The Search for an Environmental Ethic

ERIC ASHBY

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ERIC ASHBY is a biologist and university administrator and author of works on experimental biology, education, and environmental policy. He is a Fellow of the Royal Society of London, past president of the British Association for the Advancement of Science, and former chairman of the Royal Commission on Environmental Pollution. Lord Ashby is former Master of Clare College, University of Cambridge, former Vice-Chancellor, University of Cambridge, and was created a Life Peer in 1973.

I

1. CLEARING THE GROUND

The only passage in these lectures that was easy to write is this opening paragraph. By endowing lectures on human values Mr Tanner has provided for a continual re-examination of a perennial question: by what values do I live? No question is more important at this stage of history. By inviting me to give the Tanner Lectures here in Utah, the University has conferred on me a rare honour and has confronted me with a daunting challenge. It is a great pleasure to thank the University Ð and particularly the committee presided over by Dean Fordham Ð for the honour. Now I must try to meet the challenge.

Let me begin by setting limits to my theme. The academic study of human values lies in the province of philosophy, theology, jurisprudence, and political and social science. I have no professional expertise in any of these disciplines; but, in common with thousands of other administrators, I have had to make assumptions about the values people hold, in order to make administrative and political decisions on their behalf. My assumptions have not been the product of sophisticated argument such as philosophers use, but of experience: namely, repeated trial and error in the world of action.

In these lectures I invite you to reflect on one particular facet of human values, in a severely pragmatic way. The root of the word 'value' is a verb, and I ask: how do people value the environment? The meaning attached to the word 'value' will become evident in the context in which I use it. What I want to emphasise at the outset is that my purpose in asking the question: how do people value the environment? is not to satisfy philosophical curiosity; it is to seek a guide to practical action. I shall avoid

the technical jargon of the social sciences, and 'speak plain', not out of consideration for you but because a lot of the jargon is unintelligible to me.

When Mr Tanner established these lectureships he didn't (I'm sure) expect them to unearth a new Plato, Descartes, or Kant. It is inconceivable that anyone like myself would have anything fundamentally new to say about human values. What I offer you are the reflections of a generalist who has tried to apply the established wisdom of others to the solution of some contemporary problems. I shall be disappointed if some of the things I say are not criticised in the seminars which follow these lectures. Indeed, a good subtitle for these lectures would be: 'Agenda for a Seminar'.

2. The Problem

Two quotations introduce my theme. In his second *Treatise of Government,* John Locke wrote this passage: "Though the Water running in the Fountain be every ones, yet who can doubt, but that in the Pitcher is his only who drew it out? His *laboar* hath taken it out of the hands of Nature, where it was common, and belong'd equally to all her Children, and *hath* thereby *appropriated* it to himself."[1] This proposition is unexceptionable so long as the fountain flows freely and there is water for all who need it. But if the fountain begins to dry up, if demand for what economists call a 'free good' exceeds supply, then the proposition is insufficient. Either the amount which each can draw has to be rationed by some authority under some principle of fairness and justice, or some of those who use the fountain will begin to show signs of passion; there will be conflict.

Fifty or so years ago an Australian poet, Mary Gilmore, put this kind of conflict into four lines of verse which starkly summarize one theme of these lectures. She wrote:

[1] John Locke, *Two Treatises of Government,* ed. P. Lasiett (Cambridge: Cambridge University Press, 1967), p. 307.

All men at God's round table sit,
And all men must be fed.
But this loaf in my hand,
This loaf is my son's bread.

Under conditions of life where there is no stress there is a balance among reasonable people between self-interest and concern for others. Under conditions of stress that balance is upset. When a community is threatened from outside, as in time of war, self-interest is put aside and the balance tips toward concern for the common weal. But when a community is threatened from within, the balance may tip toward possessiveness and self-interest. I think no one doubts that we are now living in a time of stress, possibly in a climacteric of human history. In affluent countries the optimism of the post-war 1940s Ð a prospect of prosperity for everyone, a harvest of the fruits of technology Ð is being displaced by the pessimism of the 1970s Ð a prospect of scarcity, followed by desperate competition to possess the dwindling resources of the planet. It is a time of perplexity. Of course we don't know what direction history will take, although plenty of people are making predictions, uttering prophecies, and trumpeting doom. But two statements about the present can be made with confidence. One is that thoughtful people are deeply apprehensive about the future; the other is that this apprehension is already in some ways (but not in others) changing social values. This apprehension has not, so far, persuaded rich nations to lower their material standard of living, nor has it reconciled poor nations to the prospect that they are likely to remain poor. These are threats which loom like storm clouds ahead of us. But among rich nations apprehension about the future of the environment has already shifted the attitude of people from indifference to concern. I say this because in pluralistic democracies, where politicians can't disregard what they reckon to be public opinion, laws are being passed and decisions are being made to protect the

environment to a degree which would have been out of the question fifty years ago. Dramatic examples of this are national decisions in the 1970s to abstain from doing things which would unquestionably have been done in the 1920s if the techniques for doing them had been known. For fifty years the United States encouraged the production of faster and faster aircraft; but in 1971 America deliberately decided not to produce supersonic aircraft for public travel.[2] For a century or more Europe encouraged technologies for producing more energy; but in November 1978, Austria held a referendum to decide whether to use a nuclear power station already built and loaded with radioactive elements. Sixty-four percent of the electorate turned out and a majority—though it was a narrow one — voted against the use of nuclear energy in Austria. The power station will now have to be converted to use conventional fuel and Austrians will have to pay more for their electricity.[3] Doubtless these two decisions were made out of concern primarily for the quality of life for people, and only secondarily for the environment. But this is not true for all decisions involving the environment. The Alaska pipeline was redesigned to allow the free movement of caribou. Construction of the Tellico dam for the Tennessee Valley Authority was held up in June 1978 by a majority decision of the Supreme Court because it was deemed to put at risk the welfare of a little fish protected by the Endangered Species Act. And — a sample of public opinion about this — in the following week the Supreme Court's decision was backed by 57 percent of voters in an opinion poll held as far away as Michigan.[4]

It is a traditional duty of governments to protect their citizens against hazards (originally from enemies and criminals) and now also from floods, malnutrition, disease, and pollution. To this has

[2] J. Primack and F. V. Hippel, *Advice and Dissent* (New York: Meridian Books, 1974), p. 10

[3] *The Times,* 6 Nov. 1978.

[4] *Detroit Free Press,* 18 June 1978.

been added a novel duty for governments: to protect the environment from over-exploitation by citizens; the citizens, not the environment, are regarded as the hazard. In every industrial country there are self-appointed guardians of the environment, lobbies that are successfully obliging states to assume responsibility for nature as well as for man. But there is risk of a backlash against this increased concern for the environment. When concern runs to excess — and it sometimes does — the guardians of the environment are criticised as "econuts" and their pleas are rejected. On one hand people make ever-increasing demands for water and energy; on the other hand you can't build a power station or a dam now until you have scaled a precipice of protests. This solicitude for the environment is better than the indifference of our forefathers, but it's not a secure position. Before it can become an accepted social norm, rather than an emotive mood liable to disperse under stress, it needs to be supported by a framework of principles. Just as jurisprudence gives us a rationale for rules of conduct between people, so we need a similar rationale for rules of conduct toward nature. Hence the need to search for an environmental ethic. I must now define what I mean by this. By *environment* (which I shall use interchangeably with *nature)* I mean the totality of inanimate and animate objects on the earth, apart from mankind; sometimes in a broad sense (ecosystems, landscape), sometimes in a narrow sense (the atmosphere, rivers, species of plants and animals). By *ethic* I mean guidelines or rules of conduct for deciding whether a decision about the environment (particularly whether to exploit it or protect it) is right or wrong.

There are two shortcuts to an environmental ethic which I don't propose to take and I must explain why. One shortcut is to declare belief in a revealed religion in which God created all living things and Man is his steward, permitted to exploit nature but charged also to protect and conserve it. An environmental ethic based on this kind of stewardship would indeed provide a ra-

tionale for political decisions about natural objects, but it would have no currency among a majority of the world's people who don't subscribe to such religious beliefs; for to be a steward implies that there is a master. Environmental problems are global, so — although religious beliefs may powerfully influence an attitude to nature — the environmental ethic we seek needs to be one which appeals to people irrespective of their attitude to religion.

The other shortcut is to wallow in the rhetoric of Arcadia or Utopia: exhortations to mankind to revert to the (imagined) tranquillity of pre-industrial society or to assume a degree of amity which would require a change in human nature, where 'the wolf also shall dwell with the lamb . . .'. Atavism simply isn't on; and as for Utopian expectations, the genetical barriers to such a change in human nature are as formidable as the genetical barriers which prevent wolves dwelling with lambs, at any rate to the satisfaction of the lambs. Any prescription which relies on a change in human nature has — as I shall explain in a minute — no prospect of being transformed into political action. For the practical decision-maker it is empty rhetoric. We have to try to solve our problems with the human nature we've got.

But let us return to the problem. In the search for an environmental ethic, what are the interests which merit consultation? I think there are four: self-interest; the public interest; posterity's interest; nature's interest. I shall consider these in turn, and at the end I shall make some tentative suggestions for a guide to practical action.

But first, a warning (to myself as well as to you) about an ambiguity in this word 'interest'. It may mean what John Doe, or the public, *wants,* which is a matter of fact, or what John Doe, or the public, *ought* to have, which is a matter of values prescribed by society or its leaders. I hope it will be clear from the context in which sense I use the word. It's an important distinction: that something is desired doesn't necessarily make it desirable.

3. SELF-INTEREST

Homo sapiens is a primate. He is a product of evolution, subject to the mechanisms and constraints of evolution. In common with other living things his intuitive primary goal is the successful survival and transmission of his genes. Ages ago, when he was a hunter–gatherer, he became genetically coded to optimize personal survival together with his prospects of mating, reproduction, and the care of his children. This same sort of coding determines how birds build nests and feed their young, how wolves combine into packs, and how ants immolate themselves to defend their nest. Let me add in the same breath that in man these primitive genetic drives are now deeply buried beneath an immensely complex superstructure of socially coded behaviour. But the primitive drives remain and because of them self-interest lies at the roots of human behaviour. If this sounds to you a cynical and materialist attitude, let me remind you that it was Christ who said, "Thou shalt love thy neighbour as thyself," and it was the Buddha who preached that self-love comes first, for only from that can one learn to love others. Life-long bonding between male and female to ensure cooperation in the care of offspring; willingness to make sacrifices for one's kin, even to risk death; a shared sense of purpose within a group and a suspicion of individuals outside the group; self-assertion in the face of shortages of food; a level of aggression if it is needed to establish status or to defend property or to have access to mates: all these are traits (some of them no longer adapted to present human environments) which we share with birds, rats, even some invertebrates.

Self-interest and altruism toward those who share our genes belong to the 'hard core' of our inheritance. When presented with many options in life, we ask (of course unconsciously) : what's in it for *my* genes? Of course we don't in the end always act on this primal impulse; indeed if we did it would destroy the foundations of civilised living. Control is taken over by a complex system of

'soft-core' responses which are the product of cultural selection, some of it also dating from a long way back; behaviour patterns which fitted our neolithic ancestors to live harmoniously in groups: customs for co-operation, conventions, taboos, rituals, and a deep desire to be accepted and to have status among one's group; patterns which enhance the stability of the group and its sense of security. This soft-core altruism extends beyond genetic kin to the wider kinship groups described by anthropologists. A 'tribal self' is superposed upon the 'individual self'.

The origin of soft-core altruism is a matter of fierce controversy.[5] Some believe that these patterns, too, are to some extent genetically determined; others believe they have no genetical basis, and that they are imprinted by training and education which the young acquire as they grow up. There is no need for me to enter into this controversy, for whatever the origins of soft-core altruism may be, everyone agrees that people couldn't live in communities without it, and (except for hermits) life apart from communities is intolerable. It may be that consideration for other people is basically an investment in self-interest — if I scratch your back today, you'll scratch mine tomorrow. It may be that co-operation with fellow members of the group is a condition for winning the coveted reward of social approval. What probably happens is that arbitrary rules are found to have a positive survival value in the group; they become hardened into conventions; they become sanctified, and it is then a heresy to challenge them. It was Thomas Henry Huxley who said that "the greatest restrainer of the anti-social tendencies of men is fear, not of the law, but of the opinion of their fellows."[6] The rebel in primitive communities paid a high price for his non-conformity; in totalitarian states he still does.

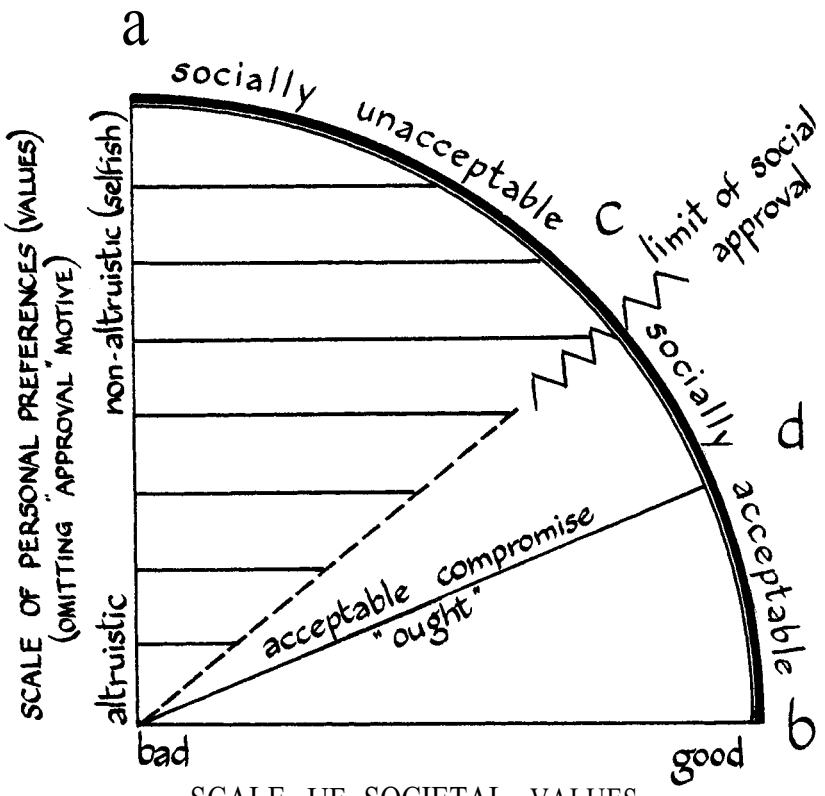
The point I want to make now is that these two standards of

[5] E. O. Wilson, *On Human Nature* (Cambridge: Harvard University Press, 1978).

[6] T. H. Huxley, *Collected Essays*, vol. 9 (London: Macmillan, 1925), p. 57.

behaviour — the concealed innate genetically coded standard which is an ineradicable part of human nature, and the prevailing socially coded standard which differs in different societies — coexist, sometimes in harmony, sometimes in conflict. The balance between them affects not only our attitude to our fellow human beings; it affects also our attitude to the environment. For if the environment is able to meet our physical needs — space, food, shelter, energy — then competition for survival is relaxed; we can afford to be what we call civilised, indulging in competition for quality of life and not just for the necessities to sustain life. But if the environment imposes constraints upon us — overcrowding, scarcity of food, of shelter, of energy — then (to go back to my text) the conflict breaks out between bread for my son (and for me) and bread for others sitting at God's round table. Economists have a lot to say about this conflict, for they deal with the logic of choice under conditions of scarcity. It is an axiom of economics that when two *individuals* enter into a contract or understanding they will, if they are rational, be motivated by self-interest, each trying to maximize his own satisfaction or utility from the transaction. But when the individual is making a bargain with *society* (so to speak), e.g., about an environmental issue (whether or not to discharge pollutants into a river or into the air), the rules for the contract are far less clear, for there is no socially accepted ethic, nor is it clear what ethic is desirable. The reconciliation of a conflict between selfish interests and social interests in everyday practice is illuminated by a simple geometrical model (Figure 1), which I have adapted from one proposed by G. E. Pugh.[7] Imagine a quadrant of a circle between two radii, one running vertically upward from the centre; the other at right angles running horizontally from the centre to the right. On the vertical radius is measured satisfaction on a scale of personal values (i.e., what

[7] G. E. Pugh, *The Biological Origins of Human Values (New* York: Basic Books, 1977).



a- best personal preference
b- best societal preference
c- zone between what is socially acceptable and unacceptable
d-acceptable compromise between "a" and 'b'

FIGURE 1. SCALE OF SOCIETAL VALUES

suits *me* best), *excluding* the satisfaction that comes from being approved by society for what you do; maximum personal satisfaction is where the vertical radius cuts the circumference of the quadrant. On the horizontal radius is measured satisfaction on a scale of societal values (i.e., what suits *society* best), again with maximum satisfaction where the horizontal radius cuts the circumference on the right-hand side of the quadrant. On the arc between the two radii lies the range of rational decisions open to an individual, from the purely selfish (vertical) to the purely altruistic (horizontal), Somewhere on this arc there will be a 'fuzzy' point which separates acceptable from unacceptable social behaviour. Action between this point and the vertical radius will be regarded as selfish, or 'not done', or wrong. Action between this point and the horizontal radius will be regarded as altruistic, or proper, or right. The 'reasonable' individual, wanting both to maximise his self-interest and yet to earn approval from society, chooses a decision-point somewhere on that part of the arc between pure altruism and the point dividing approval from disapproval.

This geometrical model reminds us that two separate forces play upon one's conscience when a decision is made (e.g., whether to hog water from the fountain, to hoard bread in a famine, to pollute the air with a cosy coal fire, to drop litter). It reminds us that there *is* a conflict, even among the nicest people, and that the decision how to act is a compromise between forces often (not, of course, always) pulling different ways.

The choice for self-interest can be summarized in this way. There are three options open to me in my behaviour over public issues such as concern for the environment. One option is to be a 'free rider': let everyone co-operate to clean up litter, to observe the speed limit, to give up using aerosols with fluorocarbons, *except* myself. Another option is genuine altruism: to co-operate over all these, *even though no one else does.* A third option is what Fred Hirsch (from whose work I take this summary) calls

'as if' altruism: to co-operate *provided* everyone does? The first option invites censure from other people, and that is a powerful deterrent. The second option goes against the hard core of genetic self-interest, though there are always a few people whose conscience overrides their hard-core genes. The third one is the one consistent with down-to-earth practical politics (and you remember that practical politics is what these lectures are about). But it is usually against human nature to expect a consensus without some intervention by authority: Adam Smith's 'invisible hand' of laissez-faire has to be guided by regulation in the public interest.

4. The Public Interest

Since I began this lecture I have been talking about the attitudes of 'a person', 'people', 'man', toward nature and the hazards of the environment. In a free enterprise society like our own, markets or governments respond primarily to individuals each concerned with his *own* needs, for the simple reason that it is individuals who shop in markets and vote for governments. But it is an elementary pitfall in politics to suppose that the preferences of individuals (which economists call individual welfare functions) can be added up to produce a preference-statement for the whole society (which economists call a social welfare function). The sum of a multitude of rational decisions made by each individual may turn out to be an irrational collective decision. Thus it is in the short-term interest of each individual crew of fishermen to catch more fish, but if each crew continues to increase the catch, all of them stand to lose their livelihood. The fishing industry in the North Sea refused to discipline itself over the herring catch, and the result? The stock declined from about 2,500,000 tons in 1960 to about 250,000 tons in 1977. If millions flock to enjoy the wilderness, no wilderness will be left to be enjoyed. If too many

[8] F. Hirsch, *Social Limits to Growth* (London: Routledge & Kegan Paul, 1977), p. 146.

people move out of the city into a suburb, the suburb loses the very quality that attracted people to move there. If too many people get a college degree, the advantages of having one are diluted. Indeed, the uncontrolled gratification of individual desires often cancels out the satisfaction even of the initially gratified individuals. As W. S. Gilbert put it in *The Gondoliers:*

> When everyone is somebodee,
> Then no one's anybody!

There is unfortunately no reliable way to deduce collective social choice from information about individual choice; no objective way to derive a social welfare function from the discordant preferences of individuals. This is a disturbing thought, for in environmental policy it is the social welfare function which is important. Furthermore, collective preferences cannot be met without compromise or the suppression of the weaker interests. There is always a conflict of values. Environmental pollution, for instance, is a secondary effect of operations which benefit society. So a dispute as to what is in the public interest about (say) energy policy, or water pollution, or the preservation of wilderness, is resolved by haggling, bargaining, and compromise between conflicting interests of adversaries arguing from different sets of values.

In the end, therefore, decisions about policy for the environment are made by persons in authority who have to guess (in ways I'll discuss in the next lecture) what the desired collective preference is. But they can't be merely passive over this. They are expected to decide what the *desirable* preference is. This means they have to construct for themselves some framework of values and to act within this framework. And herein lies a danger, for an authoritarian allocation of values is the first step toward paternalism, which is on the path toward autocracy. If Big Brother decides it is in your interest to ban smoke in the air and phosphate in the river and litter in the park, what will he be telling you to

do next? In devising guidelines for practical action we shall have to satisfy ourselves on this point.[9]

This perplexity — how to decide what is in the interest of society when all you know is what is in the interest of a sample of individuals — isn't the only problem the politician has to solve. Not only do a multitude of rational individual preferences sometimes combine to form an irrational social preference; sometimes the individual preferences themselves are not rational, at least in the sense that economists and decision-theorists use the word. If people behaved rationally in this sense, one would expect the public perception of a hazard (e.g., from floods, automobile exhausts, nuclear power) to be determined by the product of the frequency and severity of the hazard. A person would use this assessment (which exists for many environmental circumstances) in deciding his attitude toward the hazard. But that is not the way it happens. Often there is no reasonable relation between the statistical assessment of a hazard and the attitude of people toward the hazard. Thus when Canadians produced tumours in rats by feeding them 2,500 milligrams of saccharin per day (this is roughly equivalent to drinking 800 twelve-ounce bottles of soft drink per day), indicating a remote possibility that huge doses might be harmful to health, the Food and Drug Administration proposed a total ban on saccharin, thus (possibly — there can be no rigorous demonstration of such assertions) putting at risk the health of some fifty million Americans who rely on saccharin to protect themselves from becoming too fat.[10] But compare the anxiety which this low level of risk provokes with our acceptance without question of risks from other causes. In New York City, for instance, the mortality rate rises between summer and winter by about 20 percent, which is attributable, in part, according to a

[9] E. Ashby and M. Anderson, 'Studies in the politics of environmental protection . . .', *Interdisciplinary Science Reviews* I (1976) : 287.

[10] *Nature* 276 (1978) : 205.

WHO report, to inadequate protection against cold.[11] Take another example: 150 people killed on the roads every day in America makes no impact on the public because the deaths occur in scores of accidents scattered across the country. If you were told that once in every ten years or so there would be a melt-down in a nuclear power plant, causing over half a million deaths, you'd be appalled. But that is only the extrapolation over ten years of the present carnage on the roads of America, every twenty-four hours, day in, day out. The emotional overtones of words like 'cancer' and 'nuclear melt-down' heavily distort the public perception of the dangers from these and other hazards. Thus the contribution made by cancer to the death rate in the USA is about 17 percent, and the contribution made by cardiovascular diseases (some of them as distressing as cancer) is about 53 percent; yet anyone who has been involved in appeals for funds for research into these two causes of death knows that it's far easier to get money for research on cancer than it is to get it for research on cardiovascular disease. As for the hazards of nuclear power (excluding unquantifiable risk of sabotage and disposal of waste), it was recently worked out in Britain that the deaths per 10^9 watt (gigawatt) years of electricity produced, including deaths through mining and transport, were as follows: for nuclear power in Britain, 0.25; for gas and oil, 0.3; and for coal-fired electricity production, 1.8 — seven times as dangerous as for nuclear power.[12]

For the decision-maker, especially the politician, a risk is worth taking (or protection against a risk is not worth taking) if people are no longer apprehensive about it. He has the perplexing problem that a death risk of 1 in 4,000 per annum on the roads and a death risk of 1 in 400 from smoking twenty-five cigarettes a day are acceptable risks; while protection against risks of the order of

[11] World Health Organization, *Health Hazards of the Human Environment* (Geneva: WHO, 1972), p. 144.

[12] Health and Safety Commission, *The Hazards of Conventional Sources of Energy* (London: HMSO, 1978).

1 in millions (e.g., from carbon monoxide or lead in car exhausts) demand huge expenditures — in the USA alone, some $6 billion per annum — because the public will not tolerate them. It is therefore idle to suppose that principles for protecting man from environmental hazards can be drawn from technical and economic data alone. The politician has to devise a subjective formula that takes account of such things as the following: (i) people will accept a voluntary risk considerably greater than an involuntary risk; (ii) they will accept risks with known probabilities (e.g., from fires or floods) more readily than risks with unknown probabilities (e.g., nuclear melt-down, lead in gasoline); (iii) risks from new technologies are feared much more than risks from old technologies; (iv) concentrated risks (e.g., aircraft accidents) are more feared than diffused risks (e.g., accidents in the home). And, beside all this, the politician has to discover what people are thinking — i.e., what public opinion is — and whether public opinion (what is desired) coincides with what he thinks is the public interest (what is desirable).

5. Posterity's Interest

History records many examples of neglect toward posterity. In Asia Minor whole civilisations decayed because water supplies were neglected. In America soil erosion still bears witness to the disregard of some early farmers (but, notably, not the Mormons, who invented the technique of dry farming) for later generations. Huge tracts of Africa have been made infertile by the practice of slash-and-burn. Disregard for posterity still goes on: Brazil's policies over the Amazon basin, and the Soviet Union's policies over whale stocks are depriving future generations of natural objects which they may greatly wish to have had.

And yet, who knows what posterity will wish to have? It is very difficult to define our duty to posterity. Cost- and risk-benefit analyses involving the future are dangerously misleading because

it is the conventional economic technique to include a discount factor. The theory of discount depends on the assumption that a benefit *now* is worth more than a benefit of the same dollar value deferred into the future. Likewise a risk *now* is less acceptable than the same risk deferred into the future. Thus a disaster (a flood or earthquake) which might occur about once in ten years and might do damage to the tune of $100 million has a risk value of $10 million (the estimated damage multiplied by the probability of occurrence). But discounted fifty years into the future at a 10 percent discount rate, the risk value in the year 2049 to our grandchildren is reckoned to be only $90,000. By this sort of logic (as Pearce has pointed out)[13] cost-benefit, as conventionally practised, can make risks such as those arising from nuclear waste disposal vanish altogether: which may be sound economics but it will not be of much comfort to posterity.

Another difficulty is that we cannot reliably predict future events. With the aid of hindsight we see that the most rudimentary consequences of new technologies have been overlooked. Thus, it is just two hundred years since Joseph Bramah took out a patent for a device which has been the cause of death to multitudes of people. It was not a weapon of war: it was the water closet (first established in Philadelphia in 1802). Through the nineteenth century the new device was enthusiastically installed in millions of homes. By the end of the century the traditional cesspool was on its way out. But there was an extraordinary and tragic oversight. The new technology brought water into the homes of the American people, but no one had thought how to get the water out again. There were no sewers except to drain flood water from the streets. The cesspools flooded; respectable neighbourhoods stank; fear of disease spread, for smells were thought to be the cause of diseases like typhoid and cholera. After

13 D. W. Pearce, 'Social cost-benefit analysis and nuclear futures', unpublished paper given at the seminar of the Beijer Institute on Impacts and Risks of Energy Strategies, Stockholm, 1978.

much controversy the problem was —so people thought —solved. Empty the water closet into the sewer and the sewer into a river, and the refuse will be automatically purified. That was what was done in one city after another. The respectable neighbourhoods smelt better; but typhoid rampaged through the towns downstream which drew their drinking water from the rivers. By the year 1900 dozens of cities — Atlanta, Newark, Pittsburgh, Toledo— had typhoid mortality rates higher than ever before, often exceeding one death per thousand inhabitants at each outbreak: a hazard four times as great as the present hazard of being killed on the roads of America.[14]

Prophecy is one of man's oldest enthusiasms. In ancient times there were soothsayers and oracles; there still are, it is only the techniques that have changed; instead of using the flight of birds or the entrails of animals we now use scenario-casting by computers and technology assessment; but the track record of forecasts is as dismal as ever it was.

I make this digression to illustrate how difficult it is, except in vague and general terms, to predict what impact our decisions about the environment will have on posterity. Our present perplexities about energy policy are a prime example. Do we encourage proliferation of nuclear power, and bequeath to posterity heaps of radioactive waste? Or do we dilly-dally over the generation of energy, and bequeath to posterity an energy famine and its likely gruesome consequences: economic stagnation and geopolitical conflict?

Besides these difficulties there's a down-to-earth psychological difficulty. Even if we were to persuade ourselves that we knew what our duty to posterity was, would we (by 'we' I mean the affluent nations of the Western world) be willing to carry out the duty? Think: everything we fear for posterity is already happen-

[14] J. A. Tarr et al., 'Retrospective assessment of wastewater technology in the United States, 1800–1972' (Pittsburgh: Carnegie-Mellon University, 1977, mimeo).

ing to millions of our fellow men and women and children only a few hours' flight from this city: starvation, squalor, lack of fuel, lack of shelter, lack of security, inequity in the distribution of basic needs; and, nearer home, city ghettos, violence, despair in the midst of plenty. Despite our efforts by way of aid and social services, we are making hardly any impression on these problems, The percentage of the GNP which affluent nations could afford to give to the solution of these problems is not being given because the political will to give it isn't there. The world's annual expenditure on armaments is some fifteen times its expenditure on aid to developing countries.[15] If I may paraphrase scripture: 'He that loveth not his brother, whom he hath seen, how can he love posterity, whom he hath not seen'.

John Passmore, in an illuminating book called *Mads Responsibility for Nate,* draws a conclusion which —although he doesn't make the point himself —is consistent with the biological hypothesis of kin-altruism.[16] He makes two propositions. One is that we should make such sacrifices as we are prepared to make in ways that are likely to be most effective. Help given to the underprivileged now, today, to people now living, is likely to be more effective than help left in our wills, so to speak, for posterity, who may not want it, or may want something different which we haven't thought of. Henry Sidgwick took this view over a century ago when he wrote that the interests of posterity must concern a Utilitarian, "except in so far as the effect of his actions on posterity —and even the existence of the human beings to be affected — must necessarily be more uncertain." [17]

Passmore's other proposition is that the most practical way to do one's duty to posterity is to be prepared to make sacrifices

[15] C. Freeman and M. Jahoda, eds., *World Futures: The Great Debate* (London: Martin Robertson, 1978), p. 355.

[16] London: Duckworth, 1974.

[17] H. Sidgwick, *The Methods of Ethics,* 7th ed. (London: Macmillan, 1907), p. 414.

literally for love: love of one's children and grandchildren, and in general, love of one's friends who will live on into the next century. To do this (Passmore says) is to start "a chain of love and concern running throughout the remote future." When I first read this I thought it was a rather feeble prescription for what is, after all, a seminal issue in conservation. But I now think differently, for this prescription —unlike so many others pressed upon us —does not call for a change in human nature. It relies upon a basic, genetically coded feature of human nature, which we share with many of the animals: an instinct to leave the environment in a fit state for our children (and, in a more attenuated way, for our grandchildren) to inherit. Provided they do the same for their children —and we know already that their human nature will be coded to this end— we have one simple and reliable mechanism for *individuals* to discharge a duty to posterity. Of course this formula will not solve all the politician's dilemmas. On some great issues— energy policy, for example, or the international law (if it can ever become law) of the sea —the politician can't harmonize the conflicting preferences of those now living, let alone the hypothetical preferences of those yet to be born. The difficulty is that a political decision is an adaptation to contemporary circumstances. When circumstances change —and they change all the time —the decisions become obsolete. So long —range planning, far from being desirable, may, if it is too rigid, lead the social system into dangerous dead ends. It simply isn't possible to get enough information to plan with confidence for long-term goals. So the only safe planning policy is to maximize the number of options open to society, and to have machinery for a rapid response to contemporary circumstances. The making of political decisions then becomes a succession of campaigns to reach short-term mini-goals that lie in the general direction of some long-term aspirations. There are grounds for cautious optimism here, as we shall see when I come back to this matter in the next lecture.

II

6. Nature's Interest

A hundred and five years ago, in the *Descent of Man,* Darwin described the evolution of empathy in human societies. *Homo sapiens,* originally concerned only for himself and his genetic kin, was, Darwin wrote, extending his sympathies to men of all races and even to the lower animals. Of course there have been shocking setbacks to this trend of evolution, but over the last century or more Western society has made a succession of choices —to free slaves, to suppress child labour, to emancipate women, to act humanely toward animals and birds, to protect endangered species. Just over a century ago it was still arguable whether or not you might sell a man, compel a child to work in the mines, be cruel to a dog, dig up a rare orchid. All these are now forbidden by law in many nations. The laws made explicit what was implicit in the values held by society. They did more than this: they paved the way for the development of more refined values —I use the loaded word deliberately— in the attitude of man toward his fellow man and toward other living things. The level we have now reached is illustrated by a passage in the eighth annual report of the Council on Environmental Quality.[18] It records how the Congress, acting under the Endangered Species Act of 1973, is protecting a little plant called the Furbish Lousewort from destruction by the proposed Dickey–Lincoln reservoir in Maine.

This is a remarkable trend in social evolution. It is not a response to a struggle —either a biological or a social struggle — for survival. Indeed in some of its manifestations it may diminish

[18] Washington, D.C.: Government Printing Office, 1977. See also H. S. Irwin, *Garden* (Sept.–Oct. 1977), p. 7.

the fitness of individuals to survive; for instance, if the Dickey–Lincoln reservoir isn't built, the welfare of some families in that area may be impoverished. Will social values in the Western world continue to flow along this channel of widening empathy? I believe that the answer to this question depends, in part at any rate, upon what support there is for an environmental ethic. Let me emphasise again that I am searching for something practicable, to guide those concerned with environmental policies. We can approach this search in two ways: one, man-centered, the other, nature-centered.

Let us take the man-centered path first. Harnessing the resources of nature — its soils and minerals, its animals and plants, its waters and atmosphere — has been man's supreme achievement. In this century we have quite suddenly come up against the fact that nature (in this sense) is in short supply and will have to be rationed. Cities and highways and supermarkets sprawl into the countryside; some rivers and lakes are unfit to drink and no longer carry fish; residues of lead and DDT can be found even in the Arctic; the air is contaminated up to a height of fifteen kilometers; known reserves of some minerals appear to be scarce. On crude utilitarian grounds alone there is a case for protecting the environment.

But man uses the environment not only to satisfy his material needs; he depends upon it also for aesthetic satisfaction. Thoreau wanted to preserve the wilderness so that he could have solitude and tranquillity, not for the sake of the wilderness but *for himself.* In Britain we designate what we call 'areas of natural beauty' and try to protect them from despoliation. But beauty is something which gives pleasure to man, and (as Mark Sagoff wickedly pointed out) to value nature for its beauty alone is like valuing a woman for her beauty alone: it trivializes nature.[19] This atti-

[19] M. Sagoff, 'On preserving the natural environment', *Yale Law Rev.* 84 (1974) : 211.

tude was caustically put by Tchekhov in a passage from one of his stories: "Lubkov was fond of Nature. . . . He would sometimes stand still before some magnificent landscape and say 'It would be nice to have tea here'."[20] Any environmental ethic which falls back upon hedonism, especially the rarefied hedonism of intellectuals, is not likely to have survival value in times of stress. For it is an elementary consequence of utility theory (and a man-centered environmental ethic would be utilitarian) that the most efficient way to use the natural environment is to transform it into properly managed fields and pastures and forests, or highways, parking lots, and city blocks, if this is what people want. Take a familiar example: the strict Utilitarian would argue that Mineral King Valley in the Sierra Nevada could be put to better use if it were thrown open to provide innocent pleasure to millions of tourists, instead of keeping it remote and accessible only to a handful of enthusiasts from the Sierra Club and the Audubon Society.

It is for this reason that any man-centered approach puts the environment at risk, for it is essentially a utilitarian approach. If it suited man to exploit nature for strip mining, deforestation, pollution, recreation, there would be no forbidding ethic to prevent him from doing so. The decision would be solely a matter of expediency, of cost-benefit analysis. The argument that to overexploit the environment is to kill the goose that lays the golden eggs, is a sound argument, and in practical politics it is often an effective one to use. But it is not an argument which supports the interests of nature against those of man. And it's a shaky argument for conservationists to use, for they profess to be interested in nature for nature's own sake, not for the sake of man; in the goose for its own sake, not just for its golden eggs.

Let us examine next a more elusive attitude to nature, and ask

[20] Quoted in M. Midgley, *Beast and Man* (Ithaca, N.Y.: Cornell University Press, 1978).

whether this would serve as a useful environmental ethic. The American annual feast of Thanksgiving celebrates the conquest of nature by the Pilgrim Fathers. It was the transformation of a "hideous and desolate wilderness," as William Bradford called it when he landed from the *Mayflower,* into fields of corn and pastures for cattle.[21] Gradually this attitude to wilderness changed. As the triumph over the environment brought wealth and prosperity, and as the trek West revealed awe-inspiring mountains and canyons, natural objects came to be regarded as manifestations of God on earth. They acquired a metaphorical value. There they had stood for ages before any Christian had seen them. They were independent of the perception of man: an idea happily summarized in a couple of lighthearted limericks about a tree in an Oxford quadrangle:

> There once was a man who said 'God
> Must think it exceedingly odd
> If he finds that this tree
> Continues to be
> When there's no one about in the quad.'

To which there was this rejoinder:

> Dear Sir, your astonishment's odd
> I am always about in the quad,
> And that's why this tree
> Will continue to be,
> Since observed by yours faithfully, God.

Will this attitude to nature-as-metaphor, or nature as existing independently of our perception of it, help us in the search for an environmental ethic? Not much, for in a subtle way it is man-centered too. It's a better attitude than the valuation of nature for its usefulness alone, but it is in fact still coloured with utilitar-

[21] M. Sagoff, 'On preserving the natural environment', p, 227, n. 19.

ianism, for it values natural objects as surrogates for a deity. Along with other utilitarian attitudes to nature it strengthens the case for policies to protect the environment, but it does not give us the consensual ethic we are seeking.

So much for the man-centered approaches to an environmental ethic; all useful in their way, but not leading to what we seek. Now I shall try to suggest a path to a nature-centered ethic. I set aside, for reasons I gave in the first lecture, any argument which depends on the belief in survival after death with an expectation of rewards or punishments according to conduct on earth (for that argument would appeal to a kind of post-mortem utilitarianism!). In other words, I do not want the argument to rely on any purpose for man beyond life on earth —not because I deny that there is a purpose but because to assume a purpose would limit the global consensus we might hope to get.

Let us set out on firm biological ground. A common goal of all living things is to survive and ensure the creation of progeny. This is our shared heritage with bears, birds, trees, termites: the urge to survive and multiply. The life-career of an individual, its ontogeny, is in some ways determinate (bean seeds grow into beans and mouse embryos into mice) ; by contrast the evolution of a species, even of *Homo sapiens,* its phylogeny, is indeterminate. Its direction is unpredictable. No biological goal can be discerned on the horizon except survival —staying in the game. Not an inspiring goal, but now I come to the point I want to make. The *path* to the goal which we share with all other living things *is* inspiring. I mean that the process of evolution, with the constellation of secondary patterns of behaviour that it generates, *is* marvellous, even though the end (so far as we can discern it) seems so empty. In the life of man there is an incredible exuberance of form, conceptual as well as material: the richness of experience in communication with other humans, loving and being loved, sharing and receiving, creating and enjoying the creations of others, being accepted by one's fellows, being at peace with one's

conscience. The manifestations it shows, including what some cynics call hypertrophy of the intellect, are of course unique. But manifestations just as wonderful occur among plants (think of the pollination mechanisms of some orchids), among the social insects with their genetically coded loyalty to the queen, among birds whose powers of navigation are still a mystery, among whales and dolphins and elephants whose own world of consciousness is coming to light in recent research on ethology.[22]

So, to use a man-centered analogy, I regard the process of evolution as I regard the playing of a Beethoven sonata. You don't play it *toward any goal.* What matters, what is intrinsically valuable, is the experience of playing it. Its intrinsic worth does not reside in the printed marks on the page. The printed marks could (as Einstein said) be transformed into a diagram of air pressure curves. That would be a rationally faithful way to express them, but it wouldn't convey what Beethoven intended to convey. Only the process of playing the music can do that. The music is the performance.

What I find myself groping toward is an ethic which regards as sacred (in a secular sense of that word) not the *products,* but the creative *process* of evolution. It would, according to such an ethic, be vandalism, and therefore immoral, to destroy unnecessarily something which we cannot create and which is the expression (and not the end-product) of millennia of evolution; something whose very survival endows it with the options of further evolution. I say 'unnecessarily', for to hold convictions, such as the Jains do in India, that no creature whatever — mosquito, fly, microbe — shall be harmed, is so impracticable as to ridicule the case for conservation. Nature is full of predators and man is one of them; a distinction needs to be made between vandalism—the wanton and unnecessary destruction of living things or natural

22 For examples, see D. Attenborough, *Life on Earth* (London: Cambridge University Press and B.B.C. Publications, 1979).

objects or ecosystems — and the disciplined exploitation which is necessary to sustain society. Of course the line between the two is blurred and it is a matter of judgement where it should be drawn. One practicable rule of thumb which might be useful would be to apply to the treatment of natural objects criteria similar to those we apply to the treatment of objects created by man. To permit a river to be damaged by pollution would be the same kind of negligence as to permit a Renaissance mural to fall into disrepair. In the course of evolution some species will anyway become extinct; to hasten their extinction by wanton hunting or by unnecessarily depriving them of their natural habitats (as happens when wetlands are drained) would be the same kind of insensitivity as to pull down, without good reason, a medieval church. This argument does not rest on such concepts as beauty (that is a man-centered value), nor does it imply a divine immanence pervading nature (that would be a resort to pantheism); though both of these concepts are useful adjuncts to an environmental ethic. What I am trying to say is that it is not the sanctity of the *product* that is the touchstone of an environmental ethic, but the sanctity of the *process* of evolution. We are embedded in the process, comparative newcomers; "all the history of civilised men is but an episode," wrote T. H. Huxley, compared with the history of a wild flowering plant (such as the Furbish Lousewort in Maine), and we — latecomers in the saga of evolution — suddenly find ourselves able to intervene in the process in ways which may do irreparable damage.

Another reason for regarding the process of evolution with reverence is that we still have a vitally important lesson to learn from it in the management of our own social affairs. Take, for example, the sobering contrast between a natural ecosystem, like a forest, and a man-made ecosystem, like a city. Both forest and city are bewilderingly complex in the interdependence of their living parts and the environment. Natural ecosystems have their networks of symbiosis, their food chains from plankton to mam-

mals, their recycling systems (so aptly summarized by Hamlet: "We fat all creatures else to fat us, and we fat ourselves for maggots"). Man-made ecosystems have similar networks of symbiosis. Recollect what happens when you switch on the light, flush the toilet, put waste into the trash bin, stop to fill up at a gas station, make a phone call. These are signals to fellow members of the ecosystem; after every signal you expect and depend upon a response. If you fail to get the response, you are upset. If the expected responses were to fail widely for all five of these signals on the same day, city life would collapse. Already some failures are quite common due to technical faults, human errors, or deliberate anarchy. A power failure in New York; a strike among sewage workers in London; sabotage by a gang of urban guerillas in Belfast: these are examples of the vulnerability of cities. The ugly fact is that man-made systems lack a fundamental quality found in natural ecological systems; they have none of the built-in stability that preserves equilibrium in forests, lakes, and oceans. The reason for the difference is that equilibrium in nature has evolved over millennia, the hard way. Threats to equilibrium have simply been eliminated by natural selection. There is a genetically coded stability. In man-made systems — like cities — we have introduced sophisticated networks of transport, power distribution, sewage disposal, in a sort of shortcut to a materialist's Utopia, without introducing — indeed, without having even invented — the corresponding stabilisers to keep the man-managed system in equilibrium. The stability of natural ecosystems is a triumph of the evolutionary process. When trees decay in the forest, they are recycled by fungi and bacteria in the soil. When a city centre decays it cannot be recycled; it is enormously difficult to rebuild it to produce a new and better city. So, for a mixture of motives — some man-centered, some not — I am suggesting that it is *wrong,* in the simple folk-meaning of that word, for man to upset that stability without grave consideration of the consequences of doing so. This was the conclusion, too, of one of

the pioneer economists in America, John Bates Clark of Columbia. As long ago as 1899 he wrote (in a book on the distribution of wealth): "Hinder not the grand dynamics of nature." It is an attitude well expressed in Albert Schweitzer's untranslatable phrase: "Ehrfurcht vor dem Leben."

But I must bring you back to my theme. Is this the basis for a *practicable* ethic? I think it is. The environmental ethic I suggest could be sustained by the idea of a taboo against vandalising nature, similar to the taboo which forbids the wanton destruction of medieval churches. Like a taboo, it consecrates something, in this case the processes which drive the machinery of evolution. Like a taboo, it needs to be incorporated in a social and legal code. This could be done by conferring rights on natural objects, as a legal fiction, a symbol — myth, if you like — conferring intrinsic worth upon them quite apart from their value to man. As you know, this has already been recommended by Mr Justice Douglas in a famous Supreme Court dissenting judgement. He suggested "the conferral of standing upon environmental objects to sue for their own preservation."[23]

I'm not, in making this suggestion, proposing a novel social innovation. Taboos are as old as human societies and they are still effective agents for disciplined behaviour. Moreover, what I'm suggesting for nature is an extension of the mystique we already accept in our attitude to the supreme creations of man: the cathedral at Ely, the paintings of Leonardo, a Chinese porcelain. Our attitude toward these man-made treasures is a blend of man-centered appreciation of beauty and a transcendental feeling for their intrinsic worth.

Of course this nature-centered environmental ethic will, in practice, need to be reinforced wherever possible by arguments from man-centered interests in the environment. I think this could

[23] Supreme Court of the United States, Sierra Club v. Rogers C. B. Morton, No. 70-34, April 19, 1972, dissenting opinion of Mr Justice Douglas.

be done without recourse to the crude cost-benefit analyses of the economists. Let us try to do it by drawing an analogy from a celebrated assumption in Rawls's *Theory of Justice.* He explains—you remember —how a group of people could draw up what would be acceptable principles of justice and equality *provided* they worked under what he called a 'veil of ignorance' of the status and position they would themselves hold in the society to be governed by those principles.[24] In reaching a consensus they would, of course, be acting in response to a sublimated self-interest, but the outcome would be beneficial for the whole group.

Now substitute 'environment' in place of 'justice and equality'. I think we have an analogous situation. No one knows how he (or she, or their offspring) will be affected by decisions to exploit the environment or to upset the equilibria of nature. Environmental policies are indeed made under a veil of ignorance, and those who make these policies are indeed showing — in many cases —a welcome degree of prudence. What I have suggested up to this point in the lecture is a way of harmonising the common utilitarian approach to environmental politics with an ethic which doesn't involve concepts of utility —indeed, one which is not man-centered at all.

Now let us ask how this combination of motives can be put to practical use.

7. Some Practical Considerations

This brings me back to my overture. We are seeking guidance for politicians who have to make decisions about the environment. Are we any closer to finding guidance? (In parentheses let me recall to you that I use the word 'politician' in its dictionary sense, to mean anyone engaged in the 'science and art of government', in a pluralistic society like our own.)

First, let us dispose of a comparatively simple case. If you

[24] J. Rawls, *A Theory of Justice* (Cambridge: Harvard University Press, 1971).

rank human needs in order of priority, then survival, freedom from pain, and safeguard of property come very high on the list. Self-interest and public interest generally coincide over these needs and take precedence over the claims of posterity and of nature. So a politician has no great difficulty in deciding where he stands over hazards in the environment which demonstrably put at risk the lives, health, or property of his constituents. He and his constituents may have to be jolted by the mass media into recognising the fact or seriousness of the hazards. But once their anxiety has been aroused (as it was over discharges of mercury, asbestos, and industrial smoke), there is no ethical difficulty (though there may be other difficulties) about what decision to make. To protect people against hazards from the environment, whether 'acts of God' (like floods) or hazards created by man (like pollution), is something governments are now expected to do.

This is the simple case: the protection of citizens against real or imagined hazards from the environment. It is the counter-case which is difficult: the protection of the environment against hazards from the citizens. This is where an environmental ethic might prove useful.

Of two things the politician can be sure: there will be a conflict of values, and the evidence alone will not be sufficient to resolve the conflict — indeed there will often be a conflict of evidence as well as of values. It is the politician himself who has to find a solution to these conflicts. Part of his task is to fit the information into a framework of obstinate political verities. Let's consider two of them.

First, any policy to protect the environment against exploitation will affect someone's profits or liberty or amenity. Clashes of self-interest between two individuals or two corporations can usually be settled by some compromise or by recourse to the courts. But there are occasions when the conflict can't be settled this way without injustice because the would-be exploiters are more powerfully armed with facts and cash than the defenders —

this was so, for instance, in a recent dispute between the airport authority in Boston and the citizens of East Boston — then the politician has to intervene to redress the imbalance between a Goliath lobby and a David lobby. The haggling and trade-offs then take place in the Capitol or the City Hall instead of in the courts or the marketplace, and the bargaining is not over dollars of compensation but over the phrasing of some regulation to prevent abuse of the environment. The politician cannot remain inert; he must declare his commitment to some social values and be prepared to act on his commitment.

But this is only the beginning of the politician's problems. The second obstinate verity is that a bargain struck between two self-interest groups may not be in the public interest. The public interest — we talked about this in the last lecture — may be totally inconsistent with the interests of individual members or groups of the public. The politician's dilemma is compounded by the fact that there is often no reliable way to discover what the public interest is. Even referenda, such as some American states use, don't give trustworthy results because they don't penetrate deeply enough. If you ask people (as Californians were asked in Proposition 13) whether they would like lower taxes, of course they say yes; but what would they say if asked whether they'd accept the consequent impoverishment of schools and other social services?

The public interest, of course, has its pressure groups. They claim not to speak on behalf of their own interests alone, but on behalf of society as a whole, or of posterity, or of nature. They are criticised — sometimes rightly so — as being unrepresentative and elitist. Nevertheless they have a massive influence on public policy and the politician neglects them at his peril. What use can he make of these pressure groups when he comes to assess what is in the public interest? And, indeed, how otherwise can he discover what the man-in-the-street thinks about environmental issues? Let us spend a few minutes on these two questions.

On practically any important environmental proposal — whether to build more nuclear power plants, to 'go supersonic', to use phosphates in detergents — there is a range of opinion which can be thought of as measured along the familiar bell-shaped distribution curve (see Figure 2). [25] At one extreme 'a', are a few persons rabidly opposed to the proposal; at the other extreme 'b', are a few persons equally rabidly in favour of it. It is a waste of time to include such persons in any consultation. Their prejudice is impenetrable; no argument will change their minds, no evidence will dislodge them. In the middle of the bell-shaped curve of opinion is a great mass 'c' — normally the majority— of people who have no opinion either way, and they are not interested enough to hear the evidence. They are content to depend on hearsay; they are prepared to follow the crowd (though they *are* the crowd). If it were practicable it would of course be desirable to bring this great mass of people into consultation. But it's not practicable. What, then, can be done ?

Between the apathetic majority and the embedded minorities at each extreme there are persons ('d' and 'e') who, at the start, incline toward one view (e.g., in favour of nuclear power) or the opposite view (e.g., against it). But their minds are open to fresh information: they will consider arguments for and against; they are willing to listen and to take some trouble to learn; they are open to conversion. These are the reasonable people whose opinions matter. If, after they have heard the evidence, a consensus emerges among these reasonable people, this is as good a measure of what is *desired* by these members of the public who have earned a right to an opinion as the politician is likely to get. The apathetic majority, if they emerge from their indifference at all, will be inclined to accept the assurances of those who have actively participated in the discussions. As for the extremists, those at one

[25] W. D. Rowe, 'What is acceptable risk and how can it be determined?', unpublished paper given at the seminar of the Beijer Institute on Impacts and Risks of Energy Strategies, Stockholm, 1978.

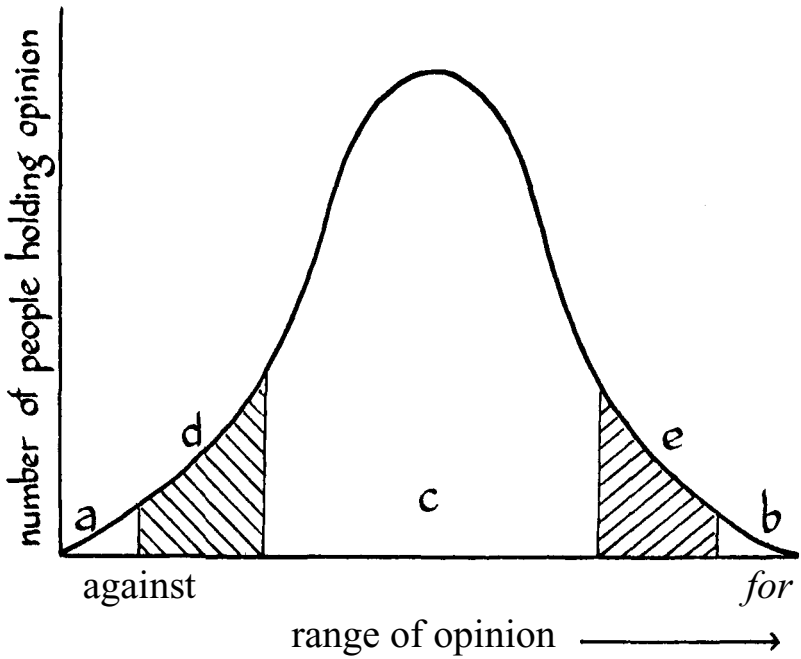


FIGURE 2. Schematic representation of range of opinion on a controversial environmental issue. For simplicity it is assumed that the bell-shaped curve is symmetrical; but if there were a strong majority opinion against the issue, the curve would be skewed to the left; and if the majority were in favour of the issue, the curve would be skewed to the right.

a = persons rabidly opposed to the proposal
b = persons rabidly in favour of the proposal
c = majority, who are indifferent or apathetic to the proposal
d = persons who oppose the proposal but are prepared to reconsider their views in the light of evidence
e = persons who favour the proposal but are prepared to reconsider their views in the light of evidence
a + d are likely to belong to lobbies opposing the proposal
e + b are likely to belong to lobbies supporting the proposal

end will crow over their 'victory' and those at the other end will subside into resentment. This critical band of reasonable people ('d' and 'e') cannot be counted or precisely identified, but they can be reached through reputable public interest lobbies. People who take the trouble to become paid-up members of the Sierra Club, the Audubon Society, the Friends of the Earth, the Conservation Society, the National Society for Clean Air (to mention only a few names as they come into my head) are obviously biased, for they are critical of an economic system which lets nothing stand in the way of material productivity, exploitation of resources, pollution of the biosphere. However, you take account of this bias, as you take account of the bias of a lawyer pleading a case in the courts. And there is no lack of self-interest lobbies, with a bias on the other side, who can be relied upon to make mincemeat of public interest lobbies who don't get their facts straight. The important thing about people in both these kinds of lobbies is that they do their homework; they master the facts; they are aware of the complexities of the issue. They offer the best practicable means for the politician to find out the opinions of people who have taken the trouble to think about the issues. Those who haven't taken the trouble can't complain if their opinions are disregarded.

Of course this alone doesn't give the politician a full statement of the public interest, but only raw data which assist him to decide what is *desirable* in the public interest. Many controversies about the environment are conflicts, not between good and bad, but between two incommensurable kinds of good. To be sure, the case is coloured with emotion by some who take part in it; the evidence is sometimes distorted; the real motives behind arguments are sometimes concealed. But these controversies do prick the public conscience; they present people with moral choices; they oblige people to think about an environmental ethic. I don't expect (or want) sweetness and light in controversies such as these. Often there has to be some compromise, of course; a bar-

gain has to be struck over laws and regulations, instead of over price in the market (the process is very similar). Thus, industry cannot be allowed to use air as a 'free good', nor can conservationists be allowed to get away with laws imposing zero pollution. But on many specific issues (e.g., whether to build a dam on the Delaware, whether to protect parts of Alaska from development) it would be wrong to seek a cosy consensus, truce, or compromise. It *is* a conflict: one side is going to win and the other side is going to lose; but the conflict itself gives the politician much important information.

There is room, however, for improvements in the rules of conflict, especially over two matters.

(i) Public participation in conflicts about the environment will be unfair unless all the adversaries (there are often more than two) have access to all the information relevant to resolving the conflict. In the USA you have a constitutional provision for open government. In Britain we have no such provision; on the contrary, anyone engaged in government business is bound and gagged by the Official Secrets Act. Of course some business has to be secret, and if the Act covered only this sort of business, few people would object; but it is invoked to cover any kind of sensitive information which might bring criticism upon the authorities. Memoranda about the levels of mercury in fish, lead in the air, radioactivity, and so on, float about among civil servants in documents marked 'confidential', are not released to the public unless and until politicians decide it is expedient to release them. A similar seal of confidentiality — not broken until the authorities deem it to be timely to do so — protects information about the intentions of authorities (sometimes governments, sometimes corporations) to change the environment by building dams, roads, power stations, airports. In the end such intentions as these are brought into the open (in Britain they would be submitted to a public enquiry under the Town and Country Planning Acts), but by the time that happens, those who hold the information are far

more powerfully equipped than are those who challenge them. So one improvement in the rules would be to give equal and timely access to technical and other information for all parties engaged in an environmental conflict. I am not sure that this is guaranteed even by open government as you have it in America.

(ii) Public participation in conflicts about the environment needs to be conducted, if it is to be effective, within strict 'rules of the game'. It is compliance with 'rules of the game' that enables disputes to be settled in courts of law and in legislatures—and, for that matter, among scientists over scientific controversies. I don't think we have yet invented appropriate rules for resolving conflicts about environmental policy. In America the courts are used a great deal. In 1973, three years after the National Environmental Policy Act (Public Law 91-190) was passed, over four hundred lawsuits had been filed under the Act." It is doubtful whether the adversary procedure and the strict rules of evidence in Anglo-Saxon law make courts suitable arenas for this kind of combat. In Britain the courts are rarely used; the common procedure is a Ministerial enquiry, which is conducted before an inspector appointed by the Lord Chancellor and (like some law procedures in France) is inquisitorial rather than adversary; so are the committees of enquiry which we in Britain use to resolve particularly difficult issues such as the proposal to instal equipment to reprocess nuclear products at Windscale. This is (I think) a better procedure than the process of the courts; but it, too, has drawbacks, notably that anyone can appear at a Ministerial enquiry to give evidence, and a lot of time is wasted in hearing the views of people who have not taken the trouble to familiarize themselves with the problem. A suggested alternative is to hold a 'science court'. This proposal was made in 1975 by Arthur Kantrowitz. It caused quite a stir, for it proposed that when there is a dispute

[26] U.S., Council on Environmental Quality, *Fourth Report* (Washington, D.C.: Government Printing Office, 1973).

about some technical issue of great public interest, a panel of scientific experts should be appointed to 'try' the case, hearing advocates on both sides. This adversary technique would be employed to pronounce upon such controversial issues as food additives and nuclear power. I am skeptical about the value of this suggestion, for apparently it is intended to deal only with the scientific issues of a controversy; and there is in the scientific world a good, though slow, method for dealing with these already.[27] If there is a dispute about facts, then experiments or observations are simply repeated until the facts are agreed; and until then the conclusion is held in abeyance. If there is a dispute about the scientific interpretation of agreed facts, then experiments are designed to distinguish between the competing hypotheses. The arena is the published paper and the scientific colloquium. It is when the social and political consequences of some scientific innovation are controversial (as, for instance, the effect of silicon chip circuits on employment) that the need arises for some better procedure than the courts or the legislature; and we have no satisfactory machinery of participation yet.

One interesting case study, however, points the way to a possible procedure. It comes from the San Diego Gas and Electric Company.[28] The company had to put up a new power plant to meet the needs of Southern California. They invited all environmental and planning organizations in the area where the site would have to be to attend a seminar where they explained why there had to be a new power plant, and proposed that those who came to the meeting should elect an environmental advisory committee to examine alternative sites and to take part in deciding where the plant should be. It was emphasised that members of

[27] *American Scientist* 63 (1975): 505; and U.S., Department of Commerce, *Proceedings of the Colloquium on the Science Court* (Washington, D.C.: 1977, mimeo).

[28] J. F. Dietz, 'Public participation in power plant sitings: A case history', in Electric Power Research Institute, 'Proceedings of a workshop on the measure of intangible environmental impacts' (Palo Alto: 1977, mimeo).

the committee would have to do a lot of work, prepare a written report on the project, and make recommendations by a specific date. The company representatives then withdrew from the seminar, leaving those attending the meeting to talk about the proposal and (if they agreed) to elect their committee. The committee was elected (composed, of course, of volunteers, though the company defrayed the expenses of the operation). The committee met at first once a week, and in the end two or three times a week. It held hearings (for which experts were provided) to educate itself on forecasting techniques, estimating future demands for energy, pricing, design, and so on. It arranged also a series of public hearings, at which other members of the public could air their views and ask questions. After some months of this intensive activity, the committee of volunteers really understood the complexities of the matter, yet it retained the confidence of the general public because its members were representatives of the public, not of the company. In the end the committee recommended a site among the options given to them, and (fortunately for the experiment!) this site was accepted by the company. There were wrangles and disputes during the meetings, but the conditions under which they occurred — the rules of the game — ensured that the conflicts of interest (between conservationists who wanted to concentrate on aesthetic matters, and businessmen who were more concerned with accessibility for water, fuel supplies, major transmission lines, and the like) were conducted with civility. Involving the public in such decisions is undoubtedly a clumsy procedure. It irritates the experts, who want to get on with the job. But it is the premium that experts have to pay if they are to retain the confidence of the public. Donald Strauss put the point well at the Colloquium on the Science Court: "The procedure is the prophylaxis." [29]

Cynicism toward decision-makers is an insidious social disease.

[29] See note 27, above

The best prophylaxis is to ensure that as much trouble is taken over the *process* of decision-making as is taken over reaching the right decision. In the Californian case I've described, the process of successful participation by the public depended upon the introduction of ritual. The evolutionary value of ritual is a phenomenon familiar among students of animal behaviour. Intra-specific conflicts arise in many animal societies —the males fighting for possession of females, for example —but they are commonly transformed into a ritual in which, at the end, the problem (possession of a mate) is resolved, yet neither contestant in the fight is seriously hurt. There is another advantage in this pattern of ritual for participation: it reduces the danger of 'Big Brother knows best', for it educates a small sample of the public (in this case the volunteers on the committee) to distinguish between matters (on one hand) which are legitimately the concern of the public, e.g., the siting of the plant, its effect on the local environment —traffic, noise, pollution, housing, employment, and the like —and the need to have an additional power plant at all, and matters (on the other hand) which have to be left to experts, e.g., detailed design of the plant, cost-benefit studies, phasing of the building programme. This is a distinction without sharp boundaries but it is nevertheless very important. I can express it best, perhaps, by a metaphor. The passengers on a ship are willing to leave the navigation of the ship to experts, but it is the passengers, before embarkation, who have a right to know the ultimate destination of the ship. If this distinction were more widely accepted, public participation would be more effective than it is at present.

To make good use of public interest lobbies, to ensure fair play in conflicts over the use of the environment, to design machinery for effective public participation: these will help the politician, but they will not exempt him from the responsibility of integrating hard facts and fragile values. His duty to do this lies at the heart of the democratic system. After all, he got elected

because he appeared to reflect what his constituents wanted; he is the least common denominator of those who voted him into office. Accordingly his own personal preferences about environmental issues are some guide to 'what people think', i.e., to what people desire. But it is his duty to transform this, so far as he can within the constraints of politics, into what is desirable in the public interest; and this requires him to give weight also to the interests of posterity and of nature.

In some matters, posterity's interests are certainly not neglected. Consider the expenditure on research and development, running into billions of dollars, to find ways to get energy from the sun, the tides, wind, the depths of the earth, and nuclear fusion; techniques that are not likely to benefit anyone over the age of fifty, but, it is hoped, will benefit posterity. The present bitter controversy over energy policy, once you have stripped away the self-serving interests involved, becomes an internecine conflict on behalf of posterity. Shall posterity have an assured supply of energy and a gruesome bequest of plutonium? Or shall posterity be spared the threat from nuclear wastes at the possible cost of an energy famine ?

Posterity and the environment are not being neglected as they were fifty years ago. But there is no ground for complacency. Some of the easy tasks have been done; the difficult tasks lie ahead. It may sound impressive that America spends some 2 percent of the GNP ($40.6 billions a year) on abating pollution.[30] But this sacrifice doesn't threaten the standard of living nor does it perceptibly erode liberty.

Awaiting us in the future there may be much more ominous problems: an oil famine, a stranglehold by hostile nations on supplies of some minerals, massive civil unrest arising from unemployment caused by new technologies, blackmail by terrorists

[30] U.S., Council on Environmental Quality, *Eighth Report* (Washington, D.C.: Government Printing Office, 1977), p. 326.

armed with plutonium, even changes in world climate due to the burning of fossil fuels: any of these would put an intolerable strain upon our Western democratic style of government and put at risk our freedom. Is *Homo sapiens* going to prove any better at anticipating the future than his fellow mammals have been? Animals and plants don't anticipate an approaching harsh environment such as the onset of an epoch of deserts or glaciers. They adapt the hard way, by a ruthless process involving the extinction of whole populations and the survival of a few strains capable of innovation. How then is *Homo sapiens* to proceed? That question puts the search for an environmental ethic into its political context.

I said earlier that an environmental ethic should be based not on any apparent goal of evolution (which may not be more than the survival of one's genes) but on the process of evolution which has given rise to such marvels as the social organisation of a termite colony, the migration of birds, and in human societies the intellect and imagination which create patterns of culture. But practical politics is based on achieving goals. When we translate our ethic into practical politics, is the ethic bound to be sacrificed? Are environmental policies doomed to futility because they lack consistent direction? I think the answer is: no, provided we look at our condition as being like that of the early explorers who navigated without maps. We cannot say (to use once again my analogy of passengers on a ship) that Western civilisation sails toward a specific destination. But we can say —and there is historical evidence to support the assumption —that the winds of evolution are taking us not so much *toward* some vague and idyllic Hesperides, as *away from* states of society that we regard as less worthy of respect than the present: away from societies with less liberty, equality, and fraternity than we have now (or, at least, know we *ought* to have), away from societies with less respect for nature than we have now. There was —after all — no WHO, FAO, or UNEP in the nineteenth century; we no longer

hunt Indians and Aboriginals like game; we pass laws to protect natural objects for their own sakes. So is it not a practical, pragmatic policy to keep on course in the same general direction? I'm sure it is a bad strategy to have too precise a goal, for that would foreclose options that our successors may need. I like to think that the best policy is the one adopted by the pioneers in America. Their overall strategy was firm: it was to go West. But each day, technical decisions had to be made: detours to avoid mountain peaks, diversions to avoid swamps and rivers, delays and postponements in bad weather. Something similar could be said about policies for the environment. The general direction seems to be right, but each individual policy decision has to be made in the light of experience of previous decisions, taking advantage of any momentum in public opinion which has followed them, nourishing the values of wise use and careful protection of the environment, attitudes that are becoming more securely implanted into the culture.

We belong to the first generation which has realised that it is entering upon an epoch of scarcity and that it can irreversibly damage nature on a global scale. The critical environmental question, here, is both political and biological. As our capacity to damage the environment increases, are we going to become more prudent (which is contrary to the natural appetites of communities)? or are we going to have to be compelled by government to be more prudent (which would be regarded as an infringement of liberties)? or, indeed, are we going to lose all opportunity for prudence (through the political and physical chaos resulting from a man-made environmental catastrophe)? This is a harsh dilemma. The political problems posed by our capacity to harm nature — and therefore ourselves — are unprecedented: how to implant into the culture a reverence for nature so that it becomes a social norm to protect public property — air, water, wilderness — as jealously as we protect our own property; how to devise techniques for participation that mobilise and educate public concern for environ-

mental issues; how to create a framework of choice, in which to cast political decisions and policies, that strengthens the present trend toward greater empathy for nature, and is nevertheless flexible enough because (as Laurence Tribe puts it) it "incorporates procedures for its own evolution." [31]

I can offer no solutions. But I have tried to take the harsh edges off the dilemma I described a moment ago by suggesting an environmental ethic, and an approach to practical politics over the environment, that have some promise of success because they build, in a progressive yet practical way, on the strength of certain existing genetically and socially coded kinds of behaviour — behaviour of both individuals and groups. Using these powerful resources of our biological and social heritage may help us to evolve into a society in which empathy for nature has survival value and where in addition — and this is important — the values of liberty, equality, and fraternity can survive too. This would be a society in which — to come back to Locke's passage about the Fountain — there would have evolved an agreed code of conduct among those who bring pitchers to the fountain; so that (on one hand) no one would be entirely without water, and (on the other hand) there would be no rationing officer standing over them as they draw water.

But achieving such a society is a challenge to society itself, not just to politicians who serve society. Can we meet this challenge? Some months ago President Carter appealed to Americans to regard the energy crisis as 'the moral equivalent of war'. The grim danger is that people even as enlightened as Americans and Europeans will not regard any threat as the equivalent of war until something happens to them which *is* the equivalent of war. Have we become so cushioned against the imperatives of nature that we think we are protected from natural selection; so soft that

[31] L. Tribe et al., eds., *When Values Conflict* (Cambridge: Mass.: Ballinger, 1976), p. 80.

we shall be unable to cope — either as civilised or even purely biological beings — with the austerities that await us in the next epoch of social evolution?

To these questions I have no answers. I can offer only a declaration of faith and a justification for hope. The processes of evolution are driving mankind slowly, haltingly, we know not whither. But this I believe: that it is away from barbarism.

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