# Human well-being and the natural world

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A feature of successful computer chess programs is that they combine powerful methods for calculation with weak procedures for evaluating their outcomes. The same might be said of standard cost-benefit analysis: a sophisticated mathematical analysis is combined with crude measures of value. The unit of value is human preference satisfaction, measured by monetary units in actual or hypothetical markets. The object is to refine the monetary instruments of measurement so that all preferences are included, and to apply a principle for the aggregation of preferences thus measured. Public policy is to be based on the aggregation of preferences. In the next four chapters I argue that this approach to public policy fails to provide the basis for rational and ethically defensible environmental policies. The present chapter examines problems concerning the constituency of environmental policy who counts in policy decisions. I argue that while cost-benefit analysis is able to incorporate the intrinsic value of nature and the preferences of future generations and non-human beings - criticism to the contrary being unfounded – it fails to give them proper weight. In the following chapters I argue that treatment of policy decisions purely as a process of preference aggregation is misconceived.

#### **4.1 COST-BENEFIT ANALYSIS: AN OUTLINE**

Cost benefit analysis arrives at public policy through the aggregation of individual preferences. The strength of an individual's preference for an object is expressed in terms of the amount she is willing to pay for that object at the margin, or alternatively, the amount she is willing to accept as compensation for its loss.<sup>1</sup>

Weighted preferences, as measured by willingness to pay or accept compensation, provides the starting point of analysis. The analyst must identify the parties affected by a proposal, and consider the benefits and costs for each party where benefits are understood as the satisfaction of preferences and costs their nonsatisfaction.

As a tool of social policy-making the analyst requires a principle for deciding which projects are worthwhile and how different proposals are to be ranked. Economic cost-benefit analysis employs only 'efficiency' principles of aggregation. The basic criterion of efficiency employed in neo-classical economic analysis is the Pareto improvement criterion - a proposed situation A represents a social improvement over a prior situation B if some individual prefers the new situation A to the old situation B and no one prefers B to A. However, where policy decisions involve both winners and losers, this Pareto criterion has little practical force. In actual policy decisions the analyst employs the potential Pareto improvement criterion on the Kaldor-Hicks compensation test. According to this criterion a proposal is 'efficient' if the gains are greater than the losses so that the gainers would be in a position to compensate the losers and still be better off.<sup>2</sup> On the Kaldor-Hicks criterion a proposal is efficient if aggregate benefits are greater than average costs whoever the gainers and losers happen to be. Where there are a number of proposals, projects can be ranked in terms of their total aggregate benefit. Neither the Pareto criterion nor the Kaldor-Hicks test for policy touches on questions of the distribution of losses or gains. Social cost-benefit analysis does attempt to do so either by placing some further distributional constraint on projects that pass the efficiency test<sup>3</sup> or by directly attaching different weights to the benefits and costs of different social groups, so that the benefit that accrues to an under-privileged group is weighted more heavily than that of a privileged group.4

Cost-benefit analysis – both 'economic' and 'social' – also standardly weights benefits and costs differently depending on the time at which they occur. Future benefits and costs are valued less the further into the future they occur. The future is discounted. Thus, by applying a social-discount rate, the analyst converts future benefits and cost to current values when aggregating costs and benefits, the further in the future the lower the value. Where the discount rate is r, the benefit B, in any year t will convert to a

current value at year 1 of  $B_t/(1+r)^t$ . The arguments typically offered for discounting will be outlined and discussed in 4.3.

Having identified parties affected by a set of proposals, calculated the weighted benefits and costs to different parties, and applied the relevant efficiency rules, the analyst has to rank the proposals. There are two modes of ranking proposals. The first I have mentioned already in discussing the Kaldor–Hicks criterion of efficiency. Costs at present value are subtracted from benefits at present value: the proposal which maximizes benefits over costs is the preferred proposal. Where there are limitations on the amount of capital that can be used in various projects, this ranking rule is often replaced by another: the best proposal is that which gives the best returns per unit of resource. Proposals are ranked in terms of the ratio of total benefits to total costs, and that with the highest benefit to cost ratio is preferred.

Two further problems which have led to further refinements will be of particular importance in what follows. They are:

(1) Should one begin with 'actual' preferences in cost-benefit analysis or fully informed preference?

(2) How is one to measure the value of goods that are not exchanged on the market?

The way in which cost-benefit analysis might deal with such problems will be examined in chapter 5.

#### 4.2 THE CONSTITUENCY OF POLICY

A standard objection to cost-benefit analysis in environmental decision-making is that, by taking preference satisfaction as basic, it necessarily fails to consider those who cannot articulate their preferences by the willingness to pay criterion, in particular (1) non-humans and (2) future generations.

#### 4.2.1 Non-humans

It might be objected that if only the preferences of currently articulate adults count in policy decisions, then there is no place in cost-benefit analysis for consideration of the intrinsic value of nonhumans. The strength of this objection depends on what is meant by 'intrinsic value'. As noted in chapter 2, the term intrinsic value has a number of distinct senses. I argued there that if by 'intrinsic value' is meant 'non-instrumental value', then the claim that non-

humans have intrinsic value is quite compatible with a subjectivist theory of value. That point has relevance here. The preferences of articulate humans might express non-instrumental concern for non-humans. Thus, if we let Pxy be the predicate 'x prefers y', while the x variable may only range over articulate persons, there is no reason why the y variable should not range over the states of the inarticulate. Among an individual's basic preferences might be the preservation of some threatened habitat or of some endangered species, independently of any benefit that might accrue to that individual. Intrinsic value in the sense of noninstrumental value can therefore be incorporated into cost-benefit analysis via the preferences of articulate humans. Within the economic literature, values founded in such preferences are termed 'existence values'. There is nothing conceptually incoherent about introducing the intrinsic value of non-humans into cost-benefit analysis via 'existence values'. What cost-benefit analysis does have difficulty in incorporating is the intrinsic value of non-humans where by intrinsic value is meant the value an object has independently of the evaluations of valuers.

#### 4.2.2 Future generations

Just as the non-instrumental value of non-humans can be included through the preferences of humans, so also the interests of future generations can be represented by the preferences of present generations. The present generation includes individuals who have preferences concerning the well-being of their children, grandchildren and generations beyond. Such values are sometimes incorporated into economic analysis as a part of the 'optionvalue' of an object, where this refers to the value an object has in virtue of its potential beneficial uses by humans. Individuals, it is argued, can assign 'option value' to an object, not only in virtue of its potential use by themselves, but also in virtue of its potential use by others - both contemporaries and future generations.<sup>5</sup> Again, there appears to be nothing conceptually improper about this employment of 'option values'. Individuals can have among their preferences a preference that something be used by others, and such preferences can appear in cost-benefit analysis. Costbenefit analysis can, then, incorporate the interests of future generations and non-instrumental value of non-humans via the preferences of current generations.

#### 4.2.3 Problems of incorporation

The value of an object is taken then to be a representation of three kinds of preferences – a preference for the actual use of the object, a preference for the optional use of an object by self and others, and a preference for the object's existence and well-being independent of its actual or potential use by others.<sup>6</sup> The problem with cost-benefit analysis is not the *possibility* of incorporating nonhumans and future generations, but the *way* in which they are incorporated. There are two problems here. First, the representation of non-humans and future generations is precarious. Second, the weights given to their interests are inadequate.

(1) The representation of non-humans and future generations by the preferences of current generations is precarious. What analysis thus far has shown is that they can be indirectly represented. It does not follow that they will be represented. They are represented only in so far as the current generation are not egoists, that is in so far as they do not prefer only to satisfy that set of interests that can be satisfied exclusively of others. I have argued in chapters 2 and 3 that our well-being incorporates the interests of future generations and non-humans. However, our preferences need not. For representation of future generations and nonhumans to be possible, enough of the current generation must possess non-egoistic preferences. The vicarious representation on which cost-benefit analysis relies to defend itself against the charge of failing to incorporate future generations and nonhumans exists only if one assumes that the preferences current generations have are those they *ought* to have. However, to begin to refer to preferences individuals *ought* to have rather than those they in fact have is to move away from a view that takes preference satisfaction as the basis of decision-making. I will discuss this point in more detail in the next chapter.

(2) The weight that is ascribed to the interests of future generations and non-humans given indirect representation of their interests by current preferences is less than it ought to be. Two points are of relevance here. The first is a continuation of that just made: the vicarious representatives of the interests of future generations and non-humans are less numerous than those they represent. Thus, given a society like ours, in which the majority in their purchasing behaviour do not exhibit great concern for the interests of future generations and non-humans, those interests

may not receive the weight they ought to. The interests of one of the affected parties of a policy – the *articulate* current generations – are likely to receive greater weight than the *inarticulate*. The second is a problem peculiar to the representation of future generations, namely that social discounting necessarily entails that their interests receive less consideration. This I consider in detail in the next section.

#### 4.3 Discounting the future

To discount the future is to value the costs and benefits that accrue to future generations less than those of the present. Since benefits and costs are in cost-benefit analysis measures of preference satisfaction and dissatisfaction, the preferences of future generations weigh less than those of the present. Thus the assumed preferences they might be supposed to have for an absence of toxic waste, expressed in their willingness to pay for that absence or their willingness to accept compensation for its presence, is valued at less than that of current generations. If their preference expressed by willingness to pay for the absence of toxic waste is £n, and the discount rate is r, then preference in t years' time is  $fn/(1 + r)^t$ . Thus if we assume a constant preference for the avoidance of toxic poisoning at some arbitrary figure, say £1,000, then, using the standard discount-rate employed in the UK of 5 per cent, the same preference in fifty years is now to be valued at only £1,000/(1.05)<sup>50</sup> = £87.2. The further into the future. the lower the weight. Likewise with benefits. Consider tree growing. A tree that took fifty years to grow, worth £100 at current prices, would in a cost-benefit analysis be given a value of just £8.72. Likewise with non-renewable resources. £100 worth of oil at present rates would be discounted at £8.72. Social discounting appears then to provide a rationale for displacing environmental damage into the future, and valuing current consumption of benefits over future consumption. Our current preferences count for more than both our future preferences and those of future generations. Given the way in which discounting appears to provide an ethically indefensible bias against future generations, how is it justified?

Four justifications of discounting are to be found in the literature.

(1) Uncertainty. Individuals value present benefits over those of the future since they are uncertain about their future preferences,

the existence of a future benefit or cost, and finally of their own existence to receive expected benefits. Similarly, in social policy, uncertainty about future preferences and the existence of future benefits and costs justifies discounting the future.

(2) Increasing wealth. On the assumption that wealth increases over time, the marginal utility of any future benefits will be less than those of the current period. Hence future benefits are to be weighted less than current benefits, in just the same way that benefits to the current wealthy are to be weighted less than those to the current poor.

(3) Pure-time preferences. Individuals have pure-time preferences – they prefer benefits now to benefits tomorrow simply in virtue of the time at which they occur. They are impatient. Any aggregation of preferences in cost-benefit analysis must reflect these pure-time preferences.

(4) Social opportunity costs. Any future benefits of a proposal have to be compared to the future benefits that might have accrued had the resources been invested at the going rates of interest. Future benefits and costs have to be discounted by the projected interest rates.

I now show that none of these arguments provides sound grounds for discounting.

#### 4.3.1 Uncertainty

Uncertainty about the future provides no justification for discounting. Uncertainty about personal existence does not entail uncertainty about species existence. One can assume that, given care on our part, future generations will exist. While uncertainty about specific preferences of future generations does exist, uncertainty about their needs does not. One can assume that toxic materials will be harmful and that they will need sources of energy, food and basic raw materials. It is of course possible that scientific progress will mean that measures counteracting or neutralizing the toxins in question will have been developed, or that the tree planted will die of disease before it reaches maturity or will have been destroyed by fire, or that substitutes for wood will have been developed and so on. However, there is no reason to suppose that the uncertainty of future benefits and costs, even if it may have a loose relation to distance in time, obeys a discount factor of  $B_{t}/(1 + r)^{t}$ . Indeed, there is no reason to suppose that any

probability function at all can be ascribed to the uncertainty of future benefits and costs. In particular, the future progress of science is in principle unpredictable, for reasons Popper has outlined. If we could predict the future progress of scientific knowledge we would already possess it.<sup>7</sup> Hence, there is no rational foundation to the assignment of any probability function to the discovery of a solution to a particular scientific problem. Hence, since such technical solutions depend on scientific theories, there is no rationally founded probability function that can be assigned to the discovery of technical solutions to any particular pollution problems or to the existence of new materials that can be substituted for the old.

We need to distinguish uncertainty from risk, where risk describes contexts in which probability functions can be assigned to possible outcomes (as in card games) and uncertainty contexts in which they cannot. Given contexts where there are unresolvable uncertainties other rules need to be applied. One such rule is the 'maxi-min' rule - given a choice of proposals or a choice between acting on a specific proposal or not so acting, assume the worst outcome will result from each course and choose that option which has the least bad worst outcome, i.e., play safe. A related rule is the 'mini-max regret' rule - follow that proposal which minimizes the maximum regret we will have. Where potential environmental disasters are possible consequences of a proposal, such risk aversion strategies are rational. Likewise, so also is the strategy of not making irreversible decisions for which the same rationale applies. Where the worst consequences of a reversible decision are avoidable, those of an irreversible decision are not. Whatever rules are applied in the context of uncertainty, given that no meaningful probability function can be applied to such outcomes, it makes no sense to appeal to uncertainty to provide a foundation for discount rates.

#### 4.3.2 Increasing wealth

If wealth is increasing at a certain rate then it makes sense within the theoretical presuppositions of social cost-benefit analysis to weight a unit of value in the future as less than it is now. To do so is simply to apply social cost-benefit analysis across generations. A unit of wealth has a lower marginal utility with increased wealth. However, the assumption that future generations will be

wealthier is not one that has a rational foundation. Given the depletion of non-renewable resources, changes in global climate, the limits of substitutibility of materials, there are good grounds for believing that the average wealth of future generations might be a great deal less than that of current generations. Indeed, there is something paradoxical about discounting when applied to non-renewable resources, in that it undermines its own justification. Given discounting, current consumption is to be preferred to future consumption, but given a finite non-renewable resource this entails that at some point  $t_n$  that generation will be likely to be less well off than current generations. The application of discounting entails the disappearance of the wealth that justifies, in terms of diminishing marginal utility, its very application.

#### **4.3.3 Pure-time preferences**

The claim that individuals have a time preference for present over future goods and that the value assigned to a good diminishes in direct proportion to its distance into the future is commonly cited as a justification for social discounting. Since it is the task of social policy to aggregate the preferences of affected parties, time preferences must be incorporated into public policy. This defence of discounting is open to two sets of objections: (1) those concerning the move from intrapersonal preferences to interpersonal preferences, and (2) those concerning the rationality of such preferences for any individual in the first place.

(1) For any individual who has a pure-time preference for the present over the future consumption of goods, that preference concerns her own future preference satisfaction. When one moves to consideration of a social-discount rate this is no longer the case. One is concerned not with the satisfaction of one's own preferences, but with those of others. Now it is one thing to say that I would be willing to pay only £8.72 for a tree I received in fifty years for which I would currently be willing to pay £100. It is another to value that tree for another person who lives in fifty years' time at £8.72. Social discount rates do just this. Even given unanimity in time preferences in the current generation, the goods and harms about which preferences are expressed satisfy or dissatisfy the preferences of a different population. Cost-benefit analysis does not aggregate the preferences of all affected by the

decision. There is no defensible way of moving from intrapersonal preferences to interpersonal preferences.

(2) Are pure-time preferences rational for an individual? Two conflicting views are to be found within both neo-classical and Austrian economics. Both hold that individuals have pure-time preferences - that, other things being equal, individuals prefer the satisfaction of wants sooner rather than later. They differ, however, in their view of the way the satisfaction of time preferences bears on human well-being. The defender of pure-time preferences argues that human well-being demands their satisfaction.8 The opponent of pure-time preferences holds that well-being demands that we ignore such time preferences since to include them will be to fail to maximize the satisfaction of desires over a person's lifetime. Time preferences show only that 'our telescopic faculty is defective';9 one should take a temporally neutral view of the satisfaction of desires. I will argue here that both views are mistaken. Neither can make sense of the reference to narrative order in the evaluation of how well a person's life goes.

Consider the following stories.

(A) A newly married couple, couple A, go on a two-week honeymoon. The holiday begins disastrously: they each discover much in the other which they had not noticed before, and they dislike what they find. The first two days are spent in an almighty row. However, while they argue continuously over the next seven days, they begin to resolve their differences and come to a deeper appreciation of each other. Over the last five days of the holiday they are much happier and both feel that they have realized a relationship that is better than that which they had before their argument. The holiday ends happily. Sadly, on their return journey, the plane that carries them explodes and they die.

(B) A newly married couple, couple B, go on honeymoon. The first twelve days proceed wonderfully. On the thirteenth day their relationship deteriorates badly as each begins to notice and dislike in the other a character trait which they had not noticed before, at the same time realizing that the other had a quite mistaken view of themselves. On the last day of the holiday they have a terrible row, and sit on opposite ends of the plane on the return journey. They both die in an explosion on the plane.

Which lives go better? Or, to stay with the language of consumer choice, given a visitation on the day before the holiday begins by an angel who presents you with a choice between the

two lives, which would you choose? (The visitation and the choice itself will be instantly forgotten, so can be ignored.) What would the consumer with a time preference choose? All other things being equal, nobody wants the stress that arguments bring. All other things being equal, everyone wants to have an enjoyable time. In holiday B, the preference satisfactions occur early, and the preference dissatisfactions occur late. The defender of time preferences suggests that we include time preferences for goods that occur sooner rather than later. With weight given to preference satisfaction sooner rather than later, the choice must be holiday B. The opponent of time preferences will ignore such relative weighting and advise a temporally neutral perspective. But, given identical dissatisfactions from arguments and satisfactions from enjoyable times together, holiday B still contains more satisfactions than dissatisfactions. Given that when these occur is of no matter, one should still choose holiday B.

However, most individuals, given a visitation from my angel, would, I suspect, choose holiday A; they would characterize the story of holiday A as a happier one than that of holiday B. They would do so neither because the temporal order of events is irrelevant nor because it is the case that it is always better to have goods sooner rather than later. What counts in favour of holiday A is the *narrative* order of events, and crucial to that order is the way in which that story ends. As I argued in the last chapter, people's lives have a narrative structure, and the ending of a narrative is crucial to the genre to which a person's life, or an episode of that life, belongs – tragic, comic, pathetic and so on. Our evaluation of how well a person's life goes depends on the narrative we can truly tell of it. Time is relevant, but not in the way that either of the protagonists in the debate about time preferences assumes.

Both the standard perspectives on time preferences make sense only if one pictures a person's life as consisting of a series of momentary acts of desire satisfaction. Given such a life a puretime preference for consumption now over consumption in the future makes sense. However, it does so at the cost of coherence in a person's life. Just as such a picture of lives across generations isolates each generation into itself, such a picture of an individual's life isolates each act into itself. A strong sense of identity across time is lacking. At any moment  $t_0$  Jones cares for Jones<sub>0</sub>, who exists now, more than for Jones<sub>1</sub> – who is physically related

to  $Jones_0 - at time t_1$ , and more than for  $Jones_2$ , who exists at time  $t_2$ , for  $Jones_2$  is a distant relation of  $Jones_0$ , more distant than  $Jones_1$ . The critic of pure-time preferences is an economic maximizer who demands equal consideration for future preferences, but on the basis of an oddly impersonal perspective. A life is still a series of discrete acts of consumption, but the maximizer instructs us to plan to maximize satisfaction over a life-time. The old self at time  $t_{70}$  is a distant relative of the self of  $t_0$  – someone about whom self<sub>0</sub> should care – and the value placed on that self<sub>70</sub>'s consumer satisfaction ought to be identical to that we place on the young person who now consumes. However, there is no sense of continuity, save physical relatedness, between the person at  $t_{70}$  and that at  $t_0$ . The lives described lack internal coherence. The economists' pictures of lives as acts of discrete consumption can make no sense of the ways in which lives as a whole are to be evaluated.

What is absent from these accounts is a view of human lives as ones which have a narrative structure – as stories of physical and moral growth and decline, of the success and failure of projects, of their re-evaluation, and so on. There is a narrative continuity between the self of  $t_0$  and that of  $t_{70}$ .<sup>10</sup> Our concern for the self of  $t_{70}$ is a concern about the way our intervening lives have gone. As I noted earlier, the genre to which a story belongs depends on the way it ends. Our concern with the future is, hence, a concern with now: how well our life at present is proceeding depends on its relation to a projected future. Thus, what from the present perspective appears to be the best part of one's life might, at a future date, turn out to be a prelude to failure. What at present appears to be a segment of one's life that has gone disastrously wrong may from a future perspective appear to be a turning point which leads to a happy conclusion.

Consider again my honeymoon stories. In holiday A, the argument at the start of the holiday is not simply a 'cost' – a moment of pain or desire dissatisfaction. Rather, taken in context, it might be that which clarifies the relationship and lays the foundation for the ensuing happiness. Within the context of the individuals' entire lives, it has another significance. Likewise, the moments of happiness in holiday B are not 'benefits' – feelings of satisfaction. Rather, within the context of the whole story, they are moments of illusion, when each person has a false view of the other, an illusion shattered by the final argument. Had their lives continued beyond that present, the argument also may have

become something else, but the ill fortune of untimely deaths robs the participants of such a future. Whether moments of pain and pleasure are goods or evils depends on their context of a life as a whole. They do not come ready-tagged as such.

The failure to allow this significance of the narrative order stems, in part, from one standard view of well-being assumed in economic literature. If one assumes, with Pigou, that 'the elements of welfare are states of consciousness', 11 then when an event occurs is irrelevant to its contribution to a person's welfare. Whether an event at time to is a 'satisfaction' or a 'dissatisfaction', a 'pleasure' or a 'pain', remains unchanged by any future event. It might be the case that at time t, its recollection causes pleasure, but its characterization at t<sub>n</sub> cannot be altered. Just as hedonism entails that our well-being cannot be affected by what happens after our deaths, so it entails that my current well-being is quite independent of what may happen later. As I noted in chapter 3, it is only if one moves towards an objectivist account of well-being which ties it to real achievements that narrative order can play a part in the evaluation of a person's life, and the characterization one gives to a particular event will be changed in terms of later events.<sup>12</sup>

#### 4.3.4 Social opportunity costs

Unlike the justifications of social discounting thus far considered, that which appeals to social opportunity costs need not be understood as valuing the goods and harms of future generations at lower rates than those of the present. Rather, interest rates provide a bench-mark against which possible benefits for future generations need to be evaluated. For any project, the capital invested in it has an alternative investment within banks at the current rate of interest. If the return of a project at year t, is less than that given at current interest rates at t<sub>1</sub>, then the project fails to provide the best outcome for future generations. Thus, for example, if the project is one of planting trees, on the assumption that the trees have a market value £v at year t,, whereas the return at t<sub>n</sub> at current rates of interest is  $\pounds v + w$ , it follows that an investment of money at current rates of interest more than compensates the future for the loss of potential trees. Similarly, for oil and other natural resources, we discount at the current rate of interest, since investment at such rates provides future generations with compensation for any losses.

There are two related problems. The first and less serious problem concerns the way in which interest rates are often misleadingly presented as simply given, with banks acting as a kind of money-generating institution independent of the rest of the economy. This instrument generates pound notes at a particular rate of interest to compensate future generations for their losses. Interest rates are of course no such thing. They rather are a measure of the cost of borrowing within an economy at a particular moment, and that cost of borrowing, in ideal market conditions, is determined by the demand for capital loans to invest in other private or public projects and the supply of savings. The expectations of each rational potential borrower is that the return on her project will be greater than that of the rate of interest. In other words, what is being compared when one uses the interest rate as a measure for discounting is the return from the project under consideration as against the return possible on other projects competing for capital investment. This point serves merely to clarify the argument from social opportunity costs and it might seem to provide a stronger case for discounting the future at the current rate of interest. The rate of interest represents a market measure of the expected returns on projects. Those that fail to meet that rate are shown to be less advantageous for future consumption than those that do.

However, as far as future generations are concerned, the argument fails. The returns on capital investment on alternative projects are likely, within a competitive market economy, to reflect expectations for immediate to medium-term gains. The capital invested in such projects might be - indeed in terms of energy and resource use is likely to be - costly to future generations. (Hence Pearce's defence of high discount rates, viz. that low discount rates 'will increase the demand for resources and environmental services', <sup>13</sup> has a grain of truth in it. The statement is true if one substitutes 'interest rate' for 'discount rate'.) In considering the effects of different projects on future generations what is relevant is not the gross rates of profit that can be expected from different projects, but rather the direct consequences of different projects for the well-being of those generations. It might be that clearing a forest and selling the wood will produce more immediate profit per unit of investment than employing the same capital to plant trees. Hence, in market terms, it might be rational to borrow capital at a certain rate of interest for

the first project, while irrational to borrow capital at the same rate for the second. However, with respect to the possibility of sustainable development which will benefit future generations the second project is likely to prove preferable to the first. Interest rates do not provide a measure of return on projects that is relevant in consideration of the interests of future generations.

This points to the second problem with the compensation argument for using interest rates as a bench-mark for discount rates for projects. The argument assumes that all goods are commensurable - that for the loss of any good there is a level of compensation losers are willing to accept. This assumption is one that I will reject in chapter 7. A point to note here, however, is that the compensation argument depends on the existence of alternative goods one can buy and substitute for that loss. Money is never its own reward. However, given the loss of basic environmental resources such as top soil, clean air, clean water, an atmosphere that filters out harmful rays, and so on, it is not clear what the substituted goods are supposed to be. Even if goods were commensurable such that all are replaceable by others at particular rates, it is simply nonsense to point to a nominal compensation sum in the absence of arguments to show that goods to be substituted will exist. One needs direct comparison of different projects in terms of the real possibilities they leave open to future generations.

The argument for discounting by appeal to social opportunity costs reveals at a deep level an old confusion between wealth and money that was noted as far back as Aristotle and again by Adam Smith in his critique of mercantilism.<sup>14</sup> Wealth refers to goods which can, in a market economy, be purchased with money, not money itself:

A guinea may be considered as a bill for a certain quantity of necessaries and conveniences upon all the tradesmen in the neighbourhood. The revenue of the person to whom it is paid, does not so properly consist in the piece of gold, as in what he can get for it, or in what he can exchange for it. If it could be exchanged for nothing, it would, like a bill upon a bankrupt, be of no more value than the most useless piece of paper.<sup>15</sup>

The last sentence is of quite direct relevance to the debate about the use of interest rates as a ground for discounting – although it

takes on a quite different meaning. What matters is not a nominal sum of wealth, but the goods, in particular the environmental goods, it can be exchanged for. What does it profit a man who gains a fortune and yet loses the world?

The appeal to market-based discount rates in the discussion of planning for the future is a mistake. It is not that discount rates should be zero, negative or positive, but that they are on the whole irrelevant to the discussion of the policy one should adopt to the future. There are good principles that govern our dealings with the future - that we minimize resource depletion, that we avoid irreversible changes, that we engage in sustainable economic activity and so on. Moreover, with any specific resource, there are rates of use and of return on projects that need to be considered. However, the appeal to general discount rates governing all activities, projects and resources cannot form the basis of rational planning for the future. More specific comparisons need to be made. To a limited extent the rule is already followed, for example in the particularly low discount rates for forestry projects. These ad hoc adjustments are not irrational: they are a rational departure from an irrational procedure. It would be better if the use of market-based discount rates were avoided completely.

### 4.4 COST-BENEFIT ANALYSIS AND THE INARTICULATE

Given that standard cost-benefit analysis does fail to give sufficient weight to the interests of the inarticulate, can it be revised to do so? One possible simple refinement of cost-benefit analysis is to include the preferences of the inarticulate directly. Thus, it might be argued, while the inarticulate cannot express their preferences, we can with a fair degree of reliability impute certain preferences to them. Indeed, that is what in practice cost-benefit analysts actually do for its standard constituency. Thus while we cannot know the detailed preferences of future generations, we do know enough of their needs to impute some preferences to them. We can assume, for example, that they will have a preference for unpolluted air, clear water and freedom from physically harmful substances – say highly radioactive substances.

Likewise, it might be argued that we can feasibly impute certain preferences to higher animals. Thus to take an example of Stone's: there is no reason, he suggests, why biologists might not construct

a 'preference profile' of the bowhead whale – its preferred route through the Beaufort Sea, its preferred foods and so on. Using such a preference profile one might then also compute a related compensation rate for a project that interfered with the whales' current paths.<sup>16</sup> A similar position is developed in the Ramsey Centre Report on environmental ethics. Where standard costbenefit analysis represents the preferences of non-humans only indirectly, the Ramsey Centre Report suggests we include them directly. Like Stone, it holds that it makes sense to refer to the preferences of non-humans:

we consider it is not improper to speak of animals' 'preferences', nor impossible to identify them ... Desires and preferences may be readily located in the drives and other behaviour-patterns of non-human animals, as may, correspondingly, their interests.<sup>17</sup>

Those preferences imputed to sentient beings should enter directly into cost-benefit analysis: 'in environmental decisions all sentient beings should receive equal consideration, and non-sentient beings, none.'<sup>18</sup> Two measures for including the preferences and interests of non-humans are suggested. The first is for the decision maker to act as a trustee and directly weigh the interests of non-humans as they might those of children and future generations alongside those of existing adults. The second is to include interests by adding a moral side-constraint on decisions.

Direct representation of the inarticulate clearly solves a problem concerning the disproportionate weight that might otherwise be placed on the interests of current generations. What is peculiar, however, is the inclusion of their interests via their *preferences*. The detour through preference is irrelevant in the inclusion of the inarticulate. What we know of future generations is what their *needs* will be – for clean air, unpolluted waters and so on. Their preferences might be quite different. They might themselves be quite unconcerned about the quality of their environment. If that were the case, then, for reasons noted in in the last chapter, that might represent a failure of ourselves and intermediate generations. However, in considering current projects that will affect future generations, we consider their needs. Their possible preferences are irrelevant.

Similar considerations apply to non-humans. In considering the interests of whales, what counts is not some hypothetical prefer-

ence profile that might be imputed to them, but rather what is known of their needs. Whales might show in their behaviour a preference for substances which are harmful to them - domestic animals often reveal preferences for sugary food that is harmful, while on the impeccable authority of my children's I-Spy Book of Nature I learn that the kinkajou has a keen taste for alcohol and literally hangs around in tropical bars, ready to drop down and steal customers' drinks.<sup>19</sup> There are no good reasons to respond to such preferences. Indeed where non-human animals are concerned there are good paternalistic reasons to deny them. Neither does it make sense in this context to employ 'informed preferences' in place of 'actual preferences' as the authors of the Ramsey Centre Report suggest.<sup>20</sup> While it makes sense to refer to possible 'informed preferences' of adult humans, i.e., to impute conditional claims of the form 'if they knew x, they would prefer y', it is unintelligible to impute such preferences to animals. They lack the cognitive capacities to possibly satisfy the antecedent of the conditional. Talk of 'informed preferences' in this context is simply a misleading way of referring to an animal's needs.

In the context of the inarticulate, then, what needs to be considered are not possible preferences, but needs. The concept of need in turn is based on non-subjective criteria of well-being. In saying 'A has a need for X', we are saying that X is required if A is to flourish. The detour into preference structure is irrelevant. In the following chapter, I will argue more generally against purely preference-regarding principles of policy. The view that environmental policy should proceed by way of an aggregation of preferences is misconceived.