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Environmental decision making in a technological age: prudence, wisdom and justice

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ABSTRACT: Although 'stewardship' is the most common approach in dealing with environmental problems, usually accompanied by the need to exercise the 'precautionary principle', these are insufficient without qualification. The contention in this paper is that prudence, wisdom and justice are necessary concomitants of robust ethical decision making. These elements are developed in other papers in this section, using examples from the 'real world' of politics, energy extraction and use, and the dilemmas of agriculturalists faced with changing climates, degrading soils, and a growing population. Although decision making on these topics can be achieved without too much pain in the developed world where there is access to plenty of resources, the available options are much more restricted in the developing world where technological choices and the means to finance them are much less.

Those who in the confidence of superior qualities or attainments, neglect the common maxims of life, should be reminded that nothing will supply the want of prudence; but that negligence and irregularity, long continued, will make knowledge useless, wit ridiculous, and genius contemptible (Samuel Johnson, 1709–84).

Stewardship is contentious for some. Clare Palmer (1992) has written, 'Stewardship can represent an easy retreat to a comfortable concept which avoids coming to terms with deeper philosophical and theological issues inextricably interwoven with the environmental crisis ... God is understood to be an absent landlord, who has put humanity in charge of his possessions ... The political message encoded in stewardship is one of power and oppression; of server and the served. Its popularity in the Western world could be said to reflect the dominant positions which the rich economies have over the struggling nations of the Third World'.

This condemnation is a minority interpretation. The Windsor Consultation in 2000 concluded that stewardship is a proper and indeed, necessary basis for our relationship to Creation — physical and biological, human and sub-human. The problem with it is not a philosophical one, but a practical one: how to exercise stewardship in practical situations. This is well-illustrated by the excellent programme for raising environmental standards in industry set up by the Royal Society of Arts under the initiative of the Duke of Edinburgh. It was found that compliance rapidly becomes a routine duty of middle management and empty of wider perspective. This is not to disparage such compliance, but merely to recognize that it quickly turns from a challenge into an obedience to rules. Industry has responded to this by developing the dynamic standards of ISO 14000, but the underlying problem remains the same: environmental compliance is a mechanical exercise, with little moral content.

History warns us about this: humankind is adept at repeatedly dodging ethical difficulties by reducing them to conscience-avoiding convenience behaviour. Two books which could be regarded as providing the context for this Consultation are Jared Diamond's *The*

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Rise and Fall of the Third Chimpanzee (1991) and its sequel *Guns, Germs and Steel* (1997). Diamond chronicles how *Homo sapiens*, genetically so close to the 2 chimpanzee species that it could legitimately be classified in the same genus, achieved ever increasing independence of its environment, enabling it to extend its range and then its niche, changing from a hunter-scavenger into a settled cultivator and domesticator. This success led to greed and exposure to epidemic diseases, and (as Diamond calls it), from egalitarianism to kleptocracy. The result is summarized by Clive Ponting (1991, p. 406), 'Instead of seeing the environment as the foundation of human history, settled societies, especially modern industrial societies, have acted under the illusion that they are somehow independent from the natural world, which they have generally preferred to see as something apart which they could exploit more or less with impunity. Ever since the first great transition [the Neolithic Revolution] which began 10 000 years ago, and particularly in the last 2 centuries, humans have put increasing pressure on the earth's environment — in defiance of basic ecological principles ... Over the last 200 years human societies have become dependent on fossil fuel energy resources. A pricing system continues to operate that takes no account of the fact that these are irreplaceable assets in which future generations have a vital interest ...'

Does all this lead us irrevocably into conflict and decline for all but a few victorious predators? This was the fear of Charles Darwin. In *The Descent of Man* (1871) he wrote: 'The bravest men, who were always willing to come to the front in war, and who freely risked their lives for others, would on average perish in larger numbers than other men. Therefore it hardly seems probable that the number of men gifted with such virtues ... could be increased by natural selection, that is the survival of the fittest'. In fact Darwin was over-pessimistic. In 1932, J. B. S. Haldane pointed out that if the unselfishness (even to the point of self-sacrifice) of an individual had an inherited basis, and if it helped his near relatives, then 'altruistic genes' could be selected in families; there would be situations where cooperation (i.e. unselfishness) is an advantage within a group of relatives. Haldane's argument was formalized in 1964 by W. D. Hamilton as the concept of 'inclusive fitness' and popularized by E. O. Wilson in a book which led to the renaming of behavioural genetics as *Sociobiology* (1975).

Wilson (1998) divides humankind into 'empiricists' and 'transcendentalists'. The former group he defined as believing that 'moral values come from humans alone; God is a separate issue' (this is the position of Daniel Dennett, Richard Dawkins, Helena Cronin, and their ilk); the latter group believe 'in the independence of moral values, whether from God or not', i.e. that there is such a thing as intrinsic right or wrong, in distinction to consequentialism or to virtue ethics (where right and wrong depend on the 'virtue' of the chooser). Debates about sociobiology have centred round the extent to which moral choice is genetically determined or influenced by outside factors — which could in principle include Divine guidance or providence. Wilson sees 'the choice between transcendentalism and empiricism [as] the coming century's version of the struggle for men's souls. Moral reasoning will either remain centered in idioms of theology and philosophy, where it is now, or it will shift towards science-based material analysis' (p. 240). Wilson sees the resolution coming from 'biological studies of human behavior' (p. 264). For him, 'which world view prevails, religious transcendentalism or scientific empiricism, will make a great difference in the way humanity claims the future. During the time the matter is under advisement, an accommodation can be reached if the following overriding facts are realized. On the one side, ethics and religion are too complex for present-day science to explain in depth. On the other, they are much more a product of autonomous evolution than is conceded by most theologians. Science faces in ethics and religion its most interesting and possibly humbling challenge, while religion must somehow find the way to incorporate the discoveries of science in order to retain credibility..... Blind faith, no matter how passionately expressed, will not suffice. Science for its part will test relentlessly every assumption about the human condition and in time uncover the bedrock of the moral and religious sentiments.'

DECISION-MAKING

Wilson sees empiricism and transcendentalism as mutually exclusive. In this, he makes the same division as those who distinguish 'science' from 'faith', 'reason' from 'belief', or even in a particularly stark form, 'evolution' from 'creation'. By doing this, he falls into the logical peril of doctrinaire reductionism, or what Donald MacKay called 'nothing-buttery', i.e. an entity or process which is assumed to be completely explained by a single cause. MacKay (1991) used the notion of 'complementarity' as proposed by Nils Bohr to expose the dangers of 'nothing-buttery'. Bohr developed the concept of complementarity to describe the apparently incompatible understandings of electron behaviour as wave or particle. He suggested that 'attitudes termed mechanistic or finalistic are not contradictory points of view, but rather exhibit a complementary relationship which is connected with our position as observers of nature' (cited by Barbour 1966, p. 291). Charles Coul-

son (1955, p. 74) extended the concept to problems of mind versus brain, free will versus determinism, and teleology versus mechanism.

MacKay enlarged the application of complementarity to free-will and determinism from his expertise as a computer engineer concerned to understand brain function and 'mind' or consciousness. For him, there was a liberty of spontaneity (as contrasted to one of indifference) in any decision and this was based on logical indeterminancy (as distinct to randomness), i.e. the ability to alter one's choice whatever the predisposing circumstances. This approach differs from the conventional one of a liberty of indifference favoured by, for example, John Polkinghorne and Arthur Peacocke, since it permits wholly rational but completely free decisions. MacKay's interpretation has been criticized (see, for example, Jonathan Doye et al. (1995), but is the most satisfying and rigorous one available. It acknowledges that there is a personal element in any rational decision which is independent of and outweighs the objectivity of the situation, but can be thoroughly based on it. This has been called 'metascience', i.e. beyond but according to scientific analysis *sensu stricto*. Our integrity as human beings demands that our free-will is grounded in spontaneity and not indifference. Debates about genetic and behavioural determinism are subsidiary to this; Wilson's method of distinguishing between empiricists and transcendentalists disappears and is replaced by the need to understand (and possibly influence) the factors which lead to specific decisions.

PLAYING SAFE: THE FRONTIERS OF PRECAUTION

Jonathon Porritt (2000) quotes Greenpeace as seeing the Precautionary Principle as the most effective way of combining science and ethics, promoting it as a 'long overdue corrective to the overconfident style of development that has dominated the global economy for the last fifty years'. He lists 6 core elements of the Precautionary Principle, as identified by Tim O'Riordan and James Cameron (1994):

(1) Preventative anticipation: willingness to take action in advance of definite scientific proof on the grounds that it's better to pay a little now than a whole lot more later.

(2) Allowing some 'breathing space' for the Earth, its resources and life-support systems, essentially as a concession to our ignorance about how these systems work and what their tolerance thresholds might be.

(3) Shifting the duty of care (or 'burden of proof') on to those who are proposing changes or new developments.

(4) Due concern for future generations and recognition of their interests (if not rights) in what this generation is doing.

(5) Accepting responsibility for our former 'ecological debts', so that those who have done the most damage to date should be the most cautious from now on.

(6) Proportionality of cost—to ensure that any restraint which a precautionary approach considers necessary is not unduly costly.

The difficulty is, as Porritt points out, that all these elements are contestable. 'For each, one can develop either a weak or a strong formulation. Weak formulations would simply mean giving a higher weighting to environmental factors in standard cost-benefit calculations, and devising tougher regulations to take account of uncertainty factors. Strong formulations would mean abandoning viable economic activity on the grounds that 'proof of safety' (which is very different from 'no current proof of damage') could not be provided by developers, as well as introducing new measures to provide absolute protection for critical natural habitats and functions' (p. 44).

Donald Bruce (2000) gets round this problem to some extent by suggesting criteria based specifically on risk-benefit assumptions:

(1) *Familiarity*: how familiar the activity is to our own experience; how much we understand it.

(2) *Comparison*: whether something like this has gone wrong before, or has proved reliable.

(3) *Control*: how much we feel in control of the risk.

(4) *Trust*: how much we trust those responsible, share their aims and motives, or fear that their interests may cloud their judgment.

(5) *Immediacy*: is the impact immediate or hard to detect?

(6) *Frequency*: if every fifth aeroplane crashed, no one would fly; since it's rare, many people do.

(7) *Magnitude*: we tend to be more averse to acute events with large consequences than many events with the same amount of harm.

(8) *Benefit*: whether we stand to have a clear personal benefit from it.

Bruce cites mobile phones and GM foods as representing contrasting responses to novel technological developments.

In his paper for this Consultation, Derek Osborn goes behind these sets of proposals and points to 4 'key principles':

(1) The application of intelligent foresight

(2) The need to 'reclaim the public realm'

(3) Concern for environmental justice

(4) Avoidance of regarding technology as the enemy.

The first of these key principles is science-based, combining basic understanding with a need to monitor and interpret trends. This is superficially straightfor-

ward, but there are many hazards and uncertainties in data interpretation which can complicate and confuse the issue. Bjorn Lonborg's book *The Skeptical Environmentalist* (English translation, 2001) is an excellent example of this. The review of it in *Nature* (2001) by Stuart Pimm condemned it as 'reading like a compilation of term papers from one of those classes from hell where one has to fail all the students. It is a mass of poorly digested material, deeply flawed in its selection of examples and analysis'. Notwithstanding, it has received wide publicity in the media, trumpeting a message that environmental care can be minimised, if not avoided completely as a waste of time and money. This causes problems for those concerned to carry out monitoring, never mind the reluctance of grant-giving bodies to support 'routine' operations.

And on top ot all this, scientific advice is liable to be distorted once it gets into the political machinery, not through wilful falsification, but through neglect of the small print and lack of necessary qualifications. Eric Ashby (1993, p. xvi), with a long experience of interacting with government, noted, 'Politicians, adept as some of them are at making evasive pronouncements, dislike receiving evasive advice; and it is inevitable that scientific evidence on complex issues, such as global warming, should be hedged about with reservations and blurred by words like "probably" and "possibly". "Certainty" is not a word scientists like to use. They wince when they hear a Minister, after taking the best scientific advice, announce that some food can be regarded as absolutely safe to eat. Senator Muskie, in the USA, spoke for many politicians when he called for "one armed" scientists; advisers who will not say "On the one hand the evidence is so, but on the other hand..."'

However, the difficulties of communicating with politicians are trivial when compared to climbing the mountain of 'reclaiming the public realm'. Indeed the entire enterprise of 'environmental decision making in a technological age' is overlain by haphazard blankets of widespread myths, nurtured by tangential waves of media excitement. Examples are legion: the alleged dangers (or poison) of genetically modified (GM) crops (typified by the dismal saga of the experiments on transgenic potatoes carried out by Arpad Pusztai in Aberdeen which a Royal Society Working Group found to be 'uninterpretable because of the technical limitations of the experiments and the incorrect use of statistical tests'; and by the publicity over the deaths from a faulty batch of transgenically produced tryptophan, which was due to a manufacturing problem and had nothing to do with the gene transfer involved); the alleged environmental hazards of the Brent Spar oil platform in the North Sea; the pathogenicity of the measles, mumps and rubella vaccine (MMR); the contraceptive pill; long-distance flights; and many others. This is not to assert that new technology is — or can be — risk-free, but to point to the ease of over-reaction from politicians and public alike. Robert May (2001), former British government chief scientist, insists that 'society needs to do a better job of deciding what kind of world it wants to make with the opportunities science offers, rather than just letting things happen. This is a debate about values (my emphasis), with science having no special voice except in factual clarification of possibilities and constraints'.

May goes on, 'The task is as hugely difficult as it is hugely important. And a large part of the difficulty lies in the uncertainties that are an inseparable part of science at the frontier'. Currently fashionable methods of 'reclaiming the public realm' rely on 'focus groups', 'consensus conferences' and 'stakeholder dialogues'. These have been reviewed and generally supported by the House of Lords Select Committee on Science and Technology (*Science and Society*, 2000). The Committee's 'most important' conclusion was the need to 'change the culture of policy-making so that it becomes normal to bring science and society into dialogue about new developments at an early stage'. This is usually non-contentious (except perhaps in some commercially sensitive areas), but to be adequate, requires the leavening guidance of an ethical input to inform the dialogues — and such ethical input depends on a solid foundation of values. It is this relevance of ethics which lies behind all the papers prepared for this Consultation. Perhaps the major task for the Consultation is to identify and suggest how to apply pertinent values, particularly as they affect the futures of energy and agriculture. In a supplement to *Nature* (1999, p. C81–84) on 'Impacts of Foreseeable Science', Michael Gibbons argued that there has been an implicit contract between science and society to produce 'reliable knowledge' but that this now needs replacing (or at least supplementing) with one where scientific knowledge is 'socially robust', and seen by society to be both transparent and participatory. Osborn's advocation of 'environmental justice' (this volume, p. 24–28) is a key element to incorporate into this search for a firm value-base.

STEWARDSHIP

Osborn's paper takes us from negatively 'playing safe' over environmental issues to the positive need to provide (and insist on) a robust value system. This is where stewardship comes in. Stewardship is much more than risk management; the UK Green Paper of 1990 defined it as 'the duty to look after our world prudently and conscientiously'. This is very different to

Clare Palmer's interpretation (see above), or from that of Steve Gould, who regards stewardship as an impossible exercise:

'Views [of stewardship], however well-intentioned, are rooted in the old sin of pride and exaggerated self-importance. We are one among millions of species, stewards of nothing. By what argument could we, arising just a geological microsecond ago, become responsible for the affairs of a world 4.5 billion years old, teeming with life that has been evolving and diversifying for at least three-quarters of this immense span. Nature does not exist for us, had no idea that we were coming, and doesn't give a damn about us ... We are virtually powerless over the earth at our planet's own geological time scale ... On geological scales, our planet will take good care of itself and let time clear the impact of any human malfeasance' (Gould 1993, p. 41–51).

More positively, Gerard Hughes (2000), responding to Prince Charles's admonition (see below) that scientists should 'work with the grain of nature', points out that 'However much we may regret the depletion of the ozone layer, or the emergence of bacteria which are resistant to antibiotics, these things have come about strictly in accord with the order of nature, in that they have come about in accordance with the laws of chemistry or evolutionary biology. They do not, as the Prince seems to suggest, 'exceed Nature's limits'. What might be said is something rather different, that these events upset a balance which we would wish to have preserved'.

In her paper, Celia Deane-Drummond (this volume, p.52–61) argues for the relevance of [divine] wisdom as an adjuct to rational — or consequential — care for the environment. Roland Murphy (1966) is even more emphatic: 'That wisdom theology is creation theology is almost an axiom in biblical studies'. He writes 'The creation doctrine of wisdom does not speak directly to the ecological concerns that have agitated recent discussions. But it does contribute to forming a basic human attitude that can have an ecological "fallout", so to speak'.

There is much meat in Deane-Drummond's paper, which will hopefully provoke debate and application. It is worth adding one further comment. In his 2000 Reith Lecture, Prince Charles said 'The idea that there is a sacred trust between mankind and our Creator, under which we accept a duty of stewardship for the earth, has been an important feature of most religious and spiritual thought throughout the ages. It is only recently that this guiding principle has become smothered by almost impenetrable layers of scientific rationalism' (Prince Charles 2000).

There is certainly truth in the accusation that we have come to take the natural world for granted and have lost much of our sense of awe towards it (although it is fair to add that a significant part of the awe with which we used to view Creation was due more to fear than wonder). However, Prince Charles's implication that this is because of 'almost impenetrable layers of scientific rationalism' is debatable. Whilst it is probably true that a misunderstanding of the scientific enterprise has led to an assumption that God (or the sacred) has become *in*-credible, this belief is straightforwardly incorrect. As long ago as 1889, Aubrey Moore wrote that 'the crude empiricism [of Baconian and Cartesian physics] led to unrelieved deism ... Science pushed the deist's God farther and farther away, and at the moment when it seemed as if He would be thrust out altogether, Darwinism appeared and under the disguise of a foe did the work of a friend. In nature everything must be His work or nothing ... It seems as if, in the providence of God, the mission of modern science was to bring home to our unmetaphysical ways of thinking, the great truth of the Divine immanence in creation'. Likewise, it is incorrect to attribute to scientists the shrouding effects of their necessarily rationalistic practice, because scientists are at least as prone as others to amazed wonder at the natural world, whatever their religious beliefs (see, for example, Ursula Goodenough 1998).

Notwithstanding, there is an undoubted need to recover a general habit of awe. Such awe is a religious (in the widest sense) response — it is where natural theology meets the theology of nature. To quote Roland Murphy (1996, p. 126) again: 'Wisdom literature [i.e. Job, Proverbs, Ecclesiastes, Ecclesiasticus, Wisdom] provides a biblical model for understanding divine revelation apart from the historical mode (salvation history) in which it is usually cast..... For non-biblical religions and their clients who have never heard of *YHWH* (Yahweh) or Christ, it points to a faith response that is not explicitly related to a particular historical revelation of God. Israel learned of her Lord also through experience and through creation ... This theological position does not take a particular stand on [biblical] truth or falsehood, or on the superiority or inferiority of any belief'.

This suggests that the 'sacred trust' desired by Prince Charles may be best found through pursuing what Murphy calls 'experience and creation'. As Christians we should beware of reacting too strongly against this on the grounds that it dilutes our faith, because it converges on the history of biblical religion, well illustrated by Charles Raven who argued that the Reformation was driven by the rediscovery of the realities of the natural world which had been obscured by the formalized myths of mediaeval churchmen (see, for example, Raven 1953) and by Peter Harrison's demonstration that one of the major impacts of the Reformers

was due to their replacement of allegory by literal history in their interpretation of scripture (Harrison 1998). Stewardship is a rational implication from study of the natural world and its misuse; when awe is added to stewardship it provides a motive for action as well as an occasion for enjoyment. Awe can be regarded as an empowerment of stewardship. Is this what Prince Charles was trying to tell us? As a scientist, I am completely happy with this interpretation; and as a Christian, I see clear apologetic and evangelistic opportunities in it.

MAKING DECISIONS

There are 4 groups who have interests in any decisions about the environment: (1) me, (2) my community—be it my village, neighbourhood, or nation, (3) future generations ('We do not hold a freehold on our world, but only a full repairing lease'), (4) nature itself. The last is the most difficult to justify, except on mystical or pantheistic grounds — or on explicitly revelation-based ones ('This earth belongs to God'). How we balance these interests depends on the value we place on each. Eric Ashby (loc. cit.) was optimistic. He believed 'Until recently, it could be said that the pursuit of self-interest in environmental dilemmas was kept in bounds (as T.H. Huxley wrote) by fear of disapprobation from the neighbours. This has been an influence also among the Governments in the European Community. But at the end of the 1980s a road-to-Damascus revelation fell upon the industrial nations. The greenhouse effect and damage to the ozone layer do not threaten any person on the voting registers of present-day Europeans or Japanese or Americans. Yet the only way to diminish dangers ahead is to pay a high insurance premium now for the sole benefit or posterity ...'

In the 2000 Reith lectures (which were given and published under the title of *Respect for the Earth*), several of the speakers (including Prince Charles) argued that sustainable development can be driven by 'enlightened self-interest'. This is an obvious and probably inevitable element in decision-making (including voting behaviour), but is it enough? Does it properly incorporate wisdom? In a lecture on 'The prevalent distrust of science' John Maddox (1995) concluded, 'If there is ever to be a *rapprochement* between science and those whose distrust springs from the fear that they will be made uncomfortable by whatever discoveries lie ahead, the chief responsibility for bringing it about must surely rest with those who are both scientists and religious people. By all acounts, there are many such people, many of whom are prominent in public affairs'.

For Prince Charles (in his Reith lecture), 'the future will need people who understand that sustainable development is not merely a series of technological fixes, about redesigning humanity or re-engineering nature in an extension of globalised industrialisation — but about a re-connection with nature and a profound understanding of the concepts of care that underpin long-term stewardship'.

Is this right? Is there more that we need to add to improve our 'environmental decision-making'? How do we combine sensible technology with the interests of community, future, and nature, never mind ourselves? Is there anything missing in our normal decision-making processes, entire and robust as we seek them to be? Are we causing problems by separating reason from perception? Does religion have any 'added value' for our decision making processes? These are the questions that we faced in this Consultation.

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