Environment and Ethics
—a New Zealand Contribution

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Preface

John Howell

A Presbyterian minister in the parish of St. Stephen and St. Aidan, Lower Hutt, John was a member of the Environmental Council from 1975 to 1984.

This collection of essays promotes a dialogue between a group of philosophers and ecologists on the subject of environmental ethics. Through group meetings and a mutual exchange of drafts over a period of two years, each author has been made aware of the thinking of others, so common themes and questions have been addressed. Nonetheless there are contrasts between the essays which the reader will observe, even though in the two preservation essays there is joint authorship. Often discussions of this kind are strong on ethics and weak on ecology, or vice versa. I believe we have here a set of integrated discussions from authors with skills from both disciplines.

The environmental crisis has been highlighted now for over a decade. Some see it to be of such a danger as to threaten the survival of the human race. Others see not survival at
stake, so much as an impoverishment in living standards. It is probably too simplistic to define the environmental crisis as the survival of our civilisation or not. Instead it could be seen as consisting of a number of components which threaten, in varying degrees, the health and wellbeing of all or some of the human population and ecological systems.

The first component is what ecologists call the carrying capacity of the earth reaching its limits. If the growth in human population exceeds our capacity to supply food, then famine and starvation will increase. If the unequal distribution of food resources amongst the international community increases, then famine and malnourishment will occur with greater frequency and scale.

The problems of resource depletion would increase due to the urgency of feeding larger populations, or due to exploitation from satisfying economic demands well in excess of basic human needs. Whatever the cause, resource depletion is the second component.

The sophistication of our chemical and technological culture has had a marked impact for good or ill upon our environment. When waste, through accident or design, is placed in ecologically disruptive places, then pollution threatens ecosystems and eventually health. The weapons of war, especially nuclear weapons, and the dependence of our technology upon fossil fuels for energy are two prime sources of pollution.

Habitat depletion, landscape and climate modification, and the diminution of species (or the increase of monocultures) are symptoms or indicators of ecological damage. It is this modification of ecological systems, often in ways unknown, that constitutes the final component of the environmental crisis.

While New Zealand is fortunate to have avoided grinding poverty or ecological disasters, it has all the ingredients to contribute to the environmental crisis. New Zealand is dependent upon fossil fuels for energy. Wetlands, rivers, water and soil quality and the loss of agricultural lands are areas of concern. Soil erosion, depletion of indigenous forests, species loss and degradation of coastlands continue to be feared by environmentalists. A series of industrial projects throughout the 1970s have shown little sympathy with environmental concerns.

After a decade since the first international conference on the environment, the political scene is far from encouraging.
In a recent review of the international situation Martin Holdgate raised doubts about the effectiveness of many governments\(^1\). Few international projects have been successful. Cold and hungry people were unimpressed by long term ecological perspectives. Holdgate saw the major problems and needs of the world environment existing in developing countries, even though many are created by the economic and social pressures rooted in the consumer societies of the developed world. Holdgate's survey, beginning with the 1972 UN Conference, established that the developed nations saw environmental problems in terms of pollution and resource depletion. In contrast, the developing nations saw poverty as the main environmental problem. Holdgate proposes reconciliation between these two views through environmentally sound development.

The World Conservation Strategy, prepared by the International Union for the Conservation of Nature and Natural Resources (IUCN) and adopted by New Zealand, puts such a view by integrating conservation and development\(^2\). The IUCN believes the Conservation Strategy is needed because the biological resources essential for human survival and sustainable development are being increasingly destroyed or depleted.

The Strategy has three main objectives:
- to maintain essential ecological processes and life support systems;
- to preserve genetic diversity;
- to ensure the sustainable utilisation of species and ecosystems.

These entail the integration of conservation and development. Conservation is defined as the wise use of resources; viz the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspiration of future generations. It includes preservation, maintenance, sustainable utilisation, restoration and enhancement of the natural environment. Development is the modification of the biosphere to satisfy human needs and improve the quality of life. Sustainable development includes economic, social and ecological factors.

The intention of the conservation strategy to affect all economic activity is sound. For if the concerns of environmentalists are seen to be with only remote wilderness
or birds in distant forests, then the response will be to let those interested worry about those peripheral matters, while everyone else gets on with the important business in the centre. Conservation must be centre stage. But does it become compromised in this framework? What does the process of integration entail?

The definition of conservation includes both preservation and sustainable utilisation. Passmore distinguishes between preservation (saving from) and conservation (saving for)\(^3\). If conservation is wise use, then preservation, a non-use, is an opposite, not a subset of use. In that sense the two are different and separate.

Conservation is also defined exclusively in terms of human utility. The arguments advanced in support of the conservation strategy are motivated by exclusive benefit for the human species.

The grounds for supporting conservation and preservation are examined in the first pair of essays. The Gunn and Edmonds essay also examines the distinction between the two concepts. The usual approach of justifying conservation and preservation by appealing to some benefit to human interest has two serious limitations. Firstly it treats non-human species as a resource with instrumental value only. Secondly, it leaves open the cutback argument, viz, that loss of benefits or increase of harm results in lack of protection.

The conclusion Gunn and Edmonds come to is to protect ecosystems. This objective will achieve the aims of species protection. The main reason that this will be achieved is that ecosystem protection has an essential contribution in the maintenance of global environmental quality. Another reason is intrinsic rather than instrumental. Yet the grounds for ecosystem protection are almost the same as for conservation. Why is one acceptable and another not? The main difference is that ecosystem protection is significant at the global level, and the loss of ecosystem resilience may have wide destructive consequences for a wide range of species including our own. On the other hand, if ecosystem resilience can be maintained, then modification is, presumably, justified.

It is reasonable to surmise that a difficulty in implementing world conservation requirements is not only that nations work in national rather than international interests, but that there is a degree of ignorance about the impact of ecosystems at global levels. That is a reason to act with caution, but it is difficult to persuade governments to act on unknown
Integrating preservation and development then is going to be difficult for wilderness, perhaps less so for species preservation if ecosystems are protected. Knowledge of global systems is required though, before development choices are made.

The interests of future generations are included in the Conservation Strategy. In general terms we can agree, but in specifics, all kinds of questions arise. Diane Hunt and Graeme Scott explore some of these difficulties.

An ethical strategy is to keep options open by biasing decisions against irreversible choices. Graeme Scott endorses the principle of avoiding harm, especially to future generations. Even with these aids in our decision making calculus, Graeme argues that the non-human interests are not protected.

John Morton tries to connect the properties of natural processes with resource management decisions, especially looking at nature holistically. Again knowledge of ecological processes is important.

Steven Davies presents a different view in looking at the moral interests of non-human animals. He makes some important distinctions between the human and non-human species, arguments which come through in Chris Parkin's paper. Both authors want to attribute something special to the human animal, yet without being open to the charge of anthropocentrism, in which only human interests are calculated. Interestingly, the World Conservation Strategy is open to this charge.

Graeme Scott identifies two value scales — a human and an ecological valuation. He maps out an area of mutual benefit, an area of low conflict, and a region of greatest conflict. It is interventions in this area which are the most contentious. Again ignorance is no excuse. This model, he believes, provides a basis for the resolution of problems identified by the Conservation Strategy.

There are then a series of dimensions to consider in the integration of conservation and development:

- to protect ecosystems which contribute to global environmental quality;
- to modify the economic model to sustainability with a longer term time frame;
- to include the transfer of losses and harm to future
generations;
— to include animal interests and animal suffering in our decisions;
— to connect natural properties with resource management decisions;
— to use the concept of moral patient to develop normative environmental principles;
— to use the two value systems model.

All of these require decisions to be made only after adequate knowledge is obtained. They all recognise that there is an environmental crisis which requires urgent attention. There is an onus on resource development decision makers to address these questions. These are not the only urgent questions. The distribution of food and the relief of famine, and the production of the weapons of war, especially nuclear weapons, are moral issues which connect with environmental questions.

Effective strategies require clear analysis and political will. The rimu or the kakapo do not elect politicians or bureaucrats. Political strategies and business economics must realise that there are moral questions that will not be answered by ignoring them.

It is perhaps by focussing on the ethical dimension that the decisions of the next decade might be more effective than the last.

Bibliography

Why Preserve Wilderness?

Les Molloy
A scientist involved in land use research, Les’s interest in wilderness stems from a long involvement in mountaineering and natural area conservation for outdoor recreation and scientific study.

Jim Wilson
A teacher of philosophy and religious studies at the University of Canterbury. Jim’s concern for the environment stems mainly from a wide range of mountaineering and other outdoor activities.

Editorial Note
The case for preservation is usually presented through a series of human interest arguments. These are present or future benefits for science, recreation, gene banks, aesthetic and
natural purposes and the like. If we are to eat and have resources for shelter and human habitation, some resources will be developed and consumed, not preserved. Which areas should be set aside then, and for what reasons?

This essay by Les Molloy and Jim Wilson canvasses those arguments. In New Zealand where there is no starvation, the reasons advanced address the kind of society we have. In a society where human survival was at stake, these reasons would fade. And on what basis is the measure of wilderness to be established? If the only basis is on some kind of calculated benefit to human interest, then wilderness is extremely vulnerable. Is there a value in wilderness, independent of human estimate?
Why Preserve Wilderness?

Introduction

Imagine we are moving, for a week or more, through an area of forests and mountains with no tracks or huts. In our packs we carry food, clothes and sleeping bags; no tent — it is more satisfying, and lighter, to cook and sleep in the open or beneath overhanging rocks.

We cannot cut across country 'as the crow flies'. Progress is made by flowing with the lie of the land. It has natural passageways; stream beds, landslides, ridgecrests, high tussocklands above the bush.

One day is calm and sunny, the streams and rivers clear and refreshing. Even weaving through tangled vine and fern is but a modest challenge when we can rest in the sun when weary, cool in a pool when hot. Evening settles gently around us as we sit by a small cooking fire after a meal. Then we drift to sleep on a mossy mound, thinking how vast a distance the light from the stars has travelled to reach our eyes, and how tiny, but how exquisitely beautiful, is our blue-green planet home.

But we wake to the wail of wind, to be lashed all day by a north-west storm. Too wet and cold to rest, even minor obstacles are trying, long stretches of dense undergrowth a sodden torment. Small streams are torrents, rivers rage into brown flood. Near dusk, after a long search, we find a low overhang of rock under the roots of an enormous tree. We nurse a fire long enough to cook a meal, then toss the night away on the damp floor of this cramped home.

How sweet the first day seems in retrospect. But the experience would be incomplete without the second. It is true that we are far from being dependent on natural resources alone — we carry and wear many products of high-energy
technology, and have ventured only temporarily into the wilderness. But the storm has shown us forcefully how much less cushioned by human devices we are compared with our usual city setting and has given us fierce satisfaction in surviving nonetheless.

**Wilderness areas**

Large tracts of land affected as little as possible by human activity, in which urban people can have experiences of this sort, are usually referred to as *wilderness areas*. In New Zealand, a wilderness area is considered to:

- be large enough to take at least two days’ foot travel to traverse;
- have clearly defined topographic boundaries and be adequately buffered so as to be unaffected, except in minor ways, by human influences; and,
- not have developments such as huts, tracks, bridges, signs, nor mechanised access (including helicopters and aeroplanes).

Wilderness areas are one of a variety of areas protected and managed for outdoor recreation. In increasing order of ‘wildness’ these include the New Zealand Walkway system, forest, maritime and national parks (some of which will include wilderness sections), and wilderness areas. Thus a range of ‘interactions with nature’ is available, from which people can choose according to their wishes and experience. Although this paper concentrates on wilderness, much of it has application to less wild areas also, and to experiences at sea as well as on land.

**Why preserve wilderness areas?**

Do we need actively to preserve wilderness? Or will there always be plenty of wild areas useless for production or development? The answer is clearly that wilderness is a diminishing resource, both in New Zealand and worldwide. At an increasing rate, wild lands previously of only marginal interest for habitation or production have been developed. Deforestation, irrigation, urbanisation, population migration and warfare have all markedly reduced the extent of the world’s wilderness. This trend has been only partly countered by the growing conservation movement of the last 15 years, with its efforts to establish a global system of protected areas such as national parks.

Moreover, within the last century even the wildest areas
that remain have been explored and accurately mapped; for example the Amazon Basin, the Arctic and Antarctica, the summits of the Himalayas and the deepest ocean trenches. Each exploration, each new map, removes a little more of the mystery of the unknown.

So if we want wilderness, we must actively seek to preserve it. But why should we want it? Can we articulate the satisfactions and benefits of wilderness clearly enough to convince people who have not experienced it to support its preservation, despite any costs involved?

At the most general level, it is our need for basic experiences not provided by our usual environment which makes wilderness important. It follows that not everyone needs wilderness experiences. For example, Fijian villagers in the interior of Viti Levu or on isolated outer islands spend much of their time struggling with semi-wilderness conditions. They clear land to cultivate food, or endure cold and danger while taking food from the sea. So many of them get great pleasure visiting the city of Suva where human influence is dominant, nature extensively tamed. Movies and mud-free pavements, supermarket shelves stacked with food, durable shelters built with the aid of machines — these fascinate because they contrast so strikingly with their normal environment.

Many of us in New Zealand, however, live most of our lives in a very human-dominated environment. Even other living beings — cats, dogs, trees and flowers — are managed and manicured by humans for humans. Only occasionally do wild forces like winds and floods intrude. For physical survival most of us do not procure food and shelter with our own hands from soil and sea. We buy from shops food produced and processed by others, with machines. If our house gives trouble we ring builders or plumbers. Living in such a physically 'cushioned' environment requires different skills, and gives rise to different satisfactions and tensions, than do more basic life-styles.

Yet for nearly all its history our species has had to survive in environments very little affected by us. Our strength and dexterity, supplemented by intelligence, were precarious tools for survival in an overwhelmingly wild setting. This history is built into us, genetically. We know deep down that we are part of our physical and biological environment, although apparently able to think and act apart from it. We still gain satisfaction from interacting and coping more directly with
Benefits of wilderness experience to individuals

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our environment. And we have an adrenalin system that in moments of emergency can put us into physical overdrive. The types of risk and adventure available in urban living — business, financial, marital, familial — do not adequately engage these important parts of our nature.

Wilderness recreation can engage them, as much as is possible without a full time return to simple living; and, as a consequence, can give a deep feeling of delight and well-being. It is a basic feeling, rather than specific benefits that can be isolated and described, but we will attempt to separate out some of the elements that contribute to it.

First and foremost, we can gain a perspective on our place in nature which is very different from our 'civilized' view of ourselves as controller and manipulator. We get some sense of this different perspective when we enjoy birds in a city. For we don’t do anything, nor need to, to bring birds into being and have them sing in trees in our carefully planted gardens. Even in cities birds emerge from the overflowing energy of nature — as we do also, though we so easily forget. In a wilderness setting, to a much greater extent, the energy and variety and effortless order of nature, gently or violently, captivates our attention. This order, unchanged for thousands of years, puts the instability and rapid change of modern human affairs into its wider setting. And the anxious 'city' feeling, that we are responsible for keeping things as they 'should be', is overwhelmed.

Instead, we are a tiny, but integral, part of the greater whole. This is what underlies a common claim on returning from wilderness: that we have been 'spiritually renewed' through contact with the source of our being. In traditional religious settings we say we understand our place in the universe created by God, or realise our identity with Brahman, the spiritual basis of all things. In evolutionary terms, we, like the riot of life around us, are spontaneous products of the energy of nature. But a theoretical setting is not necessary. It is the simple feeling of belonging, and of fitting in rather than fighting, that is so satisfying.

Secondly, there is satisfaction at surviving, preferably in comfort, beyond the safety net of civilization. This surely taps the genetic memory of times when our ancestors survived or perished on still more precarious resources. It involves a simpler set of anxieties than those of urban life, with clearer criteria of success or failure. Fear of being lost, stranded or
drowned, rather than socially off-side or financially embarrassed, is very invigorating. And a touch of terror, while disconcerting at the time, proves afterwards to be as cleansing as having a rusty radiator flushed out. From these sorts of challenges, successfully met, comes increased self-reliance and self-confidence. Belief that this is so moves business firms and other organizations to sponsor employees on Outward Bound and other adventure/challenge courses.

Thirdly, interdependence with others is fostered. Urban life, on the one hand, is often a complex web of changeable relationships. Wilderness recreation, on the other hand, involves interaction with only a few people, with consequent intimacy and intensity. When faced with the challenge of survival, reliance on friends can be literally a matter of life and death.

Fourthly, there is the excitement of discovering 'new' wild places. Few of us today can fully share the excitement of Amundsen or Hillary. But in wilderness areas we can still get the feeling of setting foot where no human feet have been before. Often, indeed, we are doing this literally, since there are no tracks to funnel feet onto identical spots.

These elements are very fulfilling in their own right. Memories of them, and a desire to repeat them, draw wilderness users back again and again. Moreover, we believe the effects endure on return to urban living. The broader perspectives gained make it easier to be more relaxed and confident, less harassed by petty concerns. In complex work and relationship problems we benefit from our testing in simpler wilderness settings. And the knowledge that wilderness areas exist to visit again gives feelings of well-being and anticipation even during long periods when we are not able to go there.

These are some of the benefits gained from wilderness; directly by a small number in our society, indirectly by those related to or working with them. If there were no competition for use of such areas, and no community money needed to administer them, no further justification would be needed for their preservation. There are costs, however, so the question must be raised whether the benefits outweigh them.

Wilderness does require some management, such as mapping, fire control, control of harmful introduced animals and plants, and search and rescue services. But these direct monetary costs are much less than for more intensively used
natural areas, and we deem them relatively insignificant.

Most wilderness costs are 'opportunity costs' — use options foregone. An obvious one is that there is no provision for visits by the disabled, the very young, the very old, and the unenthusiastic. Ability to make the physical effort involved, and acquisition of necessary survival skills, are prerequisites for wilderness travel. But to view this as 'exclusion' of certain categories of citizens is to show very little understanding of the wilderness concept. If such areas were made available to all, by helicopter flights, roads, walking tracks and huts, they would cease to be wilderness. The sought experience would elude the visitor, for it cannot be obtained in this way. Fortunately, those unable, or not wishing, to experience wilderness are catered for in other natural recreation areas which have levels of facilities appropriate to different types of visitors. Only if provision of wilderness areas was at the expense of other more accessible areas would this cost be a genuine one. So far, in New Zealand, this is not the case.

A more serious conflict with preservation of wilderness areas is possible exploitation of their mineral and/or hydro resources. The areas are usually marginal for sustained farming or forestry because of their remoteness, steep terrain and infertile soils. But their rivers are often attractive as sources of hydro-electricity, and their geological structures can be prospective for minerals. This is a very contentious issue, plaguing the planning of wilderness preservation throughout the world. Two well publicised cases in New Zealand were the hydro proposals for the Motu River Wilderness in the Raukumara Range of the East Cape, North Island, and the mineral belt in the Red Mountain region of the Olivine Wilderness of north-west Otago. Such conflicts can be resolved only by careful attempts to ascertain costs and benefits associated with the development and the preservation option.

Costs and benefits of development can usually be given an air of objectivity by being expressed in quantifiable economic terms. This makes it all the more important that a realistic assessment of the less tangible costs and benefits of wilderness preservation be fed into the debates. We have sketched some of the direct benefits to users of wilderness areas. We need to ask now to what extent wilderness does, or could, benefit the country at large.

The direct benefits could be extended to more people. While it is not clear that everyone would enjoy wilderness, many
city dwellers, once attracted into relatively wild environments by tramping and canoe clubs and outdoor pursuits centres, greatly enjoy the experience. The number of people undertaking 'wilderness treks' is increasing, particularly in commercial groups with guides. Wild river rafting, in particular, has experienced an explosion of popularity, perhaps partly because so many of these wild rivers are under threat of development.

To what extent should people be actively persuaded to venture into wilderness areas? This question presents the wilderness advocate with an awkward dilemma. If publicity and persuasion is too successful, human presence could become obvious and destroy the atmosphere of primeval landscape. Moreover such proselytising itself seems alien to the idea of initiative and discovery inherent in the wilderness concept. Certainly information on benefits should be widely available. But it would be folly to 'hard sell' the idea. Even the issue of guidebooks and maps is controversial; basic mapping would seem to be acceptable, but detailed guidebooks would not be appropriate. Fortunately, so long as there were no tracks or signs, each new visitor could choose to ignore everything that has been written, photographed or mapped by previous visitors.

This dilemma may be more apparent than real. For it is likely that the rigours of travel without huts or tracks will keep the numbers of active users down to a manageable level even when the benefits are more widely publicised.

In addition to active users, however, there are a considerable, and probably increasing, number of 'passive' users. These 'armchair wilderness travellers', whose enjoyment is gained through films, television and books about wild areas, place no strain on these areas other than that of the small number of film-makers and authors. Numbers are hard to estimate, but if there is one thing that the nature conservation movement has clearly demonstrated to our decision makers, it is that there are large numbers of citizens who want to see wilderness preserved even though they may never visit it. The preservation of Lake Manapouri in New Zealand and the Franklin River Wilderness in Tasmania stand as salutary examples of the vicarious wilderness interests of predominantly urban populations.

There are also wider, indirect, benefits to New Zealand society as a whole. The most tangible and obvious is economic. A considerable part of New Zealand's appeal to overseas
tourists is the range and extent of our 'wild' country. This is true not only of active visitors who enter wilderness areas but also of the many others who view them from their borders. If tourist benefits outweigh tourist disadvantages then preservation of wilderness is in the economic interests of society as a whole.

Wilderness preservation is also sound land use. In economic planning terms it is a decision to avoid 'putting all one's eggs in one basket'. If circumstances change, protected status can be revoked, whereas restoration of wilderness after development is a very lengthy process, if possible at all. So wilderness preservation leaves all land-use options open for future generations.

Less tangible, but more important in our view, is the contribution wilderness areas make to the goal of a diverse and interesting society. Such a society needs a wide range of facilities to give its diverse members a chance to find the interest which really suits them. It is in this context that preservation of wilderness areas, despite some costs, can be seen as similar to provision of art galleries, support of the display and performing arts, cultivation of botanic gardens, provision of playing fields for a wide range of sports and so on. If society adopted a narrow 'individual-user-pays' policy none of these facilities would receive public support — and society would be much the poorer for all.

Less quantifiable still, but even more important, is the contribution the wilderness concept can make to an overall change in society's attitudes and goals. Our present approach to our environment seems weighted towards attempts to 'control and exploit'. Increasing numbers of people are concerned that this threatens rather than aids human well-being, as well as that of other species, and feel we should aim for a 'steady-state' economy, with moral and cultural growth replacing growth in consumption. Wilderness experiences, we have argued, change our perspective on the non-human environment by removing the civilized cushion which cuts us off from vital interaction with it. Wilderness preservation is a part, a very important part, of our painfully slow evolution of a holistic philosophy, revitalising in urban people a sense of interdependence with the rest of nature without which we are unlikely to survive.

Because of this, many feel wilderness areas are far more than optional extras; they are essential to full human experience, such a vital link with our roots that without them
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... We, and our society, will lose our sanity and/or our soul. And it seems likely they will be even more important to people of succeeding generations as urban living becomes more widespread, complex and cushioned. This highlights a fundamental feature of wilderness areas which makes pleas for their preservation much more urgent and forceful. Unlike most other cultural resources of our society — playing fields, theatre, symphony orchestras, ballet companies — wilderness cannot be 'produced' if and when required. Its defining characteristic is that it is not influenced, let alone planned or produced, by humans. If this character is destroyed by development it takes decades or centuries to revert to anything like its primitive state. In some cases, owing to the nature of the development (hydro-electric lakes for example) or to climatic changes, it will never revert. So in all debates about alternative uses of land which has a wilderness character, this factor of 'irreversibility' must be given full weight.

So far we have been taking account of only New Zealand considerations. From a world perspective we can add a further point. Think of ballet, and the way Russia contributes to ballet in New Zealand and elsewhere by being a reservoir of talent, tradition and enthusiasm. Other countries can draw on this via tours, films and teachers, even if local ballet fails completely for a while. New Zealand is very fortunately placed to be a wilderness reservoir for other countries, and this gives us reason to preserve more than a calculation of New Zealand costs and benefits would indicate on its own. We could do this out of consideration for other countries less fortunate than ours, and/or with a view to reciprocal self-interest between societies — ballet from Russia, wilderness experience to Russians in return.

Wilderness areas also constitute 'biosphere reserves' in that they protect significant areas of natural systems from human modification. This is particularly important in New Zealand where our geological history and isolation have combined to produce many plant and bird species that are unique. The preservation of representative examples of New Zealand's biota provides a scientific resource that is of global significance.

The arguments analysed

Human self-interest, of one sort or another, is the basis for most of these arguments for wilderness preservation. The first step was to see in what ways wilderness serves the
interests of users. This was not, of course, to enlist their support; of that there is no need. But it was the essential basis of the second step, which was to appeal to the self-interest of non-users by arguing that wilderness is of benefit to them as well: through vicarious experience; through enhanced ability of users to work and relate in society; through living in a society with a wide range of interests and activities and hence with a greater chance for all to find an interest which suits them; and through heightened awareness throughout society of our place in our natural environment. To convince non-users that there are benefits to them greater than those lost by foregoing other uses of the areas concerned is the simplest way of enlisting their support. Self-interest is a bedrock on which such debates can rest. Of course individual non-users will differ in their assessment of whether the above appeals to their self-interest are convincing, for they will have differing priorities and hence different bases for assessing benefits and losses. But if they are convinced that preservation is in their interests as well as those of users, they are unlikely to demand further justification.

The third step was to appeal to mutual or 'bargained' self-interest between user and non-user. The appeal is of the sort: 'I’ll approve of some of society’s common resources (land, tax money, government jobs) going to facilitate your activity or interest if you will approve of some going to support ours.' To a considerable extent, though not always as explicitly as this, most societies operate through these sorts of 'bargains', and appeal to them is easy to justify. In complex modern societies, no single interest of this sort directly involves the majority of the population. Hence in such matters everyone’s special interest — theatre, ballet, sports ground, botanic gardens — is a minority interest. Everyone, therefore, has an interest in supporting minority interests. If only majority interests were to be supported none would qualify.

Agreement on any particular interests requires detailed bargaining; and the weight given to each interest in such bargaining is related to the size and influence of the minority group involved, as well as to the degree to which the value of the activity is understood by others. So this part of the argument is linked to the first two steps: that is, to success or failure in communicating what wilderness experience means to users, and in persuading more people that they directly or indirectly benefit from wilderness areas.

Arguments of these sorts, based on self-interest or on
bargaining between interests, are always vulnerable to developments which change the perceived balance of benefits and costs. At present in New Zealand preservation of significant areas of wilderness (say 2% of the land surface) is not seen as a great hindrance to other goals. But increased pressure to explore for minerals and mine them if discovered is an ever-present possibility. Hence the fourth step was to raise the much broader issue of our society's overall goals. If the trend continues towards rapidly increasing energy and resource consumption beyond renewable levels, wilderness areas will be very vulnerable indeed. Increased desire for their mineral or hydro resources will be linked to increased technological ability to extract the resources 'economically'. The less tangible benefits discussed above could have a hard time competing. Detailed arguments for a change in society's goals are beyond the scope of this paper, but the case for wilderness preservation both supports and is supported by such arguments, and cannot be considered in isolation from them.

So far we have not stressed arguments based on consideration for others' interests irrespective of benefits to oneself, or on a non-bargaining sense of what we 'owe' to others in return for past (but not bargained for) favours, or as some sort of 'duty'. This is partly because people can always respond, in a way less common when self-interest is appealed to, by saying "I'm not concerned for others," or, "I don't acknowledge that duty." (It is possible, but less common, to get the response "I'm not concerned for myself"). It is difficult to counter such responses other than by more complex appeals to mutual self-interest: "the world will be a better place for all of us, including you, if you show concern for others"; or, "if you show concern for others they will probably, in return, show concern for you".

Some of the points raised above however, especially references to the future, do depend on such considerations. Unless we preserve some areas now, a large number of subsequent generations will be without wilderness. And many people feel that we 'owe' it to future generations to be considerate of their needs, especially in long-term things which they cannot have without our active concern now. This is partly felt as a 'duty' in its own right, partly as 'repayment' for what has been bequeathed to us by past generations. This appeal to the future, coupled with the irreplaceability of wilderness once destroyed, is a fourth, and very strong,
step in the argument — even for those who do not want wilderness themselves, so long as they are convinced of the value of wilderness to others.

Concern for others independent of one’s own interests can be generalized to include the present as well as future generations, widening the scope of this fourth step. Many people do have such concern due to a variety of religious and evolutionary causes and reasons. For them, this concern for others is a basis on which arguments can be constructed, alongside, or in unusual cases perhaps even replacing, self-interest. But it is a basis for argument, not a provable conclusion of an argument from some other basis. So those who do not share it cannot by argument be induced to feel concern for others, though, as suggested earlier, they might be induced to show some consideration for others’ interests if they can be convinced it is in their own real interest to do so.

All the arguments advanced and analysed so far are concerned with benefits and costs to humans. In so far as they contribute to the development of a ‘wilderness ethic’ they fall within the category of ‘anthropocentric ethics’ in which value to humans is the only, or by far the most important, consideration. Because this human-centred tendency is pervasive and deep-rooted in our culture it is necessary to see how far wilderness preservation is in the best interests of humans.

But we have already noted that arguments of this sort are always vulnerable to changes in perceived human benefit/cost calculations. This is despite the fact that in the case of wilderness, human interests and the interests of ‘the rest of nature’ can be shown to coincide to a greater extent than is usual. For, when human interests are the major consideration, only derivative, or at best subordinate, value can be assigned to the non-human environment.

This does not at all accord with our deepest feelings about wilderness. It is not just an essential resource for humans, important though that is. To us it seems right to preserve at least some areas of this planet free from human modification without reference to human benefit at all. Wilderness has value in its own right, not just derivative value. This feeling may be more widespread than is commonly realised. We have already drawn attention to the dramatic public support for preservation of Lake Manapouri and
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Tasmania's Franklin River. The numbers involved far exceeded the numbers who have enjoyed or hope to enjoy such areas. And the intensity of the campaigns, as well as some of their content, points to this same feeling of the rightness of preserving wilderness whether such preservation can be shown to benefit humans or not.

Is this feeling simply confused, stemming really from the idea that wilderness should be preserved so that it is there if we do ever want to enjoy it? Or is it an expression of a basic sentiment, stemming from our instinctive realisation that we are a part of nature, and owe our existence to her? — in the same way as we value our parents long after our need for them to keep us physically alive has passed. Certainly many of us feel very strongly that we 'owe' it to nature, and not just to humans past and future, to leave at least some wilderness alone.

This concern for nature (like concern for other people, or, for that matter, like self-interest) cannot be argued for on some other basis; certainly not on the basis of human-centred considerations. But exposure to wilderness — the majesty of mountains, the mysterious power of forests, the ceaseless energy of sea and wind — almost imperceptibly, but inevitably, instills this concern in us. And then the rules of the game change. We are no longer bound to arguing always and only on the basis of human benefit or bane — on which basis the value of the non-human environment will always be derivative and tenuous. Instead, the value of the non-human environment in its own right becomes the basis on which detailed arguments for preservation of particular areas can be solidly built.

Bibliography

Why Preserve Species?

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Editorial Note

Alastair Gunn and Alan Edmonds begin by examining the case for species protection through a series of human interest arguments. The definitions of consumption, conservation and
preservation are analysed, and the limits to the human interest argument recognised. They conclude it is easier to produce arguments based on value to humans, than to develop arguments of intrinsic value, but point in the same direction as Molloy and Wilson in acknowledging the fragility of human interest arguments. Preservation must move beyond species to ecosystem protection, on the grounds that ecosystems are the significant factor in global balance.

Later, John Morton (p.134) takes the example of indigenous forest management at Whirinaki. His case for preservation rests on inadequacy of a sustained yield being a successful practical option, in contrast to some systems such as pine forests and fisheries that can be so managed.

The preservation case then will take us only so far. Preservation requires value judgements, and in practical terms, management such as pest or noxious plant control. While we strive to preserve a portion of nature free from human interference, it is still dependent upon human action, even if only to correct earlier interventions. The essays raise the question as to why we do this, whether it is a human interest benefit or whether there are some intrinsic values in nature.

There is a conflict between preserving parts of nature when human beings are starving, and we can observe that in the poorer, less affluent nations, the preservation argument is most at risk. This raises the question of whether affluent nations should help less affluent nations simply to relieve the pressure to consume areas that ought to be preserved.
Most of the species which have ever lived on this planet are now extinct; hardly surprising when set against the eons of time since the earliest life forms emerged. The oldest known fossils are primitive bacteria-like organisms and date from approximately 3,000 to 3,500 million years ago. Since that time the one constant feature has been change; changing climate, geological upheavals such as volcanism and, less dramatic but equally disruptive, geological processes of continental drift, uplift and erosion. Throughout its history life on earth has been punctuated by the consequences of this change. Stephen Jay Gould writes of the great dying when, about 225 million years ago, half the families of marine organisms were rendered extinct within several million years. The late Cretaceous extinction of some 70 million years ago destroyed one quarter of all animal families, including the dominant terrestrial animals, the dinosaurs. During the subsequent Tertiary Period, characterised by the rise of warm-blooded animals, around 70,000 mammal and bird species have died out — a rate of about one per 1,000 years. While not so frequently documented, species of plant, indeed whole plant families and even orders, have suffered similar extinctions. Those species that dominated the world’s lowlands during the Carboniferous Period and whose remains formed the great coal measures are barely represented today. Gigantic arborescent lycopsids and horsetails grew in extensive swamp forests along with tree-like cordaites, seed

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ferns, and primitive conifers. None of these survived much into the Tertiary Period, the arborescent lycopods and horsetails dying out more or less abruptly during the Permian. Yet another great dying.

Against this background, present day lists of endangered species seem relatively insignificant. Even so there are determined efforts to rescue endangered species. Humans have brought about the extinction of a few species in the past, of course, but given the explosive increase in human population and the pace of industrialisation, this is hardly surprising. Many countries protect rare wildlife by law and establish reserves, national parks, and wildlife refuges to preserve rare and endangered species. International treaties regulate the killing of migratory animals and the trade in live animals for animal products. It is tempting to believe that we have learned from the exploitative ways of our past, and that most endangered species will soon make a comeback. But to believe this would be most unwise. This recent picture is seriously misleading in several respects.

— It implies that extinction via human agency is limited to relatively modern, more or less industrialised societies, and ignores the destruction wrought by earlier societies.
— It underestimates the number of species presently or potentially at risk.
— It is over optimistic in assuming that most threatened species can be saved by passing legislation or by creating a few parks and reserves.
— It implies that ethical issues arise only in connection with rare and endangered species, whereas common species give rise to most of the same issues as do rare ones.
— It encourages a species-oriented approach to conservation, drawing attention away from the need to protect habitats or, ultimately, ecosystems.

This chapter tries to correct these mistaken beliefs, and examines a number of arguments for species protection. Firstly, information is presented on the scale and causes of species extinction and attempts to protect species are discussed. This part is intended as factual background material, as a context in which to discuss the moral issues
of species protection. Then two approaches to species protection, preservationist and conservationist, are examined, and contrasted with consumption. The point of these distinctions is to contrast a view of species as a resource (likely to be associated with a 'management' ethic) with a view of species as having inherent value (likely to be associated with an environmental or ecological ethic). A number of arguments for the protection of species are then evaluated. Rationales for species protection are examined in the light of claims that individual living things are entitled to moral consideration (for example, that they have rights); that rare species are especially to be valued; and that the utility of species to humans should be a decisive factor. Some common conservationist arguments are presented and criticised. Finally, it is argued that a purely species-oriented approach to environmental protection, even a preservationist one, may be too narrow, that the protection of ecosystems is a more important environmental goal.

A species may be defined as "a natural biological group sharing a common pool of genes." All members of species can successfully interbreed — that is, can produce fertile offspring. Some species are divided into subspecies (or races): groups within a species sometimes, but not always, with well marked morphological differences, such as colour, and typically geographically isolated from other subspecies. Subspecies are considered to have evolved from a common ancestor, the differences being due to adaptation to local conditions: geographical isolation prevents breeding with other populations of the species. When for some reason subspecies cease to be reproductively isolated, they often interbreed freely.

Some related species are capable of interbreeding, but the offspring are commonly infertile. A well known example is the mule, an infertile cross between the horse (Equus caballus) and one of the several species of ass or donkey (Equus species). The criterion of reproductive capability is not perfect, however, since some closely related species can successfully interbreed, for example the mallard (Anas platyrhynchos) successfully hybridises with the grey duck (Anas superciliosa) of New Zealand. The difficulty of defining a species with any degree of precision sometimes raises difficult policy questions; endangered species protection legislation often protects species from habitat destruction,
so that the taxonomic status of a population may be crucial in determining whether a proposed development is allowed to go ahead.

The systematic naming and classifying of plants and animals, known as taxonomy, began with the Swedish scientist Linnaeus (1707-1778). The basic unit of taxonomy is the species. In the Linnaean system, each species is given a two word name which indicates also the genus to which the species belongs. Thus the tiger is known as Panthera tigris: it is a member of the genus Panthera, which also includes the lion (Panthera leo), leopard (Panthera pardus), and jaguar (Panthera onca), among others. Groups of genera are grouped into families and so on into progressively larger units.

Modern taxonomy is more than just a system of naming. The divisions of living things are also meant to exhibit presumed evolutionary relationships. Evolution is a continuous process, however, and most species are capable of further evolution. Except for highly specialised species with a narrow genetic base, most species represent a point along the evolutionary process, not an end point. (Exceptions include species whose populations have sunk to a very low level, and which may be genetically almost uniform). To protect the evolutionary potential of a species it is necessary to maintain a large range of genetic characteristics, i.e. a large number of individuals. The future of a species includes the potential of some of its members to be the ancestors of new forms. To maintain only a remnant, or even a larger but inbred group, is to 'freeze' the species into its present form.

**Extinction and rarity**

A species becomes extinct when it has no members alive. Rarely do we know precisely when a species has become extinct: or rather, we know that it has become extinct, but we don't often know when that happened. An example of an exception is the death of what was almost certainly the last passenger pigeon (Ectopistes migratorius), named Martha, in the Cincinnati Zoo in 1914. But of course the species was effectively extinct when the last (unrecorded) male died. The death of Martha therefore has a symbolic significance only.

The International Union for the Conservation of Nature and Natural Resources (IUCN), an independent international organisation based in Switzerland, publishes and regularly updates lists and information on species considered at risk. This work, known as the *Red Data Book*, employs the following status classifications:
Endangered:
"Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating."

Vulnerable:
"Taxa believed likely to move into the endangered category in the near future if the causal factors continue operating."

Rare:
"Taxa with small world populations that are not at present endangered or vulnerable, but are at risk."

To what extent human behaviour is ‘natural’ is controversial. If it is natural for humans to kill animals for food, then the extermination of a species by overhunting might be natural. Included here under ‘natural causes’ are only those extinctions not caused by human activity. Often, we do not know the explanation for a natural extinction. The reasons for the disappearance of the dinosaurs, for example, are a perennial and fascinating source of speculation.

The ‘natural life’ of a species is the period from its evolution into a distinct species until its final demise or evolution into a new species. According to the IUCN, no species has ever lived for more than a few million years: the mean ‘natural life’ of a bird species is estimated at two million years, and of a mammal 600,000 years. Most extinctions, then, have been the natural result of changed conditions from those in which the species evolved and to which it was adapted — changes to which the species was unable to make a new adaptation, because its requirements were insufficiently flexible, or because the changes were sudden and catastrophic. Wholesale changes of this order, such as the periodic glaciations or Ice Ages of the last million years, may have wiped out whole complex faunas several times as the ice spread and retreated.

Other natural causes of extinction have included changes in habitat and food supply, and competition or predation by newly evolved species or species extending their geographical range. These factors may themselves have been a response to climatic changes. Cataclysmic events such as volcanic eruptions, tidal waves, hurricanes, disease and parasite epidemics, increases or decreases in solar radiation, and even intense meteor bombardments, may have wiped
Human impacts on species have mostly been indirect, such as habitat destruction. Early humans, however, had direct adverse effects, mainly by overhunting. The theory that stone age hunters acted as 'super-predators' on the giant animals of Africa, Asia, the Americas, Australia, New Zealand and Madagascar challenges the alternative view that this megafauna died out naturally due to climatic changes. Advocates of the super-predator theory argue that the hunting techniques of early humans permitted an 'overkill' of large mammals and birds which were killed at a faster rate than they could reproduce. In all the areas mentioned above, it seems, sudden extinctions coincided with the arrival of human hunting cultures. For example, 31 genera of large animals disappeared at the end of the last Ice Age in North America. The theory does not deny indirect factors such as destruction of habitat through fire, and the introduction of dogs, but concludes that around 11,000 years ago, a hunting culture of less than one million people could have exterminated these animals within a few hundred years. In New Zealand about 20 species of moa disappeared by the beginning of the nineteenth century, and their remains are so closely associated with human habitation as to give that culture the popular name of moa hunter. There is little doubt that the moa hunter culture here was directly responsible for the extinction of these large, flightless birds.

The year 1600 is usually taken as the beginning of the 'modern' period of species extinction, mainly because only since that time has reasonably complete information become available. Estimates of the number of extinctions since 1600 vary, and mostly do not include species which are very likely extinct but which may conceivably survive in remote locations. Nor, of course, do they include plants, invertebrates and perhaps reptiles, amphibians and fishes, whose presence or absence no one noticed or bothered to record. Lockley puts the total of higher animals extinct in modern times at over 200, while *Wildlife in Danger* gives figures of 94 birds and 36 mammals, representing 1% of the total number of higher animal species in 1600. This source adds that of full species still surviving, 164 races of birds and 64 mammals have become extinct during this period.

Most of these extinctions are the result of human pressures.
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There is not much evidence that any losses of full species since 1600 can be explained by natural causes, though *Wildlife in Danger* cautiously allows that 25% may be explained in this way. Some recent extinctions were a direct result of hunting for food, for example Steller’s sea-cow (*Hydrodamalis stelleri*), a marine mammal discovered in 1741 and wiped out by 1768. Others, such as the passenger pigeon, formerly numbering up to five billion, may have been extirpated by a combination of hunting pressures and habitat destruction. Uetz and Johnson\(^\text{10}\) note that whereas 86% of the seventeenth century extinctions can be attributed to the direct effects of human actions, mostly hunting, and 14% to indirect effects such as habitat destruction, by the nineteenth century the proportions are almost reversed: 24% being attributed to hunting and 76% to indirect effects (including the effects of introduced animals). In the period 1900-1970, around half of more than 60 extinctions are attributed by these authors to introduced species. For the whole period, *Wildlife in Danger* gives figures for birds of 24% natural causes, 42% hunting, and 34% indirect, while the figures for mammals are 25%, 33%, and 36% respectively.

Regardless of these figures, which to us at least seem if anything to underestimate the indirect effects, there are many instances of extinctions caused by introductions of new animals and habitat destruction. Examples include:

- The grey dodo (*Raphus cucullatus*), a giant flightless pigeon of Mauritius, discovered in 1599, and last seen in 1681. Many were killed by sailors for food, but the principal causes of its loss were the introduction of pigs and monkeys to Mauritius, which destroyed the breeding potential of this ground nesting species.

- The solitaire (*Pezophaps solitarius*), another giant flightless pigeon, was discovered on remote Rodriguez Island in 1691. By 1791 it was certainly extinct. The causes are uncertain: hunting for food must have reduced the population, but loss of habitat via forest destruction, and predation by feral introduced cats, were probably the main causes of its extinction. The cats, incidentally, were brought in to control rats introduced accidentally.

- New Zealand has lost at least seven full species since the coming of the Europeans. In almost all cases, including a quail, a honeysweater, and at least one wren,
the cause was mainly predation or environmental destruction wrought by the bewildering variety of introduced species: mice, brown and black rats, pigs, goats, deer, marsupial oppossums, hedgehogs, rabbits, feral cats and dogs, and mustelids — ferrets, stoats and weasels. The most striking example is the Stephen Island wren *(Xenicus lyalli)*, the entire population of which was exterminated by a cat belonging to the lighthouse keeper. This man saw the species alive on only two occasions. The cat, which presented its owner with 22 dead specimens in 1894, may thus be credited with the discovery and the extermination of the species in a single year.

— The American chestnut *(Castanea dentata)*, a valuable and formerly widespread hardwood, has become virtually extinct due to a fungus disease which arrived with the introduced Chinese chestnut *(C. mollissima)* early this century.

Rich and poor nations

Most developed countries have lost a number of species over the years, and today all contain at least some endangered species. But comparatively few extinctions are likely in these countries in the near future. Most have passed protectionist legislation and have established more or less adequate parks and reserves to protect species.

The situation in many Third World countries is quite different. These mostly tropical countries contain an increasing proportion of the world’s human population. They also contain most of the world’s species. The pressures to develop new food and energy sources, to urbanise and industrialise, are very strong, and in the context of widespread disease and starvation, protection of species and ecosystems inevitably receives a low priority.

It is doubly unfortunate that the poorest countries with the worst problems often contain the richest and most diverse ecosystems, and that these tropical ecosystems are often very vulnerable. "A single hectare of Brazilian Amazonia has been found to contain 235 tree species; the same area of temperate forest has about 10. A square mile of Costa Rican forest has been found to contain 264 bird species, more than wildlife-rich Alaska, an area 500,000 times larger".

The developed countries can easily afford to protect their own native species. These countries already have resources available beyond the basic needs of their people and can
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therefore choose to spend money, or forego opportunities, in order to protect species and ecosystems. This is obviously not the case in many poor countries, except where protection can be shown to have some value to humans, for example the setting up of National Parks to attract tourists.

Limits to species protection

A number of arguments in favour of species protection are outlined later. This section presents some reasons for believing that even if we become convinced that all species ought to be protected, we shall almost certainly fail. With the best will in the world we shall be unable to protect them all. It is important to realise that this is so, and why it is so, because it forces us to make choices about which species to protect.

Public opinion

Public attitudes to endangered species suggest that even in environmentally-conscious and prosperous societies, public support for species protection is rather selective. People tend to favour measures to protect species which are beautiful, are historically or culturally important, or are perceived as biologically 'close' to humans. Lizards, insects, and insignificant plants are not so favoured. It may prove impossible to mobilise public opinion to save an endangered species of snail or grass.

Lack of data

It has been estimated that there are 5-10 million living species on earth, of which only 1.6 million have been discovered. Some species will die out, undoubtedly, before they are even discovered. Even to protect an identified species requires detailed knowledge of habitat requirements, which we cannot possibly acquire for all species.

Limited resources

The lack of resources to carry out any goal may be a 'practical' problem that could, in theory, be solved if we were willing to divert resources from other goals. For example, in East Africa some fish species are threatened by programmes to eradicate water-borne diseases such as sleeping sickness and bilharzia; the insecticides which kill the hosts of these diseases also kill the fish. Indigenous fishes of Lake Victoria, again, have declined through overfishing, and the only practical way to restore the fishery is to introduce other, more vigorous species which in many cases will result in the disappearance of the native species. The people of these areas are unlikely to adopt the heroic course of preferring
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to starve, or die of disease, in order to protect endangered fish species, and (political realities aside) it seems unjust to expect their governments to impose such a value on them.

In other cases, the resources simply do not exist. For example, at least 45 taxa of New Zealand snails are endangered, mainly due to predation and overgrazing by introduced mammals. Several species have been saved by transfer to offshore islands. But there are not enough islands to secure all the sub-species: for example, no two races of the flax snail (*Placostylus ambagrosus*) are naturally found together in the same locality, and it is likely that they would hybridise, thus destroying two sub-species.\(^{15}\)

**Doomed species**

The populations of some species have sunk to such low levels that the species perhaps cannot be restored because its genetic base has become too narrow. In describing the lack of breeding success in tiny populations of the endangered Nene or Hawaiian goose Myers\(^{16}\) points out that

This problem bears out the rule of thumb that a vertebrate breeding stock with fewer than 50 individuals is liable to carry a built-in potential for its own destruction, since interbreeding brings together the harmful genes that larger pools can accommodate.

New Zealand's six endangered bird species (according to Williams and Given\(^{17}\)) have all been reduced to very small populations. That of the Chatham Island taiko (*Petrodroma magentae*) is estimated at less than 25 birds, the black stilt (*Himantopus novaezealandiae*) at about 50 birds in the wild and now interbreeding with the pied stilt (*Himantopus leucocephalus*) which probably arrived here from Australia in the nineteenth century, and the Chatham Islands robin (*Petroica traversii*), perhaps the world's rarest bird, at one time reduced to 5 individuals on Mangere Island. Our three other endangered bird species have wild populations ranging from less than 200 birds (kakapo, *Strigops habroptilus*), through about 250 birds (takahe, *Notornis mantelli*) to 500-600 birds (little spotted kiwi, *Apteryx oweni*). We might do better to use scarce resources to protect species which still have a chance — such as the North Island kokako (*Callaeas cinerea wilsoni*) with at least a few hundred wild individuals, the saddleback (*Philesturnus carunculatus*) with about 300 individuals of the South Island subspecies and 2,000 of the North Island subspecies, or the stitchbird (*Notiomystis cincta*)
with a few thousand individuals — rather than spend large sums on species which may already be past the point of no return.

That a species is unlikely to survive is not a conclusive reason for denying all assistance. Funding for species protection programmes depends on public awareness and goodwill. It may be that the way to the public’s consciousness (and heart) is through spectacular, cuddly, or otherwise appealing animals, rather than equally rare animals of less obvious attraction. Thus there is good reason to feature pandas, tigers, and Chatham Islands robins in educational and fundraising programmes, and even if it should turn out that the robins, for instance, cannot be saved, the rescue operation will have been worthwhile in promoting public support for species protection in general.

**Consumption, conservation and preservation**

Human attitudes to the rest of nature have too often been exploitative. Land, water, air and living things have been viewed, and treated, as a resource, often as an inexhaustible resource, although these attitudes have begun to change in recent years. The recognition that natural resources are not infinite has led increasingly to management policies designed to ensure that there will still be resources for future generations: conservation is replacing consumption. A more fundamental shift in attitudes has also taken place: some people have questioned the view of nature as a resource, arguing that animals, for example, have value in themselves and should be accorded a moral standing. In this view, preservation should replace conservation. This part of the chapter makes these distinctions clearer and relates them to species protection. These concepts are also discussed by Diane Hunt.

**Consumption**

To consume a resource is to use it up; to destroy it so that it will not, in the foreseeable future, be available again. Conventional strip mining for coal is an obvious example of consumption: the land is destroyed in the mining process, and the coal is consumed by burning. Both coal and land are non-renewable: as a friend put it, they stopped making them a long time ago. The coal and land resources are therefore finite and irreplaceable: to consume any part of the resource is to diminish the total resource. If all existing coal is consumed, the resource itself will have been consumed.
Twentieth century discussion of our use of nature, particularly in former European colonies, has taken place against the backdrop of earlier consumption - a reckless wasteful exploitation of nature which used up materials, felled forests, decimated wildlife and destroyed indigenous cultures. Most non-European societies were relatively undeveloped technologically. For this reason, and sometimes because it was deeply rooted in their culture, most indigenous people lived in reasonable harmony with their environment.

European settlement changed all that. Colonists perceived natural resources as inexhaustible. The land was often cleared of natural forests and the organic content of soils exhausted, to leave eroded slopes and dustbowls. Native peoples were enslaved, massacred, poisoned and displaced.

The effects on animals were often equally devastating: wildlife was consumed as if it were just another inexhaustible resource. Many species of birds were almost exterminated by the demand for their feathers for the millinery trade. The huia was finally exterminated in New Zealand by those collecting skins of this wattle-bird for the museums of Europe and North America. Not only the dictates of fashion but also those of science have played a part in the destruction of wildlife. Other extinctions or near extinctions resulted from a combination of factors including habitat destruction, hunting pressure, competition or predation from introduced species, introduced diseases or parasites. Island faunas such as those of New Zealand and Hawaii have suffered particularly in these ways.

**Conservation**

An infinite, or practically infinite, resource can be consumed at a very high rate for as long as we wish to consume it. There are no intrinsic constraints on the rate of consumption of such a resource; or rather, we can never consume the resource itself however rapidly we consume its parts. The only limits will be extrinsic: for example, even if energy resources were unlimited there would be good reasons for restraining our use of them, because the waste heat generated in fuel use would have serious environmental effects.

Conservation policies are a response to the recognition that resources are limited, coupled with a desire that the resources be available in the future. Conservation, then, is linked to consumption in this way: it is "the saving of resources for our later consumption".18

To conserve a species is to use it in such a way that it
will be possible to go on using it for the indefinite future. The use made of members of the species may be consumptive - for example, eating them. But if consumption is restrained by killing, say, only the proportion of 'surplus' animals or plants beyond those necessary to maintain a stable population, then the resource - the species - is not consumed but conserved.

Conservationists, then, regard species as resources, and the language of wildlife management is remarkably similar to that used in discussions of minerals extraction or agricultural production. The population is the 'resource'; the annual kill is the 'crop' or 'harvest'; the optimal harvest is the 'maximum sustainable yield'. Conservationists advocate species protection in order that we may continue to consume members of the species indefinitely. They object to the extinction of a species because the resource is thereby destroyed.

Preservation of nature is "the saving of species and wilderness from damage and destruction". Preservationists, therefore, hold fundamentally different views from conservationists on species protection. The conservationist opposes only wastefulness. The preservationist, broadly speaking, denies the legitimacy of any destructive use of natural objects, at least where there is an alternative. Fur seals for instance, might be legitimate prey for traditional Eskimo subsistence hunters, who would starve or freeze without seals, but not for modern commercial hunters who, by and large, provide luxuries for the wealthy. To the preservationist, 'excessive' commercial hunting of seals does not merely waste a resource: the very conception and treatment of these animals as a resource is illegitimate.

Broadly preservationist justifications for the protection of threatened species, and the maintenance of common ones, generally appeal to intrinsic values: the value of the lives of individual animals, or of whole species, or of ecological wholes. Sometimes this view is presented as, ultimately, self-evident — or at least not supportable by evidence or reasons. Paul and Ann Ehrlich assert that the argument (sic) is simply that our fellow passengers on Spaceship Earth, who are quite possibly our only living companions in the entire Universe, have a right to exist.

Romain Gary sees the giving of reasons (which he identifies
with the efficient pursuit of self interest) as antithetical to saving species: "... as far as hard reason goes, killer takes all. The heart either speaks or it does not. The reason why has about as much to do with rationality as does beauty". 21 In contrast, Tom Regan 22 presents a carefully reasoned case for valuing the lives of non-human animals, though not for valuing species as such. Regan's views are considered in the next section.

Traditional ethical systems in the west have not attributed intrinsic value to animals, plants or the land. Rather, the rest of nature has been seen as having only an extrinsic or resource value — having value only as a means to human ends and not for its own sake. Peter Singer has popularised the term 'speciesism', which he defines as

> a prejudice or attitude of bias towards the members of one's own species and against members of other species. 23

The speciesist evaluates the treatment of non-humans solely in terms of their fitness to human ends. Speciesism, according to Singer, is wrong for much the same reasons that racism and sexism are wrong: it fails to take account of the interests of non-humans, treating them as if they were of no account, just as sexism fails to recognise the interests of women. Singer, a utilitarian, argues that all sentient beings have an interest in not suffering; that suffering is an evil no matter what the species of the being which undergoes the suffering; and that the infliction of suffering on any being is therefore wrong except in extreme and rare cases where the infliction of relatively trivial suffering on one being will result in relatively great gains which quite clearly outweigh that suffering.

Singer, then, would evaluate policies of species protection on the basis of their tendency to reduce suffering and promote happiness. But whereas the conservationist considers only the effects on human welfare, the 'animal liberationist' considers, equally, the effect on the welfare of animals too. Many of the arguments for species conservation presented in the next part of this chapter, such as the value of species for food, would be rejected by Singer since they are based on the assumption that humans are morally entitled to exploit animals by eating them.

It is not easy to apply Singer's version of utilitarianism to species protection for several reasons. Firstly, the extermination of species, or their replacement by introduced
species, need not cause any suffering at all. A programme
to eradicate a species by painlessly sterilising each member
(placing a contraceptive substance in the water holes they
use, for instance) would cause no direct suffering, and the
introduction of an exotic species which would fill the vacant
ecological niche could ensure the welfare of the predators
and parasites which depended on the now extinct species.
Singer has indicated that in his view

Members of common and rare species of, say, whales
have exactly the same moral standing qua individual
animals.\textsuperscript{24}

To harm individual animals is wrong, regardless of their
species; so if the extermination of a species caused no loss
of utility or ecological damage, it would not be wrong.

Secondly, a species as such cannot suffer, and so cannot
be harmed: they do not have an interest in avoiding suffering,
therefore. To exterminate a species would be wrong only if
it caused suffering, whether directly to the animals that died,
or indirectly by depriving other animals of food. But the harm
would then be done to individual animals, not to the species.

Thirdly, utilitarianism is limited to sentient beings, since
only they can suffer, as Stephen Davies points out in Chapter
4. To exterminate a plant species, then, would be wrong only
to the extent that the loss of the species would deprive
animals (including humans) of the benefits of eating or
otherwise utilising the species. In one sense, of course, plants
feel; they certainly perceive through physical sensation and
respond to several stimuli including gravity, light, temperature
and some chemicals. Among the unbelievably bad verse
 penned prolifically by Erasmus Darwin, Charles’ grandfather,
is this couplet about \textit{Mimosa pudica}, the famous sensitive
plant:

\begin{quote}
Weak with nice sense the chaste Mimosa stands
From each rude touch withdraws her timid hands.
\end{quote}

In recent years several popular accounts of apparently
telepathic communication between plants and humans have
added to earlier reports of the existence of nervous systems
in plants. Much of this work has involved the use of lie
detectors or polygraphs whose electrodes, attached to a plant,
record electrical responses in the plant to threatened
violence. Recent British work suggests that most of these
results can be duplicated with a damp cloth replacing the
plant. However, electricity does play a part in plant cells whose
surface electrical potentials vary sharply and considerably in
response to many stimuli. What plants lack is a nerve centre of any sort. They certainly possess elementary impulse transmission systems, but none of the centralised nervous system from which sentience might develop.

To replace an indigenous forest with an exotic one, capable of supporting the same population of sentient beings as formerly occurred, would not be wrong on utilitarian grounds, even if as a result several indigenous species became extinct, assuming that the replacement of the one by the other did not cause suffering to animals living in the original forest. If the new ecosystem was able to support a larger number of sentient beings, and if it better provided for human wants, it might even be a duty to make the change. Utilitarians, then, cannot value plants at all, except as a resource.

**Animal rights**

The most complete and persuasive argument in favour of animal rights is offered by Tom Regan. He argues that animals "are to be treated with respect and that respectful treatment is their due". That such respect, or recognition of them as right holders, is a matter of justice. The reason why animals are entitled to respect is that they are 'subjects of a life', that they have a life of their own, and therefore have value apart from anyone else's interests. Animals have this right equally with humans, so that it is always wrong to disregard their rights, though they may sometimes, for reasons too complex to explain here, be overridden. Regan concludes, as does Singer, that it is wrong to raise animals for food, to hunt or trap them, commercially or for sport, and to use them for research.

The rights view, then, implies that conservationist arguments must be rejected. Thus Regan writes, "A practice, institution, enterprise, or similar undertaking is unjust if it permits or requires treating individuals with inherent value as if they were renewable resources..." If species protection policies are justified, in this view, they would be preservationist policies and their justification would not be that good consequences would follow from protection, but that the rights of individual animals would be protected. The defence of species preservation would be that members of rare species, like those of common species, have rights which we ought to respect. Regan, like Singer, argues that the species of a being is irrelevant to its moral status. Species as such do not have any value, so there is no duty to preserve species as such.
The view that animals have rights, then, is not transferable to the claim that species have rights. Regan writes "The rights view is a view about the moral rights of individuals. Species are not individuals, and the rights view does not recognise the moral rights of species to anything". It is therefore no worse to kill a member of an endangered species than of a common species, other things being equal. Regan emphasises that the rights view does not oppose the protection of endangered species — indeed, it supports such efforts, but primarily in order to protect the rights of individual members. Regan accepts, also, that human interests in preserving rare species for cultural, aesthetic, or other non-destructive reasons are also important, but these interests would not necessarily justify preservation of an endangered species. Finally, plants do not qualify as right holders in Regan’s view, so to exterminate a plant species would be wrong only if it destroyed the natural habitat of an animal species. Seriously endangered plants are not essential to any animal, usually, and so there is no compelling reason, based on their rights, to preserve them unless humans happen to care strongly enough.

The idea of legal rights for species, bypassing the question of whether they have moral rights, is less problematic. Christopher Stone has argued that non-human entities such as natural features, trees or lakes could be given a legal standing just as corporations, by a legal fiction, are treated as persons for certain purposes. Corporations can sue and be sued and can be held liable for breaches of the criminal law: the 'interests' of corporations are represented legally by actual persons such as company officials or lawyers. Stone argues that a lake, for example, could be granted a legal status too: it could be granted certain legal rights against those who would damage it by pollution, for instance, and persons could be appointed to represent it in court. The New Zealand practice of appointing Boards of Guardians for certain lakes is along those lines. A legally protected species, as are all New Zealand’s terrestrial and freshwater native vertebrates (except freshwater fish) as well as selected terrestrial and freshwater invertebrates, could be treated similarly.

**Rarity and value** Ethical questions about protecting species arise, usually, only about rare and endangered species. This is not surprising, perhaps, since the point of ethics is to help us to decide
what to do, and we do not need to do anything to protect common species. The purpose of conservationist legislation and government policy is often to protect species whose continued existence is threatened by past or present human action; some countries protect only species believed to be threatened, permitting the killing or capturing of common species even where they are not seen as 'pests'. New Zealand for instance, has long provided protection for the tuatara but other indigenous reptiles considered to be common such as some skinks and geckos received protection under the Wildlife Act as recently as 1981. Of our indigenous freshwater fish only the grayling, *Prototroctes oxyrhynchus*, considered now to be extinct, is afforded legal protection, and that under fisheries legislation. The implication is that it is morally acceptable to kill, destroy, or capture individuals, so long as that individual is not a member of a rare taxon. Such policies are clearly speciesist and conservationist and imply a view of non-human animals and plants as resources to be used rather than as individuals meriting respect.

Our concern with rare species as such raises several puzzling questions, two of which are discussed in the remainder of this section. The first puzzle arises from the value that many people attach to rare, as opposed to common species. It is not merely that our actions can make a difference to the survival of the species, whereas at the moment we do not need to worry about our effects on common species. Many people also value encounters with rare species. As enthusiastic bird watchers, we actively seek encounters with rare species of birds; but the reason cannot merely be that such encounters are infrequent. Encounters with muggers or leprosy are infrequent, and we do not value them. We do not, in fact, value anything merely on account of its rarity: we do not attach value to rarities as such. Rather, rarity seems to function as an intensifier of value, so that the pleasure (or pain) of an experience is increased according to the unlikelihood of the experience. Thus, bird watchers, or stamp collectors, value birds and stamps in general, and especially rare birds and stamps; no-one wishes to contract any disease, but especially not a rare disease. Thus it is 'lucky' to see a rare bird, 'unlucky' to contract a rare disease.

Secondly, although we may value encounters with rare species more than encounters with common species, we wish that rare species were not rare. One of your authors has seen
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a black stilt on but one occasion, and was very glad to do so. To observe this rare species was good, but we wish that there were more black stilts, that they were not rare. To value rare species is not to wish that they continue to be rare, but to wish that they would become more common. The purpose of the captive breeding and release programme is to increase the numbers of black stilts so that they will no longer be rare.31 If they do become common, an encounter will presumably lose some of its special value. It is possible, of course, that some bird watchers will therefore regret the fact that black stilts are no longer rare. This possibility suggests, once again, a view of species as a resource.

To say that black stilts ought to be protected because they are rare is not like saying that they should be protected because they are beautiful or unique, fierce or strong, or necessary to maintain balanced ecosystems. We suggest that the rarity of a species is not, in fact, a proper ground for valuing it, though it may be a good reason for doing something to protect it. The remainder of this chapter, therefore, addresses the problem of the value of species in general, alluding to rare species as such only when the question of special measures for species in need of protection is relevant.

Conservationist defences of species protection take many forms — not surprisingly, since animals and plants are useful or agreeable to humans in many different ways. Arguments in favour of protecting, or not exterminating, species or populations appeal to their economic, medicinal, scientific, educational or aesthetic value, their potential to provide genetic diversity, food or energy sources, tourist revenues, ecological health, indicators of environmental quality or (often unspecified) benefits to future generations; their cultural or religious significance, their contribution to our understanding of ourselves or even to our ultimate survival. Finally, even where there are manifestly no benefits to present or (conceivably) future generations, it is sometimes argued that we should protect all species because if we allow exceptions it makes the general case for protection that much weaker.

The following sections examine a number of arguments for species protection which are conservationist in that species are valued ultimately as a resource, even if the use of that resource is non-destructive.

Food

The conservation of suitable species may provide a cheap,
Economic arguments

Some species have an actual or potential economic benefit to humans. Determinations of the economic value of a species can be made only on a basis of cost-benefit analysis and it is often argued that such calculations fail to take account of moral or aesthetic values on which a dollar price cannot be put. Norton\(^3\) points out that cost-benefit analysis depends on the assumption that the best policy is the one which satisfies the most desires within a group. Even if it is possible to determine objectively what would have this effect, this would not provide a reason for saving very many species. The rewards of saving tigers or takahē may be high, and opportunity costs low, but most people will not lose utility if many obscure species disappear. At the same time the aggregate cost of protecting all species would be very high.

The appeal to economic value is a dangerous weapon and may rebound, for we cannot defend conservation of species on economic grounds without being prepared to accept that economics will sometimes point the other way.

The human benefits of species protection, then, need to be conceived more broadly. At the same time, one cannot merely ignore economics. Many people would not accept the bald claim that "... no food, no clothing, no shelter, no land,"
and certainly no luxury or technology is worth the irreplaceable loss of any species.” \(^{36}\) Argument is needed to persuade people that they should give up luxuries and technology and perhaps food, clothing and shelter, in order to protect species, especially when people are starving to death. There is also the practical problem that even if the claim under consideration is a justifiable one, the public will need to be convinced of its truth before it can become policy.

**Aesthetic arguments**

Many species are conventionally regarded as beautiful or otherwise visually appealing. Sometimes, as in the case of spotted cats, their beauty has been their downfall. But these animals, and others, are also aesthetically valuable because of their grace, the way they move and their stillness in repose. Elliott\(^{37}\) argues that the aesthetic value of works of art lies in their potential to produce enjoyment and pleasure in onlookers, and that it would therefore not be wrong for the last human on earth to destroy works of art. If this is accepted, it follows that the last human would likewise not do wrong to destroy species of animals or plants if their only value was aesthetic.

Whether or not aesthetic values are inherent to works of art or natural objects, not all living things are aesthetically valuable in themselves. Some rare animals in New Zealand such as the Canterbury mudfish (*Neochanna burrowsi*) are aesthetically insignificant, while Hochstetter’s frog (*Leiopelma hochstetteri*) is probably regarded by most people as downright ugly.

The appeal to aesthetic value then may justify the protection, for the time being, of a small number of species, but will not provide a rationale for general protection.

**The value of genetic diversity**

Many arguments for conserving species which may be of use as sources of food, drugs or other materials are claims that we should protect potentially useful genotypes. Common plants or animals instantly provide us with resources once their value is recognised. Rare and endangered ones cannot do this until they have multiplied sufficiently to be non-vulnerable. We cannot maintain large populations of all species, and all species are at least potentially useful for something. Many species have probably never been common — some, such as the Castle Hill buttercup (*Ranunculus paucifolius*) and many species of invertebrates, have always been restricted to a small area. Others have become rare
due to habitat loss, and a vast effort would be required to restore the lost habitat — much of it, today, agricultural, urban or industrial.

The argument for genetic diversity is a compelling one, but still we cannot protect large populations of all species. As our knowledge of genetics increases, it may be possible to predict just what proportion of a species is necessary to preserve its entire genetic range. Indeed, it may not require us to save many, or even any, actual members in the wild. In many cases we can (perhaps more safely) maintain individuals in captivity, or store the genetic materials in some kind of gene bank. Eventually we may be able to recreate genotypes at will, so that we will need to keep only formulae, much as a cook keeps files of recipes rather than storing the dishes themselves.

To exterminate a species is to lose, forever, the possibility of finding out information about it. Even intensively studied species may have secrets for later generations to discover, while the extinction of an unknown species represents a considerable loss of knowledge. Knowledge and understanding of the world are commonly accepted to be components of or contributors to the good life, and we ought to maintain or increase opportunities for them rather than permanently foreclosing them.

Knowledge is indeed good, but it is not the good. Belsey argues that even if we accept that scientific research is good in itself it is still proper to urge that it be directed towards useful (and certainly not towards destructive) ends — for there are more possible areas for research than can conceivably be completed in the foreseeable future. The scientist cannot claim that his or her desire to further knowledge should automatically have priority over other interests and needs. This is one reason why we do not approve of painful, degrading or dangerous research on human subjects, often even consenting ones.

If we do not place absolute and overriding value on the pursuit of knowledge for its own sake, we cannot urge that species protection be given the highest priority merely in order to preserve potential fields for research. For example the desire of scientists to study a species of beetle or fish would not by itself override the interest of persons who, in order to avoid starvation, propose to alter the habitat of that creature, thereby exterminating it.
Environmental indicators

The state of an ecosystem is typically reflected in the state of its members. Declines (or increases) in the populations of a species, or changes in their behaviour and health, may be the first visible indication of ecological change. Chinese scientists are reportedly studying folk beliefs about the unusual behaviour of some domestic animals prior to earthquakes, and some animals were observed to dive for cover shortly before the eruption of Mount St. Helens in May 1980.

Less spectacularly, animals or plants may provide early warnings of environmental deterioration. The practice of old-time miners taking caged canaries into the mines (these birds being sensitive to the presence of toxic or explosive gases) is well known. Many species of fish are much more sensitive to damage by water-borne pollutants than humans. Dead fish in a river are an early warning of pollution; and it is becoming standard practice to monitor the purity of factory waste water discharges by passing samples through a fish tank.

Ecological indicators, then, enable us to detect (and therefore possibly to treat) problems early. They are therefore of considerable indirect benefit, in helping us to protect ourselves from threats, and enabling us to increase resources.

For all that, we can hardly conclude that all species ought to be protected in case they turn out to be useful indicators.

The limitations of conservation

The conservationist case for species protection is, as David Ehrenfeld points out, ultimately inadequate. He writes, "The difficulty is that the humanistic world accepts the conservation of Nature only piecemeal and at a price: there must be a logical, practical reason for saving each and every part of the natural world that we wish to preserve." (original emphasis). Yet many threatened species are, in Ehrenfeld's terms 'non-resources': they have no economic, aesthetic, recreational or other resource value. Aldo Leopold was perhaps the first to note the limitations of conservationist policies: his view, often quoted, was that "one basic weakness in a conservation system based wholly on economic motives is that most members of the land community have no economic value." Conservationists, says Leopold, 'invent subterfuges' to show that apparently 'useless' species really do have economic value, for example to claim that wild predators are necessary for the health of game populations. This section presents a number of arguments designed to cast further doubts on the conservationist stance on species protection.
Conservationists often argue that the resource potential of most species is unknown at present and that many species may turn out to be useful. But if the value of species is only their resource value, then at some point we are entitled to clear out the 'useless' species in order to make better use of the useful ones, or other natural resources.

Utilitarian conservationists (other than non-speciesists such as Peter Singer) are committed to approving of schemes which raise the overall level of human wellbeing. They should approve, therefore, of policies designed to create the highest net utility including, sometimes, the replacement of indigenous species by introduced ones. If utility is the sole ground for species protection, then it would seem rational to introduce species which are more useful, even at the expense of indigenous species. In such a case the utilitarian appears to be committed to policies resulting in species extermination.

A commitment to resource conservation, with its philosophy of maximum sustainable yield, may imply the reduction or elimination of competitors or predators, by direct killing or habitat modifications. Acclimatisation societies have experimented with predator elimination policies in areas set aside for hunting, so as to increase the survival rate of species favoured by hunters. In this instance the resource value of some species is enhanced by reducing the population of others, perhaps to the point of local extinction.

To conserve a species as a resource may be effectively to destroy the qualities for which preservationists (or even some conservationists) value it. Africa’s large quadrupeds have considerable value as tourist attractions; millions of tourists visit many African countries specifically to look at wildlife. Elephants attract flocks of tourists; elephant tusk, hides and meat are valuable too. The Kruger National Park, which contains most of South Africa’s 7,800 elephants, is described as ‘rigidly managed’ and even has a modern abattoir to process culled animals.

Careful management is necessary to maintain populations
within the resources available, to protect herds from poachers, and to ensure that enough animals of impressive size are easily viewed by tourists. At Addo National Park, also in South Africa, about 100 elephants live protected behind a steel fence. "From slaughter to strict preservation of a tiny fragment — this South African example may foreshadow the future of most of Africa’s elephants." 42

The price of protecting these animals is high. Their nomadic instincts are frustrated and may eventually be bred out; the most aggressive animals, which may damage perimeter fences or attack wardens and tourists, will be culled; surplus baby elephants are sold to circuses and zoos; temporarily sick or disabled animals, which provide an outlet for elephants’ altruistic, supportive behavioural needs, will be culled instead of being healed or dying a proper death within their own society. These selective pressures, and the genetic isolation of small populations, will alter the gene pool, probably detrimentally. Something of the value of elephants will be lost, precisely because the elephants are protected as a resource.

A number of conservationist arguments for species protection: claims that the continued existence of various species is necessary, might be necessary, or at any rate contributes to human welfare have been discussed. No single argument justifies a commitment to preserving species as such. It is tempting to conclude that even though each of the arguments has flaws, taken together they are conclusive. This will not do. Michael Scriven, writing about arguments intended to demonstrate the existence of God, refers to an old story about a theologian who said "None of my arguments is any good by itself, but taken together they constitute an overwhelming proof". 43

The conservationist, though, may argue that the attack mounted so far is unfair. It is not as if conservationists are arguing for deliberate or casual destruction of species. On the contrary, they urge restraint on the grounds that species represent irreplaceable resources. The variety of benefits which we do, or might expect to gain from a variety of species, ought to make us hesitate to destroy or threaten any species unless there is some clear and considerable benefit which could not be gained by less destructive means. Our knowledge of animal behaviour, genetics and ecology is still very incomplete; we should proceed with caution.
In many cases conservationist and preservationist approaches will yield similar practical conclusions, even though for quite different reasons. It is in those cases where no conceivable use can be imagined for a species that the two approaches will yield differing conclusions. A good example is the case of species whose existence is actually harmful to human interests, and it is to this problem that we now turn.

**Harmful species**

Some species are, or may be useful; many are almost certainly not. Worse, other species have a negative value for humans. If the only value of a species is as a resource, then 'harmful' species presumably can be exterminated with a clear conscience. Such cases pose difficulties for the preservationist who advocates the protection of all species. The smallpox virus (*Poxvirus variola*) is probably extinct 'in the wild' thanks to a systematic vaccination campaign by the World Health Organisation. British microbiologist Bernard Dixon notes that "this is the first time in history when man has been able to obliterate — for all time and by conscious, rational choice — a particular form of life," and asks, "Should the WHO be applauded for pioneering this new form of genocide or is there a case for the preservationists to call a halt?"

Dixon goes on to argue that the virus should indeed be preserved, both because knowledge of it might be useful in fighting related diseases, and because of its potential use in genetic engineering. But these are arguments for protecting it only in laboratories: the virologists who wish to maintain it presumably do not wish to preserve it in its ecological role. The risks of maintaining the species are enormous, since fairly soon there will be no natural or acquired immunity in the human population: an accidental or deliberate release could cause millions of deaths.

There are less dramatic 'problem species', including agricultural and other 'pests': aphids, mealy bugs, rats, mice and silverfish for instance. These species have a wider ecological role than disease organisms, whose only function appears to be to keep down the human population by (presumably) unacceptable deaths. There are also behavioural and technological solutions to prevent 'pests' from seriously harming human interests while not threatening populations in areas where they do not harm human interests. The preservationist will be prepared to pay the price of such measures, even though extermination might be cheaper; the
conservationist will not. More importantly, the preservationist seems to be committed to accepting some human deaths as the price to be paid for saving species. J. Baird Callicott refers to Edward Abbey's statement that he would sooner shoot a man than a snake; while not going so far himself, Callicott writes that "the preciousness of individual (animals) . . . is inversely proportional to the population of the species" and at least implies his agreement with the view that "the human population has become so disproportionate from the biological point of view that if one had to choose between a specimen of Homo sapiens and a specimen of rare even if unattractive species, the choice would be moot."46

The adoption of a view such as Callicott's requires a revolution in our ethical thinking, and probably a much wider conceptual revision. The conservationist, in contrast, can appeal to concepts of the place of humans in nature and the value of human life which are familiar to and accepted by most people. To make a general case for the preservation of all species as such, therefore, presents a considerable challenge — especially when the existence of the species in question threatens the existence of some humans.

The conservationist case has a further dimension which has not yet been considered: that we are not (presumably) the last generation of humans. Even if we do not perceive a species as a valuable resource, it may be that future generations will, and it might be thought that we ought not to cut off the option of enjoying or utilising a species merely because we happen not to value it. This argument appeals to a duty to conserve resources of all kinds for future generations. In turn, this is part of a generally accepted duty to make some sacrifices of present enjoyment for the sake of benefits to future generations.

Accepting, for argument's sake, that these duties should be taken seriously, the conservationist could argue that we ought not to deny future generations the use of species for which we have no use at present. Indeed, perhaps we ought even to consider the possibility that they might be preservationists, who will place inherent value on all species! This argument appears to reduce the practical differences between the two positions to zero. In fact, it is seriously deficient for three reasons.

First, it requires us to speculate about the wants, needs, and values of future generations, but provides no basis for such speculation. We cannot know everything they will value,
and of course like us they will have to choose from what is available.

Secondly, the conservationist will certainly support policies designed to protect species with a view to the needs of future generations, unless strong reasons to the contrary are presented. Conservation implies the saving of resources, even potential resources. But in some cases there may be good, perhaps overwhelming, reasons for proceeding with developments which destroy the habitats of rare species, precisely in order to provide benefits for future generations. For example, our duty to provide energy or materials for future generations may require us to begin projects which will not yield benefits for decades, such as forestry planting. Some developments of this sort may destroy the habitats of endangered species.

Thirdly, our obligations to the future do not automatically override our other obligations. We also have duties to our contemporaries, and in carrying them out we may sometimes be using up resources and thereby denying the benefits to future generations. The nature and scope of our obligations to the future, then, pose difficulties for both the conservationist and preservationist. For the former, because it is not easy to decide which resources should be used now and which saved for the future; for the latter, because failure to proceed with developments may harm the interests of future as well as present generations. Once again, the preservationist may be forced to accept a considerable loss to humans as the price to be paid for protecting species.

So far we have mostly been considering species as isolated units, whose claims to protection must be based on their own properties. The value and interest of many species has often been conceived in this way. Old fashioned zoos exhibited separate animals in cages for people to look at. Biology has studied the physiology, morphology and (more recently) behaviour of species in isolation. Propaganda for species protection focuses on individual species, often spectacular or beautiful ones such as tigers, kokako, or giant panda. Legislation is often species oriented: most countries have their lists of species which it is forbidden to harm.

A different way to approach the problem is to focus on the protection of ecosystems. This approach is not an original one, of course, and is behind the creation of many national parks, reserves, and protected habitats around the world.
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The topic of wilderness preservation is covered elsewhere in this volume so we shall make only brief comments.

The following considerations may be urged in favour of the protection of large areas of land and thus of protecting species.

Both the conservationist and preservationist may argue that the setting aside of large areas is a duty to future generations. Worldwide, as development proceeds, the number and variety of relatively unmodified ecosystems is steadily shrinking. Unless some areas are protected absolutely from modification, future generations will not have the opportunity to have valuable aesthetic, recreational, scientific and spiritual experiences. In New Zealand we can well afford to set aside large areas as National Parks, and as a prosperous, lightly populated country we have a duty to do so. Already some of New Zealand’s unique ecosystems — tussock grassland, peat bogs, lowland podocarp forest — have been greatly reduced, along with the formerly common but now rare species which inhabit them. Policies to protect ecosystems, and especially fragile or diminishing ecosystems, can be justified by an appeal to the presumed interests of future generations.

It is certainly better to try to save species by protecting their habitat than to breed them in captivity, for instance, with a view to later reintroduction.

The protection of ecosystems provides hope for saving more species. Many species do not breed or even survive in captivity; some need huge tracts of land to migrate, to engage in display flights as an essential precondition of mating, or just to achieve psychological health. No animals are indefinitely adaptable: rare ones are relatively non-adaptable.

Most species behave differently in captivity than in the wild, and some captive populations undergo genetic changes in response to the special conditions of captivity. It follows that to attempt to save a species in captivity is justifiable generally only on the grounds that the eventual intention is to release it back into the wild. For various reasons, this is not always possible. Captive animals often develop behaviour traits which make their survival in the wild unlikely. If an animal is exterminated in an area, other species will often fill the vacant niche thus created. The reintroduced species may find, therefore, that it has nowhere to go; in any case, during its absence a new ecological balance may have been struck, which the reintroduction will upset.
Captive breeding over several generations may lead to genetic degeneration, both through excessive in-breeding and because captive environments usually differ in various ways from the original environment. These differences will act as selective pressures favouring traits which may not be successful in the wild and cause further problems of reintroduction. If captive breeding produces animals significantly different from the wild population, the programme will not have saved a species, but turned it into something else. There is already some evidence of significant genetic change among captive lion populations, for example.

Most of the benefits from the protection of individual species can also be gained from ecosystem protection. The charm, aesthetic appeal, and scientific interest of animals and plants is as great or greater in large natural systems as in zoos, parks or small reserves. The dynamics of population change, interspecific competition and the like can often be observed and understood only in large areas. Genetic variation and natural hybridization are protected in the wild, with the added advantage that nature both provides the product and tests it. Recreational hunting and fishing are (or ought to be) more satisfying, because it is more challenging, when the quarry is wild animals and birds living in a natural environment rather than in a carefully managed game reserve.

Finally, to adopt an ecological approach is to avoid the difficulties of trying to justify the protection of uninteresting, ugly, inedible, useless or dangerous species. Almost all species play an important role in their environment.

We have argued that the best way to justify species protection, and the best way to do it, is to protect large natural areas. There are benefits to humans and to animals (and plants, if one can benefit plants) from adopting protectionist policies. Certainly it is a great deal easier to justify the protection of large areas of Amazon rain forest, New Zealand lowland podocarp forest, or coastal marshland than it is to defend measures to protect each of the varieties of plants and animals inhabiting these areas. It is certainly easier to defend the maintenance of environmental quality globally than to provide separate arguments for saving each of the five or more million species which live there.

One aspect of ecosystems is possibly of crucial importance to the future of all species, and is only partially understood. This is ecosystem resilience; the capacity to absorb change without a fundamental alteration in the inter-relationships
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which characterise the ecosystem. For instance, changes in climate may be accommodated within a natural ecosystem by an alteration in the proportions of contributing species. Thus beech species may be favoured over podocarp species in New Zealand lowland forest should the climate become colder and drier, but on a return to warmer wetter weather the regeneration of podocarps is favoured. Throughout such slow shifts in the dominant vegetation type the myriads of other forest dwelling species adjust their numbers in proportion. In fact, such an ecosystem can absorb environmental change. With the lowland forest ecosystem reducing in extent, being fragmented by clearance for agriculture and other uses and substantially altered by logging, its capacity to adjust to possible future climatic change may eventually be insufficient to permit a forest vegetation to persist. The resilience of the lowland forest ecosystem may eventually be lost by reduction and interference.

Resilience can be considered a finite resource, dependent on the integrity of ecosystems, and capable of consumption.

The loss of ecosystem resilience, which occurs once an ecosystem has suffered a number of changes to its processes and composition, may lead to changes in the global balance of air circulation and composition, and hence climate, with surprising consequences. Some of these changes might be of such magnitude that a wide range of species presently capable of inhabiting the earth might be destroyed, our own species included.

Both ecosystem resilience and the consequences of its loss are presently little understood. However, because of the likely magnitude of global climatic change which might follow such loss of resilience it must be in our own interests to retain as much of this finite resource as we possibly can.

The arguments advanced so far ought to appeal to those who value nature as a resource (an aesthetic, scientific, spiritual and recreational resource) as well as to those whom we have called preservationists. For the latter, it is not wrong to take an aesthetic or other non-destructive interest in nature. Besides, preservationists and conservationists ought to be able to work together to support policies of protection for ecosystems and to oppose destructive developments, even if their reasons are different.

The preservationist, though, may wish to point out that the justification for National Parks, in terms of the interests of future generations in having certain opportunities, misses
the point that ecosystems are valuable wholes in themselves, even if no one happens to value them. He or she is likely to adopt an ecological or holistic perspective, and to argue that ecosystems are good simply in themselves. What is valuable about Whirinaki, for instance, is not only that it contains unusually large trees. An ecosystem is not a collection of individuals or species, a series of parts forming a whole, or a number of beings in a place. Rather, it is a whole, a place, and to ask whether the beings, processes and interactions which comprise it are good and merit protection is to miss the point.

But why should we value ecosystems? It is easier, certainly, to produce arguments based on their value to humans, than to show that they have intrinsic value. A rubbish dump is an ecosystem but even the preservationist would be pushed to find intrinsic value in it. Nonetheless, it seems to us that John Morton is right when he refers to "the value of a living system as self-subsisting good." Perhaps the best way to appreciate the holistic perspective is to lay oneself open to holistic experiences. That the existence of a forest has a different kind of value than the existence of an individual animal can best (perhaps only) be demonstrated by personal experience of both. That is why, when John Muir wanted to persuade President Theodore Roosevelt of the need to protect the Yosemite Valley, he did not rely on argument. Instead, he accompanied the President on a camping trip to Yosemite — from which Roosevelt returned "shouting ecstatically about "the grandest day of my life!"" 47

1. There are few estimates of the total number of species since life began. C.G. Simpson, in "How many species?" (Evolution 6 (1952), p.342) estimates 500 million while Norman Myers (The sinking ark, Pergamon Press, New York; 1979, p.29) suggests a range of 100-250 million.
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29. For a more detailed discussion see Gunn, A. S., 1980. *Why should we care about rare species? Environmental*
Ethics 2: 17-37.
32. But Ehrenfeld notes "the danger of assuming, with an air of infallibility, that one knows what the ecological effects of game ranching will be. This again is a manifestation of the arrogance of humanism: if the animals are to be considered resources and worthy of being saved, they must be available for exploitation". Ehrenfeld, D. 1978. The arrogance of humanism. Oxford University Press, New York. 197-98.
41. The value to tourism of one lion in Kenya has been estimated at seven and three quarter million dollars over its lifetime. In contrast, a hunter would pay only $8,500 for a licence to kill it. Myers, N. 1981. Roaring success. New Scientist (March 12). p. 697.
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4) 8-14.
Responsibility to Future People

Diane Hunt

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Editorial Note

The first pair of essays on preservation looked at spatial questions of keeping areas of nature free from human interference. To these set of concerns, we now add a temporal dimension. When we define conservation as a "saving for", we must specify for whom. The Conservation Strategy includes future generations in its definition. How many future generations?

Diane Hunt's essay examines moral dilemmas associated with allocating natural resources through time. While in general terms we would wish to bequeath favourable assets to future people, when it comes to specifics, it is not so easy. If we make sacrifices now, we do not know if those savings will be required by future generations, and if we forego opportunities we have no guarantee that later they will not be squandered. It is easy to propose a strategy which allows for sustainable use of renewable resources, but for non-
renewable resources depletion is inevitable. At what rate should we deplete? Perhaps it is easier to say what we should not do, rather than state our positive obligations.

The environmentalists' charge is that classical economic development is a major cause of the environmental crisis, but slowing down development would merely postpone, not prevent it. On the other hand, the sustainability option, with its emphasis on renewable and sustainable use, does not solve all dilemmas. Diane Hunt’s comparison of the two begins to look for answers, while leaving us aware that many are still to be found.

Justice would seem to argue for a more equitable distribution amongst the present generation, and for some generations to come. There are two elements to this. Is it unfair to diminish the inheritance of future generations of present resources by waste or by war? Secondly, what obligations does the present generation have to share resources with future generations, and how many generations?

If a renewable resource is squandered or mismanaged so that future generations are prevented from its use, that is a clear moral wrong. How far a non-renewable resource should be shared with future generations is not so easy. Resources are diminished by pollution, and the creation and disposal of harmful wastes is another way of examining these questions.
'Conservation' is a commonly used word, but it is seldom defined. Most people would associate conservation with 'saving', and in this essay I shall use it to mean the saving of resources for later consumption. Note that conservation is not the same as 'preservation' which implies saving from consumption at any time.

The purpose of this essay is to discuss conservation as an issue relating to the manner in which modern industrial society uses natural resources. These resources fall into two broad classes, namely energy and materials. In the former category are resources such as oil, coal, natural gas, hydroelectricity and sunlight. The latter category includes minerals (copper, iron, phosphate etc.) as well as biological materials such as wood, soil and food sources.

Conservation of resources such as these is often seen as incompatible with 'development', a term which for many implies the rapid exploitation, processing and consumption of natural resources. Yet both concepts — conservation and development — are concerned with matching patterns of resource use to human needs. They are both resource management concepts. Their main difference lies in the rate of consumption which they imply, with conservation suggesting a slower rate than does development. Thus the rate of resource use is a key feature of the conservation issue.

Another important issue is the manner in which a resource is used. Conservation may also imply choice of the most efficient pattern of resource use. For example, New Zealand's natural gas is a potential source of three forms of transport fuel. It may be used directly as CNG, it may be converted to methanol, or it may be taken one step further to make
synthetic gasoline. At each stage in the conversion chain energy is lost. The conservation option can be regarded as that which entails getting the most from the energy content of the gas, i.e. using it directly as a fuel. (Other factors must also be taken into account, of course, including the relative efficiencies of using CNG, methanol and synthetic gasoline in a car engine, and the energy costs of producing the respective car conversion kits.) The most energy-efficient option will increase either the amount of fuel available for society’s use now, or the useful lifetime of the resource.

To use resources too rapidly (through either wasteful use or high rates of consumption) suggests that they will run out, creating major dislocations for our industrial society. To use resources too slowly implies current sacrifice and hardship in the interests of an unknown future. The purpose of this essay is not to prescribe the ‘correct’ rate of resource use (i.e. to say how much conservation we need) but rather to identify some of the ethical and intellectual dilemmas associated with resource use decisions.

Imagine yourself representing the present generation. You stand before a well, the only known well, with a bucket in your hand. Standing behind you in a queue is a line of people with buckets, each representing a future generation, and each waiting for their turn to draw water from the well. You may draw as much water as you wish, and the more water you take, the more prosperous your generation becomes, for in this society water is the key to all things. None of the people in the queue behind you can influence you in any way. Are there any moral constraints on how much water you should take?

Before answering the question, most of us would want answers to a number of other questions. Some relevant questions are as follows:

— How long is the queue behind me?
— What are my feelings towards those behind me?
— Is the well being fed by an everlasting spring? And, if so, at what rate?
— Is the amount of water in the well finite?
— What are the chances of finding other wells?
— Is the water consumed completely as it is used?
— How many people must share in the use of my bucketful?
— To what extent will the people behind me benefit
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from the uses to which I put my bucketful?

**Question 1**

*How long is the queue behind me?*

How far into the future should we look when considering the consequences of our present actions? We do not know how many generations will succeed us on earth, and the further into the future we look, the more difficult it is for us to imagine what will serve the interests of those generations. If we are to try to ensure that everyone in the queue gets a fair share of the water, then we have a very difficult planning task on our hands.

**Question 2**

*What are my feelings towards those behind me?*

Do I have any feelings of concern for future generations? There are those who, like Groucho Marx, would say: “What has posterity ever done for me?” Others take the ethical stance of total responsibility for all generations into the future. In the middle lie those who would argue that our primary responsibility is to those in the one or two generations immediately following us.

From what stems our responsibility to those in the queue behind us? Several philosophers (e.g. De George) have addressed the question of whether future generations have rights which entitle them to be considered in the making of present decisions. A common conclusion is that because future generations do not now exist, they cannot be said to be the present holders of anything, including rights. They will have rights when they come into being, but those rights will relate only to what is available in the society and the times into which they are born. If we ascribe rights to future generations, it is us and not them expressing interest or concern.

Thus a more useful way of looking at the question is to ask: what are our feelings about the future, what obligations might we choose to impose on ourselves with respect to generations behind us in the queue? The question then is one of our choice, and our attitude to the future becomes one aspect of our ethical stance toward the rest of the world.

Almost everyone feels a bond with their own children and their children’s children. This bond is not the same as a bond of duty to the community’s children in general. Nonetheless, it is easier to extend family bonds to immediately subsequent generations than toward more distant generations. Reflecting on this it is fair to say that our responsibility to the future
may be a declining one as time goes on. It is much easier to imagine what the interests of the near future will be, and much easier to cater for them. Of course if each generation in the queue thinks in a similar manner, the future will be catered for in a succeeding chain of concern.

Obligations to the future are of the same kind as those towards friends. They spring from informal social relationships rather than from formalised relationships; they contrast with obligations to obey the law. Obligations to the future are self-imposed and spring in part from a sense of love. Passmore notes that to love (in the sense to cherish) is to care about the future of that which we love, and to be concerned about what happens to it after we die. This is one reason why our sense of duty is strongest towards immediate descendants.

Is the well being fed by an everlasting spring, and if so, at what rate?

This is a key question because it draws the distinction between renewable and non-renewable resources. A renewable resource is one which is naturally regenerated, or continues to flow (e.g. water, oxygen, sunlight), or for which regeneration can be managed by man (e.g. crops, forests, animal and fish populations). A non-renewable resource is of finite and fixed supply. If it is mineral (metals, phosphate, etc.) it may be recycled, but not regenerated. Oil, coal and gas are non-renewable energy sources. They can be neither regenerated nor recycled, and thus create particularly difficult dilemmas.

If the well is being fed by a spring then that which I take can be regenerated or replaced. Thus if my concern is to avoid disadvantaging future generations in the queue behind me, I will attempt to take water at the rate at which it is being renewed.

This analogy applies to a wide range of renewable resources, and relates to the concept of sustainability. A sustainable society is one whose resource use patterns can be sustained indefinitely. Thus in a sustainable society fish catches would be no greater than natural fish population increases; tree-felling would be no faster than the rate of replanting and regrowth. The use of any renewable energy resource (solar, wind or hydro for example) is indefinitely sustainable. Clearly a sustainable strategy also implies maintenance of the earth's life support systems (air, soil,
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water) in a healthy state; they are 'conserved' for use *ad infinitum*.

If we wish to create a sustainable resource use pattern, then we must understand the dynamics of the resources we are using. For example, the population dynamics of a fish species must be studied if a sustainable level of catch is to be achieved.

Of course even if we have this knowledge there are factors which work against achievement of sustained yield. Economic parameters are particularly important, and have prevented the implementation of a known sustainable strategy in situations such as that of whaling, where existing capital investment in fishing fleets constitutes an imperative to continue fishing in the short term despite the long term costs of doing so.

Short term economic arguments also work against the conservation of renewable resources which are renewed at a very slow rate. For example we have not replanted many native tree species such as kauri because of their long growth time to maturity.

*Is the amount of water in the well finite?*

If the water in the well represents a non-renewable resource, the conservation dilemma is a much more difficult one. Conserving renewable resources creates ecological and technical challenges rather than ethical ones. But for non-renewable minerals and energy sources (oil, coal, gas) the issues associated with the question "How much water should this generation take?" are more complex.

In our western society the allocation of such resources between generations in the queue is being shaped by the equations of economics. A representative economist chosen to comment on the parable of the well as it applies to a non-renewable resource would make the following points: first, to divide the amount of water in the well equally amongst our own and all future generations is a nonsense, since it results in a pointlessly small amount for each generation.

Second, any other economically rational method of allocating the water will involve discounting the future. Discounting is based on the assumption that present consumption is preferable to future consumption. Given a choice between a gift of $1000 now and the same real amount in seven years time, the rational person will choose to take
the money now. Thus the individual behaves as if future costs or benefits will be less than the same costs or benefits experienced today. The more distant the anticipated costs or benefits, the more they are diminished in our thinking.

This way of thinking leads to the conclusion that non-renewable resources used today generate greater human benefit than such resources used tomorrow. Thus the economists' solution to the problem of allocating water from the well involves selecting a discount rate, which is a measure of the decline in benefit with time and which also reflects our uncertainty about the usefulness of the resource to future people. The less value we place on future benefits, the higher the discount rate.

The economist will also address the question of the price of water from the well. In a market economy price reflects scarcity. If the water is abundant, its price will be low; if it is scarce its price will be high. As a resource is depleted, scarcity increases, price increases and the incentive to find substitute resources becomes greater. This leads us to the next question which will shape our decision on taking water from the well.

**Question 5**

*What are the chances of finding other wells?*

If I take what seems like more than my fair share of water and the well is eventually run dry, will those in the queue behind me be able to find other wells? If indeed there are other wells, will rapid depletion of this one in fact stimulate those behind me to search for those others?

This issue is one of our attitude to science and technology. Two attitudes can be identified. One school of thought believes that science and technology will enable humans to overcome all possible ecological and resource constraints. They point to past experience which has indicated that our knowledge of mineral resources, for example, is a function of need. As existing deposits are mined, new sources are sought. The 'technological fix' school of thought also holds that market forces stimulate the development of technologies which move industrial society from dependence on scarce resources to abundant ones. An example would be the development of optical fibres (based on the abundant resource silicon) to replace copper cables in telecommunications.

The other school of thought is more cautious and promotes the conservation of resources, bringing into its argument the
observation that the current scale and speed of growth in resource use is unprecedented, and noting the lag times which are inherent in the development of new technologies. To rely on science and technology to produce substitutes for scarce resources, it is argued, is to take a risk on behalf of future generations. There may be no limits to technological innovation, but of this we can't be sure. Furthermore, new technologies, e.g. fuel cells or solar cells for energy production, must invariably be built from materials, some of which may be extremely rare. The availability of these materials may then become a limiting factor to the amount of energy which can be generated in this way.

There are also differences in the degree to which different resources can be substituted. For example, one could never find a substitute for water which could equally well maintain human and other life. Similarly, clean air and healthy soil must be regarded as essential components of the earth's life support system. It is interesting that these resources are not priced; they are traditionally regarded as free, common property, and are therefore most open to abuse. They are most usually 'depleted' by the addition of pollutants. Resources which are more easily substituted are the minerals and energy on which the technological society is built.

**Is the water consumed completely as it is used?**

The manner in which we use the water I draw from the well will determine whether any of that water is available for future generations on a second-time-around basis. This will depend also on the nature of the resource, and an important distinction should be made between mineral and energy resources.

Mineral resources are not 'consumed' in their use, nor lost from the earth, but merely converted from one form to another. The pattern of this conversion, however, is generally such as to make these resources less available for human use. They are extracted from the concentrated source (a mine), processed (sometimes by a chemical process which binds them irreversibly to other compounds), used, and then eventually discarded. Dumps represent a source of minerals for recycling, but at enormous cost because of the very dispersed nature of the minerals therein.

Energy is a resource of a different nature. It can never be recovered and recycled. It is consumed as it is used. Current industrial society has achieved a high standard of living based
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on fossil fuels, non-renewable energy sources which were laid down millions of years ago. Once burnt, these are lost forever. They represent a form of energy 'capital' or stored energy, and they are finite in supply. No society can live off capital forever.

Renewable energy sources are those for which a constant flow is available, examples being sunlight, water, wind and waves. Biomass too is a potentially renewable energy resource; it is in effect captured sunlight, and principles for its sustained management are those which apply whether we use the biomass as a source of energy or materials.

Energy is the key resource to humankind. If we had unlimited energy resources, then all other (material) resources would potentially be available for ever. We would have the means to concentrate minerals from very dilute sources such as seawater, and to promote very high levels of primary production. We do not, however, have unlimited energy. The rates of flow of the renewable energy resources to which we must eventually return are fixed.

Because energy is the key to the availability of all other resources, the parable of the well is most powerful if one imagines the water to represent energy. The rate at which we take water from the well represents the rate of energy use of modern society. Much of this energy is non-renewable fossil fuel, and the more of this we take today the less is available for future generations. Will our current high levels of energy use be sustained by alternatives to fossil fuels?

There is considerable debate among scientists over the level of energy flow which can be achieved using only renewable sources, and some estimates fall well below that which characterises modern industrial society. If these estimates are correct, then society is facing, at some time in the future, an inevitable transition to a lower rate of energy use. Furthermore, future generations will find that the availability of all resources (particularly the lower-grade minerals we have left for them) is restricted by energy availability.

**Question 7**

How many people must share in the use of my bucketful?

It was suggested in the analogy that the water I draw from the well makes my generation prosperous. Our world experience to date suggests that such prosperity tends to fall unequally. Access to the world's resources is naturally uneven, and these inequalities are compounded by
uneven, and these inequalities are compounded by inequalities in the distribution of power between nations.

Thus a moral dilemma facing the present generation is how to balance the competing claims of the world's current inhabitants with those of future generations in the queue behind us. Is it fair to conserve resources for the future if this involves a denial of resources to those who are already in existence? If all the world's people were to attain the current standard of living of the USA, resource depletion rates would be extremely high.

**Question 8**

To what extent will the people behind me benefit from the uses to which I put my bucketful?

If my bucket of water does indeed cause our present society to prosper, then perhaps I am doing the best for those behind me by drawing as much water as possible. In other words, the interests of future generations are best served by leaving for them a prosperous society in which cultural assets are enriched and the infrastructure for science and technology is made healthy and strong.

It was noted earlier that improvements in technology are especially important, since they may cause the size of the useable resource base to increase, or, even more significantly, change an essential resource into a non-essential one, by allowing access to alternatives. The more water that is used by the present generation, the more likely it is that we will be able to advance technology and capital accumulation, to the point where the next generation is freed from the tyranny of dependence on this single well. The efficient use of optimal quantities of water from the well by the current generation may be the best guarantee that the next generation has of inheriting an accumulation of capital and technology that will be adequate to their situation.

**Discussion**

In addressing the ethical dilemmas associated with the parable of the well, we have found that the same question may often be approached from different viewpoints. In order to summarise the issues at stake, I will characterise these different viewpoints into two schools of thought, the 'conventional economics' approach and the 'sustainability' approach.

**Conventional economics**

The main tenets of this school of thought state:

- applying a discount rate to future benefits is a rational
way of allocating resource use across time;
— all resources can be substituted;
— the accumulation of capital and the progress of technology will provide access to resource substitutes; and,
— future people may inherit fewer resources than we have, but will be compensated for this by inheriting improved technology and accumulated capital.

Members of this school would argue that we take as much water from the well as is needed to sustain not only current, but growing, levels of material wealth.

**Sustainability**

A sustainable society is one whose patterns of resource use can be maintained indefinitely. The main elements of this approach are:

— we should regard future people as we regard ourselves;
— we must plan an orderly transition to a society based primarily on the use of renewable resources;
— non-essential and obviously substitutable (non-renewable) resources can be discounted and the search for substitutes should be directed to renewable resources;
— an essential and non-substitutable (non-renewable) resource should be used at a rate no greater than that required to meet society's 'basic needs' so that its use may be extended as long as possible; and,
— renewable resources should be managed in a sustainable fashion.

Members of this school would argue that we take water from the well only at the rate at which it is being renewed, or, if it is non-renewable, at a rate which either meets society's 'basic needs' only (if the resource is irreplaceable) or gives time for the development of substitutes.

Both schools of thought have strengths and weaknesses. I will now look at how adequately they deal with a number of issues.

**Energy**

The economists' viewpoint fails to acknowledge the key role of energy in providing access to all other resources. There is insufficient recognition of the fact that fossil fuels are
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essentially non-substitutable (other energy sources lack their desirable energy characteristics), and that many options for the substitution of other resources (such as low-grade mineral ores) will be impossible in energy terms once fossil fuels are depleted.

The 'sustainability' approach emphasises the importance of lowering energy flows to a level which can be maintained on a renewable base. Their approach to the use of fossil fuels, therefore, would be to achieve a societal levelling-off in the rate of use, and to plan a slow decline in order to allow a transition to renewable sources. If water in the well represents energy, then we should lower our rate of use.

Technology

Economists place faith in the progress of technology to develop substitutes as resources become scarce and to provide new options for the regeneration of essential resources. Land, air and water are essential resources; they are depleted not in quantity but in quality by the pollutants of industrial society. Economists would argue that putting a price on these resources (through pollution taxes and other economic measures) will stimulate the development of technologies which lower pollution or allow repurification.

The proponents of a sustainable society vary in their approach to technology. Some would place faith on existing technologies only, and suggest that a sustainable society will be very like pre-industrial society. Others place faith in technology to develop new and sophisticated ways of using renewable resources (solar cells, microprocessor-controlled aerofoils, etc.). A problem unresolved by the sustainability school is that such technologies will inevitably rely on non-renewable materials of some sort, which in turn will become scarce.

Distributional issues

Should we be much more concerned with achieving an equitable distribution of resources between the rich and poor of today's world, than in concerning ourselves with distribution over time? There is an important justice issue to be addressed here. It is not necessarily easily solved by either school of thought, and it is outside the scope of this essay to deal with it fully.

'Basic' needs

The contention would be made by the sustainability school that if a non-renewable resource is essential to all present and future society, and is non-substitutable, then we should
use it at a rate no greater than that required to meet society's 'basic needs', so that its use may be extended as long as possible. Whether any such resources exist is a matter for debate. Water and air are essential but can be made to last indefinitely if their quality is preserved. Minerals essential to human, animal and plant nutrition (copper, iron, phosphorus, etc.) may be of this type, and it is here that the issues of energy availability become crucial, because many of these minerals are becoming increasingly diluted, and dilute sources may be inaccessible in the future because of energy limitations.

Fossil fuels are non-renewable and, because of their particular characteristics, may be non-substitutable. Yet we use them to meet a wide range of needs, from some that are clearly basic (e.g. home heating) to others which seem clearly wasteful (e.g. driving for sport). But is the fuelling of fire engines and ambulances a 'basic' or 'excessive' need?

We are thus faced with the difficulty of defining a level of human need which is 'basic'. Is such need restricted to shelter, food and clothing, or can some level of personal and social need-satisfaction be accommodated as well?

In summary, both schools of thought prescribe certain rates of resource use, and certain conservation strategies, but in each case difficult questions remain unresolved. The choice of which viewpoint one takes is an individual decision. But each school of thought suggests a different approach to resource use by society as a whole. Resource use decisions are made on our behalf by agencies and government, and if these do not reflect our own moral viewpoint, we are faced with the challenge of attempting to effect change.

**Conclusion**

In conclusion, I find neither school of thought completely satisfactory. While I cannot accept the tenet that all resources are ultimately substitutable, I do believe that economics provides useful tools for making decisions on the allocation of resources. It is more the numbers that we feed into economic equations, than the equations themselves, which reflect our value systems.

For example, we can make economics take greater account of the interests of future generations by applying new discount rates. The lower the discount rate, the less we devalue benefits accruing in the future. A discount rate of zero applied to fossil fuels, for example, would slow our rate of use
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substantially, and spread the benefits of these non-renewable resources over many more generations. A negative discount rate would require us to place the interests of future generations over the present, and thus to leave the resource in question untouched.

The sustainability approach has much philosophical appeal. I am attracted by the value it places on the continuing health of the biosphere, and a loving concern for future generations. To use renewable resources in a way which can be sustained indefinitely seems the only responsible and sane approach to take. Yet the sustainability approach does not really give us any answers on the rate at which we should use non-renewable resources, save at a 'slower' rate than at present. The use of non-renewable resources is never sustainable, yet it is impossible, for example, to imagine a society which did not use any minerals.

Reconciliation of the two approaches may be achieved by a change in the time perspective of society. We need to take a longer-term view, to promote a move toward sustainability by applying lower discount rates to the use of non-renewable resources. We need to ensure that cost-benefit analyses take account of all relevant costs and benefits, both quantifiable and non-quantifiable, so that the long-term health of renewable resources is protected. We need to think more like the architects of the colleges of Oxford University who, when specifying roof beams of oak, also deemed that a grove of oaks be planted to provide new timbers in 300-400 years time, when the original beams would have rotted.

Pollution as a Transfer of Consequences

Graeme Scott

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Editorial Note

Graeme Scott's essay continues to explore some of the questions asked by Diane Hunt. Is it acceptable to transfer the consequences of pollution to present or future generations, particularly if it entails the transfer of harm? Using principles proposed by Rawls and Shue, he looks at specific cases of pollution, examining the extent to which we close off opportunities for the future as well as bequeathing harm. In his view, ethical theory can deal with the consequences upon present people, and with difficulty, future generations. But consequences involving non-human species are not satisfactorily resolved by existing ethical theories.
Our present western culture is without precedent for the range of benefits that it provides for its citizens. Never before in human history have people been better nourished, more healthy, better educated, or more materially well off. These advances have not been obtained without associated cost however. The provision of benefits is inexorably linked to unprecedented levels of resource harvesting and processing. Since every atom that is removed from the environment as a resource must eventually be returned to it as waste, the scale of waste production undertaken on behalf of our quest for material wellbeing is at least as great as that of resource harvesting. Perhaps $10^9$ to $10^{10}$ tonnes of waste are generated by western societies each year.

The disposal of these quantities of waste, together with the deliberate use of some substances creates consequences for other inhabitants of this planet of ours. We commonly refer to waste from the activities of others that has unwanted consequences for us, as pollution. From an ethical standpoint, the existence of pollution raises questions about the extent to which it is permissible for people to transfer consequences from activities that directly benefit themselves to others who gain no direct benefit. Three significant classes of 'others' exist (Figure 1) — other present people, future people and non-human species. There are separate moral questions for each. Similarly, two classes of consequences can be recognised — 'losses', which include financial loss, loss of amenity value or loss of opportunity for benefit; and 'harms', which include unavoidable damage or hurt to people. Again, separate moral questions are involved in each class.
A classification of the moral implications of pollution. The examples cited are further discussed in the text.

This essay consists of a discussion of the ethical implications of an example drawn from the four categories identified in Figure 1. Each particular class of recipient (present or future people) or consequence (loss or harm) is preceded by a discussion of the ethical theories that may be called upon to provide normative statements in each situation. Moral questions involving consequences borne by present people are, I find, relatively easily resolved by existing ethical theory. Issues involving future people are less easily resolved, owing to the fact that the ethical theory I have used in the context of present people is not easily 'intertemporalised'. Nevertheless, it is possible to make some tentative progress in the context of issues involving intertemporal equity.

However, in my view, consequences involving non-human species are impossible to resolve in any satisfactory way on the basis of existing ethical theories. Questions involving what accepted ethical principles indicate about our responsibility for consequences that fall upon parts of nature, therefore, cannot be answered. There is no accepted ethical theory dealing with human responsibility for nature that is capable of producing normative statements that pass the test of commonsense. The key ethical issue, therefore, is not what our ethic of nature says about pollution, but what our ethic for nature that is capable of providing normative judgements ought to be. I have relegated the whole question of an ethic
Equity in the transfer of consequences

From an ethical standpoint, the imposition of consequences upon others raises questions of justice and injustice. Justice involves equity — which I will take to mean fairness or impartiality — 'justice as fairness'. John Rawls' 'Theory of Justice' sets out a principle, which he calls the difference principle, that enables us to distinguish between justice and injustice:

All social values — liberty and opportunity, income and wealth, and the bases of self respect — are to be distributed equally unless an unequal distribution of any, or all, of these values is to everyone's advantage. Injustice, then, is simply inequalities that are not to the benefit of all.

Where transfers of consequences are involved, the difference principle has two implications². The first is that undeserved inequalities in the distribution of consequences call for redress. Put another way, the first implication becomes the transfer-limiting principle³: one may not, in general, simply transfer consequences of a significant kind arising from an activity which benefits oneself onto others who are not beneficiaries, without appropriate mitigation. The second implication is that unequal division of consequences can be justified if it works out to everyone's benefit. In other words, if all share the benefits, justice does not require that all share the consequences. One would suffer a misfortune, but not an injustice, if the only site suitable for the new sewage treatment plant was next to one's home! Equity requires impartiality and fairness in procedure. It does not require equality in the consequences borne².

The difference principle and its two implications outlined above provide a basis for determining the morality of imposed consequences that involve loss of amenity value and direct financial costs. However, they do not provide an acceptable basis in the context of consequences that involve significant harms. First, because there is no clear redress (other than restraint) for the imposition of significant harms. Second, because no amount of universal benefit can justify the imposition of severe harms upon a minority. The utilitarian position, which argues that individuals and minorities may be sacrificed to achieve 'the greatest good for the greatest number', is specifically rejected here.

Situations involving serious harms, or risks of serious harms,
will be resolved according to Henry Shue's no-harm principle:

It is wrong to inflict avoidable harm on other people and it ought to be prohibited by law.

Where people incur consequences without any direct compensatory benefit — such as employment — Shue considers the no-harm principle to apply if the following two conditions are met:

— The harm is genuine, i.e. the consequences are known with certainty to include the harm, at least for some people; and,
— the harm is incurable, at least for some people. In the case of people who derive both consequences and employment benefits from an activity, the no-harm principle does not apply if the following additional condition is met:
— The nature of the harm and the magnitude of the risk are known accurately to those who may suffer them.

As an example of this last condition, it is ethical to employ people in jobs that endanger their health, providing the risks are understood clearly by all parties. Less serious harms that are avoidable through reasonable precautions, or curable once contracted, will be considered to fall into the territory of the difference principle rather than the no-harm principle.

A colleague of mine, who is always at pains to insist that he is not 'getting at' cigarette smokers, likes to point out that smoking in public places reduces their amenity value to many people who do not smoke. His ire is aroused particularly by smoking in restaurants, where, in his view, tobacco smoke reduces the value of the restaurant experience for non-smokers. From an ethical standpoint, his case has at least superficial merit. Those who smoke transfer consequences to which they are immune — psychologically, if not physiologically — on to others who suffer a loss as a result of that transfer. From an economic perspective, the non-smoking restaurant patron would have to spend more money on more or better food and wine to restore the dining experience to its smoke-free value. Thus the non-smoker in a smoke-filled restaurant has the choice either of suffering a loss of amenity value as a result of an undeserved transfer of consequences, or of suffering an economic penalty to restore the experience to its anticipated value.

When viewed in this way, smoking in restaurants is an appropriate case for the application of the transfer-limiting
principle: one may not transfer consequences of a significant kind without appropriate mitigation. Mitigation could take one of two forms — restraint (smokers agree not to smoke) or compensation. Compensation, in turn, could involve the provision of additional amenities like free 'afters', coffee or wine, which are paid for by a surcharge on smokers — 10% extra for the provision of ash trays. To the extent that the non-smokers complaint has merit, so do solutions of this kind have merit.

The question that is unresolved, however, is whether the transfer of consequences involved in this example is sufficiently grave to warrant a solution of this kind. We are all polluters of one kind or another. Few of us in society do not transfer consequences to others — we use a noisy stereo or chainsaw, an open fire or a rubbish incinerator, an oil-burning or badly-tuned car. There are, no doubt, people whose restaurant experience is significantly diminished for them by loud conversation or laughter or by the sight of people eating meat. To a large extent, society is only possible if people show a degree of mutual tolerance with respect to consequences generated by others.

Smoking in restaurants, therefore, presents us with a threshold problem — how significant, or how widely felt, does a consequence have to be before it ceases to be one of life's little nuisances, and becomes an injustice? There is no easy answer to this question. Only two criteria deserve consideration, the number of people affected and the magnitude of their perceived loss.

In general terms, it is my view that the number of people affected is irrelevant. A transfer of consequences cannot be justified on the grounds that only a minority suffers. Just as each of us is a polluter, so we are each a member of some minority. By protecting the interests of other minorities we protect our own entitlement to consideration in minority situations. (At the same time, we do not extend our necessary benevolence towards minorities as far as a recognition of the claims of the lunatic few.) The interests of a non-lunatic minority, therefore, ought to be regarded as equivalent to the interests of the many.

The magnitude of the perceived loss, then, becomes the only relevant criterion. And since the non-smoking restaurant patron is the only arbiter of the magnitude of this loss, the loss becomes an injustice when the ordinary non-smoking patron considers that the matter has gone beyond mutual
Case 2: Continued use of the herbicide 2,4,5-T

The use of the herbicide 2,4,5-T provides an example of the second kind. The pollutant involved is non-persistent and the consequences — which are harms — fall primarily upon other present people.

In England, gorse is a benign and useful hedgerow plant. In New Zealand, where it finds conditions very much to its liking, its introduction has created a considerable economic nuisance. Farming interests insist that the continued use of the phenoxy herbicide 2,4,5-T is the only economic way of keeping gorse under control and some farmers in business. Alternative herbicides exist, but they cost about four times as much as 2,4,5-T-based preparations and they lack the most convenient selectivity of this compound.

Unfortunately, commercial preparation of 2,4,5-T results in the formation of an unavoidable contaminant — dioxin — which is one of the most toxic and carcinogenic substances known. Dioxin is also a moderate teratogen (produces birth deformities) and a mutagen. Early commercial 2,4,5-T typical of that used in Agent Orange during the Viet Nam war, contained around 70 ppm (parts per million) dioxin. Current production in New Zealand is required to contain less than 0.01 ppm dioxin. More than 40,000 scientific papers have been written on the health implications of the use of dioxin-contaminated 2,4,5-T. None have established an unequivocal causal link between the use of 2,4,5-T and poisoning, birth defects, mutations, or cancers in humans as a result of normal agricultural use.

Causal links have been established in at least two extreme situations however. One involves the significant delayed effects experienced by Viet Nam war veterans and their offspring, and the other involves the immediate effects upon the people of Seveso.

In July 1976 there was an explosion in a chemical reactor vessel at the ICMESA plant in the Italian town of Seveso. The resulting plume of dioxin-contaminated aerosols drifted over the surrounding town and quickly settled out. Plant owners and local officials were slow to mobilise and as a
result nearly all residents of the town were exposed to dioxin, either through contaminated air, water, food or soil. Immediate health effects included severe chloracne (skin burns symptomatic of liver damage by dioxin) and a rapid climb in the spontaneous abortion rate, which reached 20% one year after the incident. Spontaneous abortions and outbreaks of chloracne occurred in waves, about a year apart, for several years. More than 70% of the population appear to have suffered health effects consistent with exposure to dioxin. Italian health authorities expect a 'cascade' of cancer in the future. Following Seveso, and in the face of continuing difficulties with the disposal of dioxin-contaminated waste, the manufacture of 2,4,5-T has been discontinued in America, Britain and Western Europe.

The continued manufacture and use of 2,4,5-T in New Zealand now presents a moral question. On one hand, current land-use practices and New Zealand's 'unique situation' make its continued use very desirable to one group in society. On the other hand there is at least a prima facie case for the existence of consequences in the form of significant risks that are transferred to people who are adjacent to manufacture and use, but who obtain no direct benefit. The 12g of dioxin released into the New Zealand environment each year is theoretically enough to produce at least 1000 stillbirths and an indeterminate number of cancers. It is unknown whether the dilution of this annual amount of dioxin through a large area of land removes the potential for harm or simply obscures it within natural mutagenic events. Because significant harms are involved the moral acceptability of the manufacture and use of 2,4,5-T depends upon the application of the no-harm principle, which means, in effect, that two conditions must be applied. For the use of 2,4,5-T to be a 'prohibited harm', first the harm must be incurable in at least some cases, and second the link between substance and risk must be 'genuine'. I will take genuine to mean that the evidence is sufficient to convince an ordinary person, who is appropriately cautious in matters involving human health, that the association exists.

The nature of the risk associated with the use of 2,4,5-T under current New Zealand conditions is a technologically complex issue. Foetal malformations and death are natural events and their frequency in New Zealand both in general and among rural New Zealanders is not noticeably higher than other developed countries. Even if they were, the
identification of specific cause-effect relationships against a back-ground of random statistical 'noise' is always problematic. It is now considered that cigarette smoking kills 25% of those who become long-term practitioners of this art. Yet it took 25 years of epidemiological study to establish this fact. Cause-effect relationships involving cancer are even more difficult. In the context of long-term, low-level exposure, carcinogens behave like radiation. The effects of exposure are retained and accumulated in the body and then delivered in full many years later. Cause-effect relationships involving carcinogens are therefore obscured by a time lag, sometimes of up to 20 years. Significantly, however, a recent New Zealand study has postulated a link between known high levels of bowel cancer in sheep and similarly elevated rates of bowel cancer in humans. The same study has reported preliminary evidence of an association between bowel cancer in sheep and the use of 2,4,5-T.

Can current use of 2,4,5-T be causally associated with a proven risk of harm to those who do not benefit from its use (as Shue’s first condition requires)? My verdict, as of now, is a tentative no. Even if a causal link between 2,4,5-T and bowel cancer in humans is established, the causal agent is probably high dioxin 2,4,5-T manufactured and used many years ago. Current 2,4,5-T contains orders of magnitude less dioxin. However, it still contains some dioxin and the possibility of slow accumulation of effects, until consequences are delivered, still exists. The certain risk of harm required by Shue’s first condition, in this case, is diluted by uncertainty. There is a ‘risk of a risk’ of harm. Our verdict is therefore ‘not proven’ rather than ‘not guilty’. Those who benefit from the use of 2,4,5-T are morally entitled to continue with its use, but others are equally entitled to demand that stringent precautions be applied to all phases of manufacture, distribution and use. In particular, there is a moral obligation upon producers and users to ensure that their case for continued use does not continue to rest upon uncertainty about the true nature of the risk.

Inter-generational equity

Pollution crosses boundaries of both space and time. In the context of persistent pollutants, the central ethical question is the moral acceptability of one group in time profiting by the creation of a debt that must be faced by their descendants. The issue of responsibilities to future people parallels that of relationships with non-human species, in that it tends to
bring out the inadequacy of several existing ethical theories. The underlying difficulty is one that Robin Attfield\textsuperscript{10} calls the 'asymmetry of power' problem. To a significant extent, existing notions of justice and moral obligation have arisen because people who are contemporary and who have approximately the same vulnerability and strength, have a common interest in promoting restraint. Existing ethical positions tend to reflect those needs, vulnerabilities and strengths. Both future people and nature as a whole cannot influence present people, and so their requirements tend to fall outside the central interest of the mainstream of ethics. The issue of responsibilities to future people is complex and demands considerable discussion. It will be developed here only to the extent that it is relevant to questions of intertemporal consequences.

Problems with existing theories of intertemporal equity will not be developed in depth here. Deficiencies in two positions are however, worth noting. The first of these is John Passmore's\textsuperscript{11} view that obligations to future people depend upon, and extend only to, those we love. Since our love does not extend to the distant future, neither do our obligations. Robin Attfield\textsuperscript{10} replies that obligations normally exist irrespective of feeling — we have obligations to many people for whom we hold no positive feelings. To suggest that our obligations to future people might be abrogated simply by deciding that we no longer love them, is altogether too easy a position to hold.

To Robin Attfield's objection, I would add one of my own. The view that our responsibility to future people is one that diminishes with time — and presumably therefore eventually reaches zero — is one that is favoured by economists. It fits nicely with the concept of a discount rate. It is also a position that falls readily to counter-examples. Consider the following: I construct a large and powerful nuclear time bomb, which I intend hiding, set to explode in several generations time. On the trigger of the bomb there is a time scale, with which I can pre-set detonation to any desired future time. Under the 'declining responsibility with time' viewpoint, the responsibility that I hold for the results of the nuclear explosion depends upon the position in which I set the dial. If the bomb is set to explode far enough into the future, I hold no moral responsibility at all for the consequences!

This is a position that few people would accept. In my view, Passmore's ethic of friendship fails because it does
not make a distinction between loss of amenities and harms. In the context of resource allocation questions, for example, we may have access to a resource that we know will eventually be used up. We wonder how much of it 'rightfully' belongs to us, and how much to future generations. If the resource is not essential to human life — in other words if its total depletion does not cause harm — then we are ethically entitled to consider that our responsibilities diminish with time. However, if it is certain that future people will suffer more than inconvenience as a result of the depletion of the resource, then all future people must be considered as morally equivalent to ourselves.

The second unsatisfying philosophical position regarding responsibilities to future people results from attempts to 'intertemporalise Rawlsian views'. John Rawls proposes that those rules are just which would be chosen by rational parties about to embark on life, with a good understanding of human affairs in general, but no knowledge of their own future setting. People in this position could be expected to avoid creating injustices in human affairs, lest they suffer the misfortune of having to face them. In an intertemporal framework, rational parties about to embark on life in an unknown generation could be expected to choose rules that would equalise quality of life across generations, lest they be cast into the poorest of them. Since most of us expect the future to be 'better' than the present, so that the present is the poorest of all present and future generations (a view that is not entirely supportable) 'intertemporalising Rawls' leads to the view that, in general, we are fully justified in maximising our own well-being at the expense of those who will follow. This is a position that is in sharp conflict with the moral intuitions from which theories of normative ethics are constructed.

Setting aside these inadequate positions, three views exist concerning the obligations of present people to those in the future. The first proposes that there are no morally-relevant questions in our relations with the future, i.e. we are unconstrained by obligation to future people. The second proposes that we must regard all future people as we regard ourselves — the fully-constrained position. The third position, which is the one most commonly put into practice, acknowledges some responsibility to the immediate future and declining responsibility as the future recedes. Our actions with implications for future people therefore are partly constrained.
The unconstrained position is held only by those who accept fundamental anthropocentric moral absolutes — as of now, future people do not exist; therefore they do not hold rights; and, even if they did, they are not here to enforce any right — such as the right not to be harmed by our actions — that we might allocate to them. The unconstrained position is difficult to sustain, and readily falls to counter-examples. Most people would acknowledge, as I have already suggested, that one is morally responsible for the consequences of constructing a time bomb, whether the bomb goes off in two days’ time, two years’ time or two generations’ time. While it is true that we have no interactions with people of the distant future, make no social contracts with them, and thus acquire no obligations with respect to them, it is also true that there are unacquired obligations that we cannot avoid. These arise from unavoidable connections between our actions and their welfare. Any other viewpoint would be inconsistent with the ethic of equity that is common to our culture

Our obligations to future people are therefore properly represented either by the fully-constrained or by the partly-constrained position. In practice, the distinction between these two positions revolves around the choice of an economic discount rate. A discount rate, in this context, is a measure of the weight that ought to be given in our present accounting to costs that fall to future people. A high discount rate of 10% (which is the standard value in New Zealand decision making) means that future costs are discounted by 10% for each year ahead. At this value, future costs discount to one half their present value in seven years, and to insignificance in 40 years. A high discount rate, therefore, accords us no responsibility for costs that fall beyond 40 years into the future. At discount rate of 1%, the horizon beyond which present responsibilities for future costs evaporate, is 400 years hence. A discount rate of zero, on the other hand, means that all future costs have the same meaning as they do to us. In other words a zero discount rate represents the fully constrained position.

The use of discount rates above zero is morally equivalent to the partly-constrained position. The practice of discounting future costs — and therefore the partly-constrained position — is supported primarily by three justifications, each of which must be examined carefully in the context of any specific issue involving intergenerational equity. (The economists’
justifications for discounting future costs are regularly given severe canings by ethicists). The first justification is that of uncertainty. We may be uncertain of either the true nature of the situation or of the interests and capabilities of future people. The more distant the future, the greater the uncertainty. The second justification is that future people will be economically and technologically better off than us, and therefore any costs will be less in their terms. If we sought to 'intertemporalise' Rawls' difference principle by evenly distributing effective costs through time, we would allocate progressively greater burdens to future people on the grounds of anticipated growth in their capacity to alleviate such costs. The third justification is that future people would benefit more if we minimised our own costs, maximised our economic gains and invested in the future development of the social and economic system that they will inherit.

In the context of any specific issue involving intergenerational equity, the morality of invoking the partly constrained position depends upon the extent to which the above justifications are true. If none are true, or if all are manifestly weak, then we are morally obliged to adopt the fully-constrained position. Under these conditions, the transfer-limiting principle applies to future people, and we face the problem of mitigation, of appropriate redress, to our descendents for any costs we impose upon them. 'Appropriate redress' may involve financial compensation — although it is not easy to define institutional mechanisms through which future people might be given access to appropriate monetary compensation for our actions — or it might involve the exercise of restraint on our behalf.

In Canterbury, much of the rainfall on mountains and plains flows to the sea in underground aquifers. Water contained in aquifers is typically both very slow moving, taking several decades to reach the sea, and very pure\(^\text{13}\). Wells sunk into permanent aquifers supply nearly all domestic uses and food processing plants in Canterbury, including all of Christchurch city. Underground water therefore represents a substantial and valuable resource to the present and future people of Canterbury. During the last few years, however, it has become apparent that an increasing number of aquifers are showing contamination by nitrates.

Nitrate contamination of food and water is potentially a serious health hazard. While nitrates themselves are not a
problem, they are readily converted to nitrites by gastric juices and bacteria. Nitrites combine with the foetal haemoglobin in infants to produce a molecule no longer capable of carrying oxygen, a condition known as methaemoglobinaemia. Overseas, thousands of infant deaths have been attributed to this condition. In adults, nitrites are known to combine with food amines in the stomach to produce N-nitroso compounds which are among the most powerful and broadly-acting carcinogens known.

Non-functional haemoglobin first becomes apparent in infants when nitrate concentration in water reaches 10-20 ppm of nitrogen. No definite threshold value has been established with respect to cancer — as we would expect from the 'slow accumulation of effects until consequences are delivered' mode of action discussed earlier. However, one overseas study has found a statistical association between elevated rates of stomach cancer and water containing 21 ppm of nitrogen. While this finding does not establish a casual link between nitrates and stomach cancer (other unexamined factors may be involved) it does require us to adopt a cautious position until further evidence is available. An appropriately prudent position would be to assume that any nitrate in drinking water can increase 'natural' cancer rates, and that the increase becomes detectable above background statistical 'noise' at around 20 ppm nitrogen. The currently accepted water quality standard for nitrate contamination, 10 ppm, is therefore a conservative one with respect to methaemoglobinaemia, but not at all conservative with respect to cancer.

Nitrate contamination of groundwater is a product of agricultural activity. In New Zealand’s ryegrass-clover pastures, clover 'fixes' atmospheric nitrogen into biological compounds. Animals eat the clover, and return the nitrogen as urea, which stimulates the growth of grass. Unavoidable losses occur when rainfall and irrigation wash nitrogen through the soil and eventually into groundwater. The more intensive the agricultural production, the greater the loss of nitrogen to groundwater. Under irrigation, losses are several times those from non-irrigated pasture.

During the 1960s and 1970s agriculture in Canterbury underwent steady intensification and expansion of irrigation. By the late 1970s, nitrogen levels in groundwater were found to be increasing rapidly. As the 10 ppm safety standard was exceeded, numerous shallow wells were abandoned and
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deeper ones sunk. Current nitrogen concentrations in shallow aquifers are in the range 5-30 ppm and deep aquifers, containing water that will eventually supply Christchurch city, contain up to 4 ppm nitrogen on some parts of the plains. If the expansion of irrigation and the intensification of stocking rates continue (and the economic situation of New Zealand farmers makes it likely that both will) then nitrogen losses to groundwater can be expected to increase manyfold. Future people between one and three generations hence face the possibility that all aquifers, shallow and deep, may be unusably contaminated with nitrate.

Ethically, the problem of lost agricultural nitrogen in groundwater has three significant dimensions. First, it clearly involves a transfer of consequences of a profitable activity from a group who benefit directly, to another group who obtain no direct benefit. According to the transfer-limiting principle, undeserved inequalities in the distribution of consequence call for redress. The question of the nature and extent of appropriate mitigation is therefore involved. The second dimension of the problem is the inter-temporal aspect. Some present people of Canterbury are using nitrate-contaminated water now. However, they have the option of avoiding the associated risks by sinking deeper wells into aquifers that are at present largely uncontaminated. Future people face a possibility that this option may not exist, and that alternative sources of uncontaminated water — perhaps from the permanent snowfields of the Alps — will be very expensive. In addressing the question of present responsibilities to future people, two options exist, the partly-constrained and fully-constrained positions.

In choosing between these two positions the third dimension of the problem becomes significant, that of present uncertainty about the true nature of future consequences. Will Canterbury groundwater continue to accumulate nitrates or will contamination reach an equilibrium at some acceptable level, due to processes about which we currently know nothing? Will future people have better understanding that will enable them to control nitrate levels, for example by the strategic planting of trees to intercept lost nitrogen? Uncertainties of these kinds — if they are ethically allowable — provide justification for adopting the partly-constrained position.

Consider first the issue of redress. If we set aside for a moment the intergenerational and uncertainty aspects of the
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Nitrate problem, then the issue becomes one in which we know with certainty that existing land uses will totally contaminate all groundwater within a small number of years. What ought we to do? Mitigation could take two forms — restraint on the part of farmers, or compensation from farmers to domestic and industrial users of water for the additional costs associated with providing new sources of uncontaminated water — or some combination of both compensation and restraint. We would want to know a great deal more than we do at present about the origins and movement of both nitrates and groundwater. Land uses generating significant quantities of contaminants would be identified and either restricted to certain areas or banned. Various alternative solutions would be identified and costed. Ultimately, the chosen solution ought to be one that provided an acceptable degree of mitigation of consequences to those affected, for the least cost — both in terms of money and opportunities that must be foregone — to those responsible.

In reality, however, the consequences of present land use practices are likely to accumulate over several generations. Given that it is future people who may face the most serious consequences, to what extent do our obligations to provide redress differ from those outlined above? Under the fully-constrained position, in general terms they are the same. Present people have an obligation to find out more, to explore alternatives and to begin setting in place the mechanisms of mitigation. Because of the intertemporal aspect, however, the problem is less pressing. There is opportunity to explore limited solutions, examine their effect, and progressively to set down a less draconian strategy for nitrate management. Nevertheless, the obligation to act remains.

The fully-constrained position can be relaxed only if we accept one or more of the justifications for a positive discount rate. In the present case, one of these at least, has some merit. That is the presence of uncertainty about the true nature of future consequences. There is a distinct element of uncertainty about the future possibility of groundwater contamination ever reaching the point at which much of the total resource is unusably contaminated. In some parts of the North Island, groundwater contamination under intensive agriculture has already reached 50 ppm nitrogen. There is no evidence at present of a trend towards this level of contamination in Canterbury. Intensification of production in Canterbury will certainly lead to increased contamination, but
the extent of future contamination of the important deep aquifers, which at present are only marginally contaminated, cannot be predicted with present knowledge. While this uncertainty provides a justification for adopting the partly-constrained position, it also provides an obligation to continue to monitor the situation and to reassess present responsibility in the light of future developments.

The implications of a positive discount rate for present action are these: first it means that there is a time horizon one or more generations hence beyond which we accept no responsibility for costs that arise from contaminated groundwater. Second, it means that a small portion of the potential costs that may accrue between now and that time ought to be acknowledged by present people as being difficulties associated with providing monetary compensation from our pockets to future people, that limited redress might best take the form of either restraint, or better, of improved understanding of the origins, flows and management of both groundwater and its contaminants throughout the Canterbury region. Given also that the justification for any discount rate rests once again upon the uncertain nature of future consequences, a most equitable solution would seem to be that we owe a duty to future people to provide better knowledge of the groundwater resource and its associated problems.

Radioactive waste from nuclear power plants is taken here as an example of a class of pollutants with significant implications for the wellbeing of future people. All substances in this class are environmentally stable substances, which therefore persist once released, and that have the potential to generate incurable and unavoidable harm. Usually, that harm involves mutagenic effects, i.e. stillbirths, foetal malformations and cancer. Other significant examples of this class of substance include vinyl chloride, asbestos, benzidine, chromates and nickel carbonyl.

Radioactive material can be released to the environment in at least four points in the nuclear fuel cycle — from uranium mine tailings, through routine reactor operations, through reactor accidents, and from spent reactor fuel. All of these releases, and indeed the use of nuclear energy itself, raise significant moral issues that in total go beyond the scope of this essay. This discussion therefore will center on the ethical implications of the management of presently
stockpiled nuclear waste in general and in particular on one alternative proposed method of disposal with implications for New Zealand — that of seabed 'emplacement'.

Nuclear waste exists. Regardless of one's view of the morality of civilian and military nuclear programmes, the simple fact is that 10,000 tonnes of high level waste (HLW) are now held in engineered storage awaiting the development of some final solution to the problem of disposal. To put it nowhere is not an option. As public knowledge of occasional accidental releases from storage depots becomes increasingly likely, pressure is now mounting in several nuclear states for action on nuclear waste disposal. However, both the existence of HLW and the method of its ultimate disposal, raise significant questions regarding our responsibilities to future people for harms that they may incur as a result of the activities that some of us have undertaken.

In the context of the waste disposal problem, HLW has two characteristic time constants. For the first thousand years after production its activity is dominated by the decay of 'short-lived' fission products. Thermally and radioactively, it is very hot. Thereafter, activity is dominated by the much slower and cooler decay of actinides, such as plutonium, which have half-lives of between $10^4$ and $10^6$ years. Totally safe disposal would require guaranteed isolation from the biosphere for the next $10^6 - 10^8$ years, or for perhaps 30,000 generations. As Lovins\(^\text{17}\) points out, this requirement is in the realm of theology rather than geology. In other words it is a criterion that cannot be met with any reasonable degree of probability. Given that it is now accepted that disposal with assured absolute safety is impossible\(^\text{18}\), the criterion that is applied to disposal plans is that of ALARA - the risk should be 'as low as reasonably achievable'. (We cannot have duties beyond our capabilities.)

The most favoured general solution to the waste disposal problem involves the use of at least two barriers to release. The first barrier is a highly engineered container of stainless steel, concrete or ceramic (or several of these) which is intended to survive at least the thermal phase. The second barrier is a dry, geologically stable rock formation within which the containers of waste are buried. Once the primary container has broken down, which it inevitably will given the nature of its contents, the rock itself should have properties that enable it to immobilise the waste for as long as possible. Salt domes are considered optimal for this purpose because
of their dryness. West Germany has been routinely disposing of nuclear waste in this way for a decade, and the U.S.A. has a frequently postponed pilot programme planned.

However, there are several nuclear states that either lack suitable geological formations — such as Japan — or which are becoming increasingly nervous about disposal within their own frontiers — such as the U.S.A. and Britain. The U.S. General Accounting Office recently had this to say:\textsuperscript{19}

Because nuclear programs are such highly emotive issues, and becoming even more so, as evidenced by the states that have indicated an unwillingness to permit nuclear waste disposal within their boundaries, it may be impossible to get the public and political support necessary for any state to accept nuclear waste.

As waste accumulates in storage at the rate of 30 tonnes per reactor per year, these countries are becoming increasingly active advocates of seabed emplacement, which is the only feasible alternative to land burial. Hoskins and Russel state:\textsuperscript{20}

Seabed disposal is an attractive alternative disposal technique because technically it appears feasible that, at least for high level waste and spent fuel, the waste can be placed in areas having relatively high assurance of stability. If at some point all of the barriers failed, the great dilution and slow movement should retard the return of radionuclides to the human environment in biologically important concentrations.

The Japanese, in particular, are now strong advocates for an international HLW dump at one of several sites in the Pacific Ocean. It is perhaps ironic that the golden rule for land disposal is, 'keep the waste away from groundwater', whereas the catchcry of the advocates of ocean dumping is that, 'disposal under 4000 m of water is safer'.

In fact, dilution is in no way a solution to this kind of pollution. It is now widely acknowledged that the harms generated by exposure to mutagens like radiation are proportional to dose, right down to zero. There is no safe threshold that can be reached by progressive dilution. Any release of radioactive material to the environment, therefore, commits society to some inevitable harm, the potential for which remains for as long as the radioactivity persists.\textsuperscript{8} Dilution of the radioactive pollutant through atmosphere and hydrosphere can spread the total harm more widely, thus reducing the frequently of harm at any one place, and even
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obscurring the harm within natural background rates, but it will not reduce the total harm delivered by the radiation source. Given the acknowledged inability of current technology to provide a method of disposal with assured safety through infinite time, a Pacific dump implies probable eventual release, first to the waters of the Pacific Ocean, then to the biota of the Pacific and adjacent lands, and eventually to the globe as a whole.

The magnitude of the harms likely to result from a release of HLW is impossible to quantify. Some indication of the scale of harm involved can be gained from comparison with current estimates of the consequences of atmospheric testing of nuclear weapons, however. Estimates of mutagenic consequences vary widely, depending upon assumptions made about dose-response relationships at very low doses. Generally, governmental and military authorities adopt methods that generate low estimates and critics do the reverse. It is significant, therefore, that the US government's figure for total worldwide stillbirths and foetal malformations due to all atmospheric weapons tests is 87,000 worldwide, up to 1960. Given that the radiological inventory of the waste generated by a single reactor is equivalent to that of many, if not all, atmospheric nuclear weapons tests, and that the consequences continue to flow at a diminishing rate for almost infinite time, the magnitude of the risks presented by nuclear waste are clearly extraordinary.

I will consider first the moral implications of disposal of HLW in general, and then consider the particular moral issues for New Zealand of the proposed international Pacific seabed dump.

The existence of 10,000 tonnes of HLW presents present people with a moral dilemma of considerable proportions. The no-harm principle clearly applies: the harms associated with exposure to radiation are known with certainty to include stillbirth, foetal malformations and cancer. They are generally incurable now, and it is prudent to assume that stillbirths and foetal malformation will remain incurable throughout the time period under consideration. Second, there is no moral justification for invoking anything other than the fully-constrained position: in general, we may be uncertain about the capabilities and interests of people 100,000 years hence, but it is reasonable to assume that their capabilities will not include immunity from radiation harms. Equally, we ought to accept that their interests will not be enhanced by high
cancer rates or malformed children. No mitigation that we might offer in the form of improved nuclear technology or accumulated social wealth can properly redress the transfer to them of these kinds of consequences.

Faced with these arguments, we may properly conclude that nuclear waste ought never to have been produced! Briefly, and in passing, it is interesting to explore some of the reasons why it has. The first reason lies in the acknowledged fact that the costs of waste disposal and the implications of future harms are never taken into account during cost-benefit studies of nuclear power plants. These extraordinary omissions have always been justified on the grounds of exceptional uncertainty — the final method of disposal remains uncertain, therefore its costs are uncertain and any evaluation of future harms is also uncertain. To this, I would add my own opinion that the primary justification for nuclear power has never been a need for electricity, but a demand for plutonium for nuclear weapons. From this standpoint, nuclear waste is the desired product — so that it ought not to be regarded as a cost — and electricity is no more than a useful by-product.

Present people therefore face the dilemma that their primary moral obligations to future people, with respect to nuclear waste — either to refrain from producing it or to dispose of it with assured safety through infinite time — cannot be met. Now that HLW does exist, what moral obligations flow therefrom? The first is that an optimal decision is now required. Existing waste may continue to be stored if there are genuine prospects of better disposal techniques in the near future, or it may be disposed of now. Whatever that decision, and whatever the chosen method of disposal, it should be carried out irrespective of social or economic costs to present people. (Whether people who did not benefit directly from the use of nuclear electricity have any obligation to accept waste nearby, is a question that will be taken up later). Disposal with minimal social dislocation or financial cost is not an option. The second obligation is that the minimax rule ought to apply to all decisions — minimise the consequences of maximum failure. This requirement will probably mean that there ought to be many small dumps rather than one or a few large ones. The third obligation is that retrievability is highly desirable. Future people may be able to improve the safety of nuclear dumps by retrieving, reprocessing and replacing waste. This leads in turn to the fourth requirement. Future people are entitled
to assured knowledge of the existence of dumps, the nature of their contents and technology of their containment. The construction of a suitable monument with an assured lifetime of at least $10^5$ years, is itself an interesting engineering problem.

Finally, one further firm requirement should be added to the list. It is that all of the many judgements and technical decisions involved in the waste problem should be made by independent experts. It is regrettable that the nuclear industry has established for itself an unenviable reputation for misjudgement, underestimation and even deception in the context of issues to do with safety. Significant vested interests cannot be permitted to continue making decisions on the grounds of political and economic expediency. Equity requires impartiality and fairness in procedure.

However, equity does not require that consequences be distributed equally amongst those who have benefited from the production of nuclear power. Just as we may be fortunate or unfortunate in the attributes with which we are born, so we may suffer fortune or misfortune through the geographical attributes of the place of our birth. Some geographical locations will prove to be most suitable for nuclear waste disposal. It is just to have waste located at those sites, for it is in the interests of all present members of nuclear states that waste is disposed of in the most satisfactory manner possible. People living adjacent to those sites will suffer increased risk as a result, and an equitable solution requires that they are offered mitigation.

But what happens if the most satisfactory location proves to be a point on the seabed somewhere in the South Pacific? It is unlikely that an independent technical assessment of all potential sites would favour seabed emplacement, but it is not impossible. The people of the South Pacific have suffered an accident of geography in that they inhabit the least populated corner of the globe with more than one deep-sea trench of the kind considered optimal for seabed emplacement. Such an accident is unfortunate, but not unjust. If South Pacific nations were to refuse to accept nuclear waste (assuming that such a refusal was either accepted or enforceable), then disposal at a less optimal site would imply greater risks both to other present people and to future people everywhere as a result of a higher probability of earlier containment failure. On the other hand, most South Pacific states are innocent bystanders in that they do not have nuclear
power programs and have obtained no direct benefit from production. Therefore both the transfer-limiting principle and the no-harm principle suggest that they would suffer an injustice if consequences of this kind were imposed upon them. What are the ethical options?

In the context of a discussion of the ethical implications of HLW disposal within the USA, Ted Peters lists three ethical positions that might be adopted by states facing this problem. The first is that of self-sacrifice. Pacific people could adopt the view that the HLW problem is sufficiently grave to require them to subordinate their own interest to the interests of all people, present and future. They might volunteer to accept the risk. If this were done, it would be inequitable of nuclear states to permit us to do so without appropriate redress, either in the form of restraint or compensation. Of these two options for redress, restraint is the more compelling by far. If the nuclear power option can proceed only by creating consequences so grave that they require uninvolved others to accept those consequences for the benefit of all, then nuclear power ought not to proceed. Nuclear states could only morally accept an offer of sacrifice if they were committed to a phased withdrawal of nuclear electricity.

The second option is to refuse, or attempt to refuse, any proposal to dispose of nuclear waste outside the land boundaries of nuclear states. Strong moral grounds exist for this position, since it would require that nuclear states themselves face up to the political, social and economic consequences of continued production of HLW. If an important objective is to provide maximum encouragement for nuclear states to discontinue production, then this option has impeccable credentials.

The third option is to set aside the distinction between those who benefit from nuclear electricity and those who do not, and apply the ethic of equity proposed in the introduction to this paper. Existing and any future waste is disposed of at the optimal site, regardless of its location. Equity for those disadvantaged by this procedure is achieved by compensation from those who are so advantaged. Compensation should involve the option to move without personal cost from the disposal area to a safer place, including the option to resettle in the countries from which waste is being transferred. For those who choose to remain, compensation should include benefits that redress changes in social, economic and cultural aspects of quality of life.
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The requirement to provide agreed compensation should not be limited to members of the present generation.

Conclusion

The four cases introduced here explore the moral continuum of pollution, from the importance of tolerance in case one to possible need for intergenerational compensation for one quarter of a million years, as in case four. Taken together, the four cases suggest that moral philosophy offers useful tools to those who must make decisions about pollution management on behalf of society. The two intergenerational case studies suggest that the use of economic analysis is questionable — particularly the use of discounting when applied to evaluating the human costs of residuals. The economist should note that a social rate of time preference would be no more easily justified against moral criteria. The message of the paper as a whole is that the range of circumstances in which we may morally transfer to others nuisances, risks, costs or harms is narrower than we have become accustomed to assuming.

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Bibliography


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Stephen Davies examines the moral interests of non-human animals, arguing that animals have morally relevant interests, but not justice-rights. Justice-rights presuppose a context of co-operation in which there is mutual recognition of restrictions on behaviour, a presupposition fulfilled as a matter of fact only in the case of human animals. There is more to morality than rights, however. Case studies of the clash of human and non-human interests are provided by animal experimentation and agricultural production. The problems here for him are not with the killing of animals for food and as an aid to research, but in the manner and circumstances in which that occurs.

This is an excellent statement of a widely held view, but the analysis on which it is based will be debated. It leaves the human species in a select class as moral agents, but not as beneficiaries of morality. The protection of non-human
animals is dependent upon human actions. Non-human animals have interests which need to be recognised by humans if they are to provide that protection. This involves a view of humans as morally responsible for the way their actions affect non-human welfare.

Some environmentalists have doubted whether qualified justice rights are restricted to human or to co-operative beings only, because they believe this establishes a bias in favour of the human species. Stephen Davies recognizes that non-human animals, even though they may not have justice rights, do have morally relevant interests, which requires from us considered and careful responses.
Why are Non-human Animals objects of Moral Concern?

Introduction

My concern here is to discuss in a general way why and how it is that our treatment of animals is a matter of moral importance. Many would disagree with what I say. These disagreements might be of two kinds. In the first case, we might not be able to agree on the way in which animals ought to be treated; for example, you might think that it is wrong that we kill animals for food, while I think that this is not morally wrong. In the discussion that follows I shall attempt to outline considerations relevant to a discussion of such a disagreement, without attempting to say who is right and who is wrong. In the second case, we might be able to agree that it is morally wrong to practise goal-kicking with cats instead of footballs, but we might not agree about whether it is appropriate to say that the cat has a right not to be used as a football. Much of the following discussion is about such matters. It might seem to be trivial to argue about whether or not cats have rights, where we agree that cats ought not to be treated as footballs — after all, one might think, what matters is whether it is wrong to kick the cat and not why or in what way it is wrong. However, I do not think that such matters are trivial, or 'merely verbal'. We cannot hope to analyse the difficult cases (such as whether or not we ought to kill animals for food) unless we are clear, not only about the morality, but also about the morally relevant description of the more obvious cases on which we can agree.

I take it that, if it is morally wrong of me to kick a stone for no good reason, the wrongness of my action does not consist in its effects upon the stone, but consists in something else. For example, it may be wrong to kick stones at people.
for no good reason, and this is because of the effects of such actions on people and not because of the effects of such actions on the stones themselves. By contrast, if it is morally wrong of me to kick a cat for no good reason, then the wrongness of my action consists at least in its effects upon the cat. I wrong the cat in kicking it for no good reason, whether or not I also wrong someone or something else by this action.

That we can wrong cats, but cannot wrong stones, is not difficult to explain, for there is an obvious and relevant difference between cats and stones. Unlike stones, cats can suffer as a result of our actions, and causing suffering for no good reason is morally wrong. Suffering is a state which is experienced; it is felt. Besides pain, cats can experience (and can be caused by us to experience) other mental states; they can feel fear, anxiety, frustration and boredom. Unlike stones, cats have a mental life; cats are sentient. By holding a stone over a fire I can change it but, because it is non-sentient, the stone is unaware of these changes and does not suffer them. The stone does not feel fear at the flames or suffer pain as it is heated. The cat, by contrast, can fear the fire and suffer pain as it is held above the flames.

So far we might conclude: the kind of creature that can be morally wronged is one with a sentient life that can be affected by our actions in ways to which the creature is not indifferent. We could not morally wrong a creature which was incapable of feeling anything. We could not morally wrong a creature whose feelings were in no way affected by what we did to it. We could not morally wrong a creature whose feelings were affected by what we did to it, but which was entirely indifferent to those changes of feelings. When a feeling is described as one of pain, for example, then we are indicating that it is the sort of feeling to which the possessor of that feeling cannot be indifferent. Pain hurts and thus is something which creatures capable of feeling it desire to avoid. One might choose to ignore a pain, but one cannot be indifferent to it. One might feel a change from 10°C to 11°C in the air temperature, but be quite indifferent to this change. One could not similarly be indifferent to a sudden change from 10°C to 60°C in the air temperature, because that sort of change is painful. A creature that is not indifferent to changes in its feelings could be said to have interests. One has an interest in avoiding that which causes suffering and in seeking that which relieves suffering. If
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extreme thirst causes suffering, one has an interest in avoiding extreme thirst and an interest in obtaining regularly those things which will slake one's thirst. So the point made above can be summarised by saying: the kind of creature that one can morally wrong is one that has interests which can be affected by one's actions. Cats, for example, are such creatures; stones are not.

Interests, as I use the term, involve needs, but they also involve the desire that those needs be met. Cats need food, water and shelter if they are not to suffer and cats have interests in that they have and act upon the desire that these needs be met. But just as we can talk of the interests of a person who is now asleep or who is otherwise presently not concerned with his interests, so too can we talk of the cat's interests on occasions other than those on which the cat is showing a concern with its interests.

Not all things with needs also have interests. The cat's fur can need to be cleaned, but the fur does not have an interest in its being cleaned. It is the cat, and not its fur, which suffers if the fur is not cleaned. The fur's need to be clean is relative to the cat's interest in having clean fur. (In the same way, my car can need to be cleaned, but it is me, and not my car, which has an interest in this. My car does not suffer if it is not cleaned.)

Not all needs are relative to interests. A weed needs water and sunshine if it is to survive to set seed. But, although plants have such needs relative to their biological functions, they do not also have interests. Plants are non-sentient. They do not desire water, or suffer if they are deprived of water. It does not matter to a plant that it be deprived of water in the way that it matters to a cat that it be deprived of that which would slake its thirst. Only animate creatures are sentient and only sentient creatures have interests, but not all animate creatures are sentient or have interests. If it is wrong of me to chop down a tree, my action does not wrong the tree but does wrong some sentient creature which has an interest in my not chopping down the tree. I cannot wrong a tree.

Of course, I have been assuming that animals have feelings and that plants do not have feelings. Although these assumptions have sometimes been questioned, the evidence for their reasonableness is so strong, I think, as to be completely convincing. We know that animals (and human babies) have feelings (and that plants and stones do not
have feelings) because they (unlike plants and stones) behave in ways that are appropriate to the expression of feelings consistent with the causal circumstances. It is just as impossible to doubt that a cat feels pain if I drop a hammer on its paw, given the way that it behaves, as it is to doubt that pain is felt if I drop a hammer on a person's foot. Moreover, we know that our capacity to feel pain is correlated with the nature of our central nervous system and that higher animals, such as cats, have a significantly similar nervous system. And we can see the evolutionary advantages to intelligent creatures capable of swift reaction and of learning from experience of a 'warning system', such as pain, which leads them to avoid, if possible, situations in which they might suffer damage. Sentience is unnecessary (and would be disadvantageous) to plants, which are incapable of rapid avoidance action or of learning from experience.

We know that the higher animals have beliefs and desires, and hence that they have interests, because they show themselves to be capable of acting intelligently in being able to modify their behaviour in ways appropriate to the satisfaction of their needs in response to subtle and complex changes in their circumstances. For example, a dog will cringe before its owner if it is scolded, but will ignore others who scold it or its owner scolding the neighbours over the fence. It will cringe before its owner if its owner threatens to strike it, but it will ignore its owner raising a hand to scratch an ear, and it will respond by fleeing or attacking others who threaten to strike it. By contrast, the behaviour of insects is crudely reflexive in that they show themselves incapable of modifying their behaviour in ways appropriate to changing circumstances.

The behaviour of insects is merely instinctual. Instinctual behaviour expresses drives rather than desires of which the creature is aware and which it is trying to satisfy. Of course, it is difficult to know where to draw the line between creatures which have interests and those which do not. Do fish or molluscs have beliefs and desires? But that it is difficult to know where to draw the line does not indicate that there is no line to be drawn. There is no doubt, I think, that the higher animals possess beliefs and desires which give rise to the sorts of interests which must be taken into account in judging the morality of an action which will affect those animals.

People, as rational beings with a language, have many
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interests which animals could not have. An animal cannot take pleasure in a good book, or suffer when it is made to listen to bad poetry. An animal cannot take pleasure in the rescue of lost bush-walkers or look forward with horror to the prospect of nuclear war. Sometimes, because of this, animals may suffer more than people in equivalent circumstances. The dentist can console me by telling me that, although an injection will hurt for a short time, it will save me from suffering when my teeth are drilled. But the veterinarian cannot similarly console an injured animal which fears his or her approach. But, in general, people have more and wider interests than do animals. This is a fact of obvious moral importance. The interests of people are not more important, as interests, than those of animals, but often an action that affects some people directly will please or distress many people indirectly, whereas an equivalent action which affects some animals directly will not indirectly affect any other animals. However, because animals do have interests and can suffer where our actions affect their interests, one cannot ignore, in assessing the morality of an action, its effects upon animals.

Someone might allow that animals have the type of interests that I have described, but deny that this is a matter of moral relevance. Such a person might say that, since animals show no regard for our interests or for each other's interests, there is no reason for us to show a regard for their interests. But this claim implies, wrongly, that beings capable of acting morally need concern themselves with the effects of their actions only upon other such beings. Animals are not moral agents and bear no responsibility for their actions; they do not 'know any better' than to act as they do act. However, we are different. We are capable of appreciating the effects of our actions upon other people and animals, and of modifying our plans and actions as a result of such thoughts. Because of this, we are usually morally responsible for our actions. As moral agents, we ought to consider the effects of our actions on any creature whose interests may be affected by our actions, whether or not that creature happens to be a moral agent. We are morally responsible for what we do to animals because we can understand what it is that we are doing to them and the significance that this has for them. (Animals are not morally responsible for what they do to us or to other animals because they do not similarly understand the effects of their actions.)
So far I have suggested that animals have morally relevant interests, and hence that it is wrong to make them suffer for no good reason. The qualification 'for no good reason' is important here. It implies that there may be morally acceptable reasons for causing suffering to animals sometimes. Several examples spring readily to mind. The veterinarian who prods a dog to elicit a pain response in order to diagnose the dog's illness does nothing morally wrong. The person who smacks their dog to train it from its dangerous habit of chasing cars, does nothing morally wrong. These are cases in which the animal's interest in not being caused pain is overridden rightly with an eye to more important interests that the animal has. Sometimes an animal's interest in not being caused pain might be overridden by the more important interests of other animals or of people. If I can obtain treatment quickly for a dog or a person with a badly broken leg only by riding my horse so hard that it is caused pain, I ought to do so.

The interest that animals have in avoiding suffering is morally relevant in the sense that that suffering must be taken into account. One ought not simply to ignore the effects of one's actions upon animals. But, although the interests of animals must be considered, those interests may be overridden by other morally relevant considerations. Much of morality involves judging between conflicting interests, and there are no simple formulae which one can apply in reaching such judgements. This does not mean that it is up to the individual to say what is right or wrong, as if the individual were incapable of displaying bad judgement. But it is to say that, quite often, people will disagree about the rightness or wrongness of a particular judgement. However, although there are no 'hard and fast' rules, there are 'rules of thumb' which provide good guides in most cases. Usually, it is wrong to cause unnecessary suffering. Usually, to place one's own pleasures above the suffering of other beings, just because they are one's own pleasures, is wrong. Usually, to treat other beings as if they are mere machines is to act wrongly. Such rules provide rough guides to the way in which both animals and people should be treated.

Now, if interests confer 'rights', then animals have a right to food, a right not to be caused pain, and so on. Interests are things which ought to be taken into account and not ignored when one judges what one should do. Often, when we talk of rights, we do so as a reminder that there are morally
relevant interests which ought not to be ignored. But we also talk of rights in a different way — we talk of them as prohibiting, and not merely as counting against, certain courses of action. If you lend me your car you have the right that I not give it away. Although I might meet someone who has as much an interest in having your car as you have, you have the right that I return the car to you and that I not give it away to others, even though they need the car as much as you do. This second type of right, which I shall call a justice-right, is a right which must be met by those against whom the right is held (where it is insisted upon). In this case the right is one of ownership, and I cannot give away your car (even to those whose interest in owning your car is as strong as or stronger than your interest in owning your car), because the right of ownership is not mine to give away. So far I have argued that animals have morally relevant interests, but do they also have justice-rights?

Justice-rights arise, I believe, in the context of co-operation, where co-operation is defined as the mutual recognition of restrictions on behaviour in the name of a common enterprise. We co-operate in living peacefully together if you do not hit me as a result of recognising that I refrain from hitting you, and I do not hit you as a result of recognising that you refrain from hitting me. Each of us recognises that the one has a claim upon the other as a result of each fulfilling their role within the co-operative enterprise in which we share membership. So long as you fulfil your role within the co-operative enterprise of peaceful co-existence, which you do by not hitting me, then you have the right that I refrain from hitting you. I am obligated to play my part in the enterprise, and if I do hit you, then I am unjust to you. If I destroy the co-operative enterprise by not performing my role within it, then I no longer have the right that you perform your role, because you have a part to play only where I recognise that I have a part to play. If I hit you, you would not be unjust to me in hitting me back. (This is not to say that you ought to hit me back. Rather, it is to say that, if it is wrong of you to hit me back, it is not wrong because it is unjust to me.)

To insist that animals lack justice-rights simply because they are not people would be speciesist — it would be to assume, without bothering to check the assumption, that animals do not co-operate with us. Instead, what we must do is to look whether or not animals co-operate with us as a matter of fact. I believe that, when we do look, it is clear
that animals do not co-operate (as I have defined that notion) with people and thus I believe that, as a matter of fact, animals lack justice-rights. Of course, it is true that animals contribute within joint enterprises — my dog carries the newspaper, the horse pulls the cart, and so on. But this does not prove that animals co-operate with us. It shows only, I believe, that animals can be trained or coerced to work with us. Co-operation is reciprocal. It involves the mutual acceptance of limits upon one's actions as a result of recognising the other's claims upon one within the enterprise. Animals are incapable of such recognitions, or of controlling their behaviour as a result of such recognitions, and so do not co-operate with people in doing the work that they have been trained to do. Animals do not co-operate with us in performing their tasks within the enterprise any more than do the machines that we use. Where there is no co-operation, the notion of justice-rights gets no grip. Where the animals with which I work do not appreciate the limits that I put upon my actions, then justice will require nothing of me with respect to them. I am not unjust to my dog in failing to give it a biscuit as a reward for carrying the newspaper. If it is morally wrong of me to deny the dog the expected biscuit, then my action is wrong not because it is unjust, but for some other reason.

(As a digression, I should mention that there are conditions under which one might believe that animals both have justice-rights and that they do not co-operate with us. If a person faithfully fulfils their role within society, then that person retains justice-rights in virtue of their past performance when they retire from active participation within the community. Even dead people may have rights in this way — for example, that the terms of their wills be respected. Now, if one believed (as some people in the world do) that people may be reincarnated as animals, and even as plants, then one may well believe that animals and plants have justice-rights in virtue of their past performance as co-operative people. Perhaps one reason why some Eastern religions encourage the same regard for animals and plants as they do for people is because such religions support a belief in reincarnation. While I think that such a belief is mistaken, it is easy to understand how one's holding such a belief would lead one to the view that animals and plants possess justice-rights although neither animals nor plants co-operate with us.)

I have suggested that, as a matter of fact, animals lack justice-rights and, accordingly, that we can be neither just
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nor unjust to animals. But I have also argued that animals have morally relevant interests which ought not simply to be ignored. What then is the connection between that part of morality which is concerned with the just acknowledgement of rights and the remainder of morality?

Morality, whether ordained by God or manmade, is importantly concerned with the regulation and preservation of social life. That is, it is a set of 'rules' which, if abided by, would lead people to co-exist peaceably. Some behaviour, if it were to become widespread, would be such as to make social life impossible — for example, indiscriminate killing, a refusal to shoulder one's share of the work, or the use of violence to obtain more than one's share of the benefits. Thus there is a minimum standard of behaviour which must be met by the vast majority of people if social life is to be possible at all. That which may be required of one in the name of justice is that which establishes and maintains this minimum standard of behaviour. Whereas very often it is wrong to use physical coercion against the individual, it is not wrong to do so as a means to making that individual attain the minimum standard of behaviour which must be met (by the vast majority) if social life is to be possible. The justice-rights that people have are rights against others prohibiting those others (by force if necessary) from undermining the security of both formal and informal agreements, upon which security the stability and continuance of social life depends. Justice sets the minimum coercively enforceable standards of behaviour necessary for the maintenance of social life.

The moral standards set by justice are not high ones. A person might meet those standards voluntarily and still be a very nasty person indeed. Such a person does their job and never a jot more. Such a person demands that others do their jobs even where, through no fault of their own, they have difficulty in meeting their obligations. The landlord who evicts someone temporarily incapable of paying the rent is not unjust, but may, nevertheless, be a very unpleasant person. Social life is possible provided that the vast majority are (or are made to be) just, but social life would be very far from pleasant if people were only ever just. Justice is a very important moral virtue — for, without it, social life would be impossible — but kindness, consideration and benevolence are other moral virtues which make life in general easier and more pleasant. Injustice is an important moral
vice, but callousness, cruelty, indifference and squeamishness are other moral vices. The virtues other than that of justice and the vices other than that of injustice can be displayed in one's treatment of any being with interests, whether or not that being is capable of co-operation. Very young human babies are no more capable of co-operation than are animals. So, on the view presented above, one can be neither just nor unjust to a baby. But, obviously, we regard the treatment of human babies as a matter of considerable moral importance. A person who delights in roasting alive unwanted and abandoned babies might not be unjust to anyone, but such a person displays a gross moral defect for all that. In the same way, although we can be neither just nor unjust to animals, it does not follow that it is morally acceptable to treat them simply as we please. The way in which a person treats animals need not affect the way in which they conduct their social relationships, but could show that person to be extremely unpleasant.

If the interests of animals are not relevant to questions of justice, to what moral issues are they relevant? There is more to being moral than being just. To be unaware of the obvious suffering that one causes to animals is to display the vice of indifference. To be aware of the suffering that one causes other creatures and to under-rate that suffering, is to display the vice of callousness. To be aware of the suffering that one causes other animals and to enjoy causing that suffering is to display the vice cruelty. On the other hand, to fail to cause suffering to a creature, where this is the best and most appropriate course of action, is to display the vice of squeamishness. For example, a person who will not put 'out of its misery' a grievously injured animal because they cannot bring themselves to hurt it displays this vice. Anyone who consistently displays one or other of these vices in their treatment of animals (or birds) shows themselves to be a very nasty person indeed, however nice they may be to people. Such a person wrongs the animals concerned and may be condemned for doing so.

Although I have suggested that one can be neither just nor unjust to an animal, I wish now to emphasise that our treatment of animals can raise issues of justice and injustice. If you promise to look after my dog and if you fail to do so, your action is unjust — to me, but not to my dog. I can have the justice-right that you look after my dog and the only way in which you can be just to me is by caring for
my dog. If then you are cruel to my dog, you wrong me as well as my dog. Where animals are protected under the law, as many are in many ways, it is unjust to the members of one's community (as well, perhaps, as cruel or callous to the animals) to treat the animals in a way that is contrary to the law. But whether or not an animal is protected by the justice-rights of individuals or of the community, it is morally wrong to treat it with cruelty, callousness or indifference. One might not be unjust to any person in being cruel to an animal, but that does not make cruelty any less wrong. Laws against the maltreatment of animals do not make that treatment any more wrong (although they do mean that one wrongs the community, as well as the animal, in maltreating it). The effect of the laws is to allow for more direct and punitive measures to be taken against those who contravene the law in maltreating animals protected under it. But the moral wrongness of an act is not to be judged in terms of the procedures by which it is to be punished or condemned. It is wrong to maltreat animals because it is wrong callously, cruelly or indifferently to make them suffer, whether or not one can be punished under the law or in any other way for such maltreatment.

So far I have avoided discussing cases in which the justice-rights of people come into conflict with the interests of animals. In general I wish to maintain that justice-rights take precedence over interests. If I come across a man and his dog, both of whom have broken a leg in an accident, it is my duty, I believe, to treat the man before the dog (unless, perhaps, he tells me to do otherwise). This is not because the man's interest in being relieved of suffering is greater than that of the dog (which is not necessarily the case); nor is it because I ought always to put the interests of people above those of animals (which also is not necessarily the case). It is because to fail to treat the man first would be unjust. As a general rule, the person will have the right to be treated first. To take a more controversial case: people in the community have the right that we attempt to find cures for the serious and debilitating diseases to which they are prone. They also have the right that they not be experimented on. If the only way of discovering cures for such diseases is by experimenting on living creatures, then it may be necessary to experiment on animals. So far as is possible, the animals involved should not be made to suffer or be killed. However, the success of the experiments may depend
upon causing suffering to, and killing, experimental animals. If that is necessary in order to find a cure, it is not wrong. I believe, to do it. Of course, we can all agree in such cases that it is unfortunate that the animals suffer and die. A world in which there was no suffering would be a better world than this one. But in this world, sometimes, it is not morally wrong to cause suffering, although it is unfortunate that it is necessary to do so.

However, obviously these claims need to be examined closely. If, in the accident, the man had only twisted his ankle, whereas the dog had a broken leg, it is fairly obvious that one ought to attend to the dog first. And if the experimental programme shows no signs of discovering a cure within a reasonable period of time, the suffering and deaths of the experimental animals involved provide excellent grounds for abandoning that line of research. Alternatively, if the disease is one which might easily be avoided, such as lung cancer induced by smoking, it may be doubtful that the experimental programme which will involve the suffering and death of experimental animals should be commenced at all. (The difficulties posed by this case arise partly from the fact that not all lung cancers result from activities such as smoking.)

In recognition of such cases one might argue in one of two ways. One might say that justice-rights hold irrespective of circumstances, but that sometimes it is not morally wrong to violate such a right (where, for example, respecting that right would seriously affect the morally relevant interests of other people or other creatures). Or one might say that justice-rights are inviolable when they hold (provided that they are not voluntarily relinquished by the holder of the right), but that they do not hold under all circumstances. For reasons too complicated to discuss here, I prefer the second of these descriptions. Thus, I would say, for example, that the right that people have that attempts be made to find cures for their diseases amounts to a right that, other things being equal, useful-looking lines of research be pursued, but that they have no right that apparently useless lines of research be continued. Because an experimental programme may look to be useful, but turn out to be useless, such people, as this becomes apparent, lose the right that the programme be continued.

One other type of case should be mentioned: If, in borrowing $50 from you I promised to pay you back in a month’s time ‘come what may’, then you have a justice-right
Why are Non-human Animals objects of Moral Concern?

to the money when the time elapses. This justice-right is not conditional upon changes in circumstances because, in accepting the loan, I accepted also that it be unconditional. If at the end of the specified time, through circumstances which are beyond my control, I can pay the debt only by causing an animal to suffer (for example, by not buying food for my horse), then it would still be unjust of me not to pay the debt. However, sometimes it is indecent to stand upon one's rights. Provided that you do not need the money to feed your starving children you should, in view of the circumstances, release me from my obligation to pay now. You would not be unjust in demanding the money owed to you, for it is owed in the name of justice. But, knowing my circumstances, you might be cruel or callous to insist upon payment. Where they hold and are insisted upon, justice-rights take precedence over interests, but they ought not always to be insisted upon.

If you were nasty enough to insist upon payment, under the circumstances it might be wrong of me to pay. Although my inability to pay is not my fault, nor is it the fault of my horse. I am faced with a choice between suffering the penalty which attends my being unjust to you and a course of action which will lead my horse to suffer. In such a case, it may be selfish of me to place my own suffering above that of my horse.

Although I have discussed cases in which others may have justice-rights, where one takes courses of action which lead animals to suffer, it is not common, I believe, for others to have such justice-rights. Much more common is the case in which the interests of people conflict with the interests of animals. For example, the vast majority of painful experiments performed on animals are performed not in recognition of the rights of people but, rather, in recognition of their interests. I do believe that, when new products are brought onto the market, people have the justice-right that an attempt is made to determine that those products are safe for use. But I do not believe that people have the justice-right to have the irritability of shampoos tested by having those shampoos poured into the eyes of rabbits. Nor do I believe that people have the right that the toxicity of lipsticks be determined by seeing how many sticks of lipsticks must be eaten (as a result of force-feeding) to kill 50% of a group of experimental animals. Nor do I believe that, merely for the sake of publishing research material, the brains of research
animals should be mutilated in order to see how this alters their behaviour, or that animals be repeatedly electrocuted for the sake of 'pure' research. Thousands upon thousands of animals suffer in experiments which are known in advance to be of only trivial, if any, benefit to people (or to other animals).

Apart from the matter of animal experimentation, the most controversial issue in our treatment of animals concerns the ways in which they are reared and slaughtered for human consumption. Again, what is involved is a conflict of interests, rather than a matter of justice-rights. (If I order beef steak from the restaurant menu, then I have the justice-right that I be served with beef steak. But it is doubtful that I have the justice-right, in general, that the restaurateur have meat dishes on the menu. I might have a right, as a member of the community, that it be possible for me to purchase the food that I need to keep me alive, but, since my survival does not depend upon my obtaining meat, it is not obvious that I have a right to be able to obtain meat.) I shall conclude my discussion with a brief consideration of the morality of raising and using animals for food.

I do not believe that there is anything morally wrong, necessarily, in a person’s eating the flesh of an animal. If a hungry person comes across a rabbit which has just been killed by lightning, that person does nothing morally wrong in eating the rabbit. Nor do I believe that there is anything morally wrong, necessarily, in killing animals for food. If, in past times, the Maori relied upon killing moas for food, then I do not believe that they did anything morally wrong in killing moas. Nor, so long as the animals are killed as quickly and painlessly as possible, do I believe that there is anything morally wrong in killing for food an animal, such as a cow, which has lived a happy and long life. The moral problems which arise in connection with eating animals arise, I believe, not from the fact that they are killed or eaten at all, but rather, from a consideration of the circumstances under which they are raised and slaughtered. Nowadays farms on which animals are raised for food function like factories which are often run for economic efficiency and profits rather than for the wellbeing and painless slaughter of the animals concerned. Perhaps it is not wrong to raise and slaughter animals for food as we do, despite the suffering that those animals undergo; but if it is not wrong, then that is not because their suffering may be ignored, but because that suffering
is out-weighed by more important interests that people have in eating meat.

My aim in discussing the use of animals in experiments and the farming of animals for food, has not been to determine the morality of such practices. Instead, my point is this: given that animals have morally relevant interests in that they can suffer, one cannot merely ignore the interests of animals in assessing the morality of our actions with respect to them. This means that, as moral agents, we have a responsibility to find out about and to consider the effects of our actions upon them. To ignore the injured victim of a hit and run accident, just because one did not directly cause the accident, is to act in a morally irresponsible manner. In the same way, to ignore the suffering of animals, just because one did not cause that suffering directly through one’s own actions, is to act immorally. The suffering of animals is a matter of moral importance. To fail to take the trouble to find out that suffering is going on is to show the vice of indifference; to think that suffering does not count for much is to show the vice of callousness; to enjoy that suffering is to show the vice of cruelty. Comparatively few people are cruel or callous, but many people appear to be indifferent. But one cannot protect oneself from the charge of moral irresponsibility by claiming to be ignorant of the ways in which animals are treated, given that the relevant information is readily available. It may be, of course, that those who protest that animals are badly treated are squeamish people who overrate the suffering that we cause to animals. But one cannot reach a judgement on that matter unless one takes the trouble, which as a moral agent one ought to do, to discover in some detail how animals are, in fact, treated.

**Summary**

Animals have morally relevant interests: they suffer when they are starved, beaten, burned and so on. It can be morally correct to override the interests of animals where more important morally relevant interests are at stake, but it is not morally correct merely to ignore the interests of animals. One can be neither just nor unjust to an animal, but one can make it suffer in ways that are cruel, callous or indifferent. Behaviour which displays such vices is morally reprehensible.

**Bibliography**

John Morton argues the case for viewing nature holistically. He develops a system of distinguishing between properties, values and utility.

He defines properties as real characteristics in the system itself which do not depend upon human estimate or attitude. Which properties are to be noticed requires a judgement though, and properties like beauty seem dependent upon a beholder. This difficulty leads into the discussion about the place of an evaluator, the necessity of human judgement in perceiving ecological situations. Is nature independent of the human species? It is usually said that mankind is part of nature, but above nature, or different from nature. Our knowledge of nature is surely dependent upon human judgement. Science will provide knowledge about natural systems, and science is a human endeavour. One important way of establishing scientific knowledge is whether our
theories fit the evidence — they must be tested. Do we not discover properties about nature?

A series of questions emerge for the decision maker. Do we have sufficient knowledge about ecological processes before we intervene or manage them? What limits or constraints upon management will that knowledge provide?

John Morton wants to connect the properties of the natural processes with the decisions we make about utilising those processes on a resource basis. He also believes we should view nature holistically.
Introduction

This paper is concerned with the way environmental issues, and the values they entail, are dealt with in the political process that ends in decision making. As environmentalists, we shall be constantly finding ourselves engaged with issues with which politicians are concerned. By politics, I mean the whole public activity of a people ('polis'). We thus see 'politics' in the largest sense as the 'ecology of a valuing animal'. Our agenda will be the sharing and allocating of resources among ourselves and between today and the future.

Our decisions about ecology or economics are packed with values; but whatever the values input, any political decision about environment must begin with fact-finding about the natural system we are dealing with. Decision makers need to have trained scientists spell out the ecological foundation of a proposed policy.

The end point of decision making will be a policy for the use of a natural system. But we must begin by first looking for the properties of that system, giving ourselves time to do an unhurried investigation, with an honest intention to find out all we can before going on to make the decision. Properties are real characteristics in the system itself. They will not depend on any human estimate or attitude.

I have chosen for this essay two examples of natural systems (with properties having consequences for policy-making) as disparate as we could easily find: a central North Island podocarp forest and a Hauraki Gulf snapper fishery.

Properties

We become interested in the properties of a natural system when we want to know how it will best answer to human utility. Unlike properties, utility is a human related variable
according to how much we desire a product, what we want to do with it, and the amount there is of it. Economists will remind us that there can be very different sorts of utility. Thus water is trivially cheap, but essential. Diamonds are monetarily precious, yet can easily be done without. Sometimes the highest utility will be seen to lie in not using a resource at all, neither consuming it in a way that will use it up, nor even using it so as to conserve it or assure its ongoing availability for the future, but in leaving it entirely alone; for example, preserving a system as wilderness.

In Figure 1, it is not possible to draw a straight arrow from properties to utility. The way we see a system's utility is affected, indeed established, by the value we assign to it; not only to its productive use, but, as I am now using the term, to the thing in itself. Values are then 'qualifiers', the plus or minus signs (for or against a particular action), we apply to any environment decision, after we have done the empirical study.

The final decision then is drawn from a system's utility, arising out of its inherent properties but qualified to a greater or lesser degree by the values we entrain upon it.

Figure 1
The connections between decision making and utility, values and properties.
Decisions about the use of natural systems can be found historically to have taken different forms. With the old economic trinity of land, labour and capital, the school of Adam Smith and his followers would have taken it for granted that the role of the first two, land (environment) and labour (people), was simply to subserve the interests of capital. Over time it became acknowledged that capital has a responsibility to look after people (providing, amongst other desirables, secure employment). Today it is also being recognised that any economic system must carry a responsibility for the land, with all the living systems that grow upon it.

Some natural resources, such as fossil fuels, are of a kind that may be used until they are eventually exhausted. The only control will be over the rate at which this shall be done. In former days, forests used to be clear-felled in a similar way. On the high seas, the international history of whaling has been to turn from one species of great whale to another as each in turn became scarce and uneconomic to hunt. With the dawn of agriculture, or even in hunting and fishing, an ethic grew up by which a resource was 'conserved'. Its exploitation was limited or 'managed' to allow for a sustained, on-going yield.

Such a 'balanced use' with sustained yield, and some ongoing possibility of scenic and aesthetic enjoyment, is the policy for most of our man-made landscapes today: the fields of the Waikato or of Lincolnshire, the oak and beech forests of Europe, or the pine plantations of the Kaingaroa.

Many still find it hard to understand why such a balanced use cannot be made of our New Zealand indigenous forests, as the Forest Service is still claiming, so that a 'sustained yield' of timber could continue to be taken from them — true 'conservation' (it is urged) rather than wanting to lock up the total resource for 'selfish' reservation.

This is why I have chosen a giant podocarp forest to show how some of the natural systems still left in New Zealand cannot easily be exploited for sustained use, and why their 'best use' will involve keeping them without exploitation in their natural state.

Systems with properties like these no longer occupy very much of the vegetation map of the temperate world. The best examples are communities like forests that are complex in structure, and consequently of high visual profile and beauty. Their stability may depend precariously on keeping that complexity intact. Hence, when exploited and disrupted
they have become fragile and excessively scarce; reduced to local fragments, with a high proportion of rare or threatened species, some of them geologically ancient 'living fossils'.

Thus, in their gianthood and majesty, podocarp forests are awe-inspiring. Because of both their great age, and the peculiar age distribution in the population, they are difficult to regenerate or restore. Though they have a high present biomass (standing crop), their slow growth (low productivity) makes their logging for sustained yield a dubious investment, and any disturbance will be perilous to their stability.

By contrast, in all its population properties, a snapper fishery is almost as different as could be imagined from a podocarp forest. It is ideally suited for cropping for a sustained yield. It is of low visual profile; invisible, indeed, beneath the sea. No one thinks it beautiful. Few are even conscious it exists. Its biological structure is rather simple, widely exemplified and resilient against destruction. None of its species is known to be rare or threatened and most of them are geographically wide-ranging.

Though its population balance can fluctuate dangerously with over-exploitation, a fishery is fast growing and can be relatively easily held at, or restored to, a level of high productivity.

Our inshore fisheries are thus ideal systems for sustained yield management with conservation. With quite a modest understanding of ecology and population biology, and the real will to apply it, this could be simply achieved. The policy decisions, to capitalise the New Zealand fishing industry to its present level of effort, were made however at a time when biological advice was not being sought or heeded (see p.130).

In Table I I have set out the community properties that could be relevant to resource use decisions. First there are 'static' properties relating to structure; next, but connected with the first, 'dynamic' properties that affect growth and population biology.

Each of the parameters numbered 1 to 8 may be expressed in a gradient running from left to right. Properties to the left are those involving scarcity, fragility, complexity and, often, high beauty. Systems with a preponderance of such properties need caution in exploitation, and preservation may be the only wise option. Systems with most of their properties towards the right, which is the more common situation, can, with proper attention to their population biology, be safely exploited.
The Anatomy of Decision

Static
1. High visible profile/beauty ............ low visibility/beauty
2. Complex ................................................................. simple
3. Scarce/local/residual ...................... common/extensive/cosmopolitan
4. With threatened species ...... without threatened species

Dynamic
5. Slow growing .................... fast growing
6. Low productivity ..................................... high productivity
7. Fragile: poor recovery ................ resilient: strong recovery
8. Exhaustible ..................................................... sustainable

Table 1
The properties of natural systems

Utility
Unlike its properties, utility is not a fixed or invariant quality attached to a natural system. It arises from the way we decide to use it. We can opt to consume a system, using it up altogether, at a rate to be decided. Or we may elect to conserve it, exploiting it at such a rate that the system and its resources are not used up, but are kept in being to serve the future. In extreme cases (but some that happen to be important in New Zealand today) there are systems we can keep in being only by a decision not to exploit them at all but to preserve them. Even the preserved systems will not remain unchanged. They will be undergoing a long-term ecological succession, and a large system will itself be a complex mosaic of changes both in space and in time. These changes will however, be natural, not destructive or regressive alterations that we have externally imposed.

There may thus be different sorts of utility: utility to consume; utility to conserve; or finally utility to preserve.

I have drawn no direct arrows in Figure 1 from properties to utility. Such a linkage must be made by way of values (which will themselves also arise out of properties, being the way such attributes are perceived, through or by appeal to our moral feelings). The arrows will in effect be deflected or biased by the existence of such values, which will influence every decision we make about utility, and which sort of utility we opt for.

Decisions are thus, in effect, always value decisions. If we decide to clear-fell a podocarp forest, some kind of values will still have been invoked, even if I may personally think such values to be deplorable.
It will be wrong too, to assume that the normal 'economic' utility must be utility-of-consumption; and that when we elect to conserve or to preserve a system, hard utility has been foregone. A system's utility to us is simply what we have (after doing all the relevant values accounting) elected to do with it.

To the great classical economist Marshall, utility was seen as the correlative for desire or want, only to be measured by somebody's 'observed preference', revealed in price, as the motive force of action. Our desires or aspirations, it was conceded, need not be common pleasures. They could arise from development of our higher nature, from 'beatification' (Marshall's expressive word), even partly from self-abnegation.

The economic difference between our two sorts of utility, utility-to-consume or utility-to-conserve/preserve, lies primarily in the way we pay for them. In the private sector, things are generally put in packages and sold by a profit-taker for consumption by one, or a very finite number of customers, in response to a spontaneous (or, more often, skilfully created and stimulated) demand.

In the public sector things are less often used up. Consumer catering is the jealously guarded prerogative of the private sector. A park will be designed, an avenue planted, a vista opened up, air kept clean and lead free, advertisement hoardings restrained. All these things confer utility; few who had to exist without them would doubt this. They are being paid for, however, not by immediate users, but, like education, symphony orchestras and libraries, by the people in common, out of rates and taxes, allocated by community decision.

Neither species of utility can be said to have more 'hard' value or 'economic' worth than the other. It is only their method of accounting, and perhaps our ideological prejudice, that lead us to think so. It is this same confusion, with the downgrading of public sector spending assumed to be tax-eating and economically injurious, that has led to the state of 'public poverty' contrasted with 'private affluence' that was the theme of Kenneth Galbraith's famous book 'The Affluent Society' (1957).

The contrast was and remains evident not alone to those who read. The family which takes its mauve and cerise, air-conditioned, power-steered, and power-braked automobile out for a tour passes through cities that are badly paved, made hideous by litter, blighted buildings, billboards, and posts for
wires that should long since have been put underground. They pass on into a countryside that has been rendered largely invisible by commercial art. (The goods which the latter advertise have an absolute priority in our value system. Such aesthetic considerations as a view of the countryside accordingly come second. On such matters we are consistent.) They picnic on exquisitely packaged food from a portable icebox by a polluted stream and go on to spend the night at a park which is a menace to public health and morals. Just before dozing off on an air mattress, beneath a nylon tent, amid the stench of decaying refuse, they may reflect vaguely on the curious unevenness of their blessings. Is this, indeed, the American genius?

The private sector is biased not only in favour of goods easily packaged and consumer sold. It is also biased toward quick returns. For any economic action, the justification is measurable essentially by the price a consumer is prepared to pay. Market laissez faire has long been assumed to avoid value judgements. There is an economic alchemy by which the natural effort of each of us to better himself will result in the progress of a nation to wealth and prosperity.

That the good of all is achieved by each individual acting egoistically is also the assumption of evolution by natural selection. Laissez faire is clearly an evolutionary model. The only question is whether, in this mode and tempo, evolution is an appropriate model for a caring and discerning animal, with a capacity to plan. For there are so many grounds to look beyond the maximising of present advantage, for example the political need to ensure the distribution of resources between different requirements in the most efficient way possible. This must take account of the future, if only because the future, or the first part of it at least, involves ourselves.

Public intervention has thus become a familiar daily instrument in our common life. We have to ensure that it really is 'tuning' (however fine or coarse), and is not being done simply with hammer or bludgeon.

Aneurin Bevan wrote:

What goes where? Who is to be the beneficiary or loser by the change? This was the question that laissez faire liberalism never had to answer — except in a narrow budgetary sense — for it allowed human values to emerge from the sum total of human scramblings.
The liberal never knew what sort of society he intended until he had, in fact, made it.

When we speak of values, it will be remembered, we mean the considerations arising from the properties of a system that create in us an esteem for the thing itself. We are not thinking of any economic 'benefits' flowing from the policy decision to exploit or consume the system. These benefits would be quantified from observed preference, by the indicators of 'price'. Here we are considering as values those prior considerations (psycho-ethical-social) that will influence us in the process of arriving at any decision of policy. With a resource that can easily be rationally harvested, the resilience of the system allows a rather direct transition from properties to utility. Values considerations here need be given only marginal weight.

It is when properties are slanted to the left in Figure 1 (with scarcity, fragility, beauty) that utility needs to become substantially modified in the light of values.

With such systems we may be dealing with values-towards-preservation where it has been demonstrated that the desired stability cannot be achieved with conservation alone. In an ancient forest such as Whirinaki, such values will arise from feelings ranging from awe and respect, intellectual and aesthetic appeal to intuitions of enlightened self-interest.

We could even imagine values of such a kind, not at all economic in origin, that could motivate us to go on utilising a forest, such as the strengthening of Maoritanga by every secondary school having a giant totara to carve its own canoe. Buller and Reischek, a century ago, believed our rare and beautiful birds were on the verge of extinction. No utility-of-conservation being possible, the best utility that could be had was the diminished, but enduring one, of shooting the bird and keeping its skin in a museum.

Some questions we must be asking then, about the benefit to be derived from exploiting any natural system, will be raised at once by our consideration of a fishery:

- the amount of benefit, or in fishery terms 'catch per unit effort';
- the speed at which the benefit can be taken (in effect, the discount rate it is possible to accept for accelerated delivery); leading to,
- the sustainability of the benefit - how long can it last?;
In the past decade most of New Zealand’s inshore fisheries have become grossly over exploited. It was only in 1985 that control, through limitations of catch and exclusion from certain breeding areas, was introduced. This comes long after the fishermen themselves had been pressing for such restriction.

Fortunately a fish population is resilient, and harm done by mismanagement can eventually be repaired. The guiding formula by which the welfare of a fishery can be maintained, and the crop proportioned to the stock, is:

\[ S_2 = S_1 + A + G - (C + M) \]

Thus, the weight of catchable stock at the end of any year \( (S_2) \) will be equal to the weight of stock at the beginning \( (S_1) \) together with the addition of catchable recruits \( (A) \) and the increment by growth \( (G) \), minus the catch \( (C) \) and the natural mortality \( (M) \).

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*Figure 2*

Age structure of fish catches in situations of (A) overfishing, (B) normal fishing and (C) under fishing

In a heavily overfished population, the average size of
individuals, a function of their age, continues to fall (see Figure 2). \((C+M)\) will be large. \((A+G)\) will also be large, but there will be little opportunity for fish to attain adult size. In the classical situation of overfishing, the industry thus becomes uneconomic. Each year the catch yielded for the equivalent effort is further reduced. If, however, a lower rate of fishing were accepted, with the consequent saving of fishing effort and cost, a few years would see the reward of a greater weight of catch, from the greater number of fish growing to maturity. This level once reached could, with proper management, be indefinitely sustainable.

The extreme contrary case is that of a virgin ground where there has been no fishing. The same equation still holds, but balanced at a different age composition. With catch \((C)\) at nil, and mortality \((M)\) in natural conditions small, this means that \((A+G)\) will also be kept small, for the total weight of fish will depend upon the food supply available, and young fish will tend to be starved out and die or to grow only slowly. The stock will therefore consist mainly of old fish in very poor condition. Any increase in fishing will improve such a fishery and lead to increased yield.

Where a population is ideally conserved from year to year, high production and turnover become possible. Catch size \((C)\) can be safely maintained at a good level, resulting in a well distributed population structure, with a high \((A+G)\). \(G\) can best be increased by allowing fish to grow larger before they are caught, such as by the regulation of mesh size. This is entirely practicable in a country with its continental shelf under its own control.

Since the weight of a fish increases as the cube of the length, the dramatically increased catch, in just a few years, will soon reward the industry's providence in foregoing a high immediate catch (see Figure 3).

With a highly mechanised fishery, detection of overfishing may be delayed, and the catch per unit effort deceptive. With the same or less time spent fishing, bigger seine boats with high technology, larger winches and nets, can make a big catch by mopping up schools that are concentrated for breeding.

With the Hauraki Gulf snapper fishery, there had till recently been no restriction as to size or season. The breeding season from mid-October to mid-September was in fact when the bulk of the catch was taken. It is also when the Japanese export market 'dives', with the large oversupply. Fish caught
before or after spawning (sometimes descaled and mutilated by winching along the sea bed) was kept in cold storage to be exported later in poor condition.

![Fishing Diagram](image)

**Figure 3**

Diagrams showing the difference in the weight of catch obtained, over five years, by (a) 80% rate of withdrawal, and (b) 50% rate of withdrawal from the same sized initial input into the population in year 1.

'Big' fishermen are said to be more co-operative with each other today than ever before. After one boat has thrashed a breeding school to its capacity, another will be waiting to take over. It is hard to know what the true catch is from year to year: fishermen may not disclose the full figure, though they may be assumed to under-report by a fairly consistent figure.

Today, when a fisherman using high technology can make $30,000 in one week, then tie up his boat, remembering only the last good catch, it is not easy to persuade him that the fishery is declining. But unless population statistics are heeded, with what they inescapably have to tell, there is the potential for a sudden and dramatic collapse. A gigantic, if drastic, step towards saving the Hauraki Gulf fishery today would be to say that no vessel of over 40 feet should work the grounds.

**A podocarp forest: to log or preserve?**

A vigorous environmental lobby is today pressing for policy decisions to preserve all that is left of New Zealand's indigenous forests. Whirinaki State Forest is one of the state-owned virgin podocarp forests of the central North Island,
that have been collectively reduced to an area the size of Lake Taupo. Fine mature kahikatea and totora are today probably scarcer in New Zealand than kauri.

There are those to whom it still seems natural to ask why such forests, with a quality and density of timber found nowhere else, are not capable of being exploited for a sustained yield as are our fisheries.

This is indeed the policy that the New Zealand Forest Service proposed in its 1979 Management Plan for Whirinaki Forest. Five thousand cubic metres of podocarp timber (mainly rimu) was to be removed annually by the method known as 'selection logging'. By past standards this was a small volume, though in terms of giant trees, it would have consumed up to 1000 annually.

Intense conservation debate greeted this policy, continuing until 1985 when the Labour Government, in pursuance of its election policy, brought a halt to all logging except for salvage extraction of fallen trees.

It is interesting to retrace the arguments that centred upon Whirinaki at a time still so recent. They will bring out clearly why the conservationists were so insistent on total preservation as against sustained yield management.

Selection logging was preceded by the construction of heavy vehicle roads. Spur roads led from these into open spaces or log-landings, from which extraction tracks, of tractor width, were cut radially into the forest. Along these, at each 'selection' 20%-50% of the volume of merchantable timber was to be cut, to be brought out by haulage lines or skidders. Each selection was to be returned to, perhaps in as little as 10 years, for relogging.

The Forest Service justified selection logging at Whirinaki by asserting that giant podocarps were not regenerating, and that it is only by logging that canopy gaps could be opened up for seedlings to be planted to save an old forest today in decline. ('To save a forest: Whirinaki' critically examines this assumption).

If it could be assumed selection logging would lead to sustained yield, it would require that the amount of wood cut at any one time should not exceed the increment by growth and regeneration before the next logging. The trees left behind must continue to grow and there must be replanting or natural regeneration to replace the species removed.

Logging like this is regularly carried out in the forests of
Europe that have what is called an 'ideal selection structure', progressively fewer trees in each successively older age-class, and a supply of young trees immediately to replace those removed.

There is no such population structure at Whirinaki. The great majority of trees, so far as we can reliably estimate, are very old, ranging from 300 to 800 years (see Figure 4). In the dense areas to be logged, there had been a virtual regeneration gap over the past 200 years. Natural regeneration is poor, and planted seedlings would have needed expensive tending and release-cutting to save them from smothering by hardwood shrubs. At each re-entry, for another logging, planted or regenerated trees would have been damaged by heavy machinery.

Figure 4

Approximate age structure in a dense podocarp forest, based mainly on Herbert's (1980) data for rimu from Tihoi. In Whirinaki the tiny seedling class (I) is more numerous, but established seedlings are considerably more rare.

But it was the mortality of larger trees damaged by logging that told most heavily against calculations of sustained yield. Roading, the passage of vehicles and the hauling of logs, damage not only the rest of the complex community, but the root systems of the giants themselves. Damage to crowns happens when neighbouring trees are felled. The canopy roof
is then widely opened up, leading to the windthrow of mature trees.

Logging trials in high density forests at Whirinaki and elsewhere have produced dramatic increases of tree deaths and decline of forest health. The verdict of scientists from the Forest Research Institute Rotorua, who investigated the trials, has been that podocarp stands are extremely difficult to log selectively, and very sensitive to rapid opening of the canopy.

Forest Service officers pointed to the small effect on the profile’s mature structure from any one logging. But with each successive cut a higher proportion of large trees would be lost. Eventually all the giants would have disappeared, and the slow growth rate reduced to a low, adolescent profile.

To leave Whirinaki Forest unlogged is not to accept the pessimistic forecast that it will die and fall down. Its present magnificence should not be lost in our own day, or in that of our great-grandchildren. Regeneration is not to be expected where present trees fall. Rather, with constant cycles of change through space and time, the forests of the future will be arising on places that are today scrub-covered or cleared. The best site for replanting will not be in logging gaps but, as with the Restoration Trust working at Pureora, in spaces already laid bare from clear-felling.

Against the pretensions to log Whirinaki, could be urged all those values-towards-preservation, the feelings that would impel us to leave it intact for the future. Such feelings that come readily to the surface are:

- feelings of awe and reverence, arising from the forest’s scale and beauty and its remembered antiquity, and the ‘mysterium tremendum’ of our own pygmy scale and impotence in the face of nature;

- feelings for its scarcity and fragility, knowing that some of its stands, such as the superb closed ranks of giant kahikatea at Arahaki Lagoon and the old totaras at Tauranga Stream basin, may be the last of their kind anywhere;

- feelings of intellectual fascination, with the opportunity to study not only the species, but their dynamics as an unmodified community over such extended time;

- feelings for tribal and historic values, for safeguarding a forest where a people has lived since their first coming to New Zealand, still bearing the artefacts and
signs of their culture, and woven with their storied tradition;
— feelings of intelligent self-interest, arising from a national pride, and a 'decent respect for the opinions of mankind', impelling us to look after our parts of a world heritage, that could present imaginative options for tourism that we have not realised.

These then are the values that Whirinaki was seen to present for consideration. They were urged by the still rather small number of people who had experienced and come to love the forest. But these were speaking not as a self-interested economic lobby, but as a concerned group on behalf of many. Such advocacy often brought upon them the unpleasant charge of elitism. Their very economic detachment often itself gave rise to resentment. These advocates, it was said, were asking for preference for a remote posterity, or for people geographically distant, over the jobs and security of those on the spot.

It can be popularly appealing to argue that 'people are the most important species' or 'jobs come before trees'. But real options needed examining more carefully, how prejudicial to people will the cessation of indigenous logging really be? What are the real alternatives? Today the sawmill at Minginui remains at work, taking exotic logs from near-at-hand Kaingaroa State Forest. Local employment can thus easily continue, augmented by the tending of the indigenous forest, and all the demand for services and facilities a tourist industry will generate with a resource equal to California’s redwood forest or any of the great heritage environments of the world.

Judgement can be distorted not only by distance, but by being too close. Longer perspectives will bring in more people to share in the decision, to envisage the alternatives, and to help to carry the transition and dislocation costs.

Decisions about our remaining indigenous forests will moreover have to be taken in the wider arena of historic time. A hundred years ago the pressing need was still for felling, burning and clearing, to lay the foundations for the affluent economy we have today. For these very reasons, when there is pressure today for 'fair compromise' and 'balanced use', it is to be remembered how constantly the compromises and the balance were tipped one way in the past, until today’s remnants of these forests are all we have left.
In this paper, I have tried to invoke — as values towards preservation — the grounds upon which men and women can come to care for non-human life and wish to safeguard it. In their real depth these are not simple arguments likely to persuade everybody or always to offer economic or utilitarian rewards, though a proper study will generally uncover these.

The arguments I have advanced look upon nature holistically, and they appeal to a principle of holism in our own nature too. We would be unwise to attempt to justify the objects to be protected, species by species, or to try to be too analytic about our own motives of regard for them. For we are working here with intuited, or emotionally felt grounds, that cannot in themselves be based upon any rational calculus of advantage or utility.

I have not attempted, and would not have been able, to invoke any notion of 'rights' on behalf of species or ecosystems in ultimate tension with our own human interests. How could such rights, even if they existed, be made to avail, when our dominant human-kind can be so little trusted to respect the rights even of weaker human beings?

Rather, I believe we should want to show some care for the total fabric of life on this planet.

Many people, out of human-centred or economic motivations, will predictably refuse to accept all the arguments presented here. None of us, it could be expected, will see them or get them in focus as clearly as we might do, and could do if our understanding could be deeper or more mature. Our sympathy with natural communities grows with increasing acquaintance, as with a piece of music or with a friend. To enlarge such sympathy ought to be a constant aim of the education we receive as young and old. Especially it should form part of the education of our political leaders.

It would be sad if the grounds I have been pleading were to be altogether dismissed as elitist: feelings that the majority of contemporaries cannot come to acknowledge. Perhaps it need not be so, if those who care for the environment can be patient to share their experience with others — and humble, to know where their judgement may have been overconfident, or ill grounded. For, in the end, especially where a political decision is in contention, we shall never be able to be certain that we have got the equation right, or even correctly discovered our facts. The consequences of our mistakes we will have to live with. Some may be of
international, almost global import: a long-arid Sahara, or a poisoned atoll.

Though our judgements come to us, as it seems, on grounds of value (even in mountain-top experience, where 'Thus saith the Lord') we shall generally find them underlaid by sound utility. We have it constantly on New Testament authority that what we lay out in virtue, lo, it shall be paid to us again, in a tangible reward.

The rules of the planetary ecosystem can seem wonderfully yielding and patient under exploitative stress. But in the end we shall be bound by them. "My body is my prison" wrote John Donne three hundred years ago: "... and I must be so obedient to the law as not to break prison". Our spaceship earth, with its living fabric, is such a prison too.

We shall be making decisions about our environment as political animals, with the aid of those values we try uneasily to mediate and apply. There can be no purely quantitative determinants. As Joan Robinson told us (and she was an economist): "... there is no simple right policy: it is all a matter of judgement... we are left in the uncomfortable position of having to think for ourselves".

She went on to write:

Never before has so great a proportion of economic energy and scientific study been devoted to means of destruction... evolution produces a conscience. But biology ceases at the frontier of the tribe. Evolution will not answer the greatest of all moral questions, who is my neighbour? At that point humanity must take over from nature, but it does not show at the moment any signs of doing so.

The Human Element

Chris Parkin

A teacher of moral and political philosophy at the Victoria University of Wellington, Chris's interest in environmental issues has developed, professionally, as part of a concern to use philosophy techniques in analyzing public issues and, privately, through a range of recreational activities.

Editorial Note

Chris Parkin begins by reminding us that the claim that there is an environmental crisis is a value judgement, and like all value judgements presupposes an evaluator. Nonetheless it does not follow that human interests must be overriding. There is a difference between being a formulator of ethical principles and being a beneficiary of those principles. He goes on to acknowledge that there are occasions when the interests of non-human individuals take precedence over human interests. The big issue is whether in a conflict of human and non-human interests, the scales are not loaded against the non-human entity. He advocates an ethic of environmental responsibility which acknowledges the provisional exclusiveness of human beings without an anthropocentric bias. Shifting the focus of attention away from the necessarily human agent to the not necessarily human patient of moral behaviour, he believes can extrapolate
normative principles which are distinctively environmental. Only human beings have ethics, but that does not commit us to giving the human species pride of place all the time.

A question for the notion of moral patient, coming from a medical context, is whether it is an ethic for individuals that uneasily transfers to collective categories as in ecology. Chris Parkin offers cases where intuitive common sense can distinguish between human and non-human conflicts. He has yet to develop a positive guideline for sorting out disputes.
Philosophical reflection may be the product of pure intellectual curiosity; equally it may represent a response to some problem thrown up in the course of everyday living. My reflections in this essay are prompted predominantly by considerations of the problematic sort. The ongoing life of the human species has not left nature untouched, and the suspicion is increasingly voiced that that may have been a mixed blessing. What, even a few decades ago, still lured as a prize ripe for the plucking may, it is now feared, have been plundered to the point of impending bankruptcy. Not that we should exaggerate the novelty of concern for the well-being of the environment. A moment's thought should suffice to remind us that some Eastern religious cultures, for instance, have for centuries endeavoured to promote concern for all living things. In the West too, environmental concerns have for many years had their champions in the name of scientific interest, recreational opportunity and preservation of natural heritage. Nevertheless it is only in the last decade or so that the ecological ramifications of human undertakings have combined with human sensitivity to the problematic elements in those undertakings and their implications in a fashion which has led large numbers of concerned groups and individuals to speak of the present situation as one of environmental crisis.

The environmental crisis has what we may think of as a quantitative and a qualitative dimension.

Quantitatively there has been a marked proliferation of campaigns to save this or that species, to preserve such and such a forest, beauty spot, breeding ground etc, to restrain a particular industrial or urban development, to cure some
detrimental habit, to reform a certain wasteful lifestyle, and so forth. The cumulative effect of a dizzying succession of at best partially co-ordinated reactions to the current threat of disaster, great or small, is a sense of maybe coping — just! — with a set of symptoms whose underlying causes have not been fully exposed nor whose cure properly essayed.

Qualitatively there is keen awareness of the far reaching and long term character of the central problems within the crisis, an awareness fuelled by fear that at least some of them are, or are about to become, insoluble. What are the problems? They include the destruction of wildlife and wilderness; the loss of cultivable land through erosion; the endangering of the planet's common life support systems; pollution; waste and the depletion of resources, especially of fossil fuels; and the proportioning of human population levels to the resources which are either now available or might be developed for future use over a determinate period of time. Such problems are directly addressed by other contributors to this volume. My purpose is to focus on a recurrent theme of debate concerning these and other environmental issues, namely the need to move away from emergency first aid reactions, dictated from the rear as it were by the latest crisis, towards activities and policies given coherence and direction by a set of principles, something which can serve as a blueprint for future behaviour. And it is in something like this context that the need for an environmental ethic is voiced.

The quest for an environmental ethic has itself become a matter of controversy. The protagonists in this debate may be divided, roughly, into those who see the undertaking as that of applying established theories and principles to the particular preoccupations of the environmentalist, and those who seek a more radically innovative set of norms which are essentially derived from, rather than simply applied to, environmental concerns. On the whole, I tend to the former rather than the latter view, though I believe the line of demarcation is, in addition to its admitted roughness, misleading in certain respects. So in the next section I aim for a clearer understanding of what an environmental ethic is, and I begin by describing three incidents which provide the starting point for my initial reflections.

**Incident one:** A sheep is startled by a sudden noise, a familiar enough occurrence in New Zealand. On this occasion, however, the
sheep's startled movement brings it atop the unstable lip of a bank a few metres above a stream. With the extra weight a minor slide develops, bundling the sheep in bleating indignity into the stream where it drowns. If the dead animal is not discovered and removed, a new set of natural processes ensues whose eventual outcome we, the observers of this imaginary episode, might well describe as the stream being or becoming polluted.

**Incident two:**

A wandering sheep grazing by the roadside is startled by the sudden noise of an approaching car. The sheep's reaction, as any New Zealand driver knows, will be predictably unpredictable. On this occasion the driver is inattentive and hits the animal as it lunges in panic across the road. He pulls up in the first flush of guilt and finds that the sheep is dead. What to do? The muted murmur of water in the nearby greenery leads him to a conveniently screened stream in a minor gully. It is the work of a bare minute or so to heave the evidence of wandering attention to a watery grave. If the dead animal is not discovered and removed, we, the observers of this imaginary episode, may well describe the outcome of the driver's actions as the stream being or becoming polluted.

**Incident three:**

Amanda is furious. This morning, she discovered a small group of campers on the banks of the stream near the northern boundary of her property. Actually, if she had been able to quell the ire aroused by this unauthorised intrusion into her private domain, she would have admitted that the campsite appeared to be neat, orderly and organised with evident respect for the immediate environs. That, however, was not her concern. To her heated challenges, the campers repeatedly but civilly insisted on their legal entitlement to camp on that spot. Moreover, they averred they could not be accused of negligence or lack of consideration in the way in which they were conducting themselves, and they saw no reason why they might not prolong their sojourn over an indefinite period. Determined to have the offenders expelled forthwith, she had had recourse to the police, and, on their advice, to her lawyer. The upshot was that it seemed likely that a curious combination of factors might indeed support the campers' claims and so, unless they proved to be a public nuisance or guilty of some other criminal offence, there might be no authority to eject them. Amanda is furious. In her fury
she is prepared to go to almost any lengths to rid herself of her intruders. In the course of her day’s work she has come across the decomposing carcase of a sheep. Unobserved by the campers, she dumps the rotting remains upstream of their encampment in the expectation that the problem of her uninvited guests will be solved by the resultant pollution.

First reflections

The three incidents have been so contrived as to furnish a common outcome. In each case, the presence of the dead animal in the water alters its chemical composition. Now it is a truism that the chemical changes in the stream will occur whether or not we, or anyone else, detect them. Similarly with the further effects of those changes. But to describe those changes and their further effects in terms of the stream’s being or becoming polluted is to presuppose something new. The word ‘pollution’, and its cognates, has negative overtones; that is to say, it is typically used not merely to report the occurrence of certain natural processes but also to pass judgement on their occurrence. And so, for the description of the stream as polluted to be made at all, it is necessary to assume that at least one individual, whether observer or participant, not only evaluates the episode in a certain way but also can or does give expression to it in language. In short, that the stream is polluted is, if true at all, true only if the appropriate chemical changes are occurring and if a language-using being, real or imaginary, is evaluating their occurrence as unpleasant, inconvenient, dangerous or in some other way bad or wrong.

This point is not, of course, really one about pollution but about valuation. Reflection suggests that a value judgement, any value judgement — not just that a stream is polluted — presupposes a context in which there are language-using and evaluating beings, and is thus impossible without an evaluator. But equally a value judgement is no mere subjective whim, some evaluator’s idle invention; it is, or involves, a considered response to events, either reasoned or, if intuitive, capable of being given reasoned support. Now we, the imaginary observers of the three incidents, are in fact language-using evaluating beings, and so we can properly pass judgement on the fictional facts and accept (or reject) the description of the stream as polluted whatever, to speak a little artificially, might be the case within the confines of the episodes observed by us.
Now the three incidents have, as it happens, been imagined by a group of human beings, myself and my readers. Similarly, environmental issues have been voiced by and perplex another group, no doubt much larger, of human beings. In other words the quest for an environmental ethic has been inaugurated by and, to date, pursued exclusively by human beings. This is no accident. This volume, for instance, was from the start canvassed among humans with the intention of assembling a team of human essayists writing for a human readership. And yet, apparently paradoxically, that matter is not one of unalterable necessity. I do not rule out by some logical fiat the further evolution of non-human animals or the arrival of extraterrestrial beings or the development of sophisticated machines and so forth, any or all of which might well lead me to revise the provisionally exclusive claim just made. But, in the absence right now of such fascinating eventualities, I assume without further argument that environmental ethics is a human preoccupation. I am also committed to the view, that, with certain qualifications, human beings are the only language-using evaluating beings in our world, and hence the only beings capable of formulating an environmental ethic. There are two reasons why the human element is essential and indispensable in the quest for an environmental ethic: (i) the context in which environmental issues are raised is always ultimately a human one; and, (ii) that the beings who wrestle with the issues of the environmental crisis are human beings.

Now Amanda, in Incident Three, clearly envisages that the campers shall suffer the ill effects of her dumping the dead sheep in the stream and that provides a human element of a different sort. But there were no unsuspecting campers in the first two incidents. Indeed, if I were to rewrite the last incident so as to make non-human intruders the object of Amanda’s furious vindictiveness, it would not be at all far-fetched to suppose that no human user was affected by the carcase in the stream. In that case, a number of people may object, how can I consistently insist upon the indispensability of the human element to environmental value judgements and yet assert that a stream might be polluted even though no human user was affected? Surely, the retort might continue, I must grant that it is the indirect or even putative ill effects for actual or possible human users which is decisive. I think not. It is a mistake to suppose that what determines whether or not a stream is polluted are the
adverse implications of the steam's changing chemical composition for human users. It takes little reflection to see that quite a wide range of animal, insect and plant life might suffer harm as a result of the decomposition of the corpse, and that harm will be suffered irrespective of what any humans might suffer in addition. Moreover, the harm suffered by non-human life may constitute a sufficient ground for condemning the pollution which gave rise to it. So far, so good. But the issue is a little trickier than that. Non-human life may, I say, suffer the ill effects of the pollution but, on my assumption about the human element, it is not in a position to judge the harm it suffers to be ill effects. If that value judgement is to be made, it needs to be made by a human (language-using, evaluating) being who might, nevertheless, make it as a kind of moral proxy for the beings who actually suffer the harm. In short, I am arguing that it does not follow from a claim that the human element is essential to environmental ethics, that the rights, interests and welfare of human beings must therefore be the central focus and overriding concern of such an ethic.

Most of my reflections so far have concentrated on the common outcome of the three incidents, all those adverse consequences of a certain episode for a specifiable environment. Let us now examine some of the differences between the incidents, in particular how the outcome in each case came to be. The luckless sheep in Incident One is surely the victim of an unfortunate set of circumstances. It certainly intended neither the fact nor manner of its demise. Nevertheless, there is a sense in which it was responsible for polluting the stream — roughly the sense in which a landslip can be responsible for the lateness of a train. What is meant here is that the presence of the landslip blocking the line causes the train to be delayed, and that, in parallel fashion, the presence of the dead sheep decomposing in the stream causes the water to become polluted. So the sheep's unlucky fate is causally responsible for the stream's being polluted. But it would be absurd to hold the sheep responsible for polluting the stream, and yet that is exactly what we might want to say about both Amanda and the inattentive driver.

The efforts of the guilty driver to remove from the scene any indication of his lapse introduce into my reflections some new elements. For instance, although it remains true that the presence of the dead sheep in the stream is causally
responsible for the ensuing pollution, the driver is in turn responsible for causing the sheep’s death and for causing the physical shifting of the carcase from the roadside into the gully. But that, on its own, simply extends the chain of causes appealed to in explanation of the final outcome. There is, however, a sense in which the driver, unlike the sheep, is not a victim of his circumstances, for he had certain options which he exercised or might have exercised. Grant for a moment that, had his attention to his driving not been below par, he would have avoided hitting the animal and causing its death, i.e. in causing the sheep’s death he is doing something which, had he exercised his options differently (e.g. by being more attentive) he could have avoided. It is even clearer that in heaving the corpse into the gully he is exercising one of a range of options open to him so that, had he chosen differently, the stream would not have become polluted. So his responsibility for the stream’s pollution embraces and goes beyond the causal. Let us describe this by saying he is not just the cause of but also the agent of the sheep’s death and the stream’s pollution.

The driver’s frame of mind should not, however, pass without comment. He was, as we have said, careless in hitting the sheep in the first place. His reaction to the collision was to feel guilty about what he had done, though more, one suspects, out of consideration to the possible reactions of its owner than from any concern for the sheep. He then sought a convenient way of covering up his indiscretion, prompted no doubt by the understandable if morally dubious desire not to be caught in the act. In doing all this his mind may well have been distracted entirely from the further consequences, namely the pollution, of his disposing of the evidence in the way he did. Indeed, it may be that had he thought that far ahead he would have acted differently so as to prevent the pollution occurring. His lack of forethought is nonetheless a moral fault, and hence his responsibility, even if it is of a different order from that of Amanda.

Amanda, in the third incident, is motivated by a measure of malice which cannot but be a serious moral black mark against her. Not only is what she does governed by unruly passion; she also plans her revenge in the knowledge, indeed the expectation, that unpleasantness will ensue. Thus it is with malice and forethought that she brings about the eventual outcome: the pollution of the stream. Now this is not the place to embark upon a full-scale examination of
responsibility, but perhaps I have sufficiently indicated that in investigating how a certain outcome occurs, at least three factors may merit close attention: the causal chain culminating in the outcome; the agency through which the outcome is brought about; and the intention(s) with which the outcome is sought and secured.

The phenomena of agency and intentionality are by no means exclusively human, which means we should be alive to elements of continuity in the behaviour of human and non-human animals, e.g. in the care for and protection of the young. At the same time we have to take care that we do not go to an opposite extreme in seeing analogies between our own behaviour and that of other animals, attributing to the animals in question characteristics which lie less in the flesh than in the beholder’s fond or fearful eye. Let me make the point by caricature. A horse galloping exuberantly across a paddock, might happen to collide with a sheep breaking the sheep’s neck. The horse is clearly causally responsible for and perhaps even the agent of the sheep’s death. Alternatively, if the presence of the sheep in the paddock for some reason frightened or, more likely, enraged the horse it might have attacked the sheep intending to drive it off or even to kill it, in which case it would uncontroversially have been the agent of the sheep’s demise and its behaviour would properly be accounted for on some intentional model. Nonetheless what we cannot imagine, outside the pages of fiction, is a horse taking steps to conceal the results of its negligence or rage. The reason for this is that human beings alone are, in the provisionally exclusive sense already introduced, capable of being moral villains who act from morally discreditable motives, or, for that matter, of being morally virtuous with admirably-intentioned conduct. In short, it is as moral agents whose behaviour may be governed by moral incentives that a further human element proves to be indispensable for environmental ethics.

I end this section by summarising the main conclusions about the human element in environmental ethics to which my reflections about the three incidents have led me. There are four:

— What makes the environmental crisis a crisis is that it is evaluated as such by human beings. They are, as a matter of fact and among other things, language-using evaluators.
An environmental ethic can only be formulated by language-using evaluators and since, provisionally, human beings are nature's sole language-using evaluating species, the quest for an environmental ethic is necessarily a human enterprise.

The environmental crisis is the result of human behaviour. Human beings therefore have a causal responsibility for its occurrence, and changes in patterns of human behaviour are needed if the crisis is to be weathered. Whether, and in what way(s), humans are morally responsible for the crisis, turns on how their agency and intentions are assessed.

To insist upon the centrality of the human element to the quest for an environmental ethic is not thereby to declare the rights, interests and welfare of the human species to be its exclusive focus and overriding concern.

In the following section I develop the theme that the indispensability of the human element in environmental concerns is quite different from anthropocentrism which is in fact rejected by the ethic I favour.

What is an ethic? An ethic, I suggest, is a more or less consciously worked out set of principles which are normative both for what we do in our lives and for what we hope to achieve with them, and which serve as axioms in our efforts to justify what we do and what we strive to be.

Suppose our family agrees to look after, in our home, a relative who is convalescing after major surgery. We seek, and are given, all manner of detailed advice from the hospital on how to keep the person warm but with minimum pressure from blankets; how to ensure adequate personal hygiene without getting the site of the operation wet; how to encourage exercise but without undue strain; and so on. We might even, in a burst of enthusiasm, put a list of rules and instructions on our family notice board in case we should overlook some point. The contents of our list are all specific ways of ensuring that we do not, through ignorance, treat our invalid relative less well than we could, and of ensuring that the process of recovery goes as smoothly and as speedily as possible. But it would be silly to say that the items on our list, such as making the bed properly, are ethical principles. It is nearer the truth to say that they rest on certain ethical principles,
such as the desirability of preventing avoidable suffering and of promoting health and welfare. An ethic, then, is concerned with formulating principles which, because they are guiding principles and not detailed prescriptions for specific situations, are typically expressed in abstract or general terms which typically set out what is fundamental to our important undertakings.

An ethic, to be what it is, involves formulating principles which are normative for behaviour. But only a being of a certain sort can formulate action-guiding principles. The requisite sort of being would need, for instance, to be able to abstract and/or generalise, to be self-conscious, to be able to reflect, to be competent in the use of a sophisticated language and associated network of concepts, to be capable of free choice, and more. In other words, the formulation of an ethic presupposes a highly developed complex of capacities, rational and conative, such that there is a prima facie case for saying that, among known animals, only the human animal is of this sort. Human animals, then, are alone (so far as we know — that qualification has constantly to be added; but since it is a constant I propose to take it as read from here on) what I shall call ethical beings, i.e. beings able to construct an ethical framework within which they more or less direct their own behaviour in accordance with more or less self-imposed rules.

For an ethic thus outlined to be possible, an ethical being must exhibit a certain sort of intellectual detachment from its environment, its total surroundings. By this I mean that it be able to conceive of itself as distinct from and set over against that environment, to envisage the possibility of its environment being other than what it at present is, and to think of its own activities as sufficient in a significant range of cases to cause the world to become as it was envisaged it might be. But if any being, human or otherwise, is to give normative direction to its behaviour, its intellectual detachment from its environment must be matched by a species of pragmatic detachment too. If, to be more precise, an ethical being is to be a moral agent, if, that is, a being is not only to formulate and assent to certain principles but also to put them into practice, then it must have the kind of practical freedom which enables it to exercise its options, as I earlier put it, to act upon its environment in a causally efficacious manner.

That human beings possess the two-dimensional
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detachment from their surroundings just described does not conflict with their being members of the natural order. Nevertheless they do make necessary the idea that, in certain respects which make an ethic what it is, the human animal is set apart over against its environment. In this sense, namely that human beings are the only (known, though not the only possible) ethical animals, that they alone are capable of forming an ethic, that they alone are moral agents, any ethic is in the nature of the case a human ethic.

If any ethic is in the nature of the case a human ethic, it is tempting to ask whether there are, for that reason, any features which all ethics must share. I do not think it is possible to answer that question conclusively, but there is a strong case for supposing that certain principles and values will be typically present in any ethic. For instance, any ethic must respect the freedom of the individual in some significant measure, both as a prerequisite of personal responsibility for one's behaviour and as an indispensable foundation for ethic construction. Again, there is little point — but not no point — in trying to formulate an ethic exclusively orientated around some one person's aspirations in isolation from all others. An ethic normally has a social and inter-personal rationale, and so the enhancing of social intercourse by the promotion of mutual trust, security, reliability, stability, etc. would also seem to be fundamental. Similarly, promotion of the value of (human) life, the pursuit of excellence, and the claims of distributive justice might all be expected to figure in all ordinary circumstances. What significance, then, are we entitled to attach to that observation?

The superficially attractive answer is that the presence of these features has the effect of making human beings the prime if not the sole objects of moral concern. The life whose sanctity is zealously preserved is human life; the equals among whom the burdens and benefits of social justice are distributed are human equals; and so forth. That will not do, however. For we must insist upon the distinction between those for whom the relevant principles are normative and those who benefit from behaviour's being conformed to the principles. Ethical principles touching the value of life, the pursuit of goodness, the desirability of equitable distributions, and the rest, are indeed normative only for ethical beings which, for all practical purposes, means human beings. But there is no reason why human beings, in conforming their behaviour to these principles, should do
so solely with human benefit in view.

The distinction I have drawn between being a moral agent/ethical animal and being the beneficiary of the behaviour of an ethical animal/moral agent is confirmed if we make a brief foray into the sphere of rights. Here I simply want to suggest that the basic rights of an ethic are co-ordinate with its basic normative principles and values. So if we take as basic norms respect for the sanctity of life, pursuit of happiness, equitable distribution, and the like, we will tend to have a set of basic rights comprising a right to life, to happiness, to equal opportunity, to free speech, to personal liberty, and so forth.

Now such rights belong to a framework of social justice which has to be explicated and defended in terms of ethical beings/moral agents. For instance, one well-known prop of the notion of a just social system is the prudential/self-interested recognition of a need to get along with others if one is to live at all or at least to live well. Again, awareness of and/or respect for the dignity, the intrinsic value, of other human beings favours egalitarianism as a matter of policy. Or again, we may rely on empathy, attempt compassionately to identify with and thus understand predicaments in which human beings typically find themselves. Or once more, we may appeal to what is conducive to the greatest good or happiness of the greatest number.

The pattern is, I suggest, similar. The factors which seem at first to favour the human species turn out, on inspection, to be indefinitely malleable. In respecting the intrinsic value of human beings we are not debarred from respecting the value of non-human forms of life. If empathetic identification with humans is helpful in setting moral parameters, so too might be analogous empathetic overtures in respect of non-humans. In seeking the greatest good for the greatest number, we are bound to consider other humans but once again are not thereby debarred from also taking cognizance of other than humans. Interestingly, the factor which lends itself least favourably to the process of moral extrapolation here envisaged is the prudential one. Humans recognise, or can recognise, a need to get along with non-human populations in the environment if they are to live well or at all, but it makes little sense to suppose such recognition to be mutual. If whales were systematically to thwart human purposes by, for instance, disrupting the operations of fishing fleets, then we might have a prudential reason for revising the way we
take account of the needs of whales in organising human affairs. But that kind of pressure is rarely if ever put upon us by the non-human denizens of the globe. The provisional conclusion I draw, then, is that it may well be prudential rather than moral considerations which have a built-in human bias. Nor is that surprising, for it is doubt about the adequacy of merely prudential concerns to assist us in finding solutions to the less tractable problems of the environmental crisis which led in part to the quest for an environmental ethic in the first place.

An environmental ethic is, in virtue of being an ethic, as much a human construction as any other ethic, even if that is a claim at which some ecological activists might, at first, baulk. The environmentalist may object that such a claim arrogates to the human species an indefensible position of privilege — that the claim is, in Ryder’s coinage, speciesist. The objection is, however, mistaken. ‘Speciesist’ is a term, modelled on ‘racist’ and ‘sexist’, used to indicate prejudice between species, giving the interests of one species unjustified preference over those of others. ‘Anthropocentrism’, the term used in my discussion, can be thought of as a specific form of speciesism, that which elevates the interests of the human over those of a non-human species. In what follows I use anthropocentrism to describe any of a whole family of views which accord humanity a considered pre-eminence in the natural order.

Many of the classical Western philosophical conceptions of the world and of humanity’s place in it ascribe to human beings a primacy in nature which connotes at once superiority and control. Aristotle, for instance, ranges all living beings in a hierarchy. Each new step up in the hierarchy is marked not only by increased complexity of function and hence by a superior nature but also by a greater value. Beings higher up the hierarchy typically use their inferiors as means to their own ends — sheer survival in the case of food chains — a state of affairs Aristotle commends as at once natural and just. Man stands on his hind legs at the apex of the hierarchy, at least insofar as it exists terrestrially, a position signalled by his possession and use of rationality, that element in his nature most closely akin to the divine nature of the gods. Aristotle’s view was not an aberrant opinion but represented the intellectual norm. His predecessor, Plato, stressed the importance of proper care of the soul and hence his tendency to deprecate the world of the senses as having an at best
derived value, has a similar outcome, as does the veneration of the Stoics in later antiquity for the divine spark of reason in man.

What we may think of as the classical pagan estimate of man has its counterpart in the Christian West. Man has, in the biblical idiom, been given dominion over creation, a revealed insight Aquinas is happy to accommodate within a hierarchalism as rigid as its Aristotelian inspiration. Even the uneasily less-than-orthodox rational structures of a Descartes or of a Spinoza pose no problems in this regard. Human pre-eminence is, in virtue of our rationality, assured within the natural or created order. The environment — the non-human world in its entirety — has a merely instrumental value. Nature is there to be used by human beings as they see fit. There can be no moral requirement to respect the environment for its own sake, for the rationale of its existence is a man-centred one. This set of views is readily strengthened and confirmed by that notion of our practical freedom which construes human beings as relatively independent of their environment and, to that extent, set over against it. The emphasis which inevitably emerges is one which gives pride of place to humans as technicians, as manipulators and controllers of their environment. Marxian insistence upon the fundamental importance of human productive activities is a recent familiar and influential view within the same general tradition.

Over the centuries we have tended to conceptualise the environment as a complex set of resources, or better still opportunities, for humans to explore and make use of in promoting our own ends. Some, at least, of these resources are not inexhaustible, and so prudence counsels wise use. Since we are rational creatures, various prudential constraints operate to delimit the extent to which we might properly and profitably pursue the satisfaction of our wants and needs. We are today aware, as never before, of the irrationality of excessive consumption, non-optimal distribution, pollution, etc. Relatively quick and easy gains in terms of profits, employment, urban or rural development and so forth must therefore be balanced in a sophisticated calculation of costs and benefits so that long term considerations carry due weight alongside their usually more evident short term counterparts.

To the practical wisdom of prudential calculation, weighty as that is, may well be added one or more moral dimensions. For instance, almost any human use of the environment
invariably has an impact on other human users, actual or potential. At times the repercussions may be trivial or minimal, but where they seriously impinge on the wellbeing of others a distinctively moral consideration enters our deliberations. Nor have moral constraints been experienced solely in our dealings with other humans. In this respect too anthropocentrism has probably only rarely been held in a pure or extreme form. It is typically tempered by further moral constraints.

The moral theologian may assert categorically that dominion over creation is the prerogative of humanity alone, and may as firmly conjoin with that assertion an insistence that such a grant is not the deity’s sanction for unlimited exploitative opportunism but a trust to be discharged as a sensible and sensitive steward who is ultimately accountable to a divine auditor. Again, the moralist — religious or secular — may urge that the uses we make of our environment are themselves often morally as telling and revealing of the moral character of the users as is their behaviour to other humans. Thus clear-felling may, in appropriate circumstances, be evidence of lack of consideration or lack of foresight and co-operation or waste or self-indulgent destruction and the like — all moral black marks for the perpetrator. Similarly, flogging or overworking or starving a horse or a dog may, prudential costs aside, as clearly exhibit such morally vicious traits of character as cruelty, sadism and wanton infliction of suffering as do starving or overworking or flogging a human being, especially if that human being is dependent for its welfare on the good will of the perpetrator in a way analogous to that in which the non-human would normally be.

It has been a feature of discussion of environmental ethics in the last decade or so to challenge and reject anthropocentrism, notwithstanding its moral and prudential modifications. In the process, considerable attention has been given to the interdependence of humanity and its environment. This has acted as a much needed corrective to a centuries-long tendency to ascribe to humans an independence of their surroundings which far exceeds what is warranted by the intellectual and pragmatic detachment already granted. The rejection of anthropocentrism and the insistence that a proper account of human nature cannot be given independently of that environment has led, however, to more problematic claims. In particular that mankind is not the sole source of values in the world, and that the value
of non-human entities may, at times, be overriding. An environmental ethic, it is further suggested, will take the continued stability of the biosphere as its ultimate value so that human and non-human entities and processes will alike have value to the extent to which they contribute to that ultimate value. Now this approach to environmental ethics, attractive as are some of its features, seems to me to be mistaken for, ironically, much the same reason that anthropocentrism is mistaken. In both cases the human element is misunderstood. Anthropocentrism correctly recognises that humans alone are evaluators but invalidly infers that the non-human is therefore of purely instrumental worth, to be valued providing there is a human pay-off somewhere down the line. The anti-anthropocentrism described above correctly recognises that much which is non-human can and does have other than instrumental worth and that the promotion and protection of that worth may at times take precedence over at least some human benefits. But it is in danger of glossing over the fact that the judgements of precedence are always human judgements which give expression to principles normative for human behaviour as agents of change. An environmental ethic is, as we have seen, unavoidably human, but that does not commit us to the view that humans are or ought to be the sole beneficiaries of behaviour which accords with the basic tenets of such an ethic.

The environmental crisis might, following John Passmore, be characterised in terms of a set of problems which occur 'as a practical consequence of man's dealings with nature'. How, then, has this crisis come about? As we learned from the incidents involving the polluted stream, such 'how?' questions are implicitly multi-dimensional; and our answer will need to look to causal, agency and intentional components. I take it that it is evident that the environmental crisis is a set of problems of human making. We are, as a species, causally responsible for the ecological stew in which we find ourselves. The 'greenhouse effect', for instance, is a long term consequence of the invention of the internal combustion engine. More importantly, we humans are the agents of the crisis, by which I mean, building on the conclusions we reached in our first reflections, that if we, our contemporaries and our forbears, had exercised or were to exercise our options differently, then many of our present problems would not have existed or would have been much
That the element of human agency is indispensable in explaining how the environmental crisis has come about is confirmed by the following consideration. No organism, or species of organism, can properly be viewed as a kind of biotic atom existing self-sufficient, in splendid isolation from the natural system with which it interacts. And so there is no reason to assign to the human species a position of privilege in relation to other organisms with which it co-exists, however reluctantly. As mutual participants in an ecosystem, or set of ecosystems, the life of each complexly conditions and is conditioned by the life of all. Over and above this shared status within the system, however, we must ascribe to human organisms a capacity, of which we have taken preliminary note, which is either different in kind or at the very least substantially different in degree from the capacities of other organisms known to us. The human capacity to modify the environment, whose significance has been acknowledged by thinkers as diverse as Aristotle and Marx in cultures as alien to one another as classical Greece and industrial Europe, has achieved its most recent expression in a technology of formidable power and sophistication. And it might fairly be thought of as occupying the potentially uncomfortable role of at once grounding the human species’ biological success and also constituting a palpable threat to our continued survival.

That humans are able to modify their environment to an extent, or in ways which are not matched by other animals, and have exercised that capacity energetically, seems to me sufficient reason for seeing humans as the agents of the environmental crisis. Of course, more specific responses abound, though none commands universal assent. The population explosion, industrialisation, technological innovation, prevailing capitalist politico-economic structures, increased demands for food and consumer goods, the affluence of the developed world, accelerating growth rates of all kinds, these and other factors have been cited in whole or partial explanation. It is not for me to adjudicate between the competing claims, nor is such adjudication strictly necessary, for all these considerations derive their explanatory force from a common source: human efforts to adapt the world to how it is envisaged it ought to be.

The intentions with which this outcome has been secured, and in some cases sought, are widely varied. Within that
diversity, however, we may discern, no doubt oversimplifying but perhaps without otherwise distorting the matter, a few central trends. A great deal has been undertaken with the intention of bettering humanity's lot, and very often problems have accrued in the form of considerations which could not reasonably have been foreseen. The goal of improving the human condition is, it almost goes without saying, of central moral concern and, as such, entirely admirable. Nevertheless, it has, until recently, seldom occurred to anyone to wonder whether that concern is justifiably limited to the human beneficiary. This in turn is probably due to the fact that as a consequence of their anthropocentrism most prevailing world views, especially in the West, have, as we have noted, ascribed the non-human an instrumental value. Moreover, insofar as anthropocentrism encourages the unjustified preference of human over non-human interests it condones a form of exploitation, by which I mean the furtherance of one's own (in this case human) welfare at the expense of others. Too many human enterprises have been exploitative of the environment in more direct ways. Colonial and industrial expansion, for instance, have exhibited in full measure the human, all-too-human, faults of opportunism, mismanagement, lack of sensitivity and forethought, inordinate desire for wealth or power or prestige etc. The remedy is a distinctively human responsibility. Given the centrality of the human fault and the human responsibility, an environmental ethic must, I believe, be what I term an ethic of environmental responsibility. It will be a thoroughly human ethic, i.e. it will be formulated by humans espousing principles normative for human behaviour; it will be critical of human fault, prudential and moral, in determining responsibility for the environmental crisis, and alert to the danger of anthropocentric bias. But will it, for all that, seriously unseat the notion of human supremacy which anthropocentrism implicitly assumes or explicitly espouses? That is the final question I shall address in this essay.

I concluded my introduction by pointing out that the quest for an environmental ethic was itself a matter of controversy and that the protagonists could be divided roughly into what I shall now call extrapolationists and radicals. The latter see environmental ethics as requiring a radically innovative set of norms which are derived from environmental concerns and values, while the former construe the undertaking as one of extrapolating from, or applying more carefully, established
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theories and principles to the particular preoccupations of the environmentalist. I also said I tended to favour the extrapolationist, warning that the distinction was, however, misleading. Let me now say why.

One of the main complaints of radicals about any form of ethical extrapolationism was that it is, in principle, speciesist or anthropocentric. I have conceded that, as a matter of history, the Western intellectual tradition has been predominantly anthropocentric, but I have argued that one can properly insist upon the indispensability of the human element in an environmental ethic without being committed to the anthropocentric principle.

Suppose my rebuttal of anthropocentrism is accepted, thus far, by the radical. He or she might still remain unconvinced that I am not, perhaps even unknowingly, espousing a kind of de facto anthropocentrism. Look at it this way. Because I have been preoccupied with the problems of practice, my reflections have centred on ways in which human beings take the initiative, so to speak, both in acting and in pondering their behaviour. This is not surprising, for I have urged that the qualities in virtue of which we have a certain intellectual and pragmatic detachment from our environment are, provisionally, exclusive to our species and hence make us importantly different from other things in nature. And we captured this by describing human animals as ethical beings and moral agents. Now the qualities and capacities in virtue of which we are ethical beings and moral agents are central to what make humans valuable and hence objects of moral concern. Since non-humans do not possess these qualities, then, unless they are endowed with compensating qualities of comparable weightiness, it would seem that in any conflict between humans and non-humans the value of the ethical being would have to take precedence over that of the non-human, giving us de facto the very preference for humanity that anthropocentrism had asserted as a matter of principle.

Up to a point the argument is sound. To acknowledge that the human species has at times quite arbitrarily set its own welfare ahead of that of, for instance, non-human species is not to deny that we may sometimes, perhaps frequently, have perfectly good (i.e. non-arbitrary) reasons for such comparative judgements. For example, I am in the cab of a runaway train approaching a Y-junction where the only option open to me is whether I take the left or right hand fork. I know that a short distance along one fork an ordinary adult
human being has got a foot trapped while crossing the line. Down the other track, an ordinary adult cow has got a hoof trapped while crossing the line. Either will be killed or badly hurt if I take their fork. Then, however much I might wish further options (such as an emergency brake) were available to me, there is no doubt that I would and should steer onto the track on which the non-human entity is trapped. So in a straightforward choice between a standard specimen of the human and a standard specimen of the bovine (equine, canine, feline...) species preference would standardly be given, in the West at least, to the human; and I think that preference would hold even if the cow (horse, dog, cat...) were the last known member of its species.

But choices, even of the simplified either/or kind engineered here, do not remain straightforward for long. Thus, if my options lie between killing the cow and giving an unsuspecting snoozing tramper a hell of fright by zooming past 6 inches away, my preference ought to favour the cow. But if I have to choose between taking the life of a derelict alcoholic who has just collapsed on the line in the final throes of pneumonia and, say, an escaped panda; or between a demented multiple rapist and the highly decorated police dog in his pursuit; and so on, the business gets harder, not least because the mere fact that an animal is human does not, on its own, seem especially decisive. What makes a human animal valuable are various qualities and competences, not mere membership of a particular species, which is one reason why the precise scientific account, i.e. the genetic account, of what marks off a life as a human life is, morally, beside the point. Nonetheless, those qualities and competences are not possessed equally and uniformly by the species. In extreme cases we can see that individuals in a coma or insane, or embryos or infants, are clearly not ethical beings/moral agents in the sense we have defined and so are not valued for those qualities, but it does not follow that they are not valued, as we shall see in a moment. Finally, in this connection, consider the phenomenon of self-sacrifice. I might, as a moral agent, risk my wellbeing, even my life, to rescue a child trapped in a fire or stranded up a tree — and so might I to rescue a cat. Similarly, it is well known that humans, not least in situations of privation and hardship such as imprisonment or war, may willingly share the most meagre sustenance with similarly afflicted non-humans. In short, there is, de facto, nothing strange in the idea that human agents
at times ought to and do in fact act in ways which give the interests of non-human individuals parity with or precedence over those of humans, not least those who are uncontrovertially human agents.

At this juncture it may be timely to put my so-called radicals themselves to the question. The way in which radicals endeavour to establish ecological values — and there is no disputing the difficulty of the task — is, ultimately, by appeal to what Graeme Scott has helpfully called the moral commonsense of the ecologically informed person. Now the significance of such an appeal is not just that it tacitly asserts the indispensability of the human element to the establishment of a system of ecological values; an extrapolationist would agree with them that such an appeal is basic. What it also does is to indicate how the line of demarcation between extrapolationist and radical is, at a crucial point, misleading. I believe that all of us who accept environmental ethics to be a viable and important undertaking are, indeed have to be, extrapolationists simply because of what, I have argued, an environmental ethic — any environmental ethic — is. In which case the real dispute concerns how much the scales are or ought to be weighted in favour of human agents when their interests conflict with those of non-human entities.

A radical solution — it may be helpful to retain the epithet ‘radical’ though understood as designating not an alternative to but one particular sort of extrapolationist view — to this very acute problem may be motivated in part by a sensible suspicion that even an initially reasonable de facto preference for humanity over the non-human is likely to be abused and to degenerate into a disguised speciesism which lacks justification. Whether or not that is the case, what I call the radical solution endeavours to accommodate commonsense judgements, such as those generated by the runaway train device, to the effect that the human does not necessarily have to take precedence by affirming that our conception of the moral constituency is too narrow, that (non-human) animals have rights, that a significant range of non-human entities may properly be thought of as ethical beings with appropriate moral claims upon us. But such a solution seems to me to be mistaken mainly because, although it correctly emphasises the common lot of human and non-human in the biotic community, it minimises or even glosses over that complex of qualities and competences I have argued
constitute the distinctive endowment of humanity.

Now if the sole choice were between some form of anthropocentrism and what I have called the radical solution, perhaps the latter might, with some misgivings, be chosen. There are, however, non-radical solutions, i.e. there are views which preserve the provisional exclusiveness of humans as ethical beings and moral agents but without committing those who hold them to anthropocentrism either in principle or de facto. Moreover, the exploration of such non-radical views requires some substantially innovative work of the ethical theorist, and that is my second reason for believing the line of demarcation between extrapolationist and radical to be misleading. The challenges facing the development of a satisfying environmental ethic, what I earlier styled an ethic of environmental responsibility, will, if they are to be met, require us not only to extrapolate from established ethical positions but also to modify them in the light of what we learn from studying environmental ethics.

I cannot foresee in any detail what the findings of such innovative explorations might be, but I conclude with a broad indication of what the nature and importance of the innovation might be. I have already remarked that preoccupation with problems of practice centred my reflections on ways in which human beings take the initiative, and hence on our nature as ethical beings/moral agents. But to speak of a preoccupation is to imply that something is being missed out, given insufficient attention, and the neglected element can be brought out thus. Moral agents perform moral actions but it by no means follows that the performing agents are the beneficiaries of those actions. The beneficiaries of moral actions are simply those whose welfare is favourably or adversely affected by the performances and who may therefore be thought of as the patients of moral action. The agent or performer is on the giving end, as it were, and the patient on the receiving end. So the kind of non-radical alternative in which I am interested does not proceed by urging us to guard against too narrow a conception of ethical being/moral agent — that was how I characterised the radical solution — but against too narrow a conception of moral patient.

It is obvious that the very existence of moral agents implies that of moral patients, and yet moral philosophers have devoted almost no space in their writings to the latter. The probable explanation is that human beings in general move
through the roles of agent and patient interchangeably, i.e. there is nothing new to say about being a moral patient once it is grasped that it is the converse of being a moral agent. But if that involves the assumption that only moral agents can be moral patients, then such an assumption must be rejected because, presumably on account of anthropocentric bias, it overlooks an important asymmetry between agents and patients. If, for instance, I reveal that there were unsuspecting campers who fell victim to the pollution in Incident One of my first reflections, they might well be thought of as patients — sufferers if you like — in a situation in which there is no moral agent at all. Again, it may sometimes be that a moral agent acts in situations where there is no (other) patient at all, e.g. where his or her own self-improvement in some respect is, if that is possible, all that is at stake. More importantly for present purposes, we have already established that the interests or welfare of non-humans may be affected for good or ill by human action; and so non-humans may become moral patients without being moral agents. In short, although it is true that all moral agents are moral patients, it does not follow that all moral patients are, even potentially, moral agents.

These, I trust basically obvious and acceptable points, have far-reaching implications. We have in recent years been made aware that very young or very senile or very sick human beings may be totally unable, for various reasons, to function for the time being, if ever again, as moral agents/ethical beings. That fact — strictly, set of facts — has contributed to certain dilemmas in medical ethics for, on the one hand, a human being unable to function as a moral agent may, in a real life equivalent of our either/or runaway train device, be given a lesser value than a normally functioning moral agent and yet, on the other hand, we are loath to accept that the extremely young, senile or sick count for nothing morally. Appeal to potential either for growth into or for recovery of moral agent status carries some weight but rings somewhat desperately hollow in the case of, say, certain defective neonates or humans in irreversible coma. What we need to do, I suggest, is to remind ourselves that not having the status of moral agent, whether temporarily or permanently, does not necessarily mean having no moral status at all. We may have the status of moral patient.

We are clearly most familiar with the notion of a patient in a medical context, but we should not lose sight of the
fact that we live in a society in which we put ourselves (or sometimes are put by others) into the hands of a whole army of experts and specialists of one kind or another, of whom the medical expert is but one. One feature shared by such situations is that we are, in one or more respects and to a greater or lesser extent, dependent on the knowledge and goodwill of the expert for our continued welfare. As patients we are, in a certain sense, victims of our circumstances in that we lack the knowledge, skills, health, strength, money, power or whatever that enable us to act as agents of our own welfare. But as our morals have grown more sophisticated we have come to recognise that to be a patient is not to forfeit but to reinforce or even to acquire moral significance. Efforts to develop codes of professional ethics afford one piece of tangible evidence of principles normative for the behaviour of certain moral agents being developed with the standpoint of the moral patient primarily in view.

The phenomenon is, however, much more deeply rooted in moral practice than reference to codes of professional ethics alone would suggest. Human infants, children and adolescents all display varying kinds and degrees of helplessness and dependence and, by way of response, we have a whole moral network — often not very precisely defined — of parental responsibilities and duties; i.e. of action-guiding principles normative for the behaviour of parents but whose inspiration, as it were, is the patient of that behaviour. So the extrapolation I am proposing, and it is implicit in a number of the examples discussed throughout this essay, is that we develop our sensitivity to the myriad ways in which non-human life forms, by analogy initially with the human situations to which I have just drawn attention, have the status of being moral patient and thus generate normative principles which are distinctively environmental in character. Looking at the relationship between humanity and the environment from the point of view of the patient may be helpful in other ways too. The perspective of the moral agent is inevitably individualistic, and the development of morality has typically been with a view to guiding the behaviour of the individual. But that perspective has certain limitations, particularly with regard to collective action, and perhaps that is one reason why thinkers have been uneasy about the relevance of moral standards to political practice. The point of view of the patient would also invite much closer attention to the ways in which humans and non-humans alike are, for good or ill, affected.
by the changes following in the wake of the massive industrialisation, urbanisation etc. of the 19th and 20th century world.

If the environmental crisis is to be weathered humans must change. Changes in behaviour need to be guided, I have argued, by developing an ethic of environmental responsibility which, provisionally, places on humans alone, singly and collectively, the onus of creating more satisfactory policies in organising our place and activities in the environment of which we are, after all, an integral part. And I have suggested that fruitful further exploration may come from considering the ways in which humans and non-humans alike are patients of the human element.

Bibliography


Environment and Ethics — a New Zealand Contribution

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An Ethic for Nature

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Editorial Note

Graeme Scott asserts that nature has an intrinsic value aside from any instrumental value to humans. He acknowledges two scales of value - a scale of human values and a scale of nature's values. The latter is established from observation of nature in its wild state without human intervention. Intrinsic value is located in the proper functioning of the biosphere.

How can the two scales be reconciled? He maps out areas of conflict and discusses examples accordingly. He criticizes the new ethicists who see only the scale of nature's valuations without acknowledging two sets of values. The model he advances provides a basis for resolving the necessary tasks as identified in the Conservation Strategy.

A question for Graeme Scott's distinction between human values and nature's values, arises if mankind is a part of nature as well as separate from nature. Some questions arose for John Morton's scheme about what is a natural value — does
it require a human judgement, perhaps even a moral judgement? What is it about the proper functioning of the biosphere that is intrinsically valuable? Could the biosphere function in quite radically different kinds of ways?

Parkin and Scott use different approaches and emphases, to come to positions that, while different in theory, in practice may be not too far apart. Both accord the significance of the human enterprise, both acknowledge the need for environmental protection, both present a move away from the development model of economic growth.

Graeme Scott asserts intrinsic value in nature (the proper functioning of the biosphere) irrespective of humanity, and hence the existence of two, at times competing, scales of value. This leads to a procedure for resolving conflict between them.

Chris Parkin's model argues that the human moral agent individually and collectively is subject to genuine and effective moral constraints, founded upon the value of the moral patients. These moral patients may not in fact even be capable of acting as moral agents.

Chris Parkin's model has an emphasis on individual as opposed to collective responsibility, while Graeme Scott emphasises the biosphere as an ecological whole.
Introduction

The ultimate source of all the natural resources on which human societies run is the environment. We harvest resources from the environment, process them, use them and finally return them to the environment as waste. Developed societies have evolved a pattern of resource use that involves high levels of resource consumption per person, and correspondingly high levels of harvesting and waste production. The sheer scale of environmental modifications now undertaken on behalf of our quest for material wellbeing raises moral questions about humankind’s relationship with the global environment.

In particular, we are faced with accumulating consequences of human use of nature. There is widespread agreement that our dealings with the total non-human living world ought to be characterised by greater restraint. From an ethical viewpoint, a need for restraint implies a need for an underlying moral theory for nature that is capable of distinguishing between acceptable and unacceptable human actions on the grounds of their consequences for nature.

The need for this paper arose out of my first essay in this volume, which was an attempt to explore the ethical implications of pollution. It was possible in that paper to make some progress, in a normative sense, with the application of accepted ethical principles to specific examples of pollution that caused consequences for people — both present and future. It was not possible to consider the ethical implications of consequences that fell primarily on parts of nature. The reason for this, quite simply, is that there is no accepted body of ethical principles that provides adequate tools for this moral task. There are viewpoints within

\[ \text{The great fault of all ethics hitherto has been that they believed themselves to deal only with the relation of man to man.} \]
\[ \text{Albert Schweitzer.} \]
moral philosophy, of course, about what human responsibility for nature is, or ought to be, but they disagree quite sharply with each other. In my view, these existing ethical theories are also at variance with what I will call a reflective ecological morality — the moral commonsense of the ecologically informed person. The problem being addressed here, therefore, is not what the field of ethics prescribes about human responsibilities for nature, but rather what form an acceptable ethic, capable of providing those prescriptions, ought to take.

This essay, therefore, will examine the strengths and weaknesses of existing moral theories that encompass human responsibility for nature. Three prominent ethical theories will be introduced, those of moral stewardship, extended social contract theory and the 'new ethic'. I will argue that, when the prescriptions provided by each of these is compared with a clear statement of the nature of the problem to be solved (by means of the moral commonsense of the ecologically informed person), none provide an acceptable basis for proceeding. Having found none to be acceptable, I will take the liberty of suggesting a way out of the current dilemma.

I should make it clear at the outset that I am not concerned in this essay with selecting an ethic for nature on the basis of the philosophical credentials of the theories on offer. I am more concerned with the criterion of performance, i.e. which looks most likely to do the job that needs to be done. Equally, I will not be concerned with questions of ultimate rationale — whether we seek to preserve nature for the sake of nature alone or whether our purpose primarily is to secure maximum benefit for present and future people. This latter question is philosophically interesting, but not significant in practice I believe. The reality of our situation is that the preservation of nature — for whatever ultimate purpose — requires human restraint for which some underlying moral theory is required. The inability of present ethical theories to provide an adequate set of prescriptions governing human relationships with nature is a significant failing. I agree with John Passmore¹ when he suggests that the resolution of this failure is, "the most important task which lies ahead of philosophy."

¹ Much of the current debate about the ethical implications of human use of nature seems to be based upon value
judgements. While there is widespread agreement that
greater restraint is required, there is no agreement about
specifically what form that restraint ought to take. In other
words, those who propose or reject various moral theories
as a basis for an environmental ethic, often appear to do
so on grounds stemming from a set of personal beliefs about
the nature of the problem to be solved. Thus one ethicist,
whose central belief is that all living species should be
protected from extinction, sets out to establish a moral theory
capable of justifying that conclusion. Another, proceeding
from a deeply felt concern about human treatment of animals,
proposes an ethic giving pre-eminence to the avoidance of
animal suffering. An ethic of the first kind will prevent us
from modifying the last remaining habitat of the Castle Hill
*Ranunculus* but will permit the ‘processing’ of live meat
chickens by spraying with boiling water. An ethic of the second
kind will defend the chickens and abandon the *Ranunculus*.

Central to this essay is my view that an effective
environmental ethic must be built upon an objective
statement of the problem that requires moral solution. Such
a statement can only be obtained through the discipline of
ecology. From an ecological perspective, the central task of
an ethic for nature is to provide a kind of moral restraint
that substitutes adequately for the ecological restraint from
which technology has freed Western culture. Any species has
a demand for resources that is potentially infinite, as Charles
Darwin\(^2\) pointed out. Within natural systems individual
species are restrained by ecological controlling mechanisms,
to levels of demand that are tolerable by the system as a
whole. The evolution of human culture, from tool-using hunter-
gatherer to modern information-using industrial state, has
proceeded by a series of innovations, each of which has
increased human capacity to harvest resources or to avoid
being harvested as a resource by predators or pathogens.
Each innovation has reduced ecological restraints upon both
the size of the human population and the pursuit of human
wellbeing. The nature of the environmental problem,
therefore, is fundamentally ecological in nature. It arises out
of the unique ecological situation of the human species, and
its major manifestations are disruptions to ecological systems
and ecological processes on a global scale.

The key problems that must be addressed by an
environmental ethic, therefore, are those that were identified
by the World Conservation Strategy\(^3\). The conclusions of the
IUCN/Unep/World Wildlife Fund study of the impacts of human activities on nature are regarded as being soundly based minimal requirements for restraint. Therefore they represent the kind of prescriptions that an effective environmental ethic ought to provide, or at very least, to endorse. The three major prescriptions of the World Conservation Strategy are as follows:

— *Maintain essential ecological processes and life-support systems.* Human activities are eroding the capacity of natural systems to contribute to their own self-maintenance — loss of pollinating organisms, disruption to soil formation and maintenance, erosion of the biosphere’s capacity for biological work.

— *Preserve genetic diversity.* Modification of natural habitats is resulting in the loss of ecotypes, varieties and whole species of organisms. The capacity of the living world to respond by evolutionary development to future changes in climate or situation is being lost.

— *Utilise species and ecosystems sustainably.* Biological resources should be used in such a way that they retain their capacity to renew themselves. Both their ecological and their human values are thereby maintained for future benefits.

Before proceeding with a more detailed analysis of existing ethical theories about nature, it is possible to set down on the basis of this discussion the characteristics of an effective ethic for nature. First, it must provide greater restraint upon human use of nature than has hitherto been the case. Second, it must be consequentialist in that it must base prescribed restraints upon the ecological consequences of actions. Third, it must be holistic in the sense that it must take a system view, or even a global view, of likely consequences. And finally, it must recognise important ecological processes such as those contributing to self-maintenance, self-renewal and the capacity for continued evolutionary development. In short, an effective ethic for nature must be as much an offspring of ecology as it is an offspring of philosophy.

Relationships between present people and future people, and between humans and non-human species, both pose severe tests for conventional ethical theories. Robin Attfield suggests that this deficiency in contemporary ethics arises out of what he calls the 'asymmetry of power problem'. Ethical
systems place limitations upon our individual freedom of action for the sake of 'other agents' to whom we, as a society, acknowledge responsibility. According to Attfield, ethics has arisen because people who are contemporary and who are therefore approximately equal in their power — their strengths and vulnerabilities — have a vested interest in mutual restraint. Morality has evolved as a kind of self-defence available to all. Because future people and non-human species cannot influence the wellbeing of present people, their interests have not been in the forefront of the development of moral theory. Present theories have arisen largely out of concern with the conditions necessary to optimise human well being within our co-operative social systems. In other words, they are concerned primarily with social contract theory.

Within the current field of moral philosophy there are three quite different ethical stances with respect to human responsibilities for nature. The first is the traditional view of 'stewardship', which I will examine and reject as fundamentally inadequate. The second and third are both attempts to overcome the limitations that have become apparent in the morality of stewardship. The first alternative, which retains existing social contract theories intact, extends human obligation to have regard for the consequences of actions for others to include parts of nature. Nature may be held to have 'moral standing' by virtue of being both 'morally considerable' and 'morally significant'. I will examine this extended social contract theory approach and reject it as being unable to resolve ecological problems above the level of the individual non-human organism. Which leaves the third viewpoint.

The third approach to the task of formulating an environmental ethic is more radical. It is based upon the firm belief that human-centred ethical systems exclude any effective environmental morality by their very nature. Therefore, it is necessary, as Richard Routley suggests, to develop a new ethic on a non-traditional basis. The 'non-traditional basis' of the radical environmental ethicists is essentially that of perspectives gained from the discipline of biology in general, or of ecology. In effect, this involves reflecting nature's rules inward upon humankind, leading to an ethic based upon ecological prescriptions. Richard Routley sums up the difference between extended social contract theory and what I am calling the new ethic when
he suggests that the former leads to an ethic 'about' nature and the latter an ethic 'for' nature.

The new ethicists are a minority group among moral philosophers. They appear not to have attracted widespread support from their colleagues, probably for three reasons. The first is that they abandon much that is dear to the conventional ethicist, like the pre-eminence of the notion of human rights. The second is that their approach cannot be pursued to any great depth without encountering logical problems that are as yet unresolved. The third is that many ethicists hold that existing tools are capable of doing the job that needs to be done, anyway. However, given the nature of the problem to be solved, which I have already defined, it is my view that the alternatives to a new ethic are manifestly incapable of providing the necessary restraint.

From the point of view of the current Western-Judaean-Christian moral tradition, nature is of moral concern in that humans are stewards or guardians of nature. This view alone leaves open the important question of what the terms of reference for that guardianship ought to be. Depending upon one's religious views it allows the possibility that nature is the property of 'humanity' to be acquired, used or disposed of (providing nothing is done wastefully, because waste is a vice) — or alternatively that nature is 'superhuman' property in that it belongs to God. Either way, the present tenants, while maximising present welfare through uses of nature, should regard nature as belonging to an owner — either humanity or God — to whom they hold responsibility. As both the Routleys and Attfield suggest, in practice this is a too minimal basis from which to determine human responsibility for nature. John Passmore, in particular, likes to dispose of the theological dimension — people will not, "face their ecological problems in the full implications unless they see themselves as left to their own devices, without metaphysical guarantees of survival".

Objections to the notion of stewardship as an ethic for nature arise not so much out of its essential nature (or what it could be) but rather out of what it has become. Stewardship has become humanism — anthropocentrism, to use another word. Nature is seen as a system of resources that have value only to the extent that they are useful to humankind. Parts of nature that are without human value are valueless, therefore. Parts of unmodified nature that stand in the way
of the achievement of human benefit possess negative value in that their continued existence forecloses opportunities. The preservation of nature in an unmodified state is only justifiable morally if the greatest amount of human benefit is obtainable through this course of action. In a cost/benefit study the human benefit of preservation must emerge as greater than the human benefit achievable from any alternative use of that resource.

The dilemma that arises with increasing regularity, as David Ehrenfeld\(^1\) points out, involves our encountering a threatened part of nature that we value for reasons we cannot easily articulate and for which we can find no humanistic reason for preserving. The result is often a frantic search for rational reasons for attaching aesthetic, recreational, scientific or cultural value to that part of nature, so that the non-resource can be transformed into a resource. It is an approach, Ehrenfeld argues persuasively, that is doomed to failure. Its key failing is that it reserves the notion of value to human benefit, and this is a criterion that will never be satisfied by much of unmodified nature.

Thus the notion of moral stewardship, as it is currently practised, contains the principle that any use of nature is moral as long as it satisfies identifiable human purposes. Preservation of nature is morally required when this course of action produces human benefits. This in turn leads directly to what Tom Regan\(^9\) calls the 'human interests principle':

Whenever human beings can benefit more from overriding the preservation principle than if they observe it, the preservation principle ought to be overridden.

Since there appears to be no moral limits to the application of this principle, it is being suggested that all of unmodified nature could be, and if it becomes necessary should be, modified so as to maximise the human benefit that could be obtained from it. It would be morally acceptable — indeed, it would be morally laudable — to engineer a biosphere consisting of no more than the human species, plants and animals that are economically useful to humankind, and a few species that represent small nuisances, but for which the cost of elimination exceeds their nuisance value. Always assuming, of course, that such a biosphere were ecologically possible.

The authors of two of the major contributions to the field

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Problems with
of environmental ethics, John Passmore and Robin Attfield, both consider the call for a new ethic. Both reject it, essentially on the grounds that what is required instead is a better use of existing ethical theories (although Passmore does concede at one point that calls for a new ethic are "not entirely wrongheaded"). 'Better use of existing theories' has become a development of the notion of moral considerability, leading to an ethic based upon extensions of social contract theory. Nature is a 'moral patient' and as a result humankind has a 'duty of care'.

Something has the property of moral considerability — or moral standing — if it is capable of being affected for better or worse (in its own terms) by human actions. There is, however, no clear agreement as to the boundary this implies between organisms that are and are not to be held morally considerable. A common classification of parts of nature that may be investigated for moral considerability recognises three groups — 'mere things', 'mindless beings' and 'sentient beings'. 'Mere things' are non-living entities like rocks and rivers. It is difficult to perceive any basis for awarding them moral considerability in that there is nothing we can do to them that is either good or bad in their terms. 'Mindless beings' are, most notably, plants. While they are not 'sentient', i.e. not capable of pleasure or pain, they do have 'interests' — wants and needs, the satisfaction of which is good in their terms. A plant may have an 'interest' in receiving water. To some therefore, they are morally considerable. 'Sentient beings', like the higher animals, are those that are most widely accorded moral considerability. Their capacity to experience pleasure, pain, frustration and satisfaction gives them the strongest case for consideration by people contemplating actions that may affect their welfare. Goodpaster reminds us, however, that we ought not to be confused between moral considerability and moral significance. Moral considerability means in effect that something has a property that entitles it to be placed somewhere on a scale of things that have value. Moral significance indicates its place on that scale relative to other values. If the moral significance of something is known, then its value in relation to the value of others with competing claims can be evaluated. Thus a tree may be held to be morally considerable — because it has interests — but at the same time be judged morally insignificant because its value is slight in relation to other acknowledged values.
the extended social contract theory approach, therefore, determining the value of a living thing (and hence the extent of our obligations towards it in the face of competing claims) requires first a moral justification for its having moral considerability and then, if required, a decision regarding its moral significance. The value of a species is seen as the sum of the values accorded to its individual members.

What is wrong with all of this, in my view, is that it contains far too much philosophy and not enough ecology. It falls apart rather quickly when one tries to explore its normative implications. Consider the following examples: If we admit to the status of moral considerability the wider set of organisms, i.e. all those that have interests, then an individual tree, a protozoan and an invertebrate have a value that is greater than zero. The Antarctic krill are perhaps the most numerous metazoan species on earth, with between $10^4$ and $10^6$ times as many individuals as the human species. They would only have to be awarded a minute amount of moral significance each for the total value represented by the species to exceed that of the human species. In a moral shootout between their needs and ours, we ought to lose. Similarly, if we hold that individual protozoa are morally considerable — but nonetheless morally insignificant — the total number of plasmodia in the body of a malaria sufferer, by sheer weight of numbers, may exceed the value of the human life they threaten. These problems are arising because the morally considerable — morally significant approach is determining the value of a population or species by summing the values of individual members. In general then, we are being told that the most numerous species is the most valuable, and the least numerous the least valuable. This is an ecological nonsense.

Let us progress, then, by restricting our criterion of moral considerability to exclude the very numerous lower order species. We will require sentience for moral considerability. All plant life is now valueless, which faces us with another ecological nonsense. In both qualitative and quantitative senses plants are essential to the maintenance of non-plant life on earth. Qualitatively, they alone are able to trap the energy and absorb the minerals on which all other life depends. Quantitatively, more than 70% of all new biomass formed on Earth each year is plant matter, whereas less than 10% is animal matter. From an ecological standpoint it is 'fundamentally wrong-headed' to propose that plant life be
excluded from our sphere of moral responsibility.

A third difficulty arises when we explore what the morally considerable — morally significant theory advises us about the moral acceptability of certain ecologically significant actions. The culling of overstocked kangaroo populations in Australia is a useful example. Because of human modifications of their environment, some species of kangaroo now show regular boom-bust cycles in population numbers. Rapid rises in population numbers are followed by spectacular crashes caused by widespread starvation and disease. Current practice is to manage numbers by shooting as many as 1-2 million individuals when the population is surging. From the point of view of my ethical touchstone — a reflective ecological morality — this is a clear moral good in that it contributes to the long-term survival of the species. From the point of view of extended social contract theory, however, we can easily be sidetracked by the moral significance of the loss of a million or more units of kangaroo value and the implications of the attendant pain and suffering, so that no obvious conclusion is evident.

However, my strongest objection to extended social contract theory as a basis for ecological morality is that it is in effect an ethic of kinship. Those life forms that are most like us are most deserving of our moral consideration. In terms of the moral acceptability of suffering caused to non-human organisms, a kinship ethic is acceptable — suffering requires sentience and sentience is most abundantly apparent in organisms that are most like us. There is a moral difference between chopping a limb off a live tree and chopping a limb off a live cat. As a basis for an ethic of ecological restraint, however, kinship is another anthropocentric nonsense. The ecological value of an organism — the contribution that it makes to important ecological processes within its system — has nothing to do with its kinship to humankind.

In other words, ecological problems are not just problems of cruelty to non-human organisms on a larger scale. What is at issue here is a fundamental misdirection of moral concern. In extended social contract theory, we have an adequate ethical basis for determining the moral acceptability of acts that may cause suffering to non-human organisms — which in itself is a thing worth having. We do not, however, have a rational basis for determining the morality of acts that cause ecological harms. What we need before proceeding
with this analysis is a more ecologically sound basis for the
notion of nature's value.

We now enter the very heart of the debate on the ethics
of environmental concern. In order to establish some basis
on which to resolve conflicting claims between humankind
and nature, it is necessary to have some theory of value.
Under anthropocentric ethics, nature has value only to the
extent that it is useful to humankind. This kind of value is
called 'instrumental' — it has no value of itself, but it is
good for something else which itself is valued. To the
environmentalist, the view that nature has only instrumental
value is an extraordinarily narrow and exploitative view of
nature's worth. It leads to the view that an environmentally
destructive act is morally reprehensible only to the extent
that its environmental consequences themselves have
consequences for other people, a view that Callicott is
justified in labelling as "moral turpitude". More careful
attention to the origin and nature of the value of nature itself
is a characteristic of the work of those calling for a new ethic.
I do not propose to review the various new ethics that have
been proposed, but I am interested in some of the attendant
discussions of value.

Those who call for a more restraining environmental ethic
propose that nature be regarded as valuable in its own right.
Tom Regan's view is that if we are to have an ethic that
is 'for' the protection of the environment, as opposed to one
that is 'about' our use of the environment, then it is necessary
to justify the existence in nature of some kind of intrinsic
value that is not dependent on human valuations. The
Routleys refer to this as the 'no detachable values
assumption'. To have value, nature does not have to be valued
by any person.

The no detachable values assumption leads to a complex
of unresolved — and perhaps unresolvable — philosophical
problems. What is the nature of nature's intrinsic value? Where
is it located? What is 'intrinsic value', anyway? In answer to
the last question, Regan proposes that intrinsic value (he
calls it inherent value) is the kind of thing an individual human
being has — "... each human being has value logically
independently of whether he/she is valued by anyone else
..." Both of the former questions are answered in a variety
of ways depending upon the argument that is being advanced.
Extended social contract theorists will sometimes maintain
that any being that has interests has intrinsic value⁴ (I am sentient, therefore I am valuable). 'New ethicists' propose that intrinsic value should not be attached to the individual organism, but rather to a higher level of biological organisation — the species, the ecosystem, or, most holistically, the biosphere itself. Before exploring the eco-ethical implications of intrinsic value, I wish to divert to establish the need that I see to recognise two scales of value rather than just one.

Humankind, Attfield⁴ observes, is neither entirely part of nature nor entirely apart from nature. Therefore, any rational ethic for nature must fully recognise the anthropocentric value that lies in the achievement of human purposes, acknowledge fundamental values in nature's organisation and resolve conflicts that arise between the two intrinsically different valuations. We understand well enough the human values that are advanced by modifying nature. Resources are harvested, predators, pathogens and economic nuisances are eliminated and unproductive systems are converted to productive uses. Similarly, any ethic that restrains our entitlement to modify nature implies costs, in the form of harms that must be tolerated or opportunities for benefit that must be foregone.

I wish to approach the task of reconciliation of conflict between what I see as two scales of value by considering first the costs and benefits to humankind alone of a decision to preserve all of nature in an unmodified state.

Imagine that, for reasons that will remain forever obscure, humankind has decided to preserve all of nature in its wild state. The costs and benefits of this act of total ecological non-intervention can be placed on a scale of human value. The scale (Figure 1) has a positive range to represent those preserved features or organisms that return net benefit in their wild state. It has a negative range to represent the costs of various kinds that people must bear as a result of the many foreclosed opportunities. Some representative examples have been chosen to populate the scale. Starting from the bottom of the scale, the most severe costs will be harms that must be tolerated caused by organisms like the smallpox virus. Less severe, but still significant costs will be caused by the flourishing of economic pests such as the wheat rust fungus. The preservation of whole systems such as the remaining tropical forests will also occasion widespread loss of opportunity for economic benefit. Closer to zero, the preservation of some species such as the wolf
The effects of a policy of preserving all existing parts of nature would return more harms than benefits to humanity, or the Devil’s Hole pupfish (which stands in the way of agricultural development in the U.S.A.) will bring about minor, local inconveniences.

On the positive side, however, some benefits will be returned. Animal species with cultural value like the giant panda and giraffe will be safe, at least from us. Areas with aesthetic and recreational value (but little resource value) such as the Grand Canyon, will be forever protected from development. More significantly, important genetic variants, such as wild cultivars of wheat, will remain so that their value to people may be exploited.

On balance, however, this experiment in ultimate preservation returns many more costs than benefits. There would be widespread death through starvation and disease. At the very least, the exercise serves to remind us that people modify nature for the very best of anthropocentric reasons. Ecologically however, all of these various acts of non-intervention would have benefitted nature. All of the requirements of the World Conservation Strategy would have been met to the fullest possible degree.

The question that I wish to take up is this: how do we reflect the value to nature of preservation onto this scale
of human value in order that conflicting claims can be reconciled? My answer is that we cannot. Value to nature is conceptualised here as ecological value, and ecological goods are fundamentally different in kind from those that provide human value. We are dealing with a separate scale of value.

In other words, the extent of the conflict between the achievement of immediate human value and the protection of nature's value should never be underestimated. The protection of nature's value logically cannot arise out of the achievement of human value. The problem that we face, if we are to find an ethical basis for at least an essential minimum of preservation of nature, is to find a way of resolving competing value claims. This in turn requires that we have a more solidly grounded notion of nature's value, an observation that returns us to the issue of value theory.

Nature's biological organisation means that species, ecosystems and biosphere to a significant extent are inseparably interrelated. The location of intrinsic value at any one of these levels, if such an allocation could be justified, would imply that ecologically the other levels had instrumental value by virtue of their contributions to the maintenance of that intrinsic value. The choice of biological level at which intrinsic value is located is not without ecological consequences, however. Intrinsic value is more compelling than instrumental value. If the species is held to hold intrinsic value then we are more strongly constrained in our dealings with species but less so in our dealings with elements of the biosphere, such as the major biogeochemical cycles. Conversely if intrinsic value is held to be a biospheric property, then we are more constrained at that level but free to assert our own values in the face of competing claims from other species.

Where should nature's intrinsic value be located? Extended social contract theory, which I have already rejected, allows us to locate it at the level of the individual organism. A reflective ecological morality suggests that it will be properly placed above that level. However, the location of intrinsic value at some level above that of the individual requires that a particular condition be met. According to Robin Attfield, it requires the establishment of "a value [at that level] that is not reducable to the value in or of the lives of the beings or the entities which make it up".

From an ecological perspective there is no difficulty in
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satisfying a requirement for unique properties, and therefore unique values, at every level from species to biosphere. First, the species has properties that individuals do not possess. It has, for example, a gene pool — a set consisting of all genes and their natural variants — which, under the synthetic theory of evolution, is the unit upon which natural selection acts. At the system level there are characteristic flows of energy and materials and controlling feedback mechanisms which are essential to all component species and populations. None of these ecosystem processes can be performed by a single organism, a single population of organisms, or indeed a random collection of organisms representative of all ecological classes. The system has properties of organisation and self-regulation that are the product of the mutual, co-ordinated evolutionary development of its key biological components. Most significant of all, however, are the properties that are unique to the biosphere itself.

Jim Lovelock provides the most holistic view of life at biosphere level in his Gaia hypothesis. Lovelock points out that the two most fundamental properties of life are the increasing of order within the living thing at the expense of increasing disorder elsewhere and the presence of feedback mechanisms which maintain essential steady states. He points out that these two properties also apply to life at the level of the biosphere as a whole which he regards as a single living being, called Gaia. In comparison with our planetary neighbours, earth’s geosphere and hydrosphere are remarkable for their thermal stability. They are also remarkable for their 'profound disequilibria' in chemical composition. Both the thermal stability and the disequilibrium in chemical composition would collapse without the controlling influence of the biosphere — not just the presence of living things, but the presence of certain cyclic processes performed by all life. Thus, Lovelock suggests, life on earth optimises the conditions necessary for life on earth. Based upon this view I believe the biosphere to be the most intrinsically fundamental unit of life. Biologically, however, it is possible to argue for intrinsic value at every level above that of the individual.

However, I will proceed on the basis that intrinsic value is located in the 'proper functioning' of the biosphere. Any biological system, therefore, has instrumental value to the extent that it can be shown to contribute to biospheric processes within present or future time. At a lower level,
any species has instrumental value to the extent that it contributes to the maintenance of important functions within its ecosystem. Individual organisms possess no value at all, on the grounds that the harvesting of a single organism from a well established population will simply allow another of the same kind to take its place. Where extended harvesting or habitat destruction threatens the viability of a species, it is the value of the species unit that is at issue and not the total value of the threatened individuals.

Reconciliation

Any aspect of unmodified nature — an organism, a species, a natural system or a natural process — can be placed on two scales of value. Its place on the human scale of value indicates the benefits or costs that it returns to humankind through its continued existence in an unmodified state. Its place on an ecological scale of value indicates the contribution its continued existence makes to the continuation of the interrelated processes of life on earth. A consistent theme throughout this essay has been that human misuse of the environment — primarily through resource harvesting and waste disposal — is the product of over-use of the scale of human valuations, and under-use of the scale of ecological valuations. In this section I will attempt a reconciliation between the two scales of value.

Figure 2 sets out the relationship between the two scales.

![Diagram of two scales of value](attachment:figure2.png)

**Figure 2**
The representation of human values and ecological values requires two scales of value.
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Appropriately enough, they are set against each other, with the scale of human valuation having both positive and negative ranges, and the scale of ecological value having only a positive range. Three regions on the figure can be distinguished. All the space above the X axis (labelled A') represents an area in which parts of unmodified nature return benefits both to people and to nature. Destructive modification of any component of nature in this region would be unacceptable, therefore, in both human and ecological terms. Below the X axis is the area in which human purposes and nature's purposes are in conflict. I have distinguished two regions. Within the region labelled 'B' are environmental modifications for which ecological costs are high and human benefits only limited. Significant questions of ecological ethics are raised by interventions falling in this region. One important proviso may be added to this principle, however, and that is that humankind may elect to intervene in region B if it accepts a responsibility to manage forever the resulting ecological instability. More of this later. Finally, I distinguish region C, in which environmental intervention returns considerable human benefits and limited ecological costs.

I believe, therefore, that environmental modifications falling in region C should be regarded as morally acceptable. The exact position of the line separating regions B and C on Figure 2 cannot be defined with precision, because it is related to the still imprecise nature of the scale of ecological value. In drawing this line, I have placed it so that it includes within the moral safety of region C, the removal of ecologically less valuable species and some least valuable systems. Other ecologists might disagree with this placement, but the important point here is that we have in Figure 2 a conceptual model on which to debate our differences.

Region B in Figure 2 represents aspects of nature over which human purposes and natural purposes will be in greatest conflict. I have suggested that, as a primary rule, significant modifications to natural components and processes within this region ought to be regarded as morally unacceptable on ecological grounds, regardless of their human benefits. However, as we shall soon see, there are some sharp problems for humankind associated with organisms and processes that fall in this region. Therefore, I have allowed a small escape clause. Intervention in this region could be regarded as morally acceptable if two conditions are satisfied. The first is that the ecological
consequences of that intervention are knowable in advance, and are known. The second is that humankind elects to undertake — in perpetuity — an ecological management role that compensates for any significant consequences that flow from the intervention. Some examples will make both the operation of the model and the implications of the moral escape clause more clear.

The value of preservation of different parts of nature returns different values ecologically and socially.

The next sensible step seems to be to populate Figure 2 with some examples of parts of nature that fall into the three regions. We may then examine the morality of human actions that have significant implications for these examples. This has been done in Figure 3. The placement of each of the examples shown is discussed briefly below:

- **Wild wheat** is included as an example of a natural population that returns high value to humankind. Wild varieties of wheat represent a store of genetic material that may be drawn upon to provide improved varieties of this important food grain. Wild wheat performs only a limited ecological role within native grasslands, but its preservation is a moral good on both human and ecological grounds.

- **The giant panda** is a relic species of limited ecological value, but some cultural value. Again, its 'modification' (by extinction) would not constitute a substantial
ecological loss, but human culture would be impoverished.

— *The Devil's Hole pupfish* is again a relic species, but one that returns negative benefits to humankind through the opportunities for agricultural development that it forecloses. While there are, no doubt, a few Devil's Hole pupfish fanciers whose world would be a poorer place if it were to become extinct, on balance, its contribution to humanity is a negative one. On Figure 3 it falls in region C, which means that its elimination is morally acceptable.

— *Wheat rust* is an example of a pathogen of an important food crop. In human terms, therefore, it returns a high negative value to humankind. Ecologically, it appears to have no great significance, so it is placed in region C. Morally, it may be eliminated.

— *The smallpox virus* is an example of a human pathogen. Obviously, its continued existence returns strong negative benefits in human terms. However, I believe that its ecological role is a significant one on the grounds that it limits the population density that can be reached by a globally-distributed and ecologically-invasive species, humankind. It therefore falls in region B. It may be eliminated only if we accept a moral obligation to manage human population numbers and density in its absence.

— *Tropical forest systems* provide an example of a sharp conflict between human and ecological values. Their ecological value is very high. Collectively they perform the bulk of the earth's biological work. Their diversity and productivity are unmatched by temperate systems. Their preservation, however, locks away potentially highly productive soils and valuable wood resources from impoverished and rapidly growing third world societies.

    Current harvesting is clear-felling about 111 000 square kilometres (43,000 square miles) of tropical forest each year, a rate that will ensure their complete removal in a further 80 years. The ecological consequences of continued removal are unknown, but they have been suggested to include: global shifts in climatic patterns, disruptions to the carbon-oxygen cycle, and irretrievable loss of one half of the world's
land species. In my terms, continued harvesting of tropical forests is morally acceptable if the full consequences can be determined in advance, and if humankind undertakes to manage the resulting global instabilities. In reality, neither of these conditions can be fulfilled on the basis of current understanding.

— *The carbon-oxygen cycle* is taken here to represent the three major biogeochemical cycles. Conflict between human and ecological values reaches its most profound proportions in human modification of major cycles. The carbon cycle is perhaps the major global homeostatic mechanism by which life on earth optimises the conditions necessary for life on earth. The small concentration of carbon dioxide in the atmosphere (until recently perhaps 270 parts per million) exerts a controlling influence on a number of biogeochemical and geophysical processes, most notably the heat balance of the atmosphere, and through that, global weather patterns, the stability of terrestrial ecosystems and soil formation and development.

Human intervention in the carbon cycle has taken the form of the release of carbon dioxide stored as fossil fuels and tropical vegetation. The industrial culture is founded upon, and inexorably linked to, the use of fossil energy for resource harvesting, processing and distribution. No known alternative energy sources appear able to replace the quantity or quality of energy obtainable from fossil fuels. To date, human generated carbon dioxide has increased atmospheric levels to 340 parts per million. If present trends continue, atmospheric carbon dioxide levels will double their pre-industrial value by about the year 2050. At that time only 20% of the earth’s fossil fuels will have been converted to carbon dioxide. If all known fossil fuels are converted to carbon dioxide, atmospheric levels may increase to ten times their pre-industrial levels.

**Conclusion**

Three broad ethical theories have been explored as a basis for moral justification for restraint. The first of these is the notion of moral stewardship. Along with many others, I have judged moral stewardship to be unusably anthropocentric
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— it is in fact the source of the problem rather than the solution. The second approach is that of extended social contract theory, which sees nature as a moral patient and human-kind with a consequent duty of care. Quite inescapably, this approach as it is now practised attaches value at the level of individual organisms. This in turn leads not only to a capacity to solve moral problems concerning cruelty, but also to nonsensical normative statements about ecological problems. Given that the problems to be solved are conceptualised here as being fundamentally ecological in nature, extended social contract theory does not provide a basis for proceeding.

Finally, there is the call to abandon some or all that has gone before in moral philosophy and to develop instead a new ethic based more firmly on ecological principles. The new ethicists quickly run into philosophical problems at the level of value theory. Some of these problems, like those of the nature and location of nature’s intrinsic value, are introduced here. I am not at all sure that I have made any progress with them. From the point of view of the criterion of the moral commonsense of the ecologically informed person, however, clear recognition that nature has a scale of values beyond instrumental value to humans seems an essential ingredient of the solution to our environmental problems. Similarly, the holistic views that the discipline of ecology encourages, would suggest that nature’s intrinsic value is located at the level of the biosphere. On this basis I conclude, along with John Passmore \(^\text{10}\), that the call for a new ethic is “not entirely wrongheaded”.

It is in the relationship between the human scale of value and nature’s scale of value that I depart from the new ethicists. If the anthropocentric ethicists see only the scale of human valuations, then the new ethicists see only the scale of nature’s valuations. That both scales exist is beyond question in my belief. I have not attempted to rank human values and nature’s values on the same scale, for I believe that it would be fallacious to do so. Two sets of valuations are involved, so two separate scales are required. The resolution of conflicting value claims requires reference to the value on each scale of the item under dispute. The conceptual model that is introduced here, therefore, is not so much a new ethic, as a graft that gives new heart to an old one.

It is my belief that the model provides a moral basis for the resolution of the problems identified by the World
Conservation Strategy. It directs our attention to the moral significance of major ecological processes upon which ecological values rest. Humankind is morally entitled to eliminate species that are major pathogens and economic nuisances, and relic species where their presence forecloses productive opportunities. It does not provide unlimited licence either to eliminate species, or to modify systems. Those with important ecological roles either at system level or biosphere level have genotypes that we are morally obliged to protect, unless we elect to undertake their ecological role in perpetuity. This is a requirement that will not often be met. Most significantly, however, what is proposed here creates a moral requirement to understand in advance (as far as this can be done) the ecological consequences of an intervention before it is carried out. In the final analysis, what is required is that our species exercise its capacity for reasoned thought more fully before undertaking actions that have consequences for nature.


