marginal benefit to crime detection

Despite police claims about the utility of the expanded database, we found little evidence that keeping the DNA of people not charged or convicted increased crime detection rates.

Home Office figures state that the DNA of 6000 'innocent' people, retained on the Database since 2003, have been matched to crime scene samples. However, we do not know how many of these matches led to convictions and, while the Database has almost doubled in size since 2003, detection rates involving DNA have not increased overall.

It seems that the people now going onto the database are too often not the ones

committing crimes. The marginal benefit to crime detection does not justify the loss of privacy of many thousands of innocent people.

Given this, the Council recommends that the police should only be allowed to keep the DNA of people who are convicted of a crime, with the exception of people charged with serious violent or sexual offences. This would bring the law in England, Wales and Northern Ireland into line with that in Scotland.

We would like to see the police instead put more resources into the collection of DNA from crime scenes. At present, fewer than 20 per cent of crime scenes are forensically examined.

The Council has made a number of other recommendations relating to storing the DNA of witnesses, victims, volunteers and children, and the expanding uses of the DNA Database, for example, for research and inferring the ethnicity of potential suspects.

1. The report is available at www.nuffieldbioethics.org

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Sound bites and juicy snippets

Climate scientists are losing credibility, says Tom Lowe

The more that scientists discover about the potential impacts of anthropogenic interference with the climate system, the more urgent their calls to action – and justly so. But where in this process does the role of climate science end? Are the emphatic pleas by many scientists for immediate global action having a desirable effect?

A growing body of evidence suggests that, by crossing the threshold between the world of science and the worlds of the media, politics and public decision-making, climate scientists are losing credibility; turning a legitimate, complex and long-term concern into something of a fad, while failing to inspire the masses into action.

Blurring science and policy

Early attempts by the climate science community to create a definition of 'dangerous climate change' according to climate thresholds were found to be limited by a lack of social context. The pervasive social, economic, political and cultural implications of climate change require that the definition of 'danger' should be debated within the wider public realm. This was acknowledged by the Intergovernmental Panel on Climate Change (IPCC) in 2001, noting that science could only inform policy development – a political process which is inevitably influenced by value judgements about the level of climate risk that is deemed tolerable in response to scientific assessments.

However, this necessary separation of science from policy development now seems to have become blurred – at least in the public eye. Climate scientists are now a highly visible and vocal element of the climate change debate;

engaging with and informing the public via news items, television documentaries and heated public discussions. In many ways this approach has been a success, but the high public profile does appear to come at a cost. There is a dark side to scientific interaction with the media; the trade-off that many scientists experience at the hands of the media editor. No matter how honest the intention, scientific uncertainty provides the perfect recipe for journalistic creativity, with scientists easily pigeon-holed to sit within a particular camp and their findings 'high-graded' for sound bites and juicy snippets.

Indeed, it seems the alarmism implicit within contemporary climate discourse can filter through media channels even without the use of dramatic terms by scientists. This was apparent in the UK print media coverage following the release of the IPCC's Working Group 1 report in February this year. Front-page headlines conveyed messages of 'catastrophic', 'shocking', 'terrifying' or 'devastating' impacts, yet none of these words exist in the report, nor were they used in the scientists' presentations in Paris.

Effects on public

But what are the effects upon the public of the alarming representations proffered by climate scientists and the media? As a strategy for public and political agenda-setting, promoting a sense of urgency appears to have been successful, yet this concern is not being followed by policy and behavioural change.

Research¹ has shown a tendency for extreme representations of climate change to distance people from the issue, both

geographically and temporally. In addition, a perception is created among the public that their response may be insignificant, futile and in some cases too late to make a difference.

These observations have recently been supported by the findings of an Ipsos MORI poll. This UK poll found that respondents felt climate change would not affect them personally, with many struggling to identify the direct benefits of preventing climate change. Also significant was the identification of scepticism concerning so-called 'greenspin' – the feeling that the crisis is being overstated by scientists and politicians.

Fresh look

Based upon this evidence, it would appear that the passionate band of climate experts may have become victims of their own success. Climate change has been presented in a way which has made many feel concerned, but powerless or too far removed to act. And now, having become embroiled in the 'mainstreaming' and 'commodification' of climate change – a process which, by default, garners public distrust and loss of favour – it appears that scientists may have ventured too far.

It is clear then that climate science is attempting to keep up with the demands of popular culture by redefining and modernising its role. The question arises however, can this new 'media-savvy' science stand up to the rigours of public life while retaining its legitimacy and distinctiveness in contributing to, recognising and solving the problem, or do we need to take a fresh look at the ways in which climate science should be communicated in the future?

1. See, for example: T Lowe, K Brown, S Dessai, M de França Doria, K Haynes, K Vincent (2006) Does tomorrow ever come? Disaster narrative and public perceptions of climate change. *Public Understanding of Science* 15 (4): 435–457.



Too powerless to act

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Keeping faith

How do scientists manage their careers when their jobs and their consciences conflict? Emily Heath, Laurence Kenny and Birgit Völlm explain

Research lacks ethics

Teaching and politics are better, says Emily Heath



Military research: a dilemma for some scientists

Towards the end of my PhD in geochemistry, I became disillusioned with the prospect of a conventional academic career.

Academic research seemed to be too focussed on the pursuit of knowledge and esteem (or more precisely, publications and grants), whereas I wanted to change the world! And I didn't want to hasten climate change by travelling to international conferences. I haven't flown since 1995 and probably never will again.

But I still wanted to make use of my enthusiasm for and knowledge of science. Teaching seemed like an ideal way to do this, and to engage with other people and raise their awareness of environmental and social

issues. A green lifestyle is relatively cheap, so I don't need to work full-time, enabling me to spend time on green activism too.

Political action

My interest in green politics grew from my involvement in environmental pressure groups – and my growing realisation that most policy-makers always prioritise economic growth over social and environmental justice. I began to feel that it might be more effective to actually be a policy-maker rather than simply to lobby them.

In 1999, aged 26, I won a local election and became a Green Party City Councillor in Lancaster. Councillors do a huge variety of

activities, from consulting residents to making policy and budget decisions on land use, transport, housing, waste, and so on. I and my fellow Green Councillors have been instrumental in stopping loss of countryside, improving community facilities, driving up household recycling rates, and much more.

Obviously I'm not going to change the whole world by being a local councillor, but I believe that if people in every community all over the world made the kind of small changes that I'm making, it would add up to a massive shift towards sustainability.

Science in politics

I have found that my scientific training has been really useful in my political life. Councillors often have to read technical reports and understand concepts such as risk, uncertainty, units of measurement, and the reliability of different sources of information. For example, I have had to make difficult decisions about the siting of mobile phone masts and wind farms, how to deal with flood risk, and whether adding fluoride to drinking water is a good idea (I think not!).

I am trying to challenge unsustainable practices at my university too – such as excessive air travel. I feel very uneasy about the increasing commercialisation of university research, which I think generally lacks strong ethical guiding principles. Overall, I'm glad I chose a career in teaching and politics instead.

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These researchers all contributed to Stuart Parkinson and Vanessa Spedding, eds (2006), Critical Paths: 12 inspiring cases of ethical careers in science and technology (Scientists for Global Responsibility)

See also Langley C. (2006), Scientists or soldiers? Career choice, ethics and the military (Scientists for Global Responsibility)
www.sgr.org.uk/ethics.html

Military dilemmas

Laurence Kenny confronts his concerns

I studied mechanical engineering in the early 1980s, followed by a PhD in design.

Following my PhD I was clear that I did not want to work on military-related projects. I gained a research position working on rehabilitation devices, where I have remained ever since. This appeared to be an ideal area: interesting, challenging and ethical.

However, it quickly became apparent that several military companies also work in the biomedical engineering field which raised a number of complex ethical issues for me around whether collaboration with such companies was acceptable.

First challenge

I first encountered a particular instance of this in 2002, when I was working on a proposal for an EU-funded research project. This proposal built on a previous project (that we had not been involved with) which had included, amongst others, an Israeli telecommunications/guidance systems company: they were invited into the follow-on proposal.

Their work is best illustrated by the company

video which is an animation of a missile, incorporating one of their guidance systems, heading towards and blowing up a plane. The pilot is shown ejecting and activating his search and rescue beacon, complete with the same company logo that was on the guided missile!

Support from colleagues

The more I found out about the company, the less comfortable I felt about being part of the same consortium as them. I felt that they were a company who were clearly embedded in the military world and had the impression that they were unlikely to change. The impending war in Iraq was also serving to focus my mind. My concerns were that the company as a whole was likely to benefit from the EU-funded research.

Eventually I decided to pull out of the project, both as a public statement of my disapproval of their activities and as a way of helping me to sleep more easily at night. Although it seemed a large step at the time, I found that my close colleagues at the university and some of the other project

partners were quite supportive. My decision did not stop the project and cost me some publications and a project on my CV, but left me feeling at ease with myself.

Opening debate

After finding myself in a position where I felt I had to confront my concerns in 2002, I have come across a number of other similar dilemmas in what is a rather complex area.

Whilst I never contribute directly to military projects, I deal with each issue on a case-by-case basis and have been unable to avoid all collaboration with companies whose secondary interests also include military applications. However, I have managed to raise the issues widely, open debate and maintain a position that I feel comfortable with.

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Experimenting on animals

Birgit Völlm refuses

I started studying medicine in Frankfurt, Germany. I knew part of the course would involve animal experiments, which are still common teaching practice, despite good alternatives. I became a vegetarian for ethical reasons when I was 14. Now I was confronted with the situation of killing an animal in order to get my degree.

I thought this could be a slippery slope. If I was prepared to go against my beliefs once in the interest of my career, what else would I be prepared to do later? I felt the only option was to refuse. So I left the room while the experiments were conducted to sit outside with feelings of pride, fear and anger, while others walked by, some openly hostile, others quietly supportive, most deeply uncomfortable and pretending not to notice me at all.

Legal action

Many students at different universities were in a similar situation but there was little exchange. Therefore, we founded an organisation specifically supporting students with conscientious objections to animal experiments.

Using not only an ethical but also a scientific approach in our criticism, for example researching into alternative methods, helped our organisation to gain credibility and convinced some universities to change their teaching methods.

My university, however, was not easily persuaded, and so I decided to take the university to court. My legal argument was that two of my basic rights, according to the German Constitution, were violated: the right to choose one's profession and the right of freedom of conscience. After three years I won the case.

Few problems

I have experienced few problems because of my history. I am now an academic and clinical psychiatrist and work at a British university (needless to say my research does not involve animal experiments!).

People wonder sometimes why it took me so long to finish medical school. In applications and interviews my approach to these questions is to present my animal rights activist years as 'working for a charity

concerned with improving teaching methods in life sciences'. However, the head of my department and my colleagues know about my views on animal experiments. I think they see me as 'sort of nice if a bit odd'.

Embrace dissent

There is never a time when it is easy to express ethical views that challenge mainstream thinking, not as a student, as a junior scientist, nor as a professor.

My advice to anyone in an ethically challenging situation is not to delude yourself that this is going to be the only ethical dilemma in your career. If you have a strong awareness of such issues, they will emerge often. You can play an important role within science and I encourage you to embrace this and get comfortable with being the odd one out!

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→ Argument

Nuclear energy: has the public been misled?

The consultation was 'open, fair and full', says Malcolm Wicks

The twin challenges of where we get our energy from and how we tackle climate change in the future mean that we need to make tough decisions now.

Time is pressing on these issues, none more so than nuclear energy with most of the UK's existing nuclear power stations set to close over the next couple of decades.

This is why in May this year the government set out a comprehensive consultation document explaining why it had come to a preliminary view that it is in the public interest to give energy companies the option of investing in new nuclear power stations.

We reached this view because we believe nuclear has the potential to make an important contribution to the security of our energy supplies and to help us reduce the amount of carbon we emit.

The consultation, which ran for five months, sought views on the information and arguments contained in the document.

It is disappointing that Greenpeace has taken the stance they have in relation to the consultation. We made every effort to ensure they had the opportunity to put their point of view before the public in their own words.

Wide range of people

We were determined that the consultation should be open, fair and full. We sought advice from respected bodies who specialise in public engagement.

As a result, the consultation process was designed to enable a wide range of people to give their views. Alongside energy companies, business and environmental NGOs, we also wanted to hear from trade unions, civic groups, faith organisations and local authorities. In addition, we wanted to understand what members of the public thought of the government's preliminary view.

To achieve this we launched a website which made it easy for people to respond online, which at the time of writing had

received 3,500 registrations and nearly 2,000 responses to the consultation. On the back of this we sent out direct mail to more than five thousand grassroots and community organisations.

Meetings were held throughout the UK with organisations interested in the future of nuclear power. These were attended by over 400 representatives from academia, business, unions, civic groups, faith groups and environmental NGOs. In addition, we met people who live in communities with existing nuclear facilities, and a further 200 attended these meetings.

To ensure we received a cross section of views we held nine day-long events with members of the public across the country. People were recruited to enable us to hear from a demographically representative sample of the UK population and participants spent the day debating the issues.

We made every effort to ensure Greenpeace had the opportunity to put their point of view before the public in their own words

Different perspectives

We didn't just present the government's preliminary view at these events. We ensured that people were aware that there are a range of different perspectives and we worked with organisations, such as Greenpeace, to ensure views presented were fair and accurate. Indeed significant changes were made to the materials we used as a result of their input.

Now the consultation has closed, we will carefully consider all the information and views that we have gathered during this comprehensive consultation, before reaching our decision.

Throughout this process we have been clear that it is not a case of one option or the other in terms of our future energy security. We need a whole range of low carbon energy



Nuclear power plant, Torness

sources if we are to meet these goals. Indeed we cannot become over-reliant on any one form of electricity generation.

We have taken this process of consultation very seriously. We need to move quickly but more importantly we need to make the right decisions. Our livelihood and the future health of the planet depend on us getting it right.

Malcolm Wicks MP
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Greenpeace has accused the government of wilfully misleading the public in its consultation on the future of nuclear power. It has made a formal complaint to the Market Research Standards Council about 'numerous breaches' of the body's code of conduct by Opinion Leader Research, the organisation contracted by the government to conduct the consultation.

The consultation was a sham, says Pete Roche



The UK government's consultation on the Future of Nuclear Power – forced on it by a successful legal action brought by Greenpeace – ended on Wednesday 10 October.

By coincidence, Wednesday was also the 50th anniversary of Britain's worst nuclear accident when the reactor core at Windscale caught fire, sending a plume of radioactive material across the country.

Five decades ago, secrecy and cover-ups did nothing to reassure those with growing doubts about the risks of nuclear technology. Today, the closed consultation has carried on the tradition, according to Greenpeace, of wilfully misleading the public.

Pre-emptive PM

'We have made the decision to continue with nuclear power,' said Gordon Brown, at his first Prime Minister's Question (PMQ) time on 4 July 2007. With those ten words, he managed to break the law, sabotage the ongoing consultation and do a U-turn on his promise to listen to the people.

He was meant to be abiding by a High Court ruling that says the government can't legally make a decision on whether to build new nuclear power stations before a proper public

consultation has been carried out. Instead, he made this second consultation in as many years look as much of a sham as the first one which was so pilloried by the High Court. Civil servants were reported to be 'having kittens'. At PMQs on 11 July, Gordon Brown was forced to read a prepared statement, saying he'd only decide about new reactors after the consultation.

'Public relations stitch-up'

Britain's leading environmental groups then withdrew from the consultation just prior to 8 September when deliberative consultation workshops, organised by Opinion Leader Research (OLR), were held in eight cities around the UK with 1,100 members of the public. They were asked to assess the case for and against nuclear power and then take a vote.

The environment groups said the government had failed to fairly reflect the arguments presented at the meetings, and was distorting the evidence.

Friends of the Earth's Director, Tony Juniper called the consultation 'deeply flawed' and said, 'It is clear that the government has essentially made up its mind ... we are not prepared to take part in this latest government farce.'

The groups published a dossier accusing the government of 'conducting a public relations stitch-up'. It complained that materials provided for the public were misleading, inaccurate and biased towards nuclear power – full of pro-nuclear opinion masquerading as fact.

Academic protest

Independently, 20 senior academics say the consultations were deliberately skewed by linking nuclear to fears about climate change – because the government knew from past research that it's the only way to get people to accept nuclear, albeit reluctantly. And they say the participants were misled. An inconvenient truth about nuclear – that it can only make a small contribution to reducing the UK's overall CO₂ emissions – was buried.

Paul Dorfman, Senior Research Fellow at the National Centre for Involvement at the

University of Warwick, said the exercise was designed to come up with a popular mandate to proceed with nuclear power. The information given to the public was biased and incomplete, casting fresh doubt on whether the government has followed a court ruling to present both sides of the argument.

One participant said it quickly became clear the intention was to provide very limited, biased information in order to lead the participants to a predetermined conclusion.

Formal complaint

Greenpeace made a formal complaint to the Market Research Standards Council about numerous breaches of the body's code of conduct by Opinion Leader Research at the deliberative workshops, and is considering further legal action. Greenpeace lawyers have written to the government, calling its consultation techniques 'a complete charade'.

Unsurprisingly, results from the deliberative exercise suggested tentative public support for the government's plans. Nearly half (44 per cent) agreed that it would be in the public interest to give energy companies the option of investing in new nuclear power stations. Just over one-third (37 per cent) disagreed, while 18 per cent neither agreed nor disagreed and one per cent didn't know. But 83 per cent of people said they were either concerned or very concerned about safety and security issues associated with nuclear energy, and 90 per cent were very concerned or quite concerned about creating new nuclear waste, indicating that serious misgivings about nuclear power remain.

Meanwhile the Prime Minister appeared, yet again, to pre-judge the outcome of the consultation when he told the Labour Party Conference he wanted the UK to become a 'world leader in energy and the environment, from nuclear to renewables.'

See Greenpeace Video 'Another Bad Idea Sponsored By the UK Government, Oct 2007' <http://tinyurl.com/2ud97k>

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→ Argument

Climate change and the press: freedom or accuracy?

Bob Ward wants accuracy

Al Gore's *An Inconvenient Truth* won an Oscar for the best documentary feature earlier this year, and no doubt helped its star to earn a share of this year's Nobel Peace Prize.

The film has had a big impact on audiences around the world, raising awareness about what Gore describes as 'a planetary emergency'.

But the film contains many flaws – so many, in fact, that it is highly questionable what value it has in the teaching of climate change science to students and pupils. A few weeks ago, a High Court judge ruled that the distribution of the film to schools by the UK government should only continue as long as it is accompanied by written guidance that draws attention to the flaws.

Justice Burton identified nine problems, including its attempt to attribute Hurricane Katrina to climate change, and its oversimplification of the link between atmospheric carbon dioxide concentrations and temperature recorded over the past 650,000 years in Antarctic ice cores. The judge's list was by no means exhaustive. For instance, he neglected to highlight Gore's dubious attempt to link climate change to the spread of avian influenza and antibiotic-resistant tuberculosis.

A political film

Many have sought to excuse the errors in *An Inconvenient Truth* on the grounds that it is 'broadly accurate' about the causes and consequences of climate change. But the problems arise because it is primarily a political film, seeking to motivate the audience to support efforts to cut carbon dioxide emissions. It makes the potential impacts of climate change seem more immediate and of greater magnitude than most climate scientists would agree is reasonable.

In short, *An Inconvenient Truth* misrepresents the evidence about climate change to achieve a political end. But, in doing so, it undermines the public's confidence in the reliability and accuracy of sources of information about the science of climate change.

Political agenda

One of the most damaging consequences of

the scientific errors in *An Inconvenient Truth* is that it has allowed others with a personal or political agenda to claim they should also be allowed to misrepresent the evidence to justify their views.

One of the most blatant examples is *The Great Global Warming Swindle*, broadcast on Channel 4 in March, which made a convincing, but wholly misleading, bid to persuade the public that the recent rise in global average temperature is due to solar activity rather than greenhouse gas emissions.

The high court ruling about *An Inconvenient Truth* has led lobbyists to plan to send copies of *The Great Global Warming Swindle* to every school, presumably on the mistaken grounds that two wrongs make a right.

Broadcasting Code

When I first saw the trailers for *The Great Global Warming Swindle*, I thought it might be a spoof, so outrageously inaccurate were its claims. But when I realised that many people had believed its content to be accurate, I concluded that it must clearly breach Ofcom's Broadcasting Code, which specifies: 'Views and facts must not be misrepresented'.

David Whitehouse, a former BBC Science Correspondent, has attempted to claim that *The Great Global Warming Swindle* (and presumably all other factually inaccurate programmes) is exempt from the Broadcasting Code on the grounds of 'free speech'. This is a ludicrous defence which ignores the responsibilities that must be attached to the power wielded by the broadcasting media.

Fuzzy thinking is also apparent among some of Whitehouse's former colleagues at the BBC, who have spent the last six months wringing their hands over what impartiality means in the context of climate change. A few of its senior editors seem to think that they should put anybody on the air who sounds like they believe what they are saying, even if their views are not supported by the evidence.

Responsibility

But broadcasters also have a responsibility to convey accurately the fact that there is an overwhelming rational consensus among researchers about the causes of climate



What sort of coverage?

change. Of the many hundreds of scientific papers that have been published on climate change in the last ten years, only a few tens (constituting substantially less than five per cent of the total) dispute the interpretation that the rise in global average temperature over the past few decades is primarily due to greenhouse gas emissions.

Yet, an Ipsos MORI poll in June found that 56 per cent of the British public believe 'many leading experts still question if human activity is contributing to climate change.' This shocking statistic illustrates how badly the public have been let down by film-makers and TV broadcasters who appear to value opinions over evidence.

Bob Ward

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David Whitehouse plumps for freedom



After Channel 4 broadcast *The Great Global Warming Swindle*, many eminent scientists, along with campaigners, wrote a letter to the media calling for it not to be made commercially available by the programme makers – a private, independent production company called Wag TV. They wanted changes because they believed it would not be in the public interest for the factual errors in the programme to be distributed widely.

How curious it is then that those same people did not write to Paramount Home Entertainment to object to Al Gore's *An Inconvenient Truth* because of its factual errors, and object to it being distributed to schools without qualifications. It took Mr Justice Burton, a judge not a scientist or a campaigner, to point out the gross inaccuracies in that film.

I would have been more impressed with the scientists' moral position if they had been fairer-minded and regarded it as being not in the public interest for them to be subjected to any factual errors, no matter where they came from. Likewise, I would have been more impressed by the scholarship of media environment analysts if they had been able to come to Mr Justice Burton's opinion by themselves beforehand.

Stupid complaint

All this goes to show that some scientists still have a lot to learn about how to deal with the media. The complaint was, in my view, a monumentally stupid thing to do in terms of media management. But people, however eminent, are allowed to be stupid, especially when they stray outside their areas of expertise.

What annoyed me was the arrogance of the complaint, and its dismissal of fundamental human rights. One can understand the scientists' motivation but, basically, this is a clear wish to deny free speech and the legal rights of Wag TV. That company is not breaking the law and must be delighted by this publicity, which will certainly boost the sales of their DVD.

Freedom not accuracy

'Free speech does not extend to misleading the public by making factually inaccurate statements,' said Bob Ward, the former spokesman for the Royal Society.

Actually, Bob, it does. Being able to speak freely without censorship is fundamental to modern liberal democracies and is guaranteed under national and international law. Qualifications are made with regard to libel, slander and defamation and, in some countries, holocaust denial. The important point, and it took millennia and many lives to attain it, is that the freedom of speech principle does not mean that you have to be factually accurate. It is freedom, not accuracy or responsibility that is mandated.

People handing out leaflets on the street denying evolution or saying that the earth was made in seven days have a perfect right to hold those views and promulgate them. Their motivation does not matter. An inconvenient truth it may be but people are free to be wrong, dead wrong.

BBC Trust

There were errors in *The Great Global Warming Swindle* and they overshadowed some of the good scientific questions it made and that need to be made, not least because opposition and dissent is fundamental to science.

Some scientists and institutions seem to

have forgotten this. Strangely, it was the BBC Trust who recognised it recently in an attempt to place the BBC's partial and evangelical climate reporting into a more balanced perspective.

The BBC Trust was right to criticise the corporation's climate coverage in its news programmes, which have been championing the consensus which is only a part of the science of climate change. The widespread explanation is not always the correct one, as the Trust pointed out. The point they were making is that journalism is about the gathering, writing and production of news, not scientific consensus.

It is not journalism if you reflect only one side of an argument, no matter how strong that side may be. We would not expect coverage of politics to be like that, so why want science coverage to be? The Trust saw that the BBC had veered away from healthy journalism into campaigning.

More precious than science

This is not a question of scientists, aided by a sprinkling of campaigners, standing in the firing line faced by individuals who are motivated by ideology or commercial interests to undermine the scientific community. Call for the programme (*The Great Global Warming Swindle* and *An Inconvenient Truth*) to be modified, criticise its contents, highlight the errors, make a counterbalancing programme – but don't prevent its free and lawful distribution. Because if you do, we risk losing something more precious than science.

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Combating spurious science

Michael Norton, Gary Kass and Nick Allum want media-friendly scientists



Science's latest media-friendly face: physicist Nicholas Harrigan, winner of the 2007 NESTA Famelab competition *Famelab*

The Intergovernmental Panel on Climate Change is now very confident about its global warming assessments. In the USA, global warming sceptics have seen a sympathetic congress turn to inquiring into earlier scientific misrepresentation. It is thus ironic that some UK media still helps sceptics misrepresent their contrarian opinions as 'science'.

We are seeing a technique by which special interests discredit peer-reviewed science and 'conjure' their own science to manufacture or amplify uncertainty. By creating a body of Spurious Science (SS), or cherry-picking data, they portray the scientific foundation of an issue as too uncertain to support policy debate. Special interests thus avoid debating what action needs to be taken which may threaten their industry or way of life. Instead, they hide behind a smokescreen of uncertainty of their own making – a Tactical Uncertainty (TU).

Help for the citizen

What forms of literacy may help the citizen here? SS masquerades as science by using its 'symbols' (references, formulae and so on) while rejecting its quality control. It may also ignore the majority of data which disagrees with its 'pet' theory, use graphs with invented

figures, and make false claims based on obscure references. One sceptic describes the global consensus in IPCC thus: 'the IPCC does no original research, nor does it monitor climate-related data; its evidence is instead from selected secondary sources'.¹ Thus the strength of the IPCC process (relying exclusively on peer-reviewed papers) becomes a reason to reject the outcome!

Spotting SS can require substantial knowledge, not just about science, but also its institutions. Ordinary mortals, lacking such specialist knowledge, form their opinions in other ways, including whether they like or identify with the conveyer of the message. Communicating detailed scientific knowledge on complex subjects in an adversarial context can thus be very difficult, as many scientists have found out.

Since debates on climate change have become so political, maybe we can learn something from political science with its interest in how citizens participate in democracy.

Science and politics

It is futile to expect everyone to have the wisdom or time to make informed decisions on every aspect of life. Instead, representative democracy turns to political parties which represent their supporters' philosophy, and to stakeholder organisations for society's many groups sharing common interests.

It is equally futile to expect everyone to know enough science to make informed decisions on all scientific issues. We should thus look to representative bodies to represent science and support the citizen. Learned societies would thus have a stronger remit to protect the integrity of scientific information and the way it is used and disseminated.

Academies of Science have engaged in the policy process for some time, but a more activist role by the Royal Society and others in directly challenging distortions and mis-informational tricks would be sensible. In tackling SS and TU however, science needs to be honest about real uncertainty: what it does not know, alongside what it does know.

Importance of presentation

Tackling SS in debate involves scientists competing not just on their knowledge, but on their presentation. If they lose against media-friendly debaters on their voice, manner, wit

and so on, the argument may go too. This suggests that science's own media-friendly faces are increasingly needed to promote debate on the basis of evidence. Scientists may also need to recognise that some media may be more interested in a fight than an objective outcome, and agree only to debates where there is a genuine argument – such as new findings and science/policy interactions.

What differentiates opinion dressed up as SS from real science comes down to how conclusions were reached, and how quality was controlled – that is, the process. This suggests that public engagement should focus on science's nature (enquiry, open minds), processes (objective analysis, quality control and peer review), the role of institutions (not as special interests defending science, but as informing society of information critical to its future), and how science informs policy rather than providing 'science titbits' to justify 'my policy'.

When citizens hear claims that are not based on peer-reviewed work, are highly selective or put forward by actors with obvious political or financial interests, they will be sceptical.

Building society's capacity for critical reflection must become a key objective for science engagement in the 21st century, as a vital counter to the dangers of spurious science and tactical uncertainty.

1. Philip Stott, Political Science. *Wall Street Journal*, 2 Feb 2007

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Blogging at the Food Standards Agency

Andrew Wadge is hungry for science

Engaging the public in science has been a holy grail for many scientists in the past couple of decades. Trying to get our voices heard amongst the media babble is not easy with the constant clamour and glamour of a celeb-focused media. Compared with this fast-moving daily whirl, research and policy making is a slow business.

Not so long ago, expert scientific committees met in secret and advised ministers on policies affecting the food we all eat. Secrecy bred mistrust and, following a series of food incidents, there was a collapse in consumer confidence in the UK. Now, the whole process, from risk assessment by experts through to final decision-making by the Food Standards Agency (FSA) Board, is open to public scrutiny and challenge – and is all the better for it.

At the FSA we have a number of means of meeting the demand for information at the speed the media and public need. We have websites such as food.gov.uk, which includes details of our science programme, regular contact with our stakeholders, forums and, indeed, media outlets. But a blog is both a faster way of communicating scientific ideas and explanations and a way of encouraging people to engage with the Agency.

When avian influenza was discovered at the Bernard Matthews plant in Suffolk earlier this year, I explained why it's not a food safety issue

Bird flu and GM

Starting a blog (<http://www.fsascience.net/>) was a natural progression for me as I'm passionate about engaging the public with science. The blog lets the public – and those with a professional interest in food – know what I and my scientist colleagues at the Agency are up to, what the emerging issues are, and how we propose handling them.

Take bird flu. When avian influenza was discovered at the Bernard Matthews plant in Suffolk earlier this year, I explained why it's not a food safety issue (flu viruses rely on



Colours in children's food provokes comment

receptors in the body to cause illness and those that flu latch onto are generally found in the respiratory tract). Several people expressed concern about how they could protect themselves from risks. In my reply I took the opportunity to remind people of the importance of food hygiene and safe handling of raw meat in the kitchen – the blog is another useful route for disseminating our advice.

Unsurprisingly, topics such as genetic modification (GM) and organics attract some of the more passionate responses, which can be challenging. In September, publication of some Agency-funded research on colours in food and hyperactivity in children drew 15 comments in 24 hours and over 30 within a few days. And it's a range of people who comment: the public seeking explanations and commenting on my posts; policy makers and others already engaged in a particular debate, such as Peter Melchett of the Soil Association; and scientists and other bloggers, such as Ben Goldacre of the Guardian.

Plaudits

I'm heartened by both the number of visitors to the blog and evaluation by the Hansard Society that runs the Digital Dialogues project, of which my blog is a part.

We're averaging 12,675 visits a month to it, reaching over 18,000 last month, while the evaluation said it 'demonstrates how a blog can be used to distribute information and solicit public feedback on a manageable, ongoing basis'; '...explaining food science to general and specialist audiences ... proved an important factor in the blog's positive

reception.' Gratifyingly, the blog was also shortlisted for a New Statesman award earlier in the year.

Thick skin

So what's the downside? Nothing major, but you do need to develop a thick skin. Obviously, the comment: 'My overriding impression of this blog entry is of anodyne neutrality' met with a vigorous response!

The spontaneity of writing and publishing a couple of paragraphs is very different and can be liberating

There is also a real pressure to keep populating the blog with new entries and to respond to others' contributions. Like anyone with a busy diary, this is another demand that needs to be factored in – one that requires a different mindset. Blog entries are not the same as peer-reviewed articles. The spontaneity of writing and publishing a couple of paragraphs is very different and can be liberating.

But I do welcome this challenge and feel one respondent got it absolutely right, saying: 'the key, surely, is open debate'.

That to me is what the blog is all about and what will help improve trust in food safety in this country. I do not expect everyone to agree with our assessment of the science and indeed would be alarmed if that were the case – it probably would make it anodyne – but at least everyone has the opportunity to find out more about our work and why we reach the conclusions we do.

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Swedes losing confidence in researchers

Karin Hermansson and Esther Crooks chart the decline

Less than half of the Swedish public has confidence in researchers, according to a survey of 3,000 Swedes carried out by the Swedish association Vetenskap & Allmänhet, VA (Public & Science).¹

This represents a significant percentage decrease over the past two years. The survey also shows a decrease in confidence in research in general and in support for public funding of world class research.

'Increased dialogue between the research community and society is essential if we are to reverse this trend', says Camilla Modéer, secretary general of VA. 'A better knowledge and understanding of people's needs, concerns and values is crucial if the research community is to retain political as well as public support.'

Survey results

VA, in collaboration with the SOM Institute (studying Society, Opinion and Media) at Gothenburg University, carried out a postal survey of 3,000 Swedes about their views of science and researchers.

Almost half (48 per cent) of the respondents have a very high or quite high confidence in researchers, a drop from 67 per cent five years ago when the question was first included in the VA survey. Confidence levels in research within specific fields have also decreased. This year, 79 per cent (down from 84) expressed confidence in medical research, 69 per cent (71) in technical research, 64 per cent (68) in natural sciences, 49 per cent (52) in social science research, 37 per cent (43) in educational research and only 35 per cent (41) in research into the humanities.

A parallel survey of Swedish Members of Parliament shows that, in general, politicians have a higher confidence in research than ordinary citizens. But there seems to be agreement between the public and their elected MPs about what research areas they have confidence in. The 'ranking' of research areas, as indicated above, is strikingly similar.

Three out of four Swedes agree that scientific developments over the past few decades have made life better for ordinary people, a slight decrease from almost 80 per cent five years ago. More highly-educated people tend to have a higher level of confidence in research. Of the more highly-educated public, 86 per cent indicated

agreement compared with only 65 per cent of those with only a compulsory education (to the age of 16). Men have a slightly higher confidence in the benefits offered by scientific developments than women.

Willingness to fund research

In previous VA studies, a correlation between public confidence in research and support for the public funding of research has been observed. In accordance with this, VA's latest study shows a decrease in the public's willingness to spend tax payers' money on research for most areas.

Almost all (95 per cent) Swedes want Sweden to spend money on world-class cancer research, and nine out of ten consider environmental research to be equally important. For these purposes, the support for research seems stable.

However, 60 per cent think research on information technology is as important, a decrease from 72 per cent in 2002. Funding for research in gene technology is supported by 57 per cent (64 in 2003), history by 31 per cent (down from 39 in 2002), and space 26 per cent (down from 34 in 2004).

Influence of fraud

There are probably several reasons for this decrease in confidence in research. One possibility relates to cases of fraud within research that have received a great deal of media attention in Sweden over the past year. A second possibility is that the increased media coverage of research – both positive and negative – makes the scientific world seem less mysterious and therefore less intimidating and inaccessible to people.

A survey carried out by VA in 2006 included an open question about the possible reasons for the declining confidence in researchers. The majority of responses related to scientific fraud and academic conflicts. Some answers referred to concerns about scientists' ethics, and others expressed negative feelings caused by alarmist reports in the media:

'Some scientists cheat'
'There was a Korean... it was all fake'
'They burned some research papers...'
'There was a case when one researcher stole results from another'
'Laboratory experiments on animals'
'Experiments on human embryos'
'One says this, the other says that – you

just don't know who to believe'

'All these reports about food, such as mad cow disease'

These are just a few examples, but media reporting about science certainly seems to affect people, and negative impressions and feelings last a lot longer than detailed memories of what actually happened.

1. The results of this survey were published in June 2007. The analysis was carried out by Sören Holmberg, Professor of Political Science, and Lennart Weibull, Professor of Mass Media Studies, both from the SOM Institute.



Swedish astronaut Chris Fugelsang. Only one-quarter of Swedes think space research is important
Swedish National Space Board

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Vetenskap & Allmänhet, VA (Public and Science), is a Swedish association aimed at promoting dialogue, openness and trust between the public – especially the young – and researchers
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Strengthening science centres

Phil Willis charts the way ahead

Science centres have great potential for encouraging public involvement in science, especially for young people, but much of this good work appears to be under threat due to funding uncertainties.

Of the 18 centres which received over £450 million from the Millennium Commission, for example, two have already closed (the Earth Centre in Doncaster and Big Idea in Ayrshire) and another, At-Bristol, has had to close two of its three attractions and recently made 45 staff redundant.

It was against this background that the Science and Technology Committee decided to hold an inquiry to look at the funding of these centres and why some were struggling to stay afloat.¹

We also wanted to look at the extent to which they were actually achieving the goal of inspiring young people to take up careers in science, technology, engineering and mathematics (STEM) subjects.

In addition, there was the wider question of how best to engage with the public on scientific issues. Although most people are supportive of science, there is a significant undercurrent of concern about the potential or hypothetical dangers that scientific progress poses. Controversy surrounds subjects like stem cells, GM crops, the MMR vaccine question and global warming, to name just a few. Science centres provide an excellent resource for enhancing public understanding of such issues.

Scant evidence of effectiveness

To justify the investment of further public funds in science centres, we believe that it is first necessary to demonstrate their effectiveness. There have been very few studies on the effect of science centres on students' career choices but what evidence there is appears to be positive. Cardiff University summarised the evidence which indicates that extracurricular science activities do encourage students to study this subject at school and to pursue careers in science and science teaching.

Another indication of effectiveness came from a review carried out on behalf of the Wellcome Trust in July 2006. This assessed the impact of five Millennium science centres that the Trust had funded and found that the centres 'provide considerable resources for their local regions – contributing to local



Discovery centres: committed to public engagement © Techniquest

regeneration, supporting formal education and acting as regional 'hubs' for science based activities.' It also found they offer a wealth of knowledge and expertise relating to the wider aspects of public engagement with science and science education.

The umbrella organisation for the centres, Ecsite-uk, is currently undertaking a further government-sponsored review. Nevertheless, we would like the government to take a lead and commission independent research to look properly at the impact science centres are having on public engagement and the career choices of young people.

Opening up funding

The Committee was certainly impressed by the range of subjects tackled by these centres, their commitment to education and public engagement, and the role they play in their local communities. We would like to see more coordination of best practice but we found the financial struggles that science centres have faced and continue to face are equalled only by the unrelenting enthusiasm of the members of the science community.

We identified several possible solutions to these funding problems. First, in the inevitable gap before the government's research into effectiveness is completed, the government should make available limited, competitively awarded, short-term funding for those science centres that are at risk of closure.

Secondly, in the longer term, science centres share many of the same aims as museums but are typically differentiated from them on the grounds that museums house collections and science centres do not. The

government should consider adapting the Museum Accreditation Scheme by separating out the dual roles that museums play in terms of maintaining collections and the educational and public engagement services that they provide. A regime of this kind would open up funding streams for institutions, like science centres, which do not currently qualify as museums, for public support.

Thirdly, we also believe that the government should look at other measures such as tax changes to assist the sector in its contribution towards public engagement and inspiring young people.

These measures should be linked to a continued focus on securing funding in a range of ways, including support for these centres from Local Authorities, Regional Development Agencies, the education sector, the charity sector and the business sector. But we hope that the government will take a lead in developing further the links that have been built up with the science centre community so that the science centre sector can continue to evolve and develop in the future.

1. *The Funding of Science and Discovery Centres*. See <http://tinyurl.com/yq2qqo>

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We made every effort to ensure Greenpeace had the opportunity to put their point of view before the public in their own words

Why do some people resist science?

Deena Skolnick Weisberg and Paul Bloom think they know

Many people hold beliefs that clash with science, such as the efficacy of unproven medical interventions, the mystical nature of out-of-body experiences, and the legitimacy of astrology and ESP. The tenacity of these non-scientific beliefs is frustrating to many scientists, who wonder: Why do people believe these weird, unproven things?

Actually, this resistance to scientific ideas has a perfectly rational basis. Scientific facts are often themselves weird, because they contradict basic beliefs about the world that even children hold. For example, one year-olds know that objects will fall to the ground if unsupported. It is therefore difficult for them to understand that the Earth is round; if it were, the people and things on the other side should fall off. One reason that people resist science, then, is that science is often unintuitive.

But this does not fully explain adult resistance to science. After all, almost all of us eventually learn that the Earth is round, and we accept other strange scientific facts as well, like the fact that apparently solid objects are mostly empty space. So why are facts like these accepted while others, such as evolution, are not?

Trusting our teachers

We believe that the answer has to do with how people learn. We accept new information, even if it is unintuitive, if we trust the source. In some cases, this trust is a no-brainer — certain scientific views are taken for granted by everyone, and are not associated with any particular person or group. For example, the existence of electricity is generally assumed in day-to-day conversation and is not marked as uncertain; nobody says that they ‘believe in electricity’.

The situation gets more complicated, though, when the information is not universally accepted. Sometimes, different sources provide conflicting information. A child might note that science teachers make surprising claims about the origin of human beings, for example, while their parents and religious leaders make different claims.

To decide which claims to believe, we don't typically evaluate the information itself. We can't. Scientists and other authorities make all sorts of claims about the world, and nobody has the time, the interest, or the competence to evaluate all of them. Instead



We trust geologists to know more about the age of the Earth than priests

each of us asks: Whom should I trust? The doctor or the psychic healer? The biologist or the theologian?

Trust in scientists

Not surprisingly, scientists will argue that a rational person should trust the scientists. We agree, but it's worth noting that some skepticism toward scientific authority is clearly rational. Scientists have personal biases due to ego or ambition — just read any grant proposal. There are also political and moral biases, particularly in social science research dealing with contentious issues such as the long-term effects of being raised by gay parents or the explanation for gender differences in test scores. It would be naïve to ignore all this, and someone who accepted all ‘scientific’ information would be a patsy.

People who disagree with what scientists have to say about social issues might reasonably infer that it is not safe to trust their statements in general.

But this rejection of science would be mistaken in the end. The community of scientists has a legitimate claim to trustworthiness that other social institutions, such as religions and political movements, lack. The structure of scientific inquiry involves procedures, such as experiments and open debate, that are strikingly successful at revealing truths about the world. All other things being equal, one is wise to trust a geologist about the age of the earth rather than a priest or a politician. One way to combat resistance to science, then, is to

persuade children and adults that the institute of science is, for the most part, worthy of trust.

In sum, people will resist scientific claims when these claims clash with early emerging, intuitive expectations about the way the world works, and when these claims are contested within a society by people who are trusted. This is the current situation in the United States with regard to the central tenets of neuroscience (that the brain gives rise to all mental activity) and of evolutionary biology (that humans evolved from other primates over millions of years). These claims clash with intuitive beliefs about the immaterial nature of the soul and the purposeful design of humans and other animals — and, in the United States and most of the rest of the world, these intuitive beliefs are particularly likely to be endorsed and transmitted by trusted religious and political authorities. Hence these are among the domains where resistance to science is the strongest.

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Ecrime: the arms race of the criminal economy

Alec Broers calls for stiffer counter-measures

The Internet is a powerful force for good. It facilitates the spread of information, news and culture. It underpins communications and social networks across the world. A return to a world without the Internet is now hardly conceivable.

But along with this growing benefit and dependency comes huge risk. The Internet is now increasingly colonised by criminals. Today's 'bad guys' are not lonely hackers, but members of organised crime groups, highly skilful and specialised, focused on profit. They want to keep below the radar of law enforcement and even of their own victims.

No agreed definition

This was the background to the Science and Technology Committee's report, *Personal Internet Security*.¹ We asked a number of fundamental questions. For instance, what is the scale of ecrime? Who is responsible for protecting the individual Internet user? Who has the resources and the skills to confront and beat the online criminals?

The answers to these questions were often vague, and almost invariably worrying. While the incidence and cost of ecrime are known



The bad guys: better skills than the good guys

to be huge, no accurate data exist. There isn't even an agreed definition of what constitutes ecrime. What is beyond doubt is that every day, hundreds of thousands of details of compromised card details and bank accounts are publicly on offer on communications channels wholly devoted to the criminal economy.

The phrase we heard over and over again in our inquiry was that the Internet was witnessing an 'arms race' between the good guys, the police, and the bad guys. And the bad guys probably have better skills, and certainly much greater resources, than the good guys. For every new security product on the market, the bad guys will devise innumerable 'exploits'—viruses, trojans, and so on.

Public education not enough

So who is responsible for Internet security? The UK government told us it is 'to a large extent the responsibility of the individual to behave responsibly.' But as one witness told us, 'There is a lot of responsibility to go around.' Too much, we believe, for individual end-users to cope with.

Reliance on public education and information is not enough. It overlooks the huge challenge of reaching millions of adults. It overlooks the astonishingly rapid pace of technological change. It overlooks the fact that even if you can get through to them, end-users may not even have an incentive to improve security, if the only consequence of poor security is that they lose a little of their bandwidth to a botnet.²

Better security

We outlined what we believe to be a more equitable and realistic approach to distributing responsibility for Internet security among those with the resources, skills and opportunity to make a difference.

First, the government should develop a more co-ordinated approach to data collection, so as to get a better handle on the scale of the problem. As a first step they should agree a broad definition of ecrime, to include not only Internet-specific crimes such as denial of service attacks, but e-enabled crimes, such as online fraud.

Internet Service Providers need to offer better security standards as a core element of their service. To encourage them, the government and Ofcom should develop a kite-mark for secure Internet services.

The software and hardware industries also have to up their game. Governments internationally need to move towards the principle of vendor liability in the IT industry. The time for vendor liability may not be now—but it will come, and it will be an essential element of a mature industry.

Legal tools

We also recommend that the UK introduce a data security breach notification law, covering all organisations and businesses operating online. A legal obligation on businesses to report losses of personal data, both centrally, to the Information Commissioner, and to all individuals concerned, in writing, would make them sit up and take notice of IT security.

We also believe that the bad guys must be targeted. At present they seem to operate with impunity. The government must start by making a serious investment in improving the skills and resources of the police and the criminal justice system. That means a central reporting system, run by the police, for ecrime, backed up by automated software to process crime reports. It also means that the government should make an explicit commitment to fund the proposed Police Central Ecrime Unit; beyond this, they should look at the establishment of a central network of computer forensic laboratories to support individual police forces.

1. See <http://tinyurl.com/27ca43>

2. A botnet (a robot network) is a large number of compromised computers that are used to create and send spam or viruses or flood a network with messages as a denial of service attack. (from PCmag.com)

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Avoiding the supermarkets

Moya Kneafsey surveys 'alternative' consumers

Organic vegetable boxes, farmers' markets and community gardens: these are some of the 'alternative' food schemes used by people concerned about the separation of producers and consumers in our food system, and the power of big supermarkets.

New research provides insights into the motivations and practices of consumers and producers involved in such schemes.

Motivations

We interviewed 44 men and women in urban and rural locations. Over half of the consumers who provided us with income data had annual household earnings of less than £30,000, and 35 per cent were below £20,000.

We found that people buy, and sometimes help produce, food from these 'alternative' sources for a range of economic, ethical and personal reasons. A common catalyst for buying organic or joining schemes was the desire to feed young children a healthy and less adulterated diet.

Many of those we spoke to were primarily motivated by a desire to care for the health and wellbeing of people (themselves, their family, and those involved in producing, processing or retailing food), other sentient beings, and of the planet itself. They looked to reducing food miles, sourcing Fairtrade whenever possible, or looking for products with reduced environmental impacts and high animal welfare standards.

Suspicious about food production

Almost the converse of embracing this ethic of care was the suspicion of a good deal of the modern, highly technological food system, especially its perceived deliberate lack of transparency about technological means of obtaining, transporting and processing food.

One consumer commented, 'I just don't like processed food because you don't, you honestly do not know what goes on.' People expressed anxiety about the unseen contents of some foods and the, as yet possibly unknown, consequences of eating them: 'You know, I saw a programme about three or four years ago and it was about iceberg lettuce and they spray it to keep it crisp and you start to think, you know, crikey what are we eating?'

Disadvantages of supermarkets

Although almost all the customers we



A healthy and less adulterated diet EarthShare / Graham Noble, Moray Scotland

interviewed bought food from supermarkets as well as the schemes, many said they only shopped there out of necessity. They expressed dissatisfaction with supermarkets' use of technology, especially for foods they considered susceptible to technical manipulation.

Cheap chicken was constantly mentioned as the epitome of foods which may have had its 'freshness' maintained by means which disguise potentially negative signs of travel, storage or processing: '...the fact that you can buy two chickens for a fiver or something, they are beyond belief the way these chickens are brought in from Indonesia, they all cost 10p, they're cryogenically frozen..., so that when they get here they're unfrozen by a chemical process and then they say they're fresh... They're pumped full of antibiotics so they reckon in 20 years we will have no immunity anymore to antibiotics, it just freaks you out.'

People did not on the whole reject technology *per se*. With one or two exceptions, they embraced the use of freezers, gadgets and cars where essential. What they disliked was the use of technology to industrialise food, to make it uniform, appealing and predictable, to manufacture flavour and taste, and to disguise realities of production, storage and transport.

Advantages of 'alternatives'

Consumers were quite prepared to forego the huge choice of commodities offered by supermarkets. They enjoyed the variety available at farmers' markets. As one veg box customer explained, the surprise of seeing what was in the box each week was all part of the fun: 'I like being *given* something, I like the surprise of seeing what we've got this week, you know, because I know things change through the seasons.'

Almost everyone we spoke to commented that obtaining food through the scheme they used meant they tried out foods new to them, new varieties of common foods and ate a wider variety of food (particularly fruit and vegetables). Thus, seeming reduction in choice, particularly in terms of consumer control over what could be selected, had in almost all cases in fact increased the variety of foods consumed. Sometimes this had led to creative cookery: 'beet in the hole' instead of the traditional 'toad'!

Participation in 'alternatives' can help to build knowledge, positive relationships and a capacity for change and ultimately, could lead to the creation of fairer, greener and more connected food relationships which will benefit not only consumers, but also producers, growers and eco-systems.

A book about the research will be published by Berg in 2008, entitled *Reconnecting Consumers, Producers and Food: Exploring Alternatives*. The research was funded by the Economic and Social Research Council and the Arts and Humanities Research Council

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Dark history, bright future?

Alex Capron explores ethical conundrums of eugenics and genomics

We need to recognize the similarities between twentieth-century eugenics and the genomics of today, and to learn from them.

Fundamentally, eugenics is the use of genetic knowledge and techniques in deciding about which people will exist with what set of genes. And that covers many practices in modern genetic and reproductive technologies, such as embryonic selection, as well as any future endeavours to redesign humans genetically.

I see in the current version of eugenics too many of the characteristics of the old. And I fear not only the harm this may bring in terms of damaging practices that are adopted, but also the potentially good results from other uses of genetic science and medicine that may be derailed or derided because of fears over the direction that the uses of genetics in reproduction are taking us.

I can identify five such characteristics.

Bad science

In the nineteenth century, Galton thought that a sure measure of natural ability could be found by studying the leading families which produced eminent jurists, statesmen, scientists, military leaders and artists. In the twenty-first century, we have scientific announcements of the discovery of a gene for X, Y or Z. Both reinforce a crude genetic determinism.

Today, genetics is increasingly being invoked in policy and legal settings to seek causal explanations of complex behaviours such as juvenile delinquency, criminality and addiction.

Racist medicine without racism?

The notion that race is culturally constructed is supported convincingly by genomics, which has revealed that genetic variation within traditional racial groups is greater than that between them.

However, race remains a useful tool in genetics, where it can serve as an indicator for the presence of genetically influenced conditions that are expressed in certain populations, allowing treatments to be tailored and tests to be directed to certain racial groups.

Making use of this in medicine raises dilemmas. Should we treat everyone in the population the same, for example, and therefore forego providing a test for a rare

genetic disease when the test wouldn't provide cost-beneficial results? Or should we provide the test only to members of a group in which the disease occurs frequently enough to justify that testing? And might efforts to recruit people in the target population to come forward for testing serve to stigmatise racially identifiable groups?

Reluctant support

The eugenic restriction of reproductive liberties of a minority has, historically, been justified in terms of the benefits for wider society. Those justifications may be genetic or economic – to prevent the birth of children who would be a burden to the state, for example, or who could contribute little in terms of productive labour. How does that compare with the situation now?

If people with a condition that is causally associated with a particular gene require various forms of social support to experience lives that are full of well-being, then the decision to take a eugenic approach may simply reflect the reluctance of society to make the support available, or the inability of these people or their families to command such resources.

Threat to reproductive freedom

Our current system of so-called non-directive genetic counselling comprises impartial advice provided by experts to inform parents' decisions about whether to reproduce, or to terminate a pregnancy, in the light of genetic test results. But at what point does non-directive counselling become active discouragement?

State intervention

Here we find an important difference between then and now.

Today, the problem is less that states are using their power to promote eugenics, and more that they do not use their power to prevent it. Part of the problem is that state intervention could itself be seen as too intrusive and to detract from individuals' reproductive freedom. And how would it intervene anyway? Would the intervention be to prevent the birth of deaf children or to protect the right of parents to have deaf children? One wonders whether possession of the genes found to correlate statistically with obesity could count as



Criminality is not caused by genes

such a genetic problem.

Genomics has, potentially, a bright future. But society must have an awareness of the dark history of genetics if it is to successfully steer it towards that goal. That history provides stark reminders of the limitations of science, how science can disregard those limits, and what can happen when it does.

This is a shortened version of a public lecture given by Professor Capron to the Economic and Social Research Council Genomics Policy and Research Forum at the University of Edinburgh

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What does it mean to be a scientist?

It's not just about knowledge, says Roland Jackson

Peter Broks (2006): *Understanding Popular Science*, Oxford University Press

As a practitioner, or perhaps more accurately a bureaucrat, of public engagement with science, the immediate day-to-day reality and urgency of projects often leaves little time for perspective. This book is a good antidote, since it teases out thoughtfully and well the various historical contingencies and assumptions about the purposes and means of 'popularising' science.

The historical analysis supports three phases of popularising science by scientists. First, up to the mid-nineteenth century, the importance of science as useful knowledge. Second, from the 1840s to 1870s, challenging the cultural dominance of the clergy. Finally, from 1875 onwards, state service and what we would now define as the modernist agenda, with science communicators increasingly taking over the process, alongside some scientists themselves.

At the core of the book is the continuing tension between science as a body of knowledge and practice owned and controlled by an expert community, and science as a wholly shared social enterprise in a democratic society. To maintain its authority, science needs to be set apart from the general public, but to maintain its legitimacy and trust it needs to be accessible. In practice this is not entirely an 'either/or' but heat is generated as 'fundamentalist' scientists emphasise the former and pressure groups and left-leaning think tanks the latter.

Making meanings

The author develops what he terms a 'critical understanding of science'. This sees science as multi-directional and contextualised, with a broad notion of expertise and concerned with meaning, not simply with knowledge. I can sense the hackles of some scientists rising as I write that, but Broks clearly shows how popular science generates different meanings, which may change over time, and that these meanings can be linked to political and social struggles. Examples include the impact of Rachel Carson's *Silent Spring* and the eugenic agendas of Julian Huxley, Haldane and Hogben.

Broks sees the move to dialogue and 'public engagement', following the House of Lords

report, as problematic, since it does not give enough attention to meaning-making. Indeed, it is often characterised as the deficit approach to the problem of lack of trust, rather than lack of knowledge.

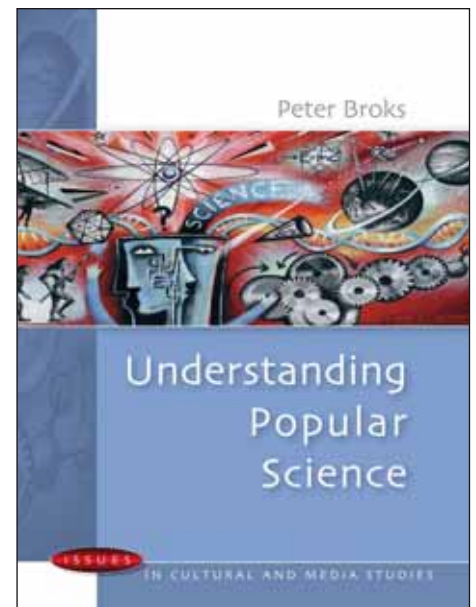
Broks then follows an interesting spatial metaphor of popular science as a forum where what is popular meets what is scientific, which begs the questions of how and where we draw the line between what is science and what is not. This leads to the issue of access to spaces for exchange of ideas, knowledge and meaning, and the dilemma for scientists in that the desire to make science more public may conflict with an equally strong desire to control the meanings the public constructs. He then explores the uneasy relationship of science with democracy, with the view that increasing contextualisation demands we rethink science as it moves from the production of reliable knowledge to the production of knowledge which is agreed and understood as relevant, appropriate and trusted, and shared within society.

Involvement in wider debate and discussion is not seen as a fundamental part of being a scientist

I was surprised that the book ended with this vision of sharing knowledge rather than the more substantive aim of sharing meaning, which might be a fruitful idea to explore. But also, as a practitioner I asked myself what his analysis, if one accepts it, implies for practice.

Scientists need to engage

Perhaps it is rare for any book to confound one's prejudices, and this one confirmed my own that the place to focus our efforts in bringing science harmoniously into society lies more within the culture of the scientific community than with the public. That is not to be critical of scientists, because such a view can often be characterised as unsupportive of scientists or even 'anti-science'. However, despite a widespread



The culture of the scientific community needs to change more than public culture

involvement by practising scientists in public engagement, involvement in wider debate and discussion is not seen as a fundamental part of being a scientist.

The research and the logic of scientific discovery comes first, teaching comes second, knowledge transfer gets an increasing look-in, but public engagement is clearly the poor relation, and this is despite some notable leadership within the scientific profession and some very committed communicators.

The Beacons for Public Engagement initiative is an interesting step in this direction. Let us hope that it does go far beyond the design of more and different public engagement initiatives, for whatever instrumental objectives (and they mostly are for instrumental objectives) to really changing the way in which scientists think about being scientists in today's society.

So I hope scientists will read this book, and not just science communicators or theorists of science communication.

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Deliberative delusions

Matt Qvortrup dissects citizens' juries

It's called a 'citizens' jury'. Prime Minister Gordon Brown called it his new big idea; a mechanism which – according to the PM – will bring about 'a new kind of politics', and result in a revitalisation of citizen engagement and participation. Alas it will not.

The idea of a citizens' jury is a simple one really. Instead of relying on tried and tested, adversarial, party politics, the government will select 'ordinary people' who – like members of a jury in a court case – will deliberate and make recommendations after they have taken evidence from experts.

In the past, citizens' juries have been used to discuss GM crops, priorities in the NHS and to gauge support – or otherwise – for nanotechnology. So it is stretching it to call it new!

Pioneered by left-of-centre American social scientists, citizens' juries were introduced in Britain in the mid-1990s by the Institute of Public Policy Research – also known as New Labour's favourite think-tank.

Of course, this association with the centre-left is not an indictment in itself. The problem with citizens' juries and the other mechanisms used by the current government is that we have no evidence that they work.

They don't work

Citizens' trust in politicians has not gone up in countries that have used citizens' juries. If anything the reverse has happened. In Denmark – one of the countries that have experimented most extensively with the mechanism – trust in politicians is at an all-time low.

The reason for this could be that governments often choose not to listen to the views of the people. Take the often quoted example of GM-Nation in Britain in the summer of 2003. Billed as 'an

unprecedented experiment in citizen participation', the website received 2.9 million hits and 24,609 visitors – of whom 60 per cent submitted feedback forms.¹ Yet, despite the expressed uneasiness on the part of the public, the government paid scant notice to their concerns.

Another example of non-listening was the citizens' juries on nanotechnology conducted by the think-tank DEMOS and Lancaster University. Contrary to expectation, the citizens grew wearier of nanotechnology once it had been explained to them.² These findings have had little impact on the government.

Governments rarely like to be told that they are wrong and that their policies do not work. Like Lord Nelson at the Battle of Copenhagen they have an in-built tendency to put the telescope to the blind eye.

In a review of more than 200 articles published on citizens' juries in the last decade, none was able to show any positive statistical effect on public services.

Manipulation

In short, Brown's new big idea is neither new nor effective. Indeed it is difficult not to see citizens' juries as simply focus groups by another name. Except citizens' juries are more open to manipulation. For whereas participants in a focus group are free to talk, members in a citizens' jury – unlike in court cases – are constantly controlled by a facilitator.

Given that citizens' juries are often organised by government-friendly organisations, it is little wonder that the government often finds the result it wants.

This has grave consequences as the outcome of citizens' juries departs from public opinion. When citizens' juries have had an effect is when participants have said

what the government wants to hear. It is, perhaps, not surprising that citizens' juries recently have received the stamp of approval by the Communist Party in the People's Republic of China!

The fact of the matter is that we live in a consultative democracy. Brown wants to strengthen the House of Commons – or so he says. But instead he continues to send legislation for consultation to interest groups. Since Labour came to power in 1997 there have – according to Cabinet Office figures – been more than 500 consultations per year. This means that there are 1.5 new consultations every day.

Real engagement

Britons are some of the most active, engaged and committed citizens in Europe. Fully 55 per cent of us sign petitions and 25 per cent of us have engaged in lawful protest (e.g. demonstrations) within the past five years.³

If Gordon Brown really wanted to engage us, he could introduce citizen-initiated referendums. In Switzerland, many US states and New Zealand, voters can demand referendums provided they can gather a specified number of signatures. Where the system has been introduced, voters' knowledge of policies increases, as does engagement and turnout.

But there is a snag. If you give power to the people, they might use it against you.

Matt Qvortrup is the author of *The Politics of Participation: From Athens to e-Democracy* (forthcoming 2007), Manchester University Press

1. See www.gmnation.org.uk/docs/gmnation_finalreport.pdf
2. M Kearnes, P Macnaghten and J Wilsdon (2006) *Governing at the Nanoscale*, London, DEMOS
3. Matt Qvortrup (2007) *The Politics of participation*, Manchester University Press



Citizens' juries are open to manipulation

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Reflecting public aspirations in research

Rupert Sheldrake suggests a new experiment

Sheila Jasanoff's article on public engagement with science (*SPA*, September, 2007) raises several important points, not least of which was her conclusion that 'science and technology are instruments through which we realise the most enduring aspirations of our societies'.

I agree with her that public engagement should affect the direction of research science and technology, which in practice means the way research is funded.

How can we find out what research questions are of public interest?

Why not ask? Organisations such as charities, schools, local authorities, trades unions, wildlife trusts and gardening associations could be invited to make

suggestions. Within each organisation, the very possibility of proposing research would probably trigger far-ranging discussions, and would lead to a sense of engagement that does not exist at present.

A one per cent fund

I suggest that this new initiative be treated as an experiment, and that a small proportion of the government science budget, say one per cent, be set aside for research proposed by the public, through organisations and societies. This would be administered by a body independent of the existing funding councils, mainly composed of non-scientists, as in many research charities.

The one per cent fund would concentrate

on projects that are not already covered by the other 99 per cent of the public science budget.

The BA could play a major role in such an initiative, helping to promote a greater public involvement in science, as well as stimulating the interest of many young people.

Rupert Sheldrake holds the Perrott-Warrick Scholarship, administered by Trinity College, Cambridge
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The advertisement features the Natural History Museum logo (a large 'N') and the 'ICE STATION ANTARCTICA' logo, which consists of a stylized orange and blue star. A yellow sign with a thermometer icon asks 'Could you live at a bone-numbing minus 20°C?' and includes the text 'Have you got what it takes?' and 'In partnership with British Antarctic Survey NATURAL ENVIRONMENT RESEARCH COUNCIL'. A red banner at the bottom of the sign reads 'New recruits wanted'. At the bottom of the advertisement, it says 'Book now at www.nhm.ac.uk/ice-station-antarctica South Kensington Until 20 April 2008' and 'Associate Sponsor Voyages of Discovery'.

Surfing the new wave of engagement

Tom Wakeford wants a boogie board



How many academics can send a photo via Bluetooth?

This question crossed my mind at a workshop on the future of rural areas. The participants, half of whom were aged between thirteen and eighteen, imagined different futures for the areas where they lived. Some foresaw a world in which they could go to and from a friend's house in a neighbouring village via affordable public transport. Others explored what policy changes would be needed for them to be able to have a future livelihood in such areas, which are currently in serious economic decline.

Even the least well-off of them brandished mobiles, some of which enabled them to take videos. If their phone had Bluetooth, they swapped these images with their friends.

Wanna see my MP4 of Mary acting out the serpent bit from the Book of Genesis, mister? I'll Bluetooth it

Share expertise

Many of those practising citizen engagement, me among them, are doubtful that any technological 'magic bullet' can solve the democratic deficit in the science and innovation process. The very manufacturing process of a mobile is a greater cause of social and environmental injustices than most others.

However, in a country where there are now more mobile phones than there are people, harnessing the capacity for these devices to allow people who exist outside university

walls to share the expertise they have gained by experience with those inside, seems at least worth thinking about.

One leading mobile phone company has now begun exploring what might be possible in this area with us at the Centre for Life and Newcastle and Durham Universities. Another has offered a mobile phone-based interface that might allow people to share knowledge about their particular neighbourhood.

You're missing out on a lot of good knowledge. Downloads, networked knowledge. It's the future, innit?

Academic resistance

While researching this collaboration, I found that some of my colleagues actively resist learning how to send a text message. Meanwhile their students are rating video clips of their best and worst lectures on YouTube. The new generation of mobile phones are technologies where people without much formal education can join professors on a more equal footing by teaching them a thing or two about IT.

Take Professor Skawdin (not his real name). Though not normally prone to nightmares, he drifts off into a disturbing dream one day after a heavy lunch. In it he encounters a group of hoodies at a bus stop. As he gets closer, he sees that they are videoing each other on their mobile phones acting out scenes from the Holy Bible, Koran and Bhagavad-Gita. Here's what I think might happen next.

Skawdin – Why aren't you at school?

Mary – We're learning theories about how we got here, Mr Skawdin. This is better than stupid lessons. Have you seen this website, mister?

Alyas – Cool! Wanna see my MP4 of Mary acting out the serpent bit from the Book of Genesis, mister? I'll Bluetooth it.

Skawdin – Blue? Tooth? Is that one of your Biblical animals? What's an earth is an MP4? Is it a mathematical formula?

Mary – Get with the programme Granddad! Don't you have a mobile?

Skawdin – Well yes... for emergencies... but it doesn't play music.

Alyas – You wanna get in touch with the times. My mobile is a calculator and does formulas. You're missing out on a lot of good knowledge. Downloads, networked knowledge. It's the future, innit?

Skawdin – I saw your religious books. You're just blindly accepting what parents and priests teach you.

Mary – You need to get real, mister. We don't go to see no priests. We're acting out different 'myths'. Last week we did myths that are pushed by your lot. We downloaded chunks of Science as Salvation, by that old-school philosopher Midgley.

Skawdin – Oh, her! Anyway, I can't stand around talking to little ragamuffins who think the world was created in seven days (thinks: not unless I can sell the idea to Channel 4). You are Creationists aren't you?

Alyas – Dunno granddad. We're just treating it as one hypothesis for human origins that has extremely weak evidential support. Sounds reasonable to me.

Mary – Aw, poor Prof. We got to get back to making our video project now, mister, but we'll Bluetooth ya Prof. Reiss's new eBook *Teaching About Scientific Origins: Taking Account of Creationism*. That'll set you right.

Alyas – Next week we're going to compare Neo-Darwinian memes to some of the myths our grandparents believed in.

Skawdin – Look, there are just three things are needed to distinguish myths from facts – academic colloquia, peer-reviewed journal articles and citation indices.

Mary and Alyas in unison – Three? That's your Holy trinity!

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Out of the laboratory!

Scientists must engage, demands Ian Gibson



One of my major gripes has always been the troubled relationship between science and politics. It emanated from too many days spent moaning about the funding and systems of higher education, first from my laboratory and then from my office as a Dean of Biological Sciences at the University of East Anglia. It led to my decision to run for Parliamentary office in the first place.

However, there is now a third key player in this debate. When we examine the relationship between science and politics we must ensure we consider how both of these relate to the public.

Journalists who live in the often disposable world of daily news fear the scholarly research of the professional scientist

Indifference to Nobel science

I was delighted to see this year's Nobel Prize for medicine awarded to a Brit, Sir Martin Evans. I put down Early Day Motion No. 2087 in the House of Commons congratulating Sir Martin and his team. Please ask your MP to sign it. However I was bitterly disappointed to see that later, in the same week, a talk on stem cell research, due to be given by Sir Martin alongside a bioethics expert, had to be cancelled due to a lack of interest.

Stem cell technology is vital to modern medicine and it is criminal that there is such a gulf between its importance to medicine and interest in the issue in wider society.

Government reorganisation

Over the summer we have gained a new government, a new Prime Minister and a new Department for Innovation, Universities and Skills. This new Department has the potential to revolutionise the way we 'do' science in the UK. The Ministers in this new Department have the following portfolios: lifelong learning, further and higher education, science and innovation, skills and intellectual property and quality.

While I would have liked to see secondary education to be included in this mix, it still provides strong framework for developing joined up science policy. If the skills and innovation department works effectively with the higher education department we can ensure that industry and higher education are working together rather than at cross purposes, as has sometimes been the case.

The third partner

In order to make science in the UK successful, it must be engrained into the very fabric of our society. The direct link between industry and education is just one step. The other of course is the media.

Scientists and journalists are almost as disparate breeds as scientists and politicians, so it is inevitable that one would be sceptical of the other and vice versa. Journalists who live in the often disposable world of daily news fear the scholarly research of the professional scientist. Scientists in turn detest the speculative world of the media, and would prefer their work stayed safely in the lab where it cannot be corrupted.

My friend Fiona Fox from the Science Media Centre wrote a fabulous blog earlier this year¹ outlining the difficulties she had getting experts to come forward to discuss the possible causes of a train crash. The reluctance of the experts to provide their views on possible causes left an information gulf which was then filled by far lesser mortals who would have been forced to gather information from second hand sources, or the dreaded Internet.

It is inevitable the press will speculate and natural that scientists do not want to.

However, in order for us to have informed debate about science issues – floods, climate change, bioterrorism, foot and mouth, nanotechnology, ID cards – scientists have an obligation to step out of the laboratory and get their expertise into the public domain. Building long-term links between research institutions and organisations such as the Science Media Centre is one way to do this.

Scientists in turn detest the speculative world of the media, and would prefer their work stayed safely in the lab where it cannot be corrupted

Court battle

Recently we have seen Al Gore attacked by a Judge who 'identified' nine errors in the film *An Inconvenient Truth* but ruled pupils should be able to see it with a warning. Despite some unlikely claims, the film essentially shows the science of climate change. The anti-science brigade seizes on uncertain fact and confuses the public with a denial of the global warming thesis.

It came as no surprise to discover that the legal battle against the film was funded by 'business interests with close links to the fuel and mining lobbies' (*Observer*, Sunday 14 October). However, I believe having the debate in court was the right thing to do and it will be to the benefit of public understanding of climate science in the long term. The public needs to be assured of the limits of the science as well as the certainties.

1. <http://fionafox.blogspot.com/> 'Why experts need to speculate, without speculating'

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