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## **Presentation and Misrepresentation: seeking integrity in communication**

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### **Abstract**

Some articles from professing Christian sources for and against contentious issues contain nonsense, and even sanctimonious misrepresentation. This is both unhelpful to any reader and a poor witness. If Christian standards of handling facts and seeking truth are no different from those of the more disreputable fringe of the green movement, then there is a problem.

In a CIS context the main issue involving facts is how we understand God's creation of the Earth and its living complement. Here the primary issue is the limits of science, but when we come to the role of science in discerning how God did his creative work and when, we run into disagreements on hermeneutics and epistemology - whether we can entertain the notion of a conflict between science and revelation

The second issue for CIS involving facts is the distinction between science and the way it is represented, currently topical in respect to global warming. There are many facts, and also projections and opinions based on them. We need to consider the general scientific consensus view and the dissenting views. It is that general issue I want to try and explore.

Of course what is communicated necessarily relates to what needs to be understood by those with their hands on the levers of power, and in today's context, those who would influence them. Grappling with climate change needs bold economic policy in national governments. But details of energy policy and science policy related to genetic manipulation and stem cells are not far behind.

In my professional role I am responsible for maintaining about 400,000 words of information on nuclear energy published on the web, which purports to be accurate, comprehensive and up to date - factual, rather than advocacy and at one remove from advocacy. It carries an intellectual warranty: the organisation "can vouch for and support anything it publishes, and unreservedly offers to correct promptly anything that might be shown as wrong or misleading in what it publishes." This warranty is there as much because of my Christian concern for integrity in publishing such information in a contentious area as because of any requirement of my role.

This stance has led me to reflect on why the standards of discourse from avowedly Christian sources on this subject can be so different. It is not simply a question of different opinions.

Of course any advocacy involves selective use of facts. And that can easily slide into spin and misrepresentation. It is a question of what the facts are made to say or support, perhaps as a half-truth, or as trivia invested with undue weight so that their significance is stretched unduly. These are the two main devices used to misrepresent issues. A related way of spinning a matter is presenting it out of context, without the perspective that it might fairly have. This may sometimes be innocent. A further aspect

is folklore and irrelevance, but these seem to arise more from ignorance than intent to mislead.

The paper explores a couple of areas of contention that I am familiar with, and try to illustrate the interaction of facts, context, perspective and meaning.

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Early in 2006 in UK there were some articles from professing Christian sources for and against nuclear power. Some of these have contained nonsense, and one is based on a policy paper of a Christian organisation which contains several pages of sanctimonious misrepresentation. This is both unhelpful to any reader and a poor witness. If Christian standards of handling facts and seeking truth are no different from those of the more disreputable fringe of the green movement, then we all have a problem, especially when the issue has a major basis in science.

In a CIS context the main issue involving facts is **how we understand God's creation of the Earth and its living complement**. Here the primary issue is the limits of science, and I don't imagine that question is contentious in any Christian framework. But when we come to the role of science in discerning how God did his creative work and when, we run into disagreements on hermeneutics - in particular how to understand a page or two of early Genesis, and epistemology - whether we can entertain the notion of a conflict between science and revelation.

A few months ago I reviewed a book by the head of the Human Genome Project, Francis Collins. This question obviously vexed him and after a very full layman's introduction to DNA and evolutionary genetics he asked in respect to Young Earth Creationism: "Can faith in a loving God be built on a foundation of lies about nature?" But this is an area of perennial interest to CIS, so having flagged it as a fundamental communication question I will not pursue it here.

The second issue for CIS involving facts is **the distinction between science and the way it is represented**. Right now this is a hot topic in respect to global warming. As we all know, a great deal of science has been brought to bear on the question and the results have recently been published in the 1600-page Scientific working group part of the IPCC's Fourth Assessment Report. There are many facts there. There are also projections and opinions based on them, and assigned a 90% plus probability. The report does not project higher temperature and sea level rises than in its previous publication five years ago, but instead brings increased certainty to earlier projections. However there are still some dissenting voices.

Probably everyone here has a view about the relative **truth** - if I can move to that word - of the general scientific consensus view and the dissenting views. It is that general issue I want to try and explore today.

The further issues I want to raise are **framed by considerations** which I will not attempt to cover, I merely acknowledge their overall relevance to what is

done with the communication. These are public acceptance, and the sometimes related question of vested interests - a major one with GM foods I am told.

Of course what is communicated necessarily relates to **what needs to be understood by those with their hands on the levers of power**, and in today's context, those who would influence them.

Grappling with **climate change** needs bold economic policy in national governments. But details of energy policy and science policy related to genetic manipulation and stem cells are not far behind. In that respect narrowly-based special pleading divorced from an understanding of practical realities can be most unhelpful as well as a poor witness, though Christians have sometimes been prominent in it, most egregiously in economic matters two decades ago. I will return to this shortly.

Another recent science area with communications implications is on **stem cells**, embryonic and other. As Christians I assume we all support the formulation of government policy on the issue rather than leaving it as a free for all for scientists with every conceivable value base. So the question of what is created by somatic cell nuclear transfer, how it is created, and how the embryo is treated, along with any time frame, is basic to the application of values to determine policy. Also relevant is how other embryos, eg surplus from IVF, are treated.

Also biological is the question of **Genetically Modified crops and foods**, which has generated a lot of heat in recent years. The Evangelical Alliance Policy Committee report on this in 2001 pleaded for "fair-minded truth-telling in campaigning and the dissemination of information." In the public arena proponents were accused of playing down hazards, and opponents of hyping them up beyond what was scientifically credible. So, those risks needed to be assessed, but by whom? Scientists who knew something about it? Or activists with a strong agenda? Furthermore the risks then needed to be weighed against benefits. Who was in a position to assess these at any early stage of a newish technology (if you accept for a moment that GM is in a different ball park to selective breeding)?

It is tempting to wonder what would have happened if about 110 years ago the motor car and 100 years ago the aeroplane had been subject to **similar kind of risk-benefit scrutiny!** If one were to describe to a primitive alien today's world of millions of cars whizzing round at considerable speed and not creating mayhem on the scale of a world war, they would probably not believe you. And would aeroplanes be allowed to fly over towns and cities? But in the light of empirical evidence regarding the safety of both we have their considerable benefits taken for granted.

In my professional role I am responsible for maintaining about **400,000 words of information on nuclear energy** published on the web ([www.world-nuclear.org](http://www.world-nuclear.org)), which purports to be accurate, comprehensive and up to date - factual, rather than advocacy and at one remove from advocacy. It carries an intellectual warranty: the organisation "can vouch for and support anything it publishes, and unreservedly offers to correct promptly anything that might be shown as wrong or misleading in what it publishes." This warranty is there as

much because of my Christian concern for integrity in publishing such information in a contentious area as because of any requirement of my role. (It leads to half a dozen e-mails per year, which get acted on straight away.) But I do want readers to hold me accountable for the substance of what we publish and for what I might call an absence of spin. (The central material here is in 108 papers which averaged 10,000 hits per day though last year, so it is not low profile.) Incidentally the paper on Clean Coal was written in close collaboration with the coal industry and was not published until they were entirely happy with it. The same process is being undertaken with revision of the Renewable Energy paper.

The stance has led me to reflect on why the **standards of discourse** from avowedly Christian sources on this subject can be so different. It is not simply a question of different opinions - I have no problem with those who hold different opinions on nuclear power and other major issues (most of my friends do on something or other!), but on the way an argument is put forward, depending on misrepresentation. Is any issue so important in a Christian context that we should prostitute the facts? Or where ignorance may be an excuse: to assert that ignorance as a point of principle?

Of course any **advocacy** involves selective use of facts. And that can easily slide into spin and misrepresentation. It is a question of what the facts are made to say or support, perhaps as a **half-truth**, or as **trivia** invested with undue weight so that their significance is stretched unduly. These are the two main devices used to misrepresent issues, and they often make them newsworthy.

A related way of spinning a matter is presenting it out of context, without the perspective that it might fairly have. This may sometimes be innocent.

A further aspect is folklore and irrelevance, and sometimes these seem to arise more from ignorance than intent to mislead. Folklore is the repetition of unsubstantiated material which, if true, would support the argument, whereas the question of relevance goes more to logic and familiarity with the subject.

Let me take you into a couple of areas of contention that I am familiar with, and try to illustrate the interaction of facts, context, perspective and meaning, and incidentally challenge you to point out where I may be loading the argument!

### **Radiation:**

We read in the newspaper financial pages that uranium stocks are doing well because "demand for the radioactive substance" is pushing prices up. Now it is true to call uranium a radioactive substance, but it smacks of fearmongering when it is really a good deal less radioactive than many materials all of us are daily in contact with. Of course journalists look for colourful adjectives, but I find that one a bit tedious in the context of community misunderstanding on the issue. There are many other mentions of radioactivity in the media, representing it as generally threatening.

### Some science-related facts:

1. Radioactivity is natural in many materials around and even in us.

2. The radiation from materials formed in a nuclear reactor is no different in kind to that we receive naturally.
3. Human exposure to this radiation is easily limited (and of course must be).
4. No harm to humans has ever been shown from low levels of exposure, below the maximum natural levels in some parts of the world, say 100 mSv/yr.
5. There is scientific contention as to whether such harm, right down to zero exposure, might occur. But increasing evidence shows it as being beneficial - the hormetic effect - below about 10 mSv/yr.

On the basis of those and other relevant facts I can then write for John Ray Initiative:

Nuclear power produced by human technology does not increase radiation exposure significantly for anyone outside the industry. Even those with occupational exposure in any part of the nuclear fuel cycle receive, with very rare and newsworthy exceptions, doses well below regulatory limits, which are themselves never more than half the natural levels experienced by people in several regions of the world. Most parts of our environment - and we ourselves - are radioactive to some extent.

There is no question that that is designed to be a reassuring statement, but I believe it is scientifically punctilious, and it avoids the still contentious question of hormesis.

### **Wastes:**

Nuclear power, along with most industrial processes, produces wastes. It is sometimes asserted that these wastes are particularly dangerous and that their handling and disposal is an intractable problem. Nuclear wastes are certainly a political hot potato - nowhere more so than in UK - but they are really not an issue technologically, economically, environmentally or health-wise. Yet it almost a mantra to refer to the problem of nuclear wastes whenever nuclear power is talked about. Greenpeace says: "Despite billions of dollars of investment in various disposal options, the nuclear industry and governments have failed to come up with a feasible and sustainable solution."

Some science-related facts (just about HLW - the rest is a much lesser issue):

1. Nuclear high-level wastes are intensely radioactive, making them hot.
2. The radioactivity decays very rapidly at first, and by 40 years is down to about 0.1% of the original level when the reactor is switched off to remove the used fuel.
3. However, it will remain significantly radioactive for thousands of years.
4. The amount of such high-level wastes is small - about 4 grams per kilowatt hour (if used fuel is not reprocessed, 1 gram if it is). This compares with a kilogram of CO<sub>2</sub> per kWh for coal generation.
5. Isolation from people is by shielding - basically mass (for alpha radiation a plastic bag is sufficient).
6. The amount of radioactivity (becquerels) per unit mass declines to less than that in the equivalent original uranium orebody after a few thousand years.
7. The high-level waste is very easily contained and managed - no significant incidents in 50 years.

8. By the mid 1960s UK and French research had come up with technical solutions almost identical to those now accepted as eminently satisfactory and are being implemented.

Some perspectives:

1. All nuclear wastes comprise about one percent of all toxic industrial wastes in the EU.
2. Their handling and eventual disposal is fully funded as electricity is generated (that has not always or fully been the case in UK!)
3. All national policies call for deep geological disposal of high-level wastes (eg 500m down in stable rock).
  - and for those with a sense of irony:
4. Millions of pounds per year are now being spent locating hot dry rocks up to five kilometres deep in order to try and tap the heat for steam to generate power. The heat in these rocks comes largely from radioactive decay in them, since they have relatively high concentrations of uranium.

So on the one hand you have a section of the community saying nuclear power is inappropriate because it gives rise to nasty wastes (even: "huge quantities of wastes which nobody knows what to do with"), and on the other you have something very similar to those wastes being sought eagerly, using public money raised on sharemarkets.

Of course there are further political and NIMBY questions associated with these or any wastes which I don't have time to go into now.

**Safety:**

Another issue is the safety of nuclear power plants. For very obvious reasons this has been a primary concern since scientific attention turned from the Manhattan Project in 1945 to the 'uranium boiler' - as it had been called in the report of the UK MAUD committee mid 1941 - incidentally said to be "one of the most effective scientific committees that ever existed."

Beyond the basic nuclear physics, not a lot was known when the first power reactors were designed, so some very conservative (ie extreme) assumptions were made about what would happen in a loss of coolant accident leading to melting of the core, looking at the complete chain of consequences with worst case leading to worst case. Extraordinary effort was devoted to ensuring that a meltdown of the reactor core would not take place, since it was assumed that this would create a major public hazard, and if uncontained, a tragic accident with likely fatalities. These concerns gave rise to a genre of dramatic fiction (eg *The China Syndrome*) in the public domain and also some solid conservative engineering including containment structures (at least in Western reactor designs) in the industry itself. In retrospect, these can now be seen as excessive, you can read about it in our Safety of Nuclear Power Plants paper on the web.

Some science-based facts:

(so you do not miss the significance of what I am saying: civil nuclear power for electricity - currently 435 relatively large reactors - is a subset of a wider field including research and experimental reactors and naval propulsion.)

1. There are now over 12,500 reactor years of civil nuclear power operation (and a similar number in naval service).
2. There have been two significant accidents to civil nuclear power reactors in that, and a total of eleven accidents (in all kinds of plants) with core melting.
3. No-one has ever been harmed by radiation from a civil nuclear power plant except for Chernobyl.
4. Experience with the Three Mile Island accident and recent analyses for Indian Point in USA suggest that even with major core melt *and* major breach in containment, the hazard beyond a couple of kilometres would be very small.
5. Ultimately no-one can guarantee the complete safety of any nuclear, chemical or petrochemical plant, either from internal malfunction or external terrorist action.

Some perspective:

The Chernobyl disaster in 1986 was largely irrelevant to any nuclear power plant outside the Soviet bloc, since its design was so far from being licensable elsewhere. It tragically underlined the reasons why such plants could never be built outside the Soviet Union.

So what does Greenpeace have to say on this? "Safe reactors are a myth. An accident can occur in any nuclear reactor, causing the release of large quantities of deadly radiation into the environment. Even during normal operations radioactive materials are regularly discharged into the air and water. The policy of secrecy, which surrounded the development of the bomb, was transferred to civil nuclear power projects after World War II and lives on today. The nuclear industry was suffering serious nuclear accidents long before the catastrophic Chernobyl accident in 1986. Twenty years later the industry is plagued with incidents, accidents and near-misses."

They then instance:

- Japan's Tokai Mura fuel processing plant: 2 deaths - essentially a backyard operation which was not part of the civil nuclear power scene.
- Steam release at Mihama in Japan killing 5 - one of a number of such accidents in power plants which use steam, but in this one happened to be from nuclear heat.
- Corrosion at Davis Besse nuclear power plant in USA - a serious lapse but which was caught in good time.
- Flooding at two French nuclear plants which caused them to shut down for a few days.
- Problems at Sellafield reprocessing plant in UK, I assume referring to the broken pipe which caused a major leak into a confined space. Safety was not compromised, though the plant was shut down for a long time as a result.

The Greenpeace web site also quotes one of its founders, Dr Patrick Moore, from a 1976 article:

"Nuclear power plants are, next to nuclear warheads themselves, the most dangerous devices that man has ever created. Their construction and proliferation is the most irresponsible, in fact the most criminal, act ever to have

taken place on this planet."

Patrick Moore, *Assault on Future Generations*, 1976

In the Foreword to my 2006 book *Nuclear Energy in the 21<sup>st</sup> Century* the same Patrick Moore says:

"In the last two decades I have pursued the concept of sustainable development and sought to develop an environmental policy platform based on science, logic, and the recognition that more than six billion people need to survive and prosper, every day of the year. Environmental policies that ignore science can actually result in increased risk to human health and ecology. The zero-tolerance policy against nuclear energy that has been adopted by so many activist groups is a perfect example of this outcome. By scaring people into fearing atomic energy they virtually lock us in to a future of increasing fossil fuel consumption."

It is instructive to compare these statements. Thirty years on, he has not come to love nuclear power so much as to be able to see it in perspective alongside much greater problems.

### **Weapons proliferation:**

Greenpeace again: "Civil nuclear programmes lead to nuclear arms."

#### Some science-based facts:

1. Uranium can be enriched to about 5% U-235 for power generation or to 90%+ U-235 for weapons.
2. Plutonium can be and is made from U-238 in any nuclear reactor.
3. If the irradiation is short, that plutonium is suitable for weapons.
4. If the irradiation is long, as with power generation, the plutonium produced is profoundly unsuitable for weapons.
5. There is disagreement as to whether such reactor-grade plutonium *might* possibly be used for explosive purposes by a determined, reckless and extremely competent terrorist group. But it has never been made to explode.
6. Very little weapons-grade material - U or Pu - is required for a bomb.
7. A plutonium bomb is a very complex device (as North Korea reminded us with its fizzer).
8. Today high-enriched weapons uranium is being diluted about 30 to one and is supplying about half the needs of US nuclear power generation.
9. The knowledge and to some extent the technology required for making nuclear weapons is widespread and available to anyone determined to find it.

These facts have led to my writing the following:

Civil nuclear power has not been the cause of or route to nuclear weapons in any country, and no uranium traded for electricity production has ever been diverted for military use. All nuclear weapons programmes have either preceded or risen independently of civil nuclear power<sup>1</sup>, as shown most recently by North Korea. No country is without plenty of uranium in the small quantities needed for a few weapons.

Perspective is relevant: As little as five tonnes of natural uranium is required to produce a nuclear weapon. Uranium is ubiquitous, and if cost is no object it could be recovered in such quantities from most granites, or from sea water. In contrast, world trade for

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<sup>1</sup> See also individual case studies in <http://www.uic.com.au/nip15.htm>

electricity production is about 66,000 tonnes of uranium per year. There is no chance that the resurgent problem of nuclear weapons proliferation will be solved by turning away from nuclear power or ceasing trade in the tens of thousands of tonnes each year needed for it.

So, **back to the mainstream of the paper.** You can see that in my business it isn't too hard to get the science right, but communicating the application and significance of it can be a challenge.

The credibility of scientists is a basic question in all this. The EA GM Foods report came out in the wake of Britain's experience of the BSE crisis, which the report notes "had already engendered a mood of distrust in scientific intervention in food production and our ability to regulate it properly."

The question of motive also arises. We are used to preaching that sincerity is no substitute for truth - that also applies here. But the main problem is where it is impossible to avoid the conclusion that there is deliberate misrepresentation by intelligent people for whom ignorance is an implausible excuse.

In returning to the need for Christians in the public arena to **have an awareness of practical realities and not merely effuse in the abstract**, let me refer to my book - *Responsible Dominion*, published last year and arising from 30 years involvement in these issues. It sets out to do two things that are relevant to our subject today:

- challenge some green Christian writing published over the last fifteen years, and suggest that a Christian approach should not only respect God's handiwork in creation - the focus on green and aesthetic aspects, but also encompass a practical understanding of the earth's resources, which are no less his handiwork. Furthermore those resources are needed to give all the six billion inhabitants a standard of living comparable with ours.
- challenge the basis of secular environmental ideology, which is fundamentally pagan and contemptuous of Christian priorities which understand humankind as made in God's image. That of course doesn't stop it being picked up by Christians and retailed into the churches.

Apart from that it is fairly uncontroversial.

The substance of the book looks on a scientific basis at what is practical and sustainable in relation to land use, agriculture, forestry, minerals and energy.

It makes the case that Christian stewardship of God's creation should involve attending to the human economy as well as natural ecology, to science and not to folklore, to engineering as much as environment, to expanding the supply of minerals and energy as much as conservation and recycling.

Christians are in danger of being coopted to agendas which are churlish, implying that God has been less than bountiful in endowing the world with a super abundance of resources. But we, especially in the developed world, need to get our act together in mediating these resources to the needy majority of his people on Earth, since we in the West are custodians of the main science and technology needed.

Part of the reason that we don't stir ourselves more energetically is that we have all been conned for a long time:

- by the Limits to Growth fallacy in the 1970s - suggesting that mineral and energy resources are very limited,
- by the notion that land and biodiversity is best protected by locking up large areas in national parks rather than by proper management of multiple complementary land uses, and
- by patronising attitudes to third world development projects.

I make the point that activist campaigns on environmental issues often lose sight of human need and that they drive the political process in wasteful or even counterproductive directions, through sustained misinformation. Junk science displaces proper consideration and regulation, which are bypassed by appeal to public outrage. The result is wasted opportunity.

Thank you!