Professionalism, scientific freedom and dissent: individual and institutional roles and responsibilities in geoethics

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Outline

- Diversity and dissent in science, and in scientific advice to government and the public
- The challenge of distinguishing 'legitimate' from 'illegitimate' dissent
- Ethical behaviour – individual responsibilities and institutional roles

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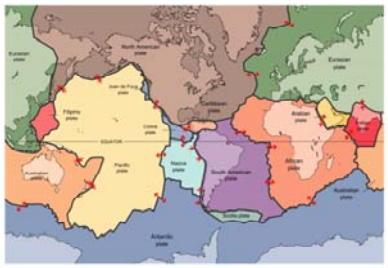
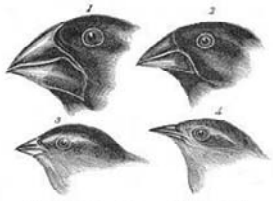
Science advances through debate and dissent

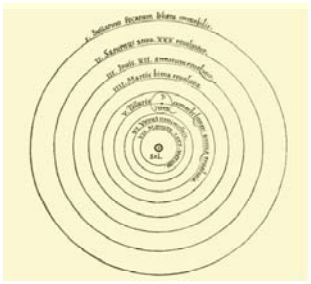
- Plate tectonics
- Evolution through natural selection
- Heliocentrism





1. Geospiza magnirostris
2. Geospiza fortis
3. Geospiza parvula
4. Certhidea olivacea

Finches from Galapagos Archipelago



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What now seems unquestionable and obvious was once contested, controversial, or even heretical.

In geoscience, we can look back to the establishment of the plate tectonics paradigm – only fully established 50 years ago, and continental drift (100 years ago) was not widely accepted.

Looking further back... Darwin (natural selection).

Heliocentrism – centuries of dispute, culminating with Copernicus and Galileo – the evidence eventually overwhelmed dogma of the church.

Importance of developing and testing an *evidence base* in establishing the truth of these theories.

Diversity in policy advice

- 'Plural and conditional' scientific advice
- Democratic legitimacy
- Empowering a diversity of voices to be heard
- 'Monocultures' of scientific advice do not work...

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Edmund will talk about the importance of diversity in the geoscience workforce, in education and institutions.

But a diversity of scientific perspectives and views, and healthy legitimate dissent and disagreement in science, is essential to the advancement of scientific knowledge and understanding.

It is also valuable when providing scientific advice to policy-makers and seeking to inform public debate.

We should offer what Andy Stirling has termed 'plural and conditional' scientific advice – not just for the sake of democratic legitimacy, but because it supports better informed and more effective policy-making.

Many of the great societal challenges now facing us require interdisciplinary approaches, across the natural sciences and more widely still.

'Monocultures' of scientific advice may have a superficial appeal to policy-makers, but they devalue the contribution of scientists, undermine the resilience of regulatory structures, and are often misleading.

Bovine Spongiform Encepalopathy (BSE) in the 1980s. Probably transgenic in origin. Concerns it could be transmitted to humans denied by the government.

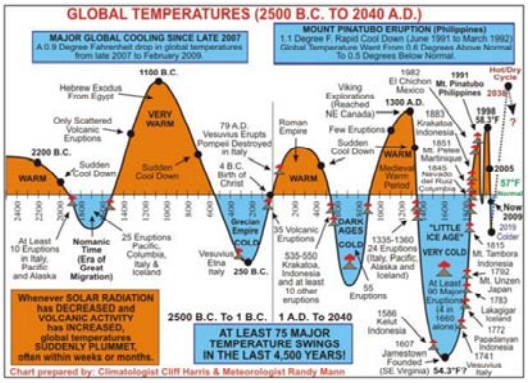
1990 – John Selwyn Gummer, as Minister for Agriculture, fed a British beefburger to 4 year old daughter Cordelia, for the TV cameras, to reassure the public. In 1997, the UK Government was forced to admit that their reassurances had been false. It is now clear that vCJD (variant Creuzfeld-Jacob Disease), a transmuted form of BSE affecting humans, was contracted by some people who ate infected beef. Some tens of people have died since as a result – fears at the time it could be much worse.

Erik Millstone called this 'the most serious failure of UK public policy since the Suez invasion of 1956'. It is hard to underestimate the extent to which it shook established structures of scientific advice to policy-makers, and its communication to the public. Crucially, uncertainty had been covered up over a period of years. The Phillips inquiry (1998-2000) was a powerful critique of these structures, and was highly influential in shaping extensive reform of science advice for policy making, in the UK and internationally.

Phillips inquiry conclusions summarised: Public trust requires openness. Openness requires recognition of uncertainty, where it exists.

Abuses of scientific freedom

- Climate change
- Shale gas
- Radioactive waste disposal



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Adopting an open and honest approach to dialogue between scientists, policy-makers and the public, embracing scientific dissent, uncertainty and a diversity of perspectives, is not without its difficulties...

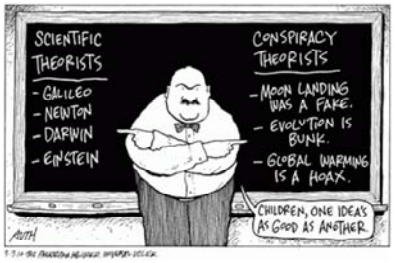
In contentious areas such as climate change, use of politically charged sources of energy such as shale gas, and disposal of radioactive waste, such an approach may make researchers and practitioners who act in good faith vulnerable to advocates and campaigners who claim to be speaking scientifically, but are selective about their use of evidence, deliberately misrepresent it, or present scientific uncertainty and debate as mere ignorance – for example, by claiming that there are uncertainties about the evidence for climate change, and that we therefore don't know whether it is happening.

Scientists themselves are not above such unethical tactics, deliberately conflating evidence with opinion, and research with persuasion.

In many of these contested areas, those on both sides of polarised political debates often indulge in such tactics.

Legitimate dissent vs pseudo-science

- How can we distinguish between them?
- Not clear to non-experts
- Responding to non-conformist views
- Media (often) do not help...



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So, how can we distinguish between legitimate dissent and debate on the one hand, and pseudo-science - abuse of scientific method and freedoms – on the other? It is often difficult or impossible for anyone who is not an expert in the matter at hand to do so, especially as unscrupulous 'campaigning scientists' acquire an apparent authority from their academic and professional credentials, and from their fluency in the languages and cultures of science.

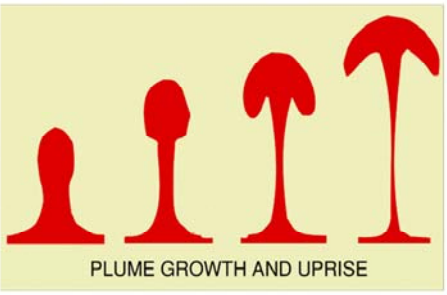
Scientific communities who feel under attack don't always deal with non-conformist or unorthdox views (whether these have scientific legitimacy or not) in the best way. There is a temptation to silence such views.

Media don't help – seek controversy, false balance (if we interview someone who says anthropogenic climate change is happening, we must also interview someone who denies it).

(Note the small print on the Newsweek cover – the point being made here is not that global warming is a hoax, but that loud voices saying so are favoured disproportionately.)

GSL 'great debates'

- Mantle plumes (2003)
- Chicxulub – 'smoking gun' for the dinosaurs or not? (2004)
- Journals: closed to non-conformist views?
- Newspapers: seeking controversy and emotion



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Not seeking to 'settle a dispute' but to facilitate debate and discussion, and testing of the evidence. Those who were challenging the orthodoxy felt that their perspective was being excluded from the peer-reviewed scientific literature. We used the then relatively new medium of an online debate to stimulate discussion between those with differing interpretations of the evidence.

Mantle plumes – Gillian Foulger et al. Do they exist? If so, are they as widespread and as powerful an explanatory mechanism as the mainstream view claims? Is the evidence base robust?

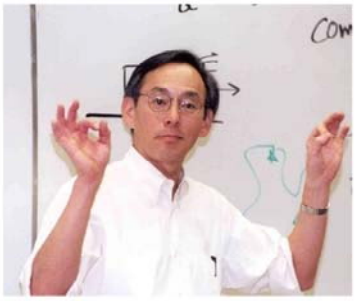
Chicxulub – Gerta Keller et al. Was the impact that caused the Chicxulub crater the sole cause (or even a major contributory factor) to the extinction of the dinosaurs?

Interestingly, the leading challenger to the mainstream view in each case was a woman who was forthright in expressing her alternative interpretation. Far be it from me to suggest that this had anything to do with their apparent exclusion from the male-dominated bastions of the major Earth science journals and conferences of the 1990s...

The Great Plumes debate garnered some media coverage, e.g. an article in the Times newspaper. The constructive and civilised debate was described using words such as 'bitter', 'virulence', 'acrimonious' and 'impassioned', under the headline 'Fuming over plumes'.

What to do? Principles for individuals...

- Honesty
- Openness
- Respect
- Dialogue



'Everyone is entitled to his own opinion, but not to his own facts' (Senator Daniel P Moynihan)

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Honesty, openness.

This means acknowledging uncertainty, as well as not exaggerating it.

Respect for the views, expertise and experience of others.

Dialogue – which involves listening as well as speaking.

Distinguishing between evidence, interpretation, opinion and belief – and keeping the difference clear in one's mind.

Disagreement over the interpretation of evidence leads to the design of the next experiment!

Senator Moynihan's wise words about opinions and facts were taken by Steven Chu, a Nobel Laureate in Physics, as his starting point for addressing climate change when President Obama made him Secretary of State for Energy in 2009.

Edmund and Ruth will talk more about the roles institutions such as learned and professional scientific societies can usefully play in changing cultures of scientific and professional behaviours, in documenting the principles of such behaviours, and of encouraging best practice and compliance with agreed standards. Some closing observations from me...

We are all professionals! Not just those working in industry who are interested in 'professional matters' such as licensure, Chartered status, etc. Professional standards and cultures of ethical behaviour must apply to geoscientists working in academia who generate research, as well as practitioners who apply it.

Scientific societies and other institutions interested in promoting fairness, ethical behaviour and diversity in scientific discourse also have a vital role to play in providing a forum, through their publications, meetings and wider communications activities which is open to all, which is inclusive, and in which specialist communities can become 'self-policing', by exercising their individual and collective responsibilities to develop and maintain their own high standards of ethical behaviour.

Thank you!

Questions?

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