The role of cost-benefit analysis in environmental debates

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Executive Summary

Far from resolving controversy, cost-benefit analysis generates it. Why?

- It attempts the impossible: people cannot provide meaningful answers to the contingent valuer's questions.
- It is biassed in favour of `development': the attempt to value costs in terms of the losers' *willingness to accept compensation* is unworkable in practice; the use of *willingness-to-pay* measures understates the costs of development.
- It entrenches conflict: it seeks to *capture*, in monetary form, the values of the contending parties at the start of an argument, and settle the dispute by computation.

Consensus can be built out of conflict only if people can be persuaded to *change* their values. Before computers and those who feed them with `values' can be useful in making decisions there must be agreement about what is valuable. Changing the values of participants in environmental debates is a messy and protracted process of argument, discussion, negotiation and compromise.

The failure of CBA

Cost-benefit analysis (referred to henceforth as CBA) fails an elementary political test. It does not convince. It is proffered by economists to politicians and government officials as a method for making decisions about controversial issues. But, far from resolving controversy, CBA has itself become a focus of conflict. "Horse and rabbit stew", "nonsense on stilts", "insidious poison in the body politik", "Vogon economics", and "the economics of genocide" are but a few of the more colourful epithets that have been directed at CBA over the last three decades.

The largest and best known CBA ever undertaken in Britain, the inquiry by the Roskill Commission into the third London airport (1970, 1971), recommended that a new airport be built at Cublington. Protesters against this recommendation burned Roskill in effigy and paraded about with "Stick it on Foulness" placards; the government duly rejected the Roskill recommendation in favour of Foulness, the site that came last in Roskill's cost-benefit rankings. The Government then retreated from this decision to designate Stansted as the third London airport, a decision made without the help of CBA.

For over twenty years the use of CBA (in the form of COBA) by the Department of Transport has inflamed rather than appeased the opposition to the Department's road building programme. Public inquiries to which the COBA results are presented have been disrupted, and road schemes justified by COBA have encountered physical resistance on the ground. The provision of security for both road inquiries and road construction has become a significant element in the cost of new roads.

Most recently, the attempts of cost-benefit analysts in Working Group 3 of the IPCC (Intergovernmental Panel on Climate Change) to conduct a global cost-benefit analysis (G-CBA) of global warming have provoked rancorous debate. Their assumption that North American and European lives are worth ten times more than Chinese, Indian and African lives, has provoked a barrage of protest from Third World countries and their developed world supporters.

How then can one account for its current popularity with certain government departments and international agencies? Why does the Department of Transport persist in using it? Why has the

Department of the Environment published a manual - *Policy Appraisal and the Environment* - urging its widespread application to environmental problems? Why does the Treasury insist upon it as a test of value for money? Why is the Intergovernmental Panel on Climate Change undertaking a G-CBA? And why has the Royal Commission on Environmental Pollution (see below) adopted the view of the IPCC cost-benefit analysts that one Englishman is worth ten Chinamen.

The appeal of CBA

CBA offers to make difficult decisions easy. On first encounter it is difficult to understand how an apparently simple and straightforward method of analysis could provoke such strong feelings. It is a method of project appraisal. Its essence is contained in its name. It consists of measuring the costs and benefits of proceeding with a project, and adding them up to see which is greater.

It has assumed an important role in environmental debates because of the attempts made by cost-benefit analysts to seek out and embrace `externalities' - the social and environmental consequences of decisions that are not captured by the operation of the market - such as the effects of acid rain, traffic noise, oil spills, or the deaths predicted to be caused by global warming.

In valuing such consequences cost-benefit analysts distinguish three different kinds of value: *use value*'[1] (UV), *option value* (OV) and *existence value* (EV) (Pearce et al 1989 and Pearce & Turner 1990) . These distinctions feature frequently in debates about the preservation of endangered species and environments. Grizzly bears, to take an example discussed by Pearce et al (1989), have a *use value* to the hunter; hunting is an activity from which the hunter derives a `benefit' for which he is willing to pay. They also have an *option value*; they are an endangered species and studies by economists have shown that hunters are prepared to pay to preserve the option of hunting them in the future. But they also have a value, the economists have discovered, to people who intend never to hunt them or even hope to observe them; this *existence value*, they concluded, is related to the satisfaction people take in simply knowing that they are there.

Thus the *total economic value* (TEV) of a project can be represented by economists as a simple equation:

$TEV = E(UV + OV + EV)$, where costs are represented as negative values[2], and where E indicates that the values of all `stakeholders' are collected and added together.

If a project has a positive TEV, then proceeding with it will increase economic welfare. Such a change is known in the jargon of economics as a *Pareto improvement* - a change that leaves at least one person better off and no one worse off. A society enjoys a state of *Pareto optimality* if no Pareto improvements are possible. A *Hicks-Kaldor improvement* is one in which the winners could compensate the losers and still leave a net benefit.

Advocates of CBA claim that it is clear and candid; indeed if all the costs and benefits of a project can be measured in the same currency, it is a matter of simple arithmetic to decide whether

[1] This has more recently (Pearce et al 1994) been divided into Direct Use Value (DUV) and Indirect Use Value (IUV). An example of DUV is the value of nuts, timber and rubber yielded by a rain forest. An example of IUV is the value of the rain forest as a climatic stabilizer by storing CO_2.

[2] All costs and benefits in this equation are in the form of "present values", i.e. future streams of costs and benefits are discounted.

the benefits exceed the costs, and by how much. It requires the analyst to be explicit, to set out clearly all the factors that he or she is taking into account, and the importance that is being attached to them. It is offered as a way of making decisions that is *objective, systematic, fair, transparent, `green' and democratic*.

- It is *objective* and *systematic* in the sense that, once the variables to be included in the analysis have been identified, and the method of measuring them specified, it should yield the same answer whoever is doing the analysis.
- It is *transparent* in that it is possible to explain the origin or derivation of all the numbers used. The Department of Transport has for many years been the most important user of cost-benefit analysis in Britain (if importance is judged by the amount of public expenditure justified by the method). Its version of cost-benefit analysis, COBA, is supported by substantial manuals detailing very specifically everything from the way in which future traffic flows are to be estimated, to the way in which the value of a human life is calculated. The Department insists upon strict adherence to the procedures spelled out in the manuals in order to ensure that all its road schemes are assessed on the same basis.
- The *greenness* claimed for the method stems from its ability to encompass environmental externalities - things that have in the past been neglected in economic analysis because they were not traded in markets and had, therefore, no prices. Proponents of cost-benefit analysis argue that the environment has been damaged because it has been treated as a free source of raw materials and a free sink into which wastes can be dumped. The method's ability to encompass externalities, the proponents insist, will lead to decisions that pay greater respect to the environment.
- It is claimed that it is a *democratic* way of resolving conflicts of interest between those who stand to gain from a project and those who will lose; by identifying all significant winners and losers, and valuing their winnings and losses, the method ensures that all voices are heard and given their due weight.
- It is therefore a method of ostentatious *fairness*. It should persuade those who oppose any project that has been subjected to cost-benefit analysis that, even though they might not like the final decision, they have had fair hearing.

All these supposed virtues, allied to the method's quantitative rigour, lead its proponents to insist that it is a *rational* way of making decisions. Such is the attraction of CBA, for some, that it is now proposed that its application should be extended beyond its customary role of *project* assessment to the making of environmental *policy*.

In *Policy Appraisal and the Environment: a guide for government departments* (DoE, 1991) CBA is assigned a central role in the process of formulating government policy. That the application of CBA to the making of policy represents a move into uncharted waters is made clear by the standard reference work on CBA by Mishan - a text recommended by the guide itself; Mishan repeatedly stresses the importance of restricting the application of the method to costs and benefits which are immediately related to particular *projects* which are sufficiently small not to affect the context in which they are set:

> Let me remind the reader again that the context of a cost-benefit analysis is that of partial equilibrium analysis, one in which we concentrate on the valuation of several items on the assumption that the effects of the consequent changes in the prices of all but the most closely related goods or bads may be neglected.
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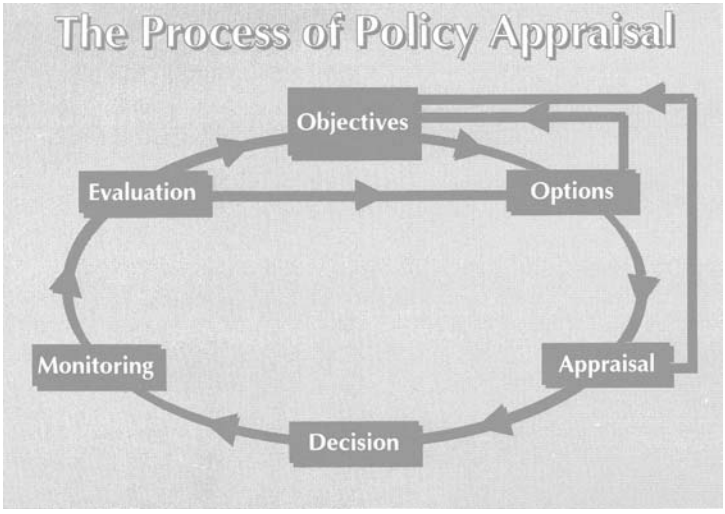
> Until recently *policy* has formed the context within which *projects* have been assessed.

Thus the Department of Transport, for example, has used CBA for many years to assess its road projects within the framework of a policy of providing road capacity to meet the unconstrained growth of traffic anticipated by its forecasters. Objectors at road inquiries who sought to question the wisdom of this policy were barred from so doing; they were told that scrutiny of government policy was the business of Parliament.

Now in *Environmental Appraisal in Government Departments* (DoE 1994) the DoE declares that CBA is to be used for `the definition and refinement of policy objectives and options.' This enlarged role for CBA in policy formulation is set out diagrammatically (see Figure 1); `appraisal', in this diagram, entails `estimating and presenting the costs and benefits of each potentially worthwhile option'. In the applications for which it was originally designed CBA aspired only to say how well or badly a particular project would serve a pre-determined policy objective. Now it is proposed to use it to define the objective itself. The past failures of CBA to settle disputes about projects suggest that its use for defining policy objectives will increase considerably the scale of the controversies that it fails to resolve.

Figure 1. Redrawn from *Environmental Appraisal in Government Departments*, p. 3



The Trouble with Cost-Benefit Analysis

The failure of CBA has three main causes:

- it attempts the impossible
- it is biassed
- it entrenches conflict

1. Attempting the impossible

Pearce and Moran (1993) note that CBA must `reduce all concerns to cash'. They add that `economists would be happy to use any other unit so long as human wants are measured.' Layard and Glaister (1994) insist

> `The only basic principle is that we should be willing to assign numerical values to costs and benefits, and arrive at decisions by adding them up and accepting those projects whose benefits exceed their costs. ... There is absolutely no need for money to be the numeraire (i.e. the unit of account) in such valuations. It could equally well be bushels of

corn but money is convenient.'

Concerns that cannot be reduced to cash - or bushels of corn - cannot be accommodated in a cost-benefit analysis. There is now an enormous literature devoted to the problem of how to do it[3]. It makes fascinating reading. There is agreement, that what they should measure is `the individual's own evaluation of his mental state', that is `a person's change in welfare as he or she would value it' (Layard & Glaister 1994). But sprinkled liberally throughout the cost-benefit literature of the last 25 years one finds acknowledgements that measuring such changes in welfare is *difficult*:

- Beckerman (1994) describes the problem as `tricky': `it is clear that there are tricky conceptual problems that have to be faced in defending any particular approach to the valuation of environmental costs and benefits and hence the choice of any particular price to be attached to the environment.'
- Layard and Glaister (1994) observe that `many economists have swallowed hard before making a particular quantification.'
- Pearce (1992) concedes that `there are indeed technical problems in validating the measures obtained - i.e. in determining whether they are "true" valuations or not.'

The caveats attached to their work by cost-benefit analysts have changed very little since the time of the Roskill Commission which observed (1970) `for some factors it is not easy to obtain evidence from which to measure people's valuation.' The Commission went on to raise a more fundamental problem, the fact that the cash quantification of some factors is not only difficult, but impossible - `the existence of unquantifiable factors presents difficulties.' Almost 25 years later the problem raised by factors that are incommensurable is still with us; in *Policy Appraisal and the Environment* the DoE observes

> `The use of money as a standard is sometimes a barrier to wider acceptance. Most people believe that there are some things which are "priceless" (in the sense that they cannot conceive of any sensible trade-offs involving these things). It may be considered immoral to place a value on goods such as clean air and water which are generally seen as a right for all. But a monetary standard is a convenient means of expressing the relative values which society places on different uses of resources.' (p23)

Most people, the DoE concedes, believe it is impossible. It *may* be immoral. But it is *convenient*. Convenient for whom? Whenever a cost-benefit analyst encounters people who say that something is priceless, or that attempting to put a price on it is immoral, he is stuck. His method requires that everything be reduced to cash. The information that he requires about how people value changes to their welfare is locked up inside their heads, and the only way that he can gain access to it is by asking them[4]. The form of asking is called `contingent valuation'; people are asked how much they would pay for the things the analyst is seeking to value *if* they were for sale. There is now abundant evidence that people cannot provide meaningful answers to the contingent valuer's questions.

Fischoff (1991) provides some telling examples in an article whose title conveys the essence of the economist's problem: `Value Elicitation: Is There Anything in There?' CBA,

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[3] Two extensive guides to this literature are found in the bibliographies of Pearce (1994) and Layard and Glaister (1994). Two useful critiques of this literature, also with extensive bibliographies, are O'Neil (1993) and Jacobs (1991).

4. There are other methods used to estimate *use* values, but contingent valuation is the only method, Pearce et al (1994) insist, that can capture *non-use* values, and hence *total economic value*.

Fischoff observes, rests on wishful thinking: `if we've got questions, then they've got answers.' Contingent valuers need people to have answers, because if they do not, the elaborate conceptual framework that they have devised to receive the answers is useless. The following is an example, discussed by Fischoff, of the sort of question that people must have answers to. It was asked as part of a study that sought to monetize the subclinical health effects of increased levels of ozone.

> `Think about the last time during the past month that you were tired easily. Suppose that it had been possible to pay a sum of money to have eliminated being tired easily immediately that *one* time. What sum of money would you have been willing to pay?'

The average value reported in this survey was $17. Fischoff observes `it is perhaps a testimony to the coerciveness of interview situations how rarely participants say *don't know*, much less try to bolt.'

There is now compelling evidence that people simply cannot do what the contingent valuers ask of them. Two more examples are offered to reinforce the point.

- *A weekend in Montreal without linen.* Kahnenman & Knetsch (1992), investigating people's willingness to pay to preserve fish in lakes in Ontario, discovered that the sum was more or less the same whether people were asked about one lake, a group of lakes, or all the lakes in Ontario. Intrigued, they proceeded to investigate people's abilities to attach values to goods which had actual market prices. They asked one group if they would pay $50 for a weekend in Montreal, a second group if they would pay $50 for gift coupons for linens, and a third if they would pay $50 for both. The results were: linen shop certificates - 24%, weekend in Montreal - 61%, weekend in Montreal + linen - 55%. A great many people, they demonstrated, are incapable of responding meaningfully to the questions to which cost-benefit analysts must have answers.

- *The Sphagnum Moss Committee*. James Fenton (1992) addressed the argument that ascribing a monetary value to wildlife and wildlife sites assists in their protection against other competing land uses. He invented the `Sphagnum valuation sub-committee' and charged it with ascertaining the amount of money that people would be prepared to pay to prevent a *Sphagnum* site from being destroyed. The following excerpts, from the minutes of the committee's meeting, give the flavour of the exercise.

  > `Dr. Ashworth reported that on his meagre salary he could only afford ,450, explaining that he would want to keep an additional ,50 for conserving the pale butterwort, a particular favourite of his. ... Dr. Penpont asked whether Dr. Ashworth's ,450 would be a one-off payment, or whether he could afford ,450 a year. ... Dr. Penpont said that he had calculated that there were 3373 people in the UK who could identify at least two species of *Sphagnum*, but he doubted that there were more than 45 who could identify all UK *Sphagnum* species. Thus he did not have high hopes of raising the total monetary value of *Sphagnum* species to more than, say, 7 times what the sub-committee could afford.'

Fenton's satire makes a number of telling points. Nature is under threat in ways that no one fully comprehends - ecologists have yet to produce workable operational definitions of `natural capital' and `biodiversity'. As a consequence few can articulate in biological/physical terms what might be lost. Fewer still can attach money values to the impending loss. And if people are forced to value such losses in terms of what they can pay to prevent them, the defence against competing uses is feeble.

Fischoff remarked on how rarely interviewees attempted to bolt when confronted by

contingent valuers. But a review by Hanley (1991) of six Scottish contingent valuation studies indicates that substantial numbers often stay behind to protest. The number of protesters is shown in Table 1. A `protest bid' is the term used by contingent valuers for any response to a valuation question that the researcher interprets as a refusal to play the CBA game. Protest can assume a variety of forms and stem from different motivations. No consistent means was used in the studies reviewed by Hanley to identify the motives of the people who failed to convince the cost-benefit analysts that they were taking their questions seriously; it is not known, for example, why 80% did not reply to the Aonach Mor mail shot.

Table 1. A summary of the findings of six Scottish contingent valuation studies. Source: Hanley 1991.

Study	Sample Size	`Bolters' & `Protesters'
Roslin Bing and Brickworks	302	150 zero bids 87 (29%) `protest' bids
Victoria Street	304	93 (31%) - 26 valued improvement but bid zero, 49 object to payment mechanism, 18 cannot afford anything
Spiers Wharf	369	112 (30%) had not noticed the site concerned
Aonach Mor	750 mail shot (150 responses) 151 face-to-face interviews	85 (28% of responses) - 13 object to payment mechanism, 15 can't afford to contribute, 46 not interested, 11 not enough information
Central Scotland Woodland Project, 1st survey	1200 questionnaires sent out, 230 returned	74 (32%) `protest' bids excluded from analysis
CSW Project - 2nd Survey	301	158 zero bids, 69 (23%) `protest bids' - `a reasonably low figure'

The Aonach Mor study asked people what they would be willing to pay to prevent a new downhill skiing development and preserve the area as it is. In this case Hanley classified only 8% as protesters - the 24 who objected to the payment mechanism or complained of insufficient information. He says `this is a very small percentage of protests, and indicates the (believability) credibility of the CV scenario.' The 15 who said they could not afford anything had zero bids entered; thus the poor were not registered as protesting that their voice in the environmental debate counts for nothing. `Not interested enough to contribute' was the summary label attached to 46 replies to the open-ended question `could you please give your *reasons*'; no one is recorded as giving more than one reason. The possibility that some of the answers that have been construed as `not interested' might be polite or poorly articulated forms of protest is not entertained; might they have been interested had they had more and better information on the issue? It is also not known how many of those who did provide answers were acting in response to the coercive circumstances of the interview. But the frequency with which contingent valuers encounter protest is indicated by

Hanleys's comment that the 23% encountered in the second Central Scotland Woodlands survey is `a reasonably low figure'. Arrow, Solow et al (1993) observe that in face-to-face interviewing the refusal rate `is unlikely to be below 20% even in very high quality surveys.' The much higher refusal rates found in the postal surveys - 80% in the case of the Aonach Mor mail shot and 81% in the first CSW project - suggest that where the circumstance are less coercive far higher numbers decline to take part.

But the most interesting question thrown up by the Aonach Mor study is what should be done with the third of the respondents who indicated that they would pay nothing to preserve the area *because they supported the ski development*? They also had their answers interpreted as zero. How might their interests be more effectively taken into account? To be consistent one should conduct an alternative WTP survey to ascertain what they would be willing to pay for the environmental benefit of a ski development. The use of the area could then be determined by who bid most - the skiers or the nature lovers. This would, of course, be tantamount to letting the market decide, and CBA would be revealed as nothing more than a form a market research - in a market in which the outcome is determined by purchasing power.

In the studies reviewed by Hanley, protest bids were either excluded or recorded as zero. Fischoff et al (1993) complain about this practice of `ad hoc culling and adjustment of responses that strike investigators as awkward, unreasonable, or signs of protest.' Such responses, they observe, `are a part of the picture when assessing the public's values.' Culling or adjusting protest bids is likely to exclude from `participation' in the cost-benefit analysis precisely those who feel most strongly about the issue being decided. It certainly undermines the contention that CBA is a democratic method of decision making.

It should also be noted that up to this point all the valuation problems that have been discussed have been examples in which economists have sought to measure people's willingness to pay for the *benefit* of an *improved* environment. As we shall see in the next section the valuation problems created by projects that *damage* the environment are much more common and much more intractable.

2. Bias

> `Increasing pressure on natural resources and the ability of the planet to absorb waste material has led to worldwide concern that environmental degradation threatens prospects for continued economic development. At the same time evidence is mounting of the significant and pervasive effects on the natural environment of policies at the macro economic level.' (Warford 1994)

This concern was expressed in a paper addressing the tensions between the environment and economic development in China, but it states succinctly the concern that is found at the heart of all debates about sustainability. Although, on occasion, human intervention might improve nature or repair previous damage, economic development is a *growth process* that usually damages the natural environment; it is a process that involves *increases* in the collection of raw materials, manufacturing, road building, the disposal of waste and the transport people and goods. It is a process that produces benefits in the form of higher material standards of living - but at a cost.

The costs of economic development that are seen as threatening the sustainability of the planet are large in geographical scale and long-lasting. A cost-benefit analyst keen to join the environmental debate might ask `Do the benefits of development outweigh these environmental costs?' or `Does the process of development make at least one person better off while leaving no one worse off?' or perhaps `Would the benefits of development permit the winners to compensate the losers and still leave a net benefit?' However the question is framed it poses a valuation problem that has proved intractable.

Valuing the *benefits* of economic development is in principle, for the economist, a relatively straightforward affair. The benefits are valued in terms of what people are willing to pay for them. Most of the products of the process are offered for sale, so there are market prices to guide the valuer. But even here there are problems. As we have seen in the previous section numerous people, when approached by a contingent valuer and asked to say how much they would be willing to pay for an environmental benefit, decline to play the game, leaving the frustrated economist to fabricate answers for them or discard their responses.

Valuing the *costs* of economic development is much more difficult. Here the economist must ascertain the sum of money that would compensate the losers for their losses. The judges of this amount must be the people suffering the losses; the economist cannot answer for them. A German example shows what can happen when the cost-benefit analyst tries to play the game conscientiously according to Pareto's rules (Adams 1989). Under German law, all residents living within a 45 degree angle from the top of a proposed building must give their consent before construction can begin. In Frankfurt in 1989 one Frau Kraus, who lived within the 45 degree angle of a proposed new skyscraper, discovered that she had in effect a right of veto over the project. She was offered DM 1 million, subsequently raised to DM 10 million for her consent. She declined, saying: `not even if they were to offer me DM 20 million would I change my mind ... it would block out my sunlight and spoil the place where I was born and bred.'

It is now accepted by most economists that the sums that people declare that they would be willing to pay (WTP) to prevent a loss are consistently less that the sums that they report that they would be willing to accept (WTA) as compensation for a loss. One obvious reason for this discrepancy is the fact that willingness to pay is constrained by ability to pay, while willingness to accept compensation is unconstrained. Wherever an economist encounters losses that are inconsolable by money - serious injury and death are common examples - his methods cannot work.

To salvage their methods economists routinely resort to asking the wrong question. They ask prospective losers what they would be willing to pay to prevent the loss and not what they would be willing to accept as compensation. In so doing, some economists (eg Pearce et al 1994) insist `there is no justification within economic theory for choosing between WTP and WTA measures' and say `good economic analysis will require good judgement on the question of whether to use WTP or WTA measures of economic value'. But others acknowledge that they are breaking the rules; Arrow, Solow et al (1993) maintain that `the conceptually correct measure of lost passive-use value that has already occurred is the minimum amount of compensation that each affected individual would be willing to accept.'[5] However, because of their concern that respondents would give `unrealistically high answers' they prefer the WTP measure which they describe as `the conservative choice.' But this is to throw away the theoretical foundation of CBA, the criterion of Pareto optimality. It is a crucially important evasion; it sacrifices the Pareto improvement principle, from which cost-benefit analysis derives both its theoretical and moral legitimacy, to expedience. Asking the conceptually-correct WTA question does indeed run into the problem of unrealistic answers, and there is no affordable test of whether people who give `unrealistically' high answers are telling the truth. The choice facing the economist in such cases is to abandon his method as unworkable, or to ask the wrong question.

The definition of `costs' and `benefits' determines the choice of measure adopted. Table 2, based on an illustration originally used by Mishan (1971), shows the way in which the legal/moral context of a problem can transform a cost into a benefit. It represents the possible bargains that might be struck during a train journey by two travellers sharing a compartment - a non-smoker,

5. Arrow et al were addressing the problem of assessing damage that had already been done, but it is equally `conceptually *in*correct' to assess future damage in terms of WTP. `Passive-use value' is their term for what other economists call `option value' and `existence value'.

and a smoker - depending on the rules of the railway company.

Under the *permissive rule*, which allows smoking, fresh air will be viewed by the non-smoker as a benefit - a departure from the status quo for which he expects to have to pay. The amount that he might pay will depend on the strength of his distaste for smoky air, and what he can afford. The amount that the smoker might accept to forego his rights might depend on the strength of his addiction or his income - or his compassion, the exercise of which would produce `payment' in the form of moral satisfaction.

Under the *restrictive rule*, which forbids smoking without the agreement of fellow passengers, the smoker's willingness to pay will be influenced by his income and the strength of his addiction, and the non-smoker's willingness to accept, will be influenced by his aversion to smoky air and how badly he needs the money. While it is difficult to imagine a civilised smoker requiring an extortionate sum of money to forego his rights, it is possible to imagine a desperately ill asthmatic refusing a very large sum of money to maintain his air supply in a breathable state. In any event, only in exceptional circumstances are a person's WTA and WTP likely to be the same.

Table 2 Who pays whom?

	Smoker	Non-Smoker
Permissive rule	**Willingness to Accept** compensation for foregoing the right to smoke	**Willingness to Pay** for the benefits of a smoke-free journey
Restrictive rule	**Willingness to Pay** for the right to smoke	**Willingness to Accept** compensation for foregoing the right to fresh air

With respect to real world environmental problems one can find analogous situations. It does sometimes make sense to ask how much people might be prepared to pay to prevent certain environmental losses. The threat to Venice by the rising waters of the Mediterranean is an example. There may also be cases in which everyone can agree that nature can be improved upon, and they are happy to pay for the benefit. But most current environmental controversies might be characterised as disputes between `developers' (representing the beneficiaries of proposed projects) and `environmentalists' (representing the losers), and the choice of which measure to use to value the prospective losses stemming from the project is, in effect, a choice of rule. If, in the above illustration, the smokers represent polluting industry, and the non-smokers, the defenders of the environment, then to ask the environmentalists how much they are willing to pay to prevent damage to the environment, is to assume a permissive rule. It is tantamount to basing the cost-benefit analysis on a presumption in favour of `development'. It is to assert that people have no *right* to clean air and water, to peace and quiet, to their architectural heritage, to cherished landscapes, or to habitats for endangered species; these are all transformed into privileges for which people are expected to pay out of limited budgets. It treats all those adversely affected as a group of non-smokers travelling in a smoking compartment.

Arrow, Solow et al (1993) imply that the bias caused by using WTP questions instead of WTA questions is not significant: they say the WTP question `is the conservative choice because willingness to accept compensation should exceed willingness to pay, *if only trivially.*' The Department of Transport's method of valuing public open space provides a good example of the magnitude of the bias that can result from using the wrong measure of cost; it is far from trivial.

Land needed for a new road, the COBA manual explains, must be valued at its opportunity cost - at what it would fetch if offered for sale on the open market. The most contentious applications of COBA occur when the DoT proposes building a road through an Area of Outstanding Natural Beauty, a Site of Special Scientific Interest, or a public park. All such areas enjoy `protection' against development, and this protection renders them of negligible commercial value. Thus the method of valuing them in terms of what commercial interests would be willing to pay for them without planning permission has the effect of inflating the benefit:cost ratios of roads protected areas; it positively targets for new roads those parts of the country that enjoy the greatest protection against development (Adams 1989).

The bias that results from using the wrong measure of environmental cost is most extreme where first world developers meet third world defenders of their environment. Consider the case (Adams 1993a) of a wealthy developer, a mining company, wishing to exploit a site, Kakadu National Park in Australia, which is sacred to the penniless aborigines who live there. The sum that the aborigines are willing/able to pay to defend Kakadu is pitifully small compared to the fortune at the disposal of the developers. To ask them what they would be prepared to accept as compensation for something that their culture holds sacred would be to attempt to corrupt them; that which is truly sacred is not for sale.

The economists of the Australian Resource Assessment Commission, perhaps in an attempt to salvage something from their cost-benefit method, conducted a survey in which they asked a random sample of 2034 people how much they would be prepared to pay to stop mining in Kakadu. The answers ranged from $52 to $128 per year. The defenders of Kakadu argued that since this sort of money given by all Australians would exceed the earnings from the mine, the mine ought not to be permitted. Did this settle the matter?

The mining company dismissed the survey results as `nonsensical' and `unscientific'. One of the main justifications that economists give for monetizing debates such as that over the fate of Kakadu is that money is the language of treasuries and big-business, and that it is necessary to address such influential interests in terms that they understand. But treasuries and big-business are better equipped than most to notice when someone is speaking nonsense in their own language. The numbers yielded by surveys such as the Kakadu one, are nonsense because they float free of any context that can give them meaning. If Kakadu were placed in a list of all the endangered species in the world, and habitats, and cultures, and works of art, and historic buildings ..., and if people were invited to say, item by item, how much they were prepared, and able, to pay each year for their preservation, **and** required to hand over the money, then the figures might mean something - but for each item, including Kakadu, they would be exceeding small.

The attempt to apply CBA to global warming provides another example of the method's ability to raise the temperature of an argument rather than settle it. The title of one of the papers being prepared for the IPCC illustrates the way in which the formulation of a problem can predetermine the result. The paper is called `The social costs of climate change: greenhouse damage and the benefits of control' (Pearce et al 1994). The prevention of the predicted `damage' caused by global warming is valued as a `benefit' - something that people are expected to pay for.

The paper makes use of estimates produced by Fankhauser (1992) of the monetary cost of the deaths that are predicted to be caused by global warming. As in the case of Kakadu, the cause of the problem is `development' - $CO_2$ emissions for which activities in the developed world are held mainly responsible - and the costs are borne mainly by the `undeveloped'; of the 229,545 deaths that Fankhauser attributes to global warming, the OECD nations account for only 38,205 (17%). But, although we may all be equal in the eyes of the Lord, we are not all equal in the eyes of the economist; each OECD death is valued at $1.5 million while each Chinese, Indian or

African death is valued at $150,000, and a life in a middle class country at $300,000[6]. Thus, although most of the estimated cost of global warming - measured in lives - is borne by the Third World, most of the cost measured in $s is borne by the OECD; of the total `damage from increased mortality' estimated by Fankhauser of $89.3 billion, $57.3 billion (64%) is attributed to damage suffered by OECD countries.

Cost-benefit analysts insist that their method requires a common unit of account. Layard and Glaister insist that bushels of corn would do equally well. Nordhaus (1994), one of the leading protagonists in the global warming debate makes the same point when he suggests that

> `the economic perspective in global cost-benefit analysis attempts to condense the complex set of impacts over time, space and sectors by summarizing them in a scalar measure of value ... the fact that the scalar is in monetary units is not really crucial; it could be in spotted-owl equivalents.'

But `why', Meyer (1994) asks `if one spotted owl equals one spotted owl, doesn't one human equal one human?' If one is determined to attempt the impossible and measure *everything* on a single scale, then Plato's advice that `man is the measure of all things', suggests that lives, not $US, is the scale that should be used. If used in calculations such as Fankhauser's it would yield radically different results.

But the poetic notion that in the dust we are all equal made is brushed aside by the cost-benefit analyst for reasons of expediency. Fankhauser justifies the price differentials he uses by the variation that can be found between rich and poor countries in `the willingness to pay to prevent an increased mortality'. Had he played the game by Pareto's rules and sought the WTA value - the value of the cash compensation required to leave the dead feeling as well-off as they were before they were dead - he would have come up with numbers that would have wrecked the whole exercise; it takes only one infinity to blow up a CBA[7].

Not surprisingly, when it became known that the IPCC's economic advisers were producing and using numbers that equated the value of 10 Indians (or Chinese or Africans) to one European, there was angry protest. A letter from the Global Commons Institute published in *The Guardian* (4.7.94) denouncing such calculation has been signed by over 200 people on behalf of

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[6] These numbers are caught up in a game of pass-the-parcel which suggests a reluctance to claim ownership; Pearce et al (1994) in a paper for the IPCC on `The social costs of climate change' attribute these numbers to Fankhauser who in turn attributes them to Pearce et al (1991). Layard and Glaister (1994) wrestle inconclusively with the value of life before concluding enigmatically `it is better to know what it is one should know, even if one cannot know it, than to know something that is irrelevant.'

[7] Fankhauser's method understates the cost of the lives that will be lost in two ways. First, as already noted, it uses WTP values when it ought to use WTA values. Secondly, it is based on willingness to pay to prevent added *risk* to life; the value of a `statistical life' is the sum of the values attached to risks when the probabilities sum to unity - e.g. if someone is prepared to pay ,200 to prevent a risk of 1/10,000 his `statistical life' is worth ,2,000,000 (200 X 10,000).

This method also greatly reduces the value of life. The WTA value for life itself is usually infinity, and the WTP value is everything one can afford. The WTA and WTP values for small risks to life are usually small amounts of money, and for risks that are considered negligible the WTA and WTP values are zero. Thus, if the identities of the individuals who will die are not known, the larger the population over which the known total number of deaths is spread the smaller will be the risk to every individual, and the lower the value of a statistical life. The implications of this method's ability to convert ignorance into cost savings for projects that threaten lives are discussed more fully in an article entitled `... and how much for your grandmother?' (Adams, 1974).

environment and development NGOs and academic institutes worldwide. Should the results of these calculations be used to support any recommendations that might ultimately be made by the IPCC, the signatories to *The Guardian* letter have made clear that their anger will be redirected to the IPCC itself; once again CBA will have demonstrated its ability not to resolve conflict but to generate it.

The dispute about the costs of global warming has now spilled over into the debate about transport policy stimulated by the publication of the report on transport and the environment by the Royal Commission on Environmental Pollution (1994). The report concludes that `For cars and light goods vehicles, tax revenue is equal to total costs if environmental costs are near the upper end of the estimated range' (7.19). Table 3 sets out the environmental effects which the Commission considered could be quantified in money terms and the values that they attached to them. The Commission appended numerous caveats to these estimates but still thought them worth presenting. It argued

> `There is nonetheless a good argument in many circumstances for monetary valuation where possible: measures to reduce environmental damage use resources that could be used for other purposes, and decisions on the use of resources will generally be helped by whatever quantification of information is possible' (7.14)

Table 3 Estimates of environmental costs of the transport system (1994/95) , billion a year. Source: Royal Commission on Environmental Pollution (1994) p.103.

	lower end of range	upper end of range
air pollution	2.4	6.0
climate change	1.8	3.6
noise and vibration	1.2	5.4
accidents	5.5	5.5
total quantified costs	10.9	20.5

Table 3 and the reaction to it thus far suggest that CBA's vaunted transparency fails in practice. The defenders of the car have been quick to pick up and use the contention that the taxes paid by car drivers cover their environmental costs[8]. But in using the estimates of climate change damage in Table 3 to estimate these costs the Commission, my inquiries have revealed, was unaware that it was using numbers that were based on the assumption that one Englishman is worth ten Chinamen[9].

The Commission accepted that some of Britain's transport benefits are being enjoyed at

[8] The RAC (Daily Telegraph 26.11.94) observed `One of the report's main findings [that the car must be curbed] does not follow from the analysis that precedes it.' And even *Nature*, not a prominent member of the motoring lobby, concludes (10 November 1994) that `the commission's figures suggest that Britain has magically arranged that the overall balance is about right.'

[9] Or more precisely, the economist is likely to insist, one `statistical Englishman' = 10 `statistical Chinamen'.

the expense of people in other countries, and in some cases at the cost of lives in other countries. The Commission included an estimate for climate change damage in Table 3 because `it can be argued on moral grounds that policy should be based on accepting the implications of Britain's share of responsibility for climatic change effects.' But because the countries that are expected to bear the brunt of global warming damage are poor, the damage - valued in terms of their willingness to pay to prevent it - counts for very little. The Commission concluded that tax revenue for cars and light goods vehicles covered their environmental costs, even if the upper end of the estimated range of these costs is included in Britain's transport cost-benefit balance sheet. But had the Commission inquired of people in those other countries whose lives and livelihoods are threatened by our transport activities what sum of money they would require in compensation - and sought to ensure that the sum was actually paid - they might have come to a different conclusion. Asking people you are about to kill what sum of money they will pay you not to do it is an odd way accepting moral responsibility for your actions. But this is, in effect, what the Commission was doing when it placed cash values on climate change in Table 3. A further objection to the Commission's argument that the taxes paid by British car drivers cover their moral obligation to those that they are damaging, is that these taxes are not actually transferred to those suffering the damage.

3. Entrenching conflict

> `We concluded that if our final recommendation [about a new London airport] were to command respect and acceptance it had not only to be as right as the best methods could make it but the reasons leading to our judgement had to be as objective and as explicit as we could make them. Only by this approach would there be any hope of persuading informed opinion that our conclusion should be accepted whatever its degree of popularity.' (Roskill 1971)

The debate about London's airports has rumbled on to this day. It was, and still is, in part an argument amongst NIMBYs who do not question the need for a new airport but want it to be built in someone else's back yard. But it also involves people who question the policy of building airport capacity to accommodate the unconstrained exponential growth of traffic. As we have already seen, the Roskill recommendation settled nothing. Similarly in the debates about roads and global warming, CBA is settling nothing.

The resolution of these debates depends not on capturing values at a moment in time, but on changing values. The defenders of Cublington tended to view their village as of unique historical importance, and Foulness as a mud flat ripe for development. The defenders of Foulness saw it as a naturalist paradise full of endangered species, and Cublington as nothing special. Those opposing a new airport anywhere couched their arguments in terms of `limits-to-growth' and focused on the blighting effects of tourism. Those in favour of a new airport spoke of the jobs it would generate and the need for Britain to remain competitive in the modern world. The participants in the debate were arguing from different premises.

The appendix contains a twenty-five year old, but still-relevant, illustration of the non-communication that results when people argue from different premises. In 1970 I wrote a review of the Roskill Commission's CBA which was critical of the Commission's neglect of environmental concerns and the inordinately high value that it placed on the convenience of air travellers. To make my point as emphatically as I could I argued that the values embodied in the Roskill report would justify an airport in Hyde Park - the most absurd place for an airport that I could imagine. My attempt at satire misfired. The *Sunday Times* reported my review. The following week it published a letter from retired Air Vice Marshal Bennett - writing from an airport - to congratulate me on having the courage to recommend Hyde Park, and pointing out

modestly that he had recommended Hyde Park in 1946.

Our arguments were rooted in different visions of a future London. Attaching cash values to the (high) value that he placed on traveller benefits and the (low) value that I placed on them, or to the (low) value that he placed on the environmental costs and the (high) value that I placed upon them, and then adding them all up to see whether an airport could be justified in Hyde Park, would stand no chance of convincing whichever of us lost the argument in cost-benefit terms. By freezing our values at the moment of collection, it would ensure that agreement remained impossible. Agreement would require one or both of us to *change* our values.

Contingent valuers are now alert to the fact that the framing of the questions that they ask, the information they impart at the point of asking, and the background knowledge already in the possession of the respondents, all influence the responses they get to their valuation questions. They see these as problems that threaten the objectivity to which they aspire. In reality they offer the only route to consensus. Only if people can be brought to a shared view of a problem is there any chance of reaching agreement about its solution.

Alternatives to CBA?

1. Try harder?

The Department of Transport (1992) announced its ambition to extend its cost-benefit analyses to embrace more environmental effects, and identified the monetization of noise as its first target. The Royal Commission on Environmental Pollution (1994a) also urges the cost-benefit analysts to try harder, because `to provide the economic rationale for sustainable development, the costs and benefits involved should be expressed in money terms wherever possible.' It acknowledges the existence of some costs and benefits that `may not' be quantifiable but, as seen above in Table 3, noise is an effect for which cash valuation, the Commission believes, is possible. Ironically, by 1994 the Department of Transport had abandoned the goal of monetizing noise and retreated to the goal of monetizing `traffic nuisance', on the grounds that the response to particular sound levels cannot be separated from reactions to the vibration, delay, danger, fumes, dust and dirt that accompany it (Green 1994).

But whether it is noise or nuisance that the Department seeks to measure, people's reactions will be influenced by their perceptions of the desirability of the activity that causes it. `Noise' is unwanted sound - one person's music is another person's noise. Even if the DoT's consultants succeed in calculating the *average* cash values that people attach to traffic *nuisance*, the number is unlikely to settle any arguments. Whether one considers traffic to be a nuisance or not will depend on one's relation to it. The reaction to traffic of someone who earns a living making cars or selling petrol is unlikely to be the same as that of an environmentalist concerned about pollution or a mother worried about her child's safety. To the extent that economists succeed in broadening the range of effects encompassed by their cost-benefit analyses, they are likely, for all the reasons discussed above, to bias further the conclusions of their analyses in favour of the environmentally damaging forces of `development'.[10]

[10] The Royal Society for the Protection of Birds (Harley 1994) argues that loading more environmental costs into a CBA will diminish a project's chances of passing its CBA test. But this is certain to provoke the opposition into loading more of their unquantified *benefits* into the analysis; the AA (1992) has provided an indication of the way the game is likely to be played; its `Balance Sheet of Motoring' lists *freedom*, *employment*, *leisure*, and *lifestyle* as some of the benefits of motoring that currently escape COBA.

2. Argue, discuss, negotiate and compromise?

The Reverend Sidney Smith, after witnessing a vitriolic exchange of abuse between two women in Edinburgh, observed `they'll never agree; they're arguing from different premises.' This description fits well numerous disputes - past and on-going - between `environmentalists' and `developers'; the response to the suggestion of an airport in Hyde Park (appendix) is a good example. The nuclear industry and Greenpeace provide another example; they have been arguing for 20 years and appear as far apart as ever. Offers of economists to serve as neutral mediators in such disputes should be viewed with suspicion. They too argue from premises. Consider the following five premises proffered by the leading proponent of CBA in Britain, David Pearce.

- `Economics, more than any other discipline, proceeds on the basis of setting what - to use the jargon - we would call an "objective function" - i.e. saying what it is that we aim to maximise or achieve - and looking at problems in this light.' (Pearce 1973)

- `Preserving and improving the environment is never a free option; it costs money and uses up real resources.' (Pearce et al 1989)

- `Economists assume that people are greedy, though not exclusively so. If environmental improvement is to be achieved, it will require policies that use selfishness rather than opposing it.' (Pearce 1992)

- `Cost-benefit analysis does indeed reduce all concerns to cash.' (Pearce and Moran 1993)

- `The issue is how, not whether to grow' (Pearce & Warford 1993)

The first assumes the existence of a common objective toward which we all strive; and, as we have seen in Figure 1, it is now proposed that CBA should be used to define this objective. It assumes, in the face of overwhelming evidence to the contrary, that Greenpeace, the nuclear industry, Air Vice Marshal Bennett and myself, are all agreed on what we aim to maximize. Cost-benefit analysts must make this assumption, or concede that their method has no significant role to play in debates about airports or nuclear power.

The second is the foundation of the belief that economic growth is necessary in order to save the environment. This is another premise not universally shared. There are expensive ways for a fat person to lose weight - health farms, liposuction, exercise machines - but eating less and walking to work would probably be more effective and *save* money - *and* be better for the environment.

The third premise is the conception of human nature upon which modern economics rests. *Homunculus economicus* is a beady-eyed little fellow who looks after number one. He is a consumer. If anything is going he is there to see how much of it he can get for himself. He is extremely well informed, and knows the price of everything, and exactly how much of everything he wants at the prevailing prices. He has a sharp mathematical brain and can re-order his wants in a flash if the price of anything changes. He has a voracious appetite that no amount of consuming can diminish. Altruism is incomprehensible to him. He weighs every action in the scales of self-interest and pursues only those that register personal gain. The beady eyes are myopic, preoccupied with spotting bargains close at hand. He is a nasty, egotistical little fellow who lurks within all of us, and most of us are thoroughly ashamed of him - but economists equate his behaviour with *rationality*.

The fourth assumes that there is a unitary - monetary - scale on which all our wants can be measured. It is a premise that King Midas saw through thousands of years ago - if *everything* is

transformed into gold, *nothing* has any value.

The fifth premise is the resultant of the first four. If we are insatiable maximizers and measure our wants by a single metric, the best diet will be the one containing the most calories and the economist as dietary advisory will recommend the diet that makes us grow fatter fastest - *ad infinitum*. Samuelson, in the best selling economics text book of all time, expressed this idea in the form of an objective function.

$$\text{Happiness} = \frac{\text{material consumption}}{\text{desire}}$$

He noted that Thoreau once recommended that people should try to reduce the denominator, but went on to dismiss this as old-fashioned advice that `now gives way to insistence on increasing the numerator of material real income'. The Royal Commission on Environmental Pollution appears to have adopted Samuelson's advice when it advocates the development of `innovatory technologies which will reduce the environmental effects of human activities and thus make it possible for economic growth to continue without causing unacceptable damage.' Acceptable damage, in cost-benefit terms, would be damage that would permit the numerator - net of damage costs - to increase - *ad infinitum?*

Homunculus economicus and the spiritual descendants of Thoreau will argue forever from different premises. The felicific calculus of the former will never convince the latter, and the moralizing of the latter appears to make no impression on the former. How then to proceed? How are governments to make decisions about proposals to build new roads, or power stations, or airports, or out-of-town shopping centres? How are such proposals to be evaluated in the context of concerns about sustainability? Consider a specific example - the building of a new motorway through Twyford Down.

This project is proffered by Barde and Pearce (1991) as a case where CBA could have made a difference. The motorway (which is now nearing completion) cuts through an area of great natural beauty. Barde and Pearce comment

> `The only option which would minimize the environmental damage was to put the road through a tunnel. The inquiry reported that a tunnel would cost £92 million more than the other options. The government decided that it was not worth it and accepted, clearly with some reluctance, the option of cutting the motorway through the area of aesthetic beauty.
>
> `In reaching their decision the UK government made no attempt to seek the monetary value of the environmental damage done. Had they, or anyone else, done so, one wonders if the conservation of the area of outstanding beauty would have been found to be worth more or less than £92 million.'

The government's COBA analysis of the scheme, which valued the land needed at its commercial value without planning permission, clearly did not include any attempt to place a cash value on the area's beauty. Had it done so, Barde and Pearce speculate, the government might have chosen the tunnel option.

But, had all the intractable problems of estimating these aesthetic costs been overcome, and had they been added to the DoT's COBA they would have been weighed against the time-saving benefits to motorists that were claimed for the scheme. Time savings to motorists are the principal benefit claimed for all the DoT's road schemes. Time savings to motorists generate more traffic because they reduce the cost of travel, and the Government proclaims that the first objective of its road building programme is `to assist economic growth by reducing transport costs' (DoT 1990). More traffic produces more opportunities, in the form of congestion-relief, to produce more time-saving benefits for motorists by building more roads. Cost-benefit analysis applied to the road building programme of the DoT rests on the premise that *more traffic is a benefit*. The new section

of motorway through Twyford Down - whether in a tunnel or in a cutting - will relieve a traffic bottleneck and thereby generate traffic (or release suppressed demand, as some transport economists would describe it).

But others argue from a different premise; *more traffic is a cost*. It not only increases noise, air pollution and danger and consumes scarce resources, it severs communities, undermines social cohesion and fosters anonymity, alienation and crime. These opposed perceptions of the desirability of traffic growth cannot be contained within a single objective function. There is, therefore, no quantitative *method* that can settle the issue. Adding up the high positive benefits that some attach to increased mobility and the high negative costs that others attach to the same phenomenon will produce an average, probably close to zero, that will settle nothing. COBA cannot recognize the `benefits' of traffic restraint measures.

CBA cannot forge agreement between the Bosnian Serbs and Muslims, or the Tutsis and Hutus of Rwanda, or between those in Britain who believe more traffic is a benefit and those who believe it a cost, or between those who like ski resorts and those who prefer undisturbed nature, or between those who like loud rap music and those who prefer peace and quiet. CBA, which assumes that a society has a single objective function that all citizens will salute, cannot be reconciled with pluralistic democracy. Vilfredo Pareto, who articulated the criterion on which CBA rests, was hailed by Mussolini as `the founder of fascist theory,' but the method that he inspired appeals to central planners of all political colours.

Before computers, and those who feed them with `values', can be useful in making decisions there must be agreement about what is valuable. In pluralist democracies complete agreement about the objectives of environmental policy is an unattainable goal. We are stuck with a messy and protracted process of argument, discussion, negotiation and compromise. In Britain this process involves Greenpeace, the nuclear industry, Friends of the Earth, the Department of Transport, the Council for the Protection of Rural England, the Ministry of Agriculture Food and Fisheries, the Royal Commission on Environmental Pollution, and countless other developers and environmental protection groups, all arguing their different cases, and altering values in the process. It is not a new process. Development has been encroaching on nature since before the industrial revolution. The developers and the defenders of nature have long argued from different premises. We can all agree with Blake that `A fool sees not the same tree that a wise man sees,' but we cannot agree which is the fool and which the wise man. The idea that the argument can now be settled by attaching cash values to the benefits of `dark Satanic mills' and to the damage they do to England's green and pleasant land will, I suspect, in the light of history look extraordinarily naive.

Beyond CBA

If there is to be any hope of forging agreement between the warring factions in the environment debate ways must be found of bringing them to the conference table. It will not be easy. At one extreme are `developers' contemptuous of the scaremongers blocking the path of progress, and at the other are `deep ecologists' warning of the impending environmental Armageddon. On both sides can be found those warning against the dangers of appeasement and deriding the idea of compromise. Between the extremes lies much confusion. There is usually a negative correlation between the strength of the scientific evidence and the vehemence with which a case is argued: the connection between traffic fumes and asthma, and the threat of global warming are two topical examples.

But wherever people can be found arguing from different premises progress toward agreement can only be made if they can be persuaded to examine the foundations of their disagreement. The skills in shortest supply for this task are not economic, but scientific and diplomatic.

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Appendix

A return visit to Roskill: 1

The cost-benefit analysis of the Roskill Commission in 1970-71 on London's Third Airport was at the time the largest ever undertaken anywhere. It has feature prominently in discussions about the merits of CBA in Britain ever since. Looking back on the troubled history of CBA, Pearce complains that it has been, and continues to be, damagingly misrepresented. The work of the Roskill Commission was, he asserts, "subject to some ridicule for allegedly placing a fire insurance value on an historic Norman church at one site. In fact, this was only a suggestion at one stage and never appeared in the final report, despite continuing erroneous comment that it did. ... None the less the damage was done."

This was more than a mere "suggestion". Insurance values for historic churches were included in the cost-benefit analysis published by the Commission in 1970[11] accompanied by the following defence.

> "It could be claimed that the valuation does not fully reflect the value of churches as monuments to visitors and non-participants. The willingness of local church communities to insure their churches at considerable cost, at least on a 'per capita' basis, is almost certainly due in part to the value of the churches as historic monuments. While accepting that this method of valuation does not fully take into account the latter benefits, it could be argued that such benefits are unlikely to be much greater than the insurance values." (p. 417)

Pearce is right when he notes that it did not appear in the final report, but it was removed *because* of the ridicule to which it was subjected (see section 2 for an example). The reasons given by the Commission for removing it from the final report provide no comfort for those who believe that rationality requires the monetization of all factors significant to a decision.

> "We decided that no attempt should be made to value explicitly in money terms such contentious items as the loss of wild life or churches which would have to be demolished. (p. 120)

They explain why in their final report[12]

> "Much of the criticism of the techniques of quantified analysis has stressed that however much those techniques may mould some complex problems into a less intractable form, they can do little to help in placing a just value upon an important and possibly unique example of post Norman-conquest church architecture, the bird life of the Essex coast line, the benefits to be derived from further advances in radio-astronomy at the Lord's Bridge Observatory or on the research work carried out at the Royal Aircraft Establishment at Bedford. … Each generation is faced with the problem of deciding what use should be made of its heritage in countryside, in buildings and other works of man which it has received from previous generations. … As William Morris said in 1877: 'It has been most truly said that these old buildings do not belong to us only: that they belonged to our forefathers and they will belong to our descendants unless we play false. They are not in any sense our property to do as we like with them. We are only trustees for those that come after us.' We cannot know whether our descendants would commend our judgment the more for preserving Stewkley Church or for preserving the Essex coastline and for preventing the extinction of the dark bellied Brent Goose. … The lover of the open countryside and of

[11] Commission on the Third London Airport, *Papers and Proceedings: volume VII*, HMSO 1970.

[12] Commission on the Third London Airport, *Report*, HMSO 1971.

> historic churches will unhesitatingly say that less environmental damage is done by an airport at Foulness than at any of the inland sites. … The naturalist and the bird lover will find no comfort in these arguments. He regards the preservation of wildlife- especially the unique wildlife of Foulness as of as great if not greater importance than the preservation of the countryside and its communities. … For us to claim to judge absolutely between these views is to claim gifts of wisdom and prophecy which no man can possess. All we can do is respect both points of view." (pp 52,55)

So what should the cost-benefit analyst do? The Roskill Commission respected views about these "contentious items" by dropping them from their quantitative analysis – effectively giving them a zero value. But these "items" are representative of the issues that are central to the sorts of environmental controversies which CBA purports to be able to settle. Pearce may be entitled to be cross with someone who has failed to notice that insurance values for Norman churches were dropped from the final report (after much ridicule), but he does not provide an alternative valuation for this contentious item – and his form of "rationality" requires one.

There was an even larger contentious issue which the Roskill Commission ducked. It is an issue that remains at the core of environmental debates today.

> "The logical result of pressing both views to the extreme [i.e. the views of the defenders of wildlife and coast line, and the views of the defenders of countryside and community] is that there can be no airport at all. We refuse to accept this conclusion for it is clear to us that the nation requires a third London airport." (p. 133)

The requirement of land to accommodate more traffic - of people and goods, by surface and air - is a concomitant of the process of economic development: projected GDP levels are the main drivers of almost all traffic forecasting models. Whether the benefits of development are worth the costs was not a question asked by Roskill; the benefits were simply *assumed* to outweigh the costs.

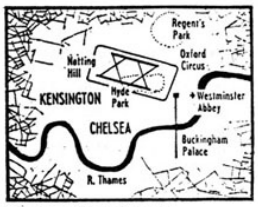
Recent attempts by economists to subject this assumption to the rigours of cost-benefit analysis in the case of global climate change have produced more valuations that have received, and deserve, ridicule for the same reasons that led the Roskill Commission to retreat from insurance values. The most notorious of these is the valuation of the lives of the richest people in world at fifteen times more than the lives of the poorest.[13]

[13] This number is almost certainly an embarrassed compromise. It hugely understates the difference between the sums that the richest and poorest are willing (able) to pay for measures that save lives.

A return visit to Roskill: 2

My first encounter with CBA was in 1970 when I published a critical review of the Roskill cost-benefit analysis complaining that the high values it assigned to passenger convenience and the low values that it assigned to environmental damage would justify building an airport in Hyde Park in the centre of London. The article was my first venture in satire. It was the subject of an article in *The Sunday Times* which reproduced my map showing the southern runway pointing at Buckingham Palace.

SUNDAY TIMES JULY 12 1970



Site for third airport?

How about an airport in Hyde Park?

By Tony Dawe

THE CITY of Westminster is a logical site for the new London

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Mr Adams says: "
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of life of thousands
this way."
Mr Adams cites t
on recreational f
historic churches.
report evaluates
facilities as the cost
replacing them and
time and travel cost
reaching a new site.
The report asses
on their insurance

The following week the editor published a letter from retired Air Vice-Marshall Don "Pathfinder" Bennett congratulating me on the idea – while pointing out modestly that he had recommended the same thing in 1946. Ever since this exchange I have tried and failed to imagine a kit of analytical tools that could settle the disagreement between the Air Vice-Marshall and me about the most appropriate site for a new London airport.

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Yes to Hyde Park Airport

- "congratulate those who have had the courage to recommend an airport in Hyde Park"
- "London needs at least 6 airports of this size"
- "recommended Hyde Park in 1946"

Don Bennet (Air Vice-Marshal, ret)

Blackbushe Airport, Camberley