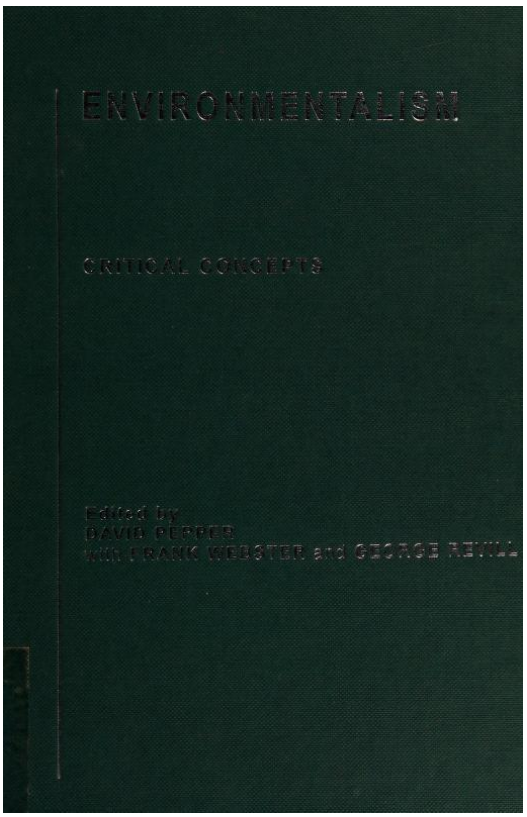
Environmentalism: Critical Concepts, Volume 1

David Pepper, Frank Webster, George Revill



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1966	Kenneth E. Boulding	The economics of the coming spaceship earth	H. Jarrett (ed.), *Environmental Quality in a Growing Economy.* Essays from the sixth Resources for the Future Forum. Baltimore Md: Johns Hopkins Press, pp. 3-14.	III	61
1968	Garrett Hardin	The tragedy of the commons	*Science* 162: 1243-1248.	III	59
1972	M. Golding	Obligations to future generations	*The Monist* 56: 85-99.	IV	69
1973	E. F. Schumacher	The greatest resource: education	E. F. Schumacher, *Small is Beautiful.* London: Abacus, pp. 64-83.	I	1
1974	Murray Bookchin	Toward an ecological	M. Bookchin,	III	50

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	A. Dobson and P. Lucardie (eds) (1993),	I	15		
1993	Eric Katz	Artefacts and functions: a note on the value	*The Politics of Nature.* London: Routledge, pp. 161-176.		
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1993	Bruno Latour	of nature Revolution	B. Latour, *We Have Never Been Modern.*	V	98
1993	Kenneth Robert Olwig	Sexual Cosmology: nation and landscape	New York: Harvester/ Wheatsheaf, pp. 49-88.		
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1994	Alan Holland	Natural capital	R. Attfield and A. Belsey (eds), *Philosophy and the Natural Environment,* Royal Institute of Philosophy Supplement 36, Cambridge: Cambridge	III	63

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B. Doherty and M. de Geus (eds), *Democracy and Green Political Thought: sustainability, rights and citizenship.* London: Routledge, pp. 212-236.

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1996	Steven Feld	A poetics of place: ecological and aesthetic coevolution in a Papua New Guinea rainforest community	R. Ellen and K. Fukui (eds), *Redefining Nature: ecology, culture and domestication.* Oxford: Berg, pp. 61-87.	V	90	
1996	Ron Johnston	Modes of production	R. Johnston, *Nature, State and Economy: a political economy of the environment.* Chichester: John Wiley & Sons (2nd edn), pp. 49-81.	III	60	
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1999	Ted Benton	Reflexive modernization	G. Browning, A. Halcli and F. Webster (eds), *Understanding the Present.* London: Sage, pp. 97-111.	IV	82
1999	Ron Harre. Jon Brockmeier and P. Muhlhausler	Environmental narratives	R. Harre, J. Brockmeier and P. Muhlhausler. *Greenspeak: a study of environmental discourse.* London: Sage, pp. 69-90, 189-198.	V	93

General Introduction

Most commentators consider that today's widespread concern about the state of the environment, and the global movement that voices such concern, originated in the 1960s, though clearly their roots and influences go back much further. Rachel Carson's (1962) book *Silent Spring* is often taken as the landmark publication which triggered off a mass movement, when it alerted the public to the dangers of chemical synthetic pesticides and herbicides being used in modem agriculture. Citizens' groups in America campaigned to ban certain pesticides, notably DDT, and soon they started organisations such as the Environmental Defense Fund. More established societies concerned with nature conservation, such as the Sierra Club, spawned activist offshoots such as Friends of the Earth, marking a pronounced growth in environmental protest.

This modem 'environmentalist' movement provoked fundamental questioning of deep-seated notions of progress and modernity, integrally tied to the human conquest of nature, which lay at the heart of industrialism - both in the West and the 'actually-existing' socialism of the East. Environmental fundamentalists (especially deep and social ecologists, for example) maintained that established ethical codes and attitudes had to be completely overturned and replaced by biocentric values, perhaps mixed in with socialist concern for greater equality, and anarchist rejection of hierarchical social arrangements. Accordingly, when we try to define environmentalism we have to go beyond the generality that it is 'a concern that the environment should be protected, particularly from the harmful effects of human activities'. Environmentalism is a broad and diverse movement, understanding of which requires appreciation of many positions on a spectrum from Earth First! to the Council for the Protection of Rural England, for example. Moreover, as Tim O'Riordan put it in his seminal work entitled *Environmentalism* (1976), environmentalism is as much a state of being as it is a mode of conduct. The concern to protect ecosystems is a relatively superficial manifestation of more deeply rooted values, for at its heart environmentalism preaches a *philosophy of human conduct* (which, says O'Riordan, is sometimes difficult to understand, and which some consider unattainable).

Hence the scientists, such as Paul and Anne Ehrlich and Garett Hardin, who issued early warnings of imminent ecological collapse based (ostensibly) on empirical evidence, did not feel able to leave it there. They did not limit their public utterances to matters of purely scientific moment: they inexorably went on to draw social, political and economic inferences from what they regarded as constraints placed on present human behaviour by the carrying capacity of the earth's ecosystems. Soon the debate mushroomed to embrace centrally the social sciences and humanities, includ-

ing philosophy, anthropology, geography, history, sociology, economics and just about every other discipline. Indeed, in embracing 'holism', environmentalist thinkers challenged the validity of 'disciplines' as such, holding them to be symptomatic of Western reductionist and over-analytical epistemologies which were as much the cause of our environmental problems as a solution to them.

What then, in the light of the explosion of popular and academic literature on environmentalism that has taken place over the past quarter-century, can one say about a collection of readings which attempt to span the scope of this great field? The brief of *Critical Concepts: Environmentalism,* as we have interpreted it, is to map out the territory - to illustrate by virtue of just one hundred selections from the literature what the agenda of environmentalism is today, and what is the nature of some of the key debates and discussions that have developed within it. Yet an early attempt to come up with a list merely of some main *themes* in environmentalism produced about 35 headings! And under each heading it was possible to think of upwards of half a dozen seminal papers or books on the subject - selections which simply could *not* be omitted! In the face of this dilemma, any 'final' one hundred selections might be dismissed as arbitrary and no more valid or useful than any other - perhaps completely different - one hundred selections. They might represent the highly personal opinion of one editor as to what is most important and what is not, and might not stand for much else.

Faced with this dilemma, we have chosen to mitigate it in two ways. First, rather than have one editor we formed an editorial team of three - a sociologist and two geographers - each of whom comes at the subject from a very different background and set of experiences. Second, we opted to make the collection more collegial, and more representative of work on environmentalism in social sciences and humanities, by enlisting the aid of a few highly distinguished academics also working in the field. We asked them to list their 'top twenty' or so papers and books, which by their reckoning had been highly influential and/or ground-breaking, and/or which had successfully and succinctly summarised debates in different areas. The resulting collection is a distillation of their suggestions, together with our own lists, and we are extremely grateful to them - Robyn Eckersley, Jon O'Neill, Mary Mellor, Tim O'Riordan and Tim Hayward - for their help and co-operation. We feel that the usefulness of the collection and its quality and scope have been much enhanced as a result.

One further editorial problem has been what to do about what one might call 'landmark' publications, such as Lynn White's attack on Christianity as the source of present environmental 'crisis', or the *Limits to Growth* and *Blueprint for Survival* reports which caused such a stir in the early 1970s. On the whole (but not entirely - see, for instance, the selections from Aldo Leopold, Garrett Hardin and Fritz Schumacher) we have resisted their inclusion on the grounds that they have been printed and reprinted many times elsewhere, and are very accessible. This is especially true when what they have said is reported and discussed by the authors of those selections which we have included-

So we end up with a set of selections of work aimed largely at an academic audience and written largely by academics. However, this does not signal that the collection is divorced from the real world, for what the authors have described, discussed and perhaps helped to solve is a set of real world problems. Here, in environmentalism, is an example *par excellence* of how the issues in academia tend to follow and illuminate the concerns of the majority of people beyond the university precinct. We hope that this collection will help to focus minds on what constitutes perhaps the most urgent group of problems of our time.

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Part 1: Valuing nature, and environmental ethics

Introduction

What does the 'environmental crisis' stem from?

In the early phase of modern environmentalism, in the late 1960s and early 1970s, dire warnings of impending ecological collapse often provoked searches for the fundamental causes of our 'plight'. In a seminal paper, Lynn White (1967) attributed the environmental 'crisis' to prevailing *values* in Western society. These mainly originated, in his opinion, in Judaeo- Christianity, which he believed still exercises strong influence on Western philosophies and actions. But regardless of whether or not Christianity is 'guilty', perhaps the most influential notion that White expressed was this idea that what we *do* to nature is a function of dominant social *attitudes* towards it, and how we value it.

This strongly idealist position has characterised many subsequent green perspectives. It was restated by the influential economist Schumacher (Ch. 1), who asserted that the key factor in all economic development comes out of the *mind* of 'man': and which values occupy our minds strongly depends upon how we are educated. Schumacher finds conventional Western education culpable for environmental, social and moral 'crisis'. While it refuses to provide adequate overt moral guidelines on how we should behave towards society and nature, at the same time it provides a hidden curriculum transmitting a 'bad, vicious, life-destroying type of metaphysics', based on outmoded and inappropriate nineteenth-century ideas - including evolution, competition, materialism, relativism and positivism.

What values, then, would form an appropriate basis for an ecologically benign and sustainable society? Attfield (Ch. 2), *contra* White, considers that they might well be found in Christianity. His paper gives a flavour of the protracted debate about what Christianity really says to us concerning nature, usefully summarising the positions of some of the main protagonists. He argues that critics, such as White and Passmore (1980), can indeed extract some evidence from the Old Testament of an exploitative, instrumental attitude to environment and non-human nature. But there is much more evidence for a beneficent set of attitudes to these things. He provides copious quotations suggesting that God wants nature preserved and looked after, and animals treated well. God's positioning of humans as dominant over nature implies that we are obliged to steward it wisely and caringly - and Attfield claims that this tradition (of *noblesse oblige)* is traceable back beyond medieval times in Christian teaching.

A bioethic

For many environmentalists, however, stewardship values are inadequate, since they smack of anthropocentric hubris. Their preferred canon is informed by the more humble

'land ethic' articulated by American conservationist, Leopold (Ch. 3), who eloquently and economically describes nature in terms of biotic pyramids, food chains, land as an energy circuit, etc.: providing what is now recognised as an 'ecological' view. This view has normative implications, which make for an extension of human social ethics towards 'land'. We should enlarge the boundaries of our social community, to include soils, waters, plants and animals, and affirm (at least in part) a 'right' for these community members to continued existence beyond mere calculation of instrumental value to ourselves. This declaration of biotic rights became a distinguishing feature of what O'Riordan (1976) termed *ecocentrism.* Ecocentric morality is derived from Leopold's famous adage: 'A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise'. This bold assertion, however, opens the way for extensive debate about ethics, rights and the valuation of nature, and subsequent papers in the first section, and the next on animal rights, explore this debate.

For Taylor (Ch. 4), environmental ethics need not stem from an imperative to maintain a given state of nature. Rather, it is the well-being of individual organisms, who have inherent worth, which determines our moral relations. Taylor's theory of environmental ethics is symmetrical in structure with a theory of human ethics based on respect for the individual's inherent worth, making him or her worthy of moral consideration. Similarly, we must protect wild plants and animals for *their* sake, and regardless of whether they are sentient. By rational extension from the components of this biocentric outlook, we see that humans are not superior to other species.

None of this is unproblematic, however. Heffernan (Ch 5) reveals the potential misanthropy in Leopold's ethic; which might appear to overturn older definitions of right and wrong as relating to benefit or harm to *human* interests. Thus, while the biosphere is instrumental in human good, failure to reduce its integrity and stability (therefore diversity) - e.g. by practising agriculture — may often work against human interests. So Heffernan would revise the land ethic along lines which, he believes, Leopold anyway intended; so as to weigh systemic good in with human good. He ventures also the principle that survival interests of humans should outweigh those of nature, but that the latter should outweigh non-survival human interest. Thompson (Ch. 6) further challenges the land ethic, refuting the possibility of extending ethics to non-sentient beings, since they cannot define their own interests and concerns. Failing such articulation, environmental ethics would not meet the requirements of all ethics: consistency, non-vacuity and decidability. For determining what a non-sentient organism's *own* good is, is not easy. Why, for instance, should we suppose that for a plant to live a long life rather than a short one is in its own interests? Only because this is what we want for ourselves. But plants don't 'want'. All this shows that the criteria to decide what is of value fail, through problems of arbitrariness and cut-off points, to satisfy the formal requirements of an ethic. Thompson concludes that in any case the environment can be adequately protected by a view that it has value for us: such value need not be narrowly instrumental.

Intrinsic value theory

All this begs a central question, of whether, and how, nature might have intrinsic value, when it is we humans who do the valuing. Katz (Ch. 7) asserts that nature unchanged by human agency has needs, interests and goods of its own because it has biological functions and adaptive subsystems that serve an evolutionary role. This ethic would derive from Kant's teaching that the possibility of moral consideration lies in an entity's independence from rational control and design (i.e. its existence as an end in itself). Organic and non-organic entities form complex whole natural systems and communities, which are independent from external design, and purpose. Non-living entities are essential components of these autonomous natural systems. Intervention, however, destroys that autonomy - the anthropocentric alteration of natural processes denies unhindered growth and development as .ve//[:]realisation.

Such reasoning however, according to Callicott (Ch. 8), may smack of the naturalistic fallacy, whereby a natural property, like sentience and the ability to feel pleasure, is declared objectively good - when in fact the conclusion that it *is* good is arbitrary. But intrinsic value cannot logically be equated with some 'objective' natural property - for what holds such value, and why, is intuited and may differ from person to person. Callicott distinguishes between intrinsic value, independent of all valuing conscious, and 'inherent value'. We humans confer this latter on subjects by *subjectively* declaring that they have value for themselves. This ethic traces back to Hume's subjectivist axiology, where moral value lies in the eye of the beholder. But this does not give *carte blanche* for total arbitrary treatment of nature. For, following Darwin, there is a sort of 'objective' or majority truth: a standardisation of moral values commonly agreed on i.e. those most conducive to survival.

In any case, Callicott continues, the Cartesian subject-object distinction underlying discussion of 'intrinsic' value has been undermined by twentiethcentury quantum theory, which implies that *no* properties in nature, including value, are strictly intrinsic. Zukav's (Ch. 9), reading of quantum physics dramatically underlines this view. He says that they show observer and observed to be related fundamentally. For instance, the 'complementarity' concept implies that properties of light are actually properties of our (the observer's) interaction with light, which therefore has no properties independent of us. 'The next step in the logic is inescapable. Without us light does not exist... without light, or, by implication, anything else to interact with, we do not exist!' So we study ourselves when we study nature, essentially 'choosing' the very properties which our object of study has when we study it. Accepting this. Callicott derives that if self and nature are continuous, and if self is intrinsically valuable, then nature is intrinsically valuable. And 'my' selfish interests are nature's interests.

But such readings are controversial. O'Neill (Ch. 10) insists that Callicott's argument - that natures' evaluative properties may be 'secondary' in the Cartesian sense, but that quantum physics show that this classic primarysecondary properties distinction is invalid, therefore evaluative properties are as real (as intrinsic) as 'primary' qualities - fails at every stage. He prefers to argue for the (objectively existing) 'reality'

of evaluative properties on grounds that all living things have *interests* conducive to their own flourishing. These interests do not therefore depend on reference to human observers. And anyway, O'Neill points out, anthropocentrism might not be as unacceptable a basis for valuing nature as some ecocentrics (e.g. Eckersley 1992) insist, for caring for nature for the sake of *its* interests makes for the best and most flourishing form of *human* existence.

O'Neill's paper usefully clarifies how environmentalists variably interpret the notion of intrinsic value: to mean non-instrumental, or objectively- existing, or non-relational value. But greater clarity is vital here, for nature's intrinsic value is a central canon of most radical green perspectives. It strongly relates to the property of 'naturalness' - creation by non-human (therefore non-'artificial') agency - which is the distinguishing mark of green as opposed to neoclassical theories of value. Goodin (Ch. 11) explores 'naturalness', asking why we often object to what we perceive of as 'fake' natures (e.g. restored landscapes). Desire for naturalness has to do with our need to know there is something outside of, and bigger than, ourselves, which is why we often object far more to large rather than small-scale interventions in nature: the latter allows the larger-than-us context to remain.

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1. The Greatest Resource

Education

E. F. Schumacher

Source: E. F. Schumacher, *Small is Beautiful.* London: Abacus, 1973, pp. 64-83.

Throughout history and in virtually every part of the earth men have lived and multiplied, and have created some form of culture, Always and everywhere they have found their means of subsistence and something to spare. Civilisations have been built up, have flourished, and, in most cases, have declined and perished. This is not the place to discuss why they have perished; but we can say: there must have been some failure of resources. In most instances new civilisations have arisen, on the same ground, which would be quite incomprehensible if it had been simply the *material* resources that had given out before. How could such resources have reconstituted themselves?

All history - as well as all current experience - points to the fact that it is man, not nature, who provides the primary resource: that the key factor of all economic development comes out of the mind of man. Suddenly, there is an outburst of daring, initiative, invention, constructive activity, not in one field alone, but in many fields all at once. No-one may be able to say where it came from in the first place; but we can see how it maintains and even strengthens itself: through various kinds of schools, in other words, through education. In a very real sense, therefore, we can say that education is the most vital of all resources. >

If western civilisation is in a state of permanent crisis, it is not far-fetched to suggest that there may be something wrong with its education. No civilisation, I am sure, has ever devoted more energy and resources to organised education, and if we believe in nothing else, we certainly believe that education is, or should be, the key to everything. In fact, the belief in education is so strong that we treat it as the residual legatee of all our problems. If the nuclear age brings new dangers; if the advance of genetic engineering opens the doors to new abuses; if commercialism brings new temptations - the answer must be more and better education. The modern way of life is becoming ever more complex: this means that everybody must become more highly educated. 'By 1984,' it was said recently, 'it will be desirable that the most ordinary of men is not embarrassed by the use of a logarithm table, the elementary concepts of the calculus, and by the definitions and uses of such words as electron, coulomb, and volt. He should further have become able not only to handle a pen, pencil, and ruler but also a magnetic tape, valve, and transistor. The improvement of communications between individuals and groups depends on it.' Most of all, it appears, the international situation calls for prodigious educational efforts. The classical statement on this point was delivered by

Sir Charles (now Lord) Snow in his 'Rede Lecture' some years ago: 'To say that we must educate ourselves or perish, is a little more melodramatic than the facts warrant. To say, we have to educate ourselves or watch a steep decline in our lifetime, is about right.' According to Lord Snow, the Russians are apparently doing much better than anyone else and will 'have a clear edge', 'unless and until the Americans and we educate ourselves both sensibly and imaginatively'.

Lord Snow, it will be recalled, talked about 'The Two Cultures and the Scientific Revolution' and expressed his concern that 'the intellectual life of the whole of western society is increasingly being split into two polar groups... At one pole we have the literary intellectuals ... at the other the scientists.' He deplores the 'gulf of mutual incomprehension' between these two groups and wants it bridged. It is quite clear how he thinks this 'bridging' operation is to be done; the aims of his educational policy would be, first, to get as many 'alpha-plus scientists as the country can throw up'; second, to train 'a much larger stratum of alpha professionals' to do the supporting research, high-class design and development; third, to train 'thousands upon thousands' of other scientists and engineers; and finally, to train 'politicians, administrators, an entire community, who know enough science to have a sense of what the scientists are talking about'. If this fourth and last group can at least be educated enough to 'have a sense' of what the real people, the scientists and engineers, are talking about, so Lord Snow seems to suggest, the gulf of mutual incomprehension between the 'Two Cultures' may be bridged.

These ideas on education, which are by no means unrepresentative of our times, leave one with the uncomfortable feeling that ordinary people, including politicians, administrators, and so forth, are really not much use; they have failed to make the grade: but, at least, they should be educated enough to have a sense of what is going on, and to know what the scientists mean when they talk - to quote Lord Snow's example - about the Second Law of Thermodynamics. It is an uncomfortable feeling, because the scientists never tire of telling us that the fruits of their labours are 'neutral': whether they enrich humanity or destroy it depends on how they are used. And who is to decide how they are used? There is nothing in the training of scientists and engineers to enable them to take such decisions, or else, what becomes of the neutrality of science?

If so much reliance is today being placed in the power of education to enable ordinary people to cope with the problems thrown up by scientific and technological progress, then there must be something more to education than Lord Snow suggests. Science and engineering produce 'know-how'; but 'know-how' is nothing by itself; it is a means without an end, a mere potentiality, an unfinished sentence. 'Know-how' is no more a culture than a piano is music. Can education help us to finish the sentence, to turn the potentiality into a reality, to the benefit of man?

To do so, the task of education would be, first and foremost, the transmission of ideas of value, of what to do with our lives. There is no doubt also the need to transmit know-how but this must take second place, for it is obviously somewhat foolhardy to put great powers into the hands of people without making sure that they have a

reasonable idea of what to do with them. At present, there can be little doubt that the whole of mankind is in mortal danger, not because we are short of scientific and technological knowhow, but because we tend to use it destructively, without wisdom. More education can help us only if it produces more wisdom.

The essence of education, I suggested, is the transmission of values, but values do not help us to pick our way through life unless they have become our own, a part, so to say, of our mental make-up. This means that they are more than mere formulae or dogmatic assertions: that we think and feel with them, that they are the very instruments through which we look at, interpret, and experience the world. When we think, we do not just think: we think with ideas. Our mind is not a blank, a *tabula rasa.* When we begin to think we can do so only because our mind is already filled with all sorts of ideas *with which* to think. All through our youth and adolescence, before the conscious and critical mind begins to act as a sort of censor and guardian at the threshold, ideas seep into our mind, vast hosts and multitudes of them. These years are, one might say, our Dark Ages during which we are nothing but inheritors; it is only in later years that we can gradually learn to sort out our inheritance.

First of all, there is language. Each word is an idea. If the language which seeps into us during our Dark Ages is English, our mind is thereby furnished by a set of ideas which is significantly different from the set represented by Chinese, Russian, German, or even American. Next to words, there are the rules of putting them together: grammar, another bundle of ideas, the study of which has fascinated some modern philosophers to such an extent that they thought they could reduce the whole of philosophy to a study of grammar.

All philosophers - and others - have always paid a great deal of attention to ideas *seen as the result of thought and observation:* but in modern times all too little attention has been paid to the study of the ideas which form the very instruments by which thought and observation proceed. On the basis of experience and conscious thought small ideas may easily be dislodged, but when it comes to bigger, more universal, or more subtle ideas it may not be so easy to change them. Indeed, it is often difficult to become aware of them, as they are the instruments and not the results of our thinking - just as you can see what is outside you, but cannot easily see that with which you see, the eye itself. And even when one has become aware of them it is often impossible to judge them on the basis of ordinary experience.

We often notice the existence of more or less fixed ideas in other people's minds - ideas *with which* they think without being aware of doing so. We then call them prejudices, which is logically quite correct because they have merely seeped into the mind and are in no way the result of a judgment. But the word prejudice is generally applied to ideas that are patently erroneous and recognisable as such by anyone except the prejudiced man. Most of the ideas with which we think are not of that kind at all. To some of them, like those incorporated in words and grammar, the notions of truth or error cannot even be applied; others are quite definitely not prejudices but

the result of a judgment; others again are tacit assumptions or presuppositions which may be very difficult to recognise.

I say, therefore, that we think *with* or *through* ideas and that what we call thinking is generally the application of pre-existing ideas to a given situation or set of facts. When we think about, say, the political situation we apply to that situation our political ideas, more or less systematically, and attempt to make that situation 'intelligible' to ourselves by means of these ideas. Similarly everywhere else. Some of the ideas are ideas of value, that is to say, we evaluate the situation in the light of our value-ideas.

The way in which we experience and interpret the world obviously depends very much indeed on the kind of ideas that fill our minds. If they are mainly small, weak, superficial, and incoherent, life will appear insipid, uninteresting, petty and chaotic. It is difficult to bear the resultant feeling of emptiness, and the vacuum of our minds may only too easily be filled by some big, fantastic notion - political or otherwise - which suddenly seems to illumine everything and to give meaning and purpose to our existence. It needs no emphasis that herein lies one of the great dangers of our time.

When people ask for education they normally mean something more than mere training, something more than mere knowledge of facts, and something more than a mere diversion. Maybe they cannot themselves formulate precisely what they are looking for; but I think what they are really looking for is ideas that would make the world, and their own lives, intelligible to them. When a thing is intelligible you have a sense of participation; when a thing is unintelligible you have a sense of estrangement. 'Well, I don't know,' you hear people say, as an impotent protest against the unintelligibility of the world as they meet it. If the mind cannot bring to the world a set - or, shall we say, a tool-box - of powerful ideas, the world must appear to it as a chaos, a mass of unrelated phenomena, of meaningless events. Such a man is like a person in a strange land without any signs of civilisation, without maps or signposts or indicators of any kind. Nothing has any meaning to him; nothing can hold his vital interest; he has no means of making anything intelligible to himself.

All traditional philosophy is an attempt to create an orderly system of ideas by which to live and to interpret the world. 'Philosophy as the Greeks conceived it,' writes Professor Kuhn, 'is one single effort of the human mind to interpret the system of signs and so to relate man to the world as a comprehensive order within which a place is assigned to him.' The classical- Christian culture of the late Middle Ages supplied man with a very complete and astonishingly coherent interpretation of signs, i.e. a system of vital ideas giving a most detailed picture of man, the universe, and man's place in the universe. This system, however, has been shattered and fragmented, and the result is bewilderment and estrangement, never more dramatically put than by Kierkegaard in the middle of last century:

'One sticks one's finger into the soil to tell by the smell in what land one is: I stick my finger into existence - it smells of nothing. Where am I? Who am I? How came I here? What is this thing called the world? What does this world mean? Who is it that has lured me into this thing and now leaves me there? ... How did I come into

the world? Why was I not consulted .. . but was thrust into the ranks as though I had been bought of a kidnapper, a dealer in souls? How did I obtain an interest in this big enterprise they call reality? Why should I have an interest in it? Is it not a voluntary concern? And if I am compelled to take part in it, where is the director? . . . Whither shall I turn with my complaint?'

Perhaps there is not even a director. Bertrand Russell said that the whole universe is simply 'the outcome of accidental collocations of atoms' and claimed that the scientific theories leading to this conclusion 'if not quite beyond dispute, are yet so nearly certain, that no philosophy that rejects them can hope to stand. . .. Only on the firm found ion of unyielding despair can the soul's habitation henceforth be safely built.' Sir Fred Hoyle, the astronomer, talks of 'the truly dreadful situation in which we find ourselves. Here we are in this wholly fantastic universe with scarcely a clue as to whether our existence has any real significance.'

Estrangement breeds loneliness and despair, the 'encounter with nothingness', cynicism, empty gestures of defiance, as we can see in the greater part of existentialist philosophy and general literature today. Or it suddenly turns - as I have mentioned before - into the ardent adoption of a fanatical teaching which, by a monstrous simplification of reality, pretends to answer all questions. So, what is the cause of estrangement? Never has science been more triumphant; never has man's power over his environment been more complete nor his progress faster. It cannot be a lack of know-how that causes the despair not only of religious thinkers like Kierkegaard but also of leading mathematicians and scientists like Russell and Hoyle. We know how to do many things, but do we know *what* to do? Ortega y Gasset put it succinctly: 'We cannot live on the human level without ideas. Upon them depends what we do. Living is nothing more or less than doing one thing instead of another.' What, then, is education? It is the transmission of ideas which enable man to choose between one thing and another, or, to quote Ortega again, 'to live a life which is something above meaningless tragedy or inward disgrace'.

How could for instance a knowledge of the Second Law of Thermodynamics help us in this? Lord Snow tells us that when educated people deplore the 'illiteracy of scientists' he sometimes asks 'How many of them could describe the Second Law of Thermodynamics?' The response, he reports, is usually cold and negative. 'Yet,' he says, 'I was asking something which is about the scientific equivalent of: have you read a work of Shakespeare's?' Such a statement challenges the entire basis of our civilisation. What matters is the tool-box of ideas with which, by which, through which, we experience and interpret the world. The Second Law of Thermodynamics is nothing more than a working hypothesis suitable for various types of scientific research. On the other hand - a work by Shakespeare: teeming with the most vital ideas about the *inner* development of man, showing the whole grandeur and misery of a human existence. How could these two things be equivalent? What do I miss, as a human being,

if I have never heard of the Second Law of Thermodynamics? The answer is: nothing.[1] And what do I miss by not knowing Shakespeare? Unless I get my understanding from another source, I simply miss my life. Shall we tell our children that one thing is as good as another - here a bit of knowledge of physics, and there a bit of knowledge of literature? If we do so the sins of the fathers will be visited upon the children unto the third and fourth generation, because that normally is the time it takes from the birth of an idea to its full maturity when it fills the minds of a new generation and makes them think *by it.*

Science cannot produce ideas by which we could live. Even the greatest ideas of science are nothing more than working hypotheses, useful for purposes of special research but completely inapplicable to the conduct of our lives or the interpretation of the world. If, therefore, a man seeks education because he feels estranged and bewildered, because his life seems to him empty and meaningless, he cannot get what he is seeking by studying any of the natural sciences, i.e. by acquiring 'know-how'. That study has its own value which I am not inclined to belittle; it tells him a great deal about how things work in nature or in engineering: but it tells him nothing about the meaning of life and can in no way cure his estrangement and secret despair.

Where, then, shall he turn? Maybe, in spite of all that he hears about the scientific revolution and ours being an age of science, he turns to the so- called humanities. Here indeed he can find, if he is lucky, great and vital ideas to fill his mind, ideas with which to think and through which to make the world, society, and his own life intelligible. Let us see what are the main ideas he is likely to find today. I cannot attempt to make a complete list; so I shall confine myself to the enumeration of six leading ideas, all stemming from the nineteenth century, which still dominate, as far as I can see, the minds of 'educated' people today.

1. There is the idea of evolution - that higher forms continually develop out of lower forms, as a kind of natural and automatic process. The last hundred years or so have seen the systematic application of this idea to all aspects of reality without exception.

2. There is the idea of competition, natural selection, and the survival of the fittest, which purports to explain the natural and automatic process of evolution and development.

3. There is the idea that all the higher manifestations of human life, such as religion, philosophy, art, etc. - what Marx calls 'the phantasmagorias in the brains of men' - are nothing but 'necessary supplements of the material life process', a superstructure erected to disguise and promote economic interests, the whole of human history being the history of class struggles.

[1] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

4. In competition, one might think, with the Marxist interpretation of all higher manifestations of human life, there is, fourthly, the Freudian interpretation which reduces them to the dark stirrings of a subconscious mind and explains them mainly as the results of unfulfilled incest-wishes during childhood and early adolescence.

5. There is the general idea of relativism, denying all absolutes, dissolving all norms and standards, leading to the total undermining of the idea of truth in pragmatism, and affecting even mathematics, which has been defined by Bertrand Russell as 'the subject in which we never know what we are talking about, or whether what we say is true'.

6. Finally there is the triumphant idea of positivism, that valid knowledge can be attained only through the methods of the natural sciences and hence that no knowledge is genuine unless it is based on generally observable facts. Positivism, in other words, is solely interested in 'knowhow' and denies the possibility of objective knowledge about meaning and pui-pose of any kind.

No-one, I think, will be disposed to deny the sweep and power of these six 'large' ideas. They are not the result of any narrow empiricism. No amount of factual inquiry could have verified any one of them. They represent tremendous leaps of the imagination into the unknown and unknowable. Of course, the leap is taken from a small platform of observed fact. These ideas could not have lodged themselves as firmly in men's minds, as they have done, if they did not contain important elements of truth. But their essential character is their claim of universality. Evolution takes everything into its stride, not only material phenomena from *nebulae* to *homo sapiens* but also all mental phenomena, such as religion or language. Competition, natural selection, and the survival of the fittest are not presented as one set of observations among others, but as universal laws. Marx does not say that some parts of history are made up of class struggles; no, 'scientific materialism', not very scientifically, extends this partial observation to nothing less than the whole of 'the history of all hitherto existing society'. Freud, again, is not content to report a number of clinical observations but offers a universal theory of human motivation, asserting, for instance, that all religion is nothing but an obsessional neurosis. Relativism and positivism, of course, are purely metaphysical doctrines with the peculiar and ironical distinction that they deny the validity of all metaphysics, including themselves.

What do these six 'large' ideas have in common, besides their non- empirical, metaphysical nature? They all assert that what had previously been taken to be something of a higher order is really 'nothing but' a more subtle manifestation of the 'lower' - unless, indeed, the very distinction between higher and lower is denied. Thus man, like the rest of the universe, is really nothing but an accidental collocation of atoms. The difference between a man and a stone is little more than a deceptive appearance. Man's highest cultural achievements are nothing but disguised economic greed or the outflow

of sexual frustrations. In any case, it is meaningless to say that man should aim at the 'higher' rather than the 'lower' because no intelligible meaning can be attached to purely subjective notions like 'higher' or 'lower', while the word 'should' is just a sign of authoritarian megalomania.

The ideas of the fathers in the nineteenth century have been visited on the third and fourth generations living in the second half of the twentieth century. To their originators, these ideas were simply the result of their intellectual processes. In the third and fourth generations, they have become the very tools and instruments through which the world is being experienced and interpreted. Those that bring forth new ideas are seldom ruled by them. But their ideas obtain power over men's lives in the third and fourth generations when they have become a part of that great mass of ideas, including language, which seeps into a person's mind during his 'Dark Ages'.

These nineteenth-century ideas are firmly lodged in the minds of practically everybody in the western world today, whether educated or uneducated. In the uneducated mind they are still rather muddled and nebulous, too weak to make the world intelligible. Hence the longing for education, that is to say, for something that will lead us out of the dark wood of our muddled ignorance into the light of understanding.

I have said that a purely scientific education cannot do this for us because it deals only with ideas of know-how, whereas we need to understand why things are as they are and what we are to do with our lives. What we learn by studying a particular science is in any case too specific and specialised for our wider purposes. So we turn to the humanities to obtain a clear view of the large and vital ideas of our age. Even in the humanities we may get bogged down in a mass of specialised scholarship furnishing our minds with lots of small ideas just as unsuitable as the ideas which we might pick up from the natural sciences. But we may also be more fortunate (if fortunate it is) and find a teachpr who will 'clear our minds', clarify the ideas - the 'large' and universal ideas already existent in our minds - and thus make the world intelligible for us.

Such a process would indeed deserve to be called 'education'. And what do we get from it today? A view of the world as a wasteland in which there is no meaning or purpose, in which man's consciousness is an unfortunate cosmic accident, in which anguish and despair are the only final realities. If by means of a real education man manages to climb to what Ortega calls 'the Height of Our Times' or 'the Height of the Ideas of our Times', he finds himself in an abyss of nothingness. He may feel like echoing Byron:

Sorrow is knowledge; they who know the most

Must mourn the deepest o'er the fatal truth, The Tree of Knowledge is not that of Life.

In other words, even a humanistic education lifting us to the height of the ideas of our time cannot 'deliver the goods', because what men are quite legitimately looking for is life more abundant, and not sorrow.

What has happened? How is such a thing possible?

The leading ideas of the nineteenth century, which claimed to do away with metaphysics, are themselves a bad, vicious, life-destroying type of metaphysics. We are suffering from them as from a fatal disease. It is not true that knowledge is sorrow. But poisonous errors bring unlimited sorrow in the third and fourth generation. The errors are not in science but in the philosophy put forward in the name of science. As Etienne Gilson put it more than twenty years ago:

'Such a development was by no means inevitable, but the progressive growth of natural science had made it more and more probable. The growing interest taken by men in the practical results of science was in itself both natural and legitimate, but it helped them to forget that science is knowledge, and practical results but its by-products . .. Before their unexpected success in finding conclusive explanations of the material world, men had begun either to despise all disciplines in which such demonstrations could not be found, or to rebuild those disciplines after the pattern of the physical sciences. As a consequence, metaphysics and ethics had to be either ignored or, at least, replaced by new positive sciences; in either case, they would be eliminated. A very dangerous move indeed, which accounts for the perilous position in which western culture has now found itself.

It is not even true the metaphysics and ethics would be eliminated. On the contrary, all we got was bad metaphysics and appalling ethics.

Historians know that metaphysical errors can lead to death. R. G. Collingwood wrote:

'The Patristic diagnosis of the decay of Greco-Roman civilisation ascribes that event to a metaphysical disease ... It was not barbarian attacks that destroyed the Greco-Roman world ... The cause was a metaphysical cause. The "pagan" world was failing to keep alive its own fundamental convictions, they (the patristic writers) said, because owing to faults in metaphysical analysis it had become confused as to what these convictions were ... If metaphysics had been a mere luxury of the intellect, this would not have mattered.'

This passage can be applied, without change, to present-day civilisation. We have become confused as to what our convictions really are. The great ideas of the nineteenth century may fill our minds in one way or another, but our hearts do not believe in them all the same. Mind and heart are at war with one another, not, as is commonly asserted, reason and faith. Our reason has become beclouded by an extraordinary, blind and unreasonable faith in a set of fantastic and life-destroying ideas inherited from the nineteenth century. It is the foremost task of our reason to recover a truer faith than that.

Education cannot help us as long as it accords no place to metaphysics. Whether the subjects taught are subjects of science or of the humanities, if the teaching does not lead to a clarification of metaphysics, that is to say, of our fundamental convictions, it cannot educate a man and, consequently, cannot be of real value to society.

It is often asserted that education is breaking down because of overspecialisation. But this is only a partial and misleading diagnosis. Specialisation is not in itself a faulty

principle of education. What would be the alternative - an amateurish smattering of all major subjects? Or a lengthy *studium generale* in which men are forced to spend their time sniffing at subjects which they do not wish to pursue, while they are being kept away from what they want to learn? This cannot be the right answer, since it can only lead to the type of intellectual man, whom Cardinal Newman castigated - 'an intellectual man, as the world now conceives of him,. .. one who is full of "views" on all subjects of philosophy, on all matters of the day'. Such

'viewiness' is a sign of ignorance rather than knowledge. 'Shall I teach you the meaning of knowledge?' said Confucius. 'When you know a thing to recognise that you know it, and when you do not, to know that you do not know - that is knowledge.'

What is at fault is not specialisation, but the lack of depth with which the subjects are usually presented, and the absence of metaphysical awareness. The sciences are being taught without any awareness of the presuppositions of science, of the meaning and significance of scientific laws, and of the place occupied by the natural sciences within the whole cosmos of human thought. The result is.that the presuppositions of science are normally mistaken for its findings. Economics is being taught without any awareness of the view of human nature that underlies present-day economic theory. In fact, many economists are themselves unaware of the fact that such a view is implicit in their teaching and that nearly all their theories would have to change if that view changed. How could there be a rational teaching of politics without pressing all questions back to their metaphysical roots? Political thinking must necessarily become confused and end in 'double-talk' if there is a continued refusal to admit the serious study of the metaphysical and ethical problems involved. The confusion is already so great that it is legitimate to doubt the educational value of studying many of the so-called humanistic subjects. I say 'so-called' because a subject that does not make explicit its view of human nature can hardly be called humanistic.

All subjects, no matter how specialised, are connected with a centre; they are like rays emanating from a sun. The centre is constituted by our most basic convictions, by those ideas which really have the power to move us. In other words, the centre consists of metaphysics and ethics, of ideas that - whether we like it or not - transcend the world of facts. Because they transcend the world of facts, they cannot be proved or disproved by ordinary scientific method. But that does not mean that they are purely 'subjective' or 'relative' or mere arbitrary conventions. They must be true to reality, although they transcend the world of facts - an apparent paradox to our positivistic thinkers. If they are not true to reality, the adherence to such a set of ideas must inevitably lead to disaster.

Education can help us only if it produces 'whole men'. The truly educated man is not a man who knows a bit of everything, not even the man who knows all the details of all subjects (if such a thing were possible): the 'whole man', in fact, may have little detailed knowledge of facts and theories, he may treasure the *Encyclopaedia Britannica* because 'she knows and he needn't', *but he will be truly in touch with the centre.* He will not be in doubt about his basic convictions, about his view on the meaning and

purpose of his life. He may not be able to explain these matters in words, but the conduct of his life will show a certain sureness of touch which stems from his inner clarity.

I shall try to explain a little bit further what is meant by 'centre'. All human activity is a striving after something thought of as good. This is not more than a tautology, but it helps us to ask the right question: 'Good for whom?' Good for the striving person. So, unless that person has sorted out and co-ordinated his manifold urges, impulses, and desires, his strivings are likely to be confused, contradictory, self-defeating, and possibly highly destructive. The 'centre', obviously, is the place where he has to create for himself an orderly system of ideas about himself and the world, which can regulate the direction of his various strivings. If he has never given any thought to this (because he is always too busy with more important things, or he is proud to think 'humbly' of himself as an agnostic), the centre will not by any means be empty: it will be filled with all those vital ideas which, in one way or another, have seeped into his mind during his Dark Ages. I have tried to show what these ideas are likely to be today: a total denial of meaning and purpose of human existence on earth, leading to the total despair of anyone who really believes in them. Fortunately, as I said, the heart is often more intelligent than the mind and refuses to accept these ideas in their full weight. So the man is saved from despair, but landed in confusion. His fundamental convictions are confused; hence his actions, too, are confused and uncertain. If he would only allow the light of consciousness to fall on the centre and face the question of his fundamental convictions, he could create order where there is disorder. That would 'educate' him, in the sense of leading him out of the darkness of his metaphysical confusion.

I do not think, however, that this can be successfully done unless he quite consciously accepts - even if only provisionally - a number of metaphysical ideas which are almost directly opposite to the ideas (stemming from the nineteenth century) that have lodged in his mind. I shall mention three examples.

While the nineteenth-century ideas deny or obliterate the hierarchy of levels in the universe, the notion of an hierarchical order is an indispensable instrument of understanding. Without the recognition of 'Levels of Being' or 'Grades of Significance' we cannot make the world intelligible to ourselves nor have we the slightest possibility to define our own position, the position of man, in the scheme of the universe. It is only when we can see the world as a ladder, and when we can see man's position on the ladder, that we can recognise a meaningful task for man's life on earth. Maybe it is man's task - or simply, if you like, man's happiness - to attain a higher degree of realisation of his potentialities, a higher level of being or 'grade of significance' than that which comes to him 'naturally': we cannot even study this possibility except by recognising the existence of a hierarchical structure. To the extent that we interpret the world through the great, vital ideas of the nineteenth century, we are blind to these differences of level, because we have been blinded.

As soon, however, as we accept the existence of 'levels of being', we can readily understand, for instance, why the methods of physical science cannot be applied to the

study of politics or economics, or why the findings of physics - as Einstein recognised - have no philosophical implications.

If we accept the Aristotelian division of metaphysics into ontology and epistemology, the proposition that there are levels of being is an ontological proposition; I now add an epistemological one: the nature of our thinking is such that we cannot help thinking in opposites.

It is easy enough to see that all through our lives we are faced with the task of reconciling opposites which, in logical thought, cannot be reconciled. The typical problems of life are insoluble on the level of being on which we normally find ourselves. How can one reconcile the demands of freedom and discipline in education? Countless mothers and teachers, in fact, do it, but no-one can write down a solution. They do it by bringing into the situation a force that belongs to a higher level where opposites are transcended - the power of love.

G. N. M. Tyrell has put forward the terms 'divergent' and 'convergent' to distinguish problems which cannot be solved by logical reasoning from those that can. Life is being kept going by divergent problems which have to be 'lived' and are solved only in death. Convergent problems on the other hand are man's most useful invention; they do not, as such, exist in reality, but are created by a process of abstraction. When they have been solved, the solution can be written down and passed on to others, who can apply it without needing to reproduce the mental effort necessary to find it. If this were the case with human relations - in family life, economics, politics, education, and so forth - well, I am at a loss how to finish the sentence. There would be no more human relations but only mechanical reactions; life would be a living death. Divergent problems, as it were, force man to strain himself to a level above himself; they demand, and thus provoke the supply of, forces from a higher level, thus bringing love, beauty, goodness, and truth into our lives. It is only with the help of these higher forces that the opposites can be reconciled in the living situation.

The physical sciences and mathematics are concerned exclusively with convergent problems. That is why they can progress cumulatively, and each new generation can begin just where their forbears left off. The price, however, is a heavy one. Dealing exclusively with convergent problems does not lead into life but away from it.

'Up to the age of thirty, or beyond it', wrote Charles Darwin in his autobiography, 'poetry of many kinds ... gave me great pleasure, and even as a schoolboy I took intense delight in Shakespeare, especially in the historical plays. I have also said that formerly pictures gave me considerable, and music very great, delight. But now for many years I cannot endure to read a line of poetry: I have tried lately to read Shakespeare, and found it so intolerably dull that it nauseated me. I have also lost almost any taste for pictures or music... My mind seems to have become a kind of machine for grinding general laws out of large collections of fact, but why this should have caused the atrophy of that part of the brain alone, on which the higher tastes depend, I cannot conceive. ... The loss of these tastes is a loss of happiness, and may possibly be injurious to the

intellect, and more probably to the moral character, by enfeebling the emotional part of our nature.'[2]

This impoverishment, so movingly described by Darwin, will overwhelm our entire civilisation if we permit the current tendencies to continue which Gilson calls 'the extension of positive science to social facts'. All divergent problems can be turned into convergent problems by a process of 'reduction'. The result, however, is the loss of all higher forces to ennoble human life, and the degradation not only of the emotional part of our nature, but also, as Darwin sensed, of our intellect and moral character. The signs are everywhere visible today.

The true problems of living - in politics, economics, education, marriage, etc. - are always problems of overcoming or reconciling opposites. They are divergent problems and have no solution in the ordinary sense of the word. They demand of man not merely the employment of his reasoning powers but the commitment of his whole personality. Naturally, spurious solutions, by way of a clever formula, are always being put forward; but they never work for long, because they invariably neglect one of the two opposites and thus lose the very quality of human life. In economics, the solution offered may provide for freedom but not for planning, or vice versa. In industrial organisation, it may provide for discipline but not for workers' participation in management, or vice versa. In politics, it might provide for leadership without democracy or, again, for democracy without leadership.

To have to grapple with divergent problems tends to be exhausting, worrying, and wearisome. Hence people try to avoid it and to run away from it. A busy executive who has been dealing with divergent problems all day long will read a detective story or solve a crossword puzzle on his journey home. He has been using his brain all day; why does he go on using it? The answer is that the detective story and the crossword puzzle present convergent problems, and *that* is the relaxation. They require a bit of brainwork, even difficult brainwork, but they do not call for this straining and stretching to a higher level which is the specific challenge of a divergent problem, a problem in which irreconcilable opposites have to be reconciled. It is only the latter that are the real stuff of life.

Finally, I turn to a third class of notions, which really belong to metaphysics, although they are normally considered separately: ethics.

The most powerful ideas of the nineteenth century, as we have seen, have denied or at least obscured the whole concept of 'levels of being' and the idea that some things are higher than others. This, of course, has meant the destruction of ethics which is based on the distinction of good and evil, claiming that good is higher than evil. Again, the sins of the fathers are being visited on the third and fourth generations who now find themselves growing up without moral instruction of any kind. The men who conceived the idea that 'morality is bunk did so with a mind well-stocked with moral

[2] Cole, H. S. D., C. Freeman, M. Jahoda, and K. L. R. Pavitt. *Thinking about the Future: A Critique of the Limits to Growth,* London: Chatto and Windus, 1973.

ideas. But the minds of the third and fourth generations are no longer well-stocked with such ideas: they are well-stocked with ideas conceived in the nineteenth century, namely, that 'morality is bunk', that everything that appears to be 'higher' is really nothing but something quite mean and vulgar.

The resulting confusion is indescribable. What is the *Leitbild,* as the Germans say, the guiding image, in accordance with which young people could try to form and educate themselves? There is none, or rather there is such a muddle and mess of images that no sensible guidance issues from them. The intellectuals, whose function it would be to get these things sorted out, spend their time proclaiming that everything is relative - or something to the same effect. Or they deal with ethical matters in terms of the most unabashed cynicism.

I shall give an example already alluded to above. It is significant because it comes from one of the most influential men of our time, the late Lord Keynes. 'For at least another hundred years,' he wrote, 'we must pretend to ourselves and to every one that fair is foul and foul is fair; for foul is useful and fair is not. Avarice and usury and precaution must be our gods for a little longer still.'

When great and brilliant men talk like this, we cannot be surprised if there arises a certain confusion between fair and foul, which leads to double talk as long as things are quiet, and to crime when they get a bit more lively. That avarice, usury, and precaution (i.e. economic security) should be our gods was merely a bright idea for Keynes; he surely had nobler gods. But ideas are the most powerful things on earth, and it is hardly an exaggeration to say that by now the gods he recommended have been enthroned.

In ethics, as in so many other fields, we have recklessly and wilfully abandoned our great classical-Christian heritage. We have even degraded the very words without which ethical discourse cannot carry on. words like virtue, love, temperance. As a result, we are totally ignorant, totally uneducated in the subject that, of all conceivable subjects, is the most important. We have no ideas to think with and therefore are only too ready to believe that ethics is a field where thinking does no good. Who knows anything today of the Seven Deadly Sins or of the Four Cardinal Virtues? Who could even name them? And if these venerable, old ideas are thought not to be worth bothering about, what new ideas have taken their place?

What is to take the place of the soul- and life-destroying metaphysics inherited from the nineteenth century? The task of our generation, I have no doubt, is one of metaphysical reconstruction. It is not as if we had to invent anything new; at the same time, it is not good enough merely to revert to the old formulations. Our task - and the task of all education - is to understand the present world, the world in which we live and make our choices.

The problems of education are merely reflections of the deepest problems of our age. They cannot be solved by organization, administration, or the expenditure of money, even though the importance of all these is not denied. We are suffering from a metaphysical disease, and the cure must therefore be metaphysical. Education which

fails to clarify our central convictions is mere training or indulgence. For it is our central convictions that are in disorder, and, as long as the present anti-metaphysical temper persists, the disorder will grow worse. Education, far from ranking as man's greatest resource, will then be an agent of destruction, in accordance with the principle *corruptio optimi pessima.*

2. Christian Attitudes to Nature

Robin Attfield

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The roots of our ecological problems are often set down these days to the Judaeo-Christian tradition, and Christian attitudes to nature are often held to perpetuate these problems. There is some evidence for these views, but there is also much more evidence than is usually acknowledged for other, more beneficent Christian attitudes to the environment and to nonhuman nature; from this complex picture the adverse interpretation of Christian attitudes is at times derived by such methods as the selective use of evidence and the exaggeration of the significance of some of the evidence selected. At the same time the evidence for gentler attitudes is underplayed. There is some justification for highlighting what needs to be rejected if our attitudes are to be wholesome ones; but if the attitudes commended are in fact central within the Christian tradition, then disparaging it will not only distort the historical record but also unnecessarily forfeit resources by which these attitudes could be supported. Before turning to the evidence, I shall first summarize the positions of three critics of Christian attitudes, John Passmore, William Coleman, and, first of all, the writer whose account they each criticize and modify (and in some degree follow), Lynn White, Jr.[1]

I. According to Lynn White's widely republished essay "The Roots of Our Ecological Crisis," these roots lie in the Judaeo-Christian belief that man, being made in God's image, is set apart from nature, and that the entire physical creation was brought into being for human benefit and rule. The immediate roots of the crisis are to be found in the nineteenth-century coalition of science and technology, but both science and technology reflect the most influential interpretation of the tradition inherited by the Western world from *Genesis,* and adopted long before the age of Copernicus, Galileo, and Newton. Centuries earlier than this the medieval West far outstripped contemporary civilizations in technology, ruthlessly exploiting natural forces for human ends; and this distinctively occidental posture was no historical accident, but reflected the characteristic beliefs adopted in the West through the victory of Christianity over paganism. Pagan animism involved respect for the guardian spirits of trees, streams, and hills; Christianity allowed its adherents to disregard the feelings of natural objects, and with Christianity "the old inhibitions to the exploitation of nature crumbled."[2]

[1] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

[2] Cole, H. S. D., C. Freeman, M. Jahoda, and K. L. R. Pavitt. *Thinking about the Future: A Critique of the Limits to Growth,* London: Chatto and Windus, 1973.

Accordingly, we cannot solve our problems by more science and technology; we must get to the root of them and either replace the lingering attitudes of Christianity with those of Zen Buddhism, or, if that proves not to be viable, adopt the heretical views of St. Francis, believer in panpsychism and the democracy of all God's creatures.

As will be seen, White overdramatizes the change of the human role vis-a- vis nature introduced by Christianity. Thus in his illuminating study of medieval technology he comments as follows on the invention, in seventh-century northern Europe, of the eight-oxen plough complete with horizontal share and mouldboard, and the possible concomitant changes in distribution of land and crops: "No more fundamental change in the idea of man's relation to the soil can be imagined: once man had been part of nature; now he became her exploiter."[3] This isolated and staccato comment seems to assimilate heavy ploughing to the targets of contemporary ecological concern such as nuclear fallout, defoliation or the destruction of the Amazonian rainforest; before his readers see it like this, he must persuade them first that it was at any rate reprehensible. Can *this* be what a new religion is required to curtail? Indeed White's tendency to exaggerate has also been criticized by fellow-historians in the matter of his assessment of the social impact of technological innovations[4]

Now Passmore rejects White's view that the Old Testament must be interpreted as exploitative, though he holds that it does not proscribe despotic attitudes, and that its laws requiring various forms of consideration for animals are either responses to heathen rituals or motivated by concern for property. But Paul discarded such concern for animals as the Old Testament had shown, and soon the biblical belief in the human dominion over nature became allied to the Stoic belief that the irrational existed for the sake of the rational, and that people could do with nonhuman nature as they pleased without moral constraint. This attitude of "Greco-Christian arrogance" became the official position of Christianity down to recent times, though it was not systematically acted on until the modern scientific movement initiated by Bacon and Descartes. Passmore acknowledges that belief in human dominion can be taken not as despotic but as implying that humanity, as the steward or bailiff of God's creation, has responsibility for its care. But, though he finds this view of man's role in Plato's *Phaedrus* and in lambli- chus, he holds that it was not held among Christians before Sir Matthew Hale in the seventeenth century, and was held only occasionally until it became a widespread view in the last few years. Another minority tradition, on which man is to cooperate with nature to perfect it by realizing its potentialities, is traced to the ancient Hermetic writings and then among the German Romantics such as Fichte, as if it were foreign to most of the centuries in between.

Nevertheless the existence of these minority traditions shows that there already exist within Western traditions the "seeds" of a more responsible attitude to nature than the Greco-Christian one. Just as it has become accepted during the nineteenth

[3] Engels, F. *The Dialectics of Nature.* New York: International Publishers, 1940.
[4] Firey, W. *Man, Mind and the Land.* Glencoe, Illionis: Free Press, 1960.

and twentieth centuries that cruelty to animals and indifference to animal suffering is wrong, so there is scope for the development of a revised attitude to the natural world as a whole, in which the survival of no species is regarded as metaphysically guaranteed, the interdependence of species is accepted, and care is taken to avoid the despoliation of nature through the unforeseen side effects of human action. At the same time the Biblical denial that nature is sacred is endorsed, belief in the rights of animals is rejected, the value of science and technology is reaffirmed, and the preservation of human civilization is presented as morally central. By contrast with the passivity of oriental religion, the active interventions favored by the "stewardship" tradition aimed at preserving natural beauty or alleviating ecological problems are commended, though probably not all adherents of that tradition would be satisfied by the limited extent of Passmore's concern for people of more than a century hence or for preservation of wildlife and wilderness. Passmore's more recent writings, in fact, seem to call for many more revisions in the areas of ethics and metaphysics than does his book,[5] but the above account reflects his overall published position, despite his changes of emphasis. It is also perhaps appropriate to mention at this stage his high regard for the stimulation to be derived from the "vast storehouse of learning" in one particular book singled out for attention in his Preface: C.J. Glacken's *Traces on the Rhodian Shore?*

Coleman for his part concurs to some degree with the critique of White's position supplied by Lewis W. Moncrief.[6] Moncrief points out that environmental stress is not peculiar to Christian cultures, and holds that even if religious beliefs have contributed to the problems, their influence will have been indirect, and is no better evidenced than the ties between Christianity and capitalism. Moncrief largely rejects White's thesis as it concerns the medieval period, and Coleman, despite a greater sympathy with White, grants much of Moncriefs case here and also on the need to recognize a multiplicity of factors contributing to the despoliation of nature. But Coleman also claims that a form of Christian apologetics (developing from the end of the seventeenth century onwards) in which one of the evidences of providence was the endowment of some men with predispositions to manufacture and trade, constituted a blessing on capitalist enterprise; and that the writings of the theologian principally concerned. William Derham, provided just the kind of empirical basis which Moncrief had found wanting for the link between Christianity and the more direct causes of ecological stress.

Thus the contribution of Christianity to our worldwide ecological problems was a significant one, but Coleman has located it some millennia later than White had. I shall return to these and kindred matters concerning Christian attitudes to nature in the early modern period after reviewing the biblical evidence and the evidence from the patristic and medieval periods as it is relevant to the positions of White and Passmore.

[5] Glacken, C. *Traces on the Rhodian Shore.* Berkeley: University of California Press, 1967.
[6] Harvey, D. *Social Justice and the City.* Baltimore: Johns Hopkins Press, 1973.

II. As Passmore has acknowledged in "Attitudes to Nature,"[s] it is not the position of the Old Testament that everything exists to serve humanity, and White is mistaken to suggest otherwise. Thus the valleys are said to be watered for the sake of wild beasts (Psalm 104: 10f.), and the same Psalm expresses God's care for a great variety of wild creatures. Similarly the uninhabited wilderness is given rain to support the plants (Job 38: 26f.) Passages such as Psalm 148 and Psalm 104: 24, which express admiration of God's handiwork and the praise in which all his creatures join, cast doubt on Passmore's claim that, to Christianity, nature "exists primarily as a resource rather than as something to be contemplated with enjoyment.''[0] White and Passmore are correct to point out that in the Bible nature is not sacred, and that this attitude later allowed Christians to experiment on it in order to investigate its secrets; yet F.B. Welbourn[7] is also correct in denying that nature is, to the biblical writers, "unsacrosanct raw material." Not only does God find "everything that he had made . . . very good" (Genesis 1: 31), but according to Deutero-Isaiah (Isaiah 41: 17-20) God desires alongside the restoration of Israel that of nature's beauty and fertility.

The biblical belief in man's dominion over nature must not be interpreted as if these passages did not exist. In Genesis 1 only a vegetarian diet was authorized (vv. 29f.), and even when meat-eating was sanctioned (Genesis 9: 2f.), man's dominion, as Glacken points out (157), was probably seen as applying simply to meat-eating and to the domestication of animals. At any rate Welbourn is justified in observing, against White, that a large variety of religions besides animism have set limits to the permissible treatment of trees and animals (562), and that the religion of the Old Testament is among them (564). Indeed, in the light of a whole range of particular prohibitions (Leviticus 19: 23ff., 25: 1-12, Deuteronomy 14:4, 20:19, 22: 6f., 25:4) it is difficult to credit either White's claims that Christianity "insisted that it is God's will that man exploit nature for his proper ends" (11) and that with this victory "the old inhibitions to the exploitation of nature crumbled" (12), or Passmore's view "that man's relationships with [nature] are not governed by moral principles"[8]. Taken alone, these prohibitions could be construed as concerned with property or the elimination of paganism. But taken alongside the passages cited above, and together with the teaching that "The wise man has regard for the life of his beast" (Proverbs 12: 10)—where, according to Welbourn (564), the Hebrew word translated as ' has regard for" means "knowing," e.g., knowing one's wife or knowing

God—they exclude the interpretation that man may treat nature as he pleases.

Nor can the belief in man's dominion (Genesis 1: 26-28, 9: 1-17, Psalm 8: 5-8) be construed in this sense. Mankind is certainly authorized to rule, but only in a way consistent with the Hebrew notion of kingship. Kings among the Hebrews were

[7] Humboldt, A. von. *Essai Politique sur le Royaume de la Nouvelle Espagne.* Paris: F. Schoell, 1811.
[8] Jacks, G. V. and R. O. Whyte. *Vanishing Lands.* New York: Doubleday, 1939.

regarded as responsible to God for the realm.[9] The attitude appropriate for a king was that of David at I Chronicles 29: 11, 14:

Thine, O Lord, is the greatness, and the power and the glory, and the majesty: for all that is in the heavens and in the earth is thine... . But who am I. and what is my people, that we should be able thus to offer willingly? For all things come of thee, and of thine own have we given thee.

Whether or not rulers lived in accordance with this attitude, it is enough that the Hebrew understanding of dominion involved answer-ability and responsibility in matters of kingship and of property alike.[10]

The conclusion that mankind's dominion over nature was construed as the responsible exercise of a circumscribed mandate is further supported by John Black's interpretation of Genesis 2: 15. part of the Jahwist account of the creation. "And the Lord God took the man, and put him into the garden of Eden to dress it and to keep it." Man was thus to preserve the garden's beauty and protect it from harm, as well as derive his food from it. Pass- more[11] writes as if this mandate was abolished by the Fall and the curse which followed; but the prelapsarian mandate of dominion was renewed after the Fall, as Passmore allows (6), and the changed conditions resulting from the Fall can hardly have led the readers of Genesis to hold that mankind was exonerated of previous responsibilities. Similarly Glacken comments on Psalm 8 that once the conception of man's dominion is fully elaborated "there is . . . far less room for arrogance and pride than the bare reading of the words would suggest" (166). Indeed he inclines towards the view that man was in the Bible "a steward of God" (168). Passmore, as we have seen, traces belief among Christians in mankind's stewardship of nature no earlier than the seventeenth century; but at least in this case the interpretation of his mentor is to be preferred.

Likewise the New Testament bespeaks God's care for animals such as sparrows (Matthew 10: 29, Luke 12: 6) and plants such as lilies (Matthew 7: 28-30), just as much as the Old. There is no more reason to regard Jesus' advocacy of rescuing asses and oxen which have fallen into pits on the sabbath (Luke 14: 5) as motivated solely by concern for property than the Old Testament provisions relating to the well-being of domestic animals. Indeed in one parable Jesus regards with obvious sympathy the painstaking retrieval by a shepherd of the hundredth sheep, an act with slight benefit (if any) to the shepherd (Luke 15: 4-7). Against this view of his attitude to plants and animals may be urged his curse on the barren fig-tree (Mark 11: 13f., 20-24) and his treatment of the Gadarene swine (Mark 5: 1—20). In the former case, however, we have a parable at Luke 13: 6-9 which could easily have changed into the Markan narrative. Such a transition would not be unparalleled; and Stephen Clark suspects another in

[9] Kapp, K. W. *The Social Costs of Private Enterprise.* Cambridge, Massachusetts: Harvard University Press, 1950.

[10] Keynes, J. M. *The General Theory of Employment, Interest and Money.* New York: Harcourt Brace, 1936.

[11] Firey, W. *Man, Mind and the Land.* Glencoe, Illionis: Free Press, 1960.

the matter of the pigs,[12] the symbolic significance of which, as unclean animals driven out from a Gentile territory prior to its conversion, may be sufficient to account for their presence in the narrative. It is thus far from clear that the historical Jesus would have countenanced driving the swine to their deaths, though readers such as Augustine no doubt sincerely believed that this out-of-character course of action was actually his.

Paul is certainly a problem case in that regarding the Old Testament prohibition of muzzling the ox which treads the com he asks, "Does God care for oxen?" expecting the answer "no"; but as Clark points out, "When Paul was actually thinking about the fate of the non-human, as distinct from merely glancing at the topic in the course of a different argument, his judgement is" as in Romans 8:2If., where the whole creation is said to groan in travail in expectation of release from decay and participation in the liberty of the children of God. In "The Treatment of Animals" Passmore accepts that here not only humans are waiting on God (198); and, though he is probably right that the passage has influenced few since the Greek fathers to believe in the resurrection of animals, he cannot regard Paul's attitude to them here as a merely instrumental one. Non-human nature is similarly involved in the salvation of mankind in Colossians (1: 15-20); while at Revelation 5: 13 "every created thing" praises God and the Lamb, and Eden is symbolically restored (Revelation 22: 2; cf. Genesis 2: 9). With such eschatological expectations no despotic interpretation of the New Testament view of nature, even as far as the present is concerned, can be reconciled. The basic attitudes of the New Testament writers must indeed be seen as continuous with those of the Old Testament, which in any case they regarded as authoritative except where it was explicitly superseded.

III. Some of the diversity of Christian attitudes to nature in the patristic and medieval periods is recognized by White when he contrasts the symbolism and the contemplative tone of the piety of the Greek East with the more 'voluntarist' Western theology, which he believes to have promoted science from the early thirteenth century onwards. There is danger of overgeneralization here; thus Passmore locates in the West the 'exemplarist' posture, in which nature is a system of symbols to be decoded for man's enlightenment,[13] and Stanley L. Jaki finds an approach conducive to science in John Philoponus, the Eastern commentator on Aristotle.[14] In fact Christian attitudes were much more varied than either White or Passmore suggests, though I should acknowledge, as I have argued elsewhere,[15] that the doctrine of creation was conducive to the eventual emergence of modern science.

The gentle and compassionate attitude of the Greek fathers towards nonhuman creatures is recognized by Passmore. Basil prayed for animals; and Chrysostom urged kindness to them because we and they share a common origin. According to Glacken

[12] Kuhn, T. S. *The Structure of Scientific Revolutions.* Chicago: Chicago University Press, 1962.

[13] Levi-Strauss, C. *Tristes Tropiques.* New York: Atheneum, 1973.

[14] Losch, A. *The Economics of Location.* New Haven: Yale University Press, 1954.

[15] Malthus, T. R. *An Essay on the Principle of Population and a Summary View of the Principle of Population.* Harmondsworth, Middlesex: Penguin Books, 1970.

(205) he also held that we can learn from them; and according to A.M. Allchin, Eastern Orthodoxy has never lost sight of man's cosmic vocation.[16] Moreover, according to John Rodman[17] the *Institutes* of Justinian incorporated the distinction between the *ius gentium* and the *ius naturae;* the latter endorsed motives like self-defense and the maternal instinct in both humans and animals, and significantly was interpreted like this until the. seventeenth century. Origen, however, as Passmore points out, was heavily influenced by the Stoic view that the irrational exists for the sake of the rational,[18] a view which may later have influenced Augustine to declare, in the course of an anti-Manichaean polemic, that the judgment of Jesus was that there are no moral ties between humans and animals.[19]

Passmore seems to find lacking among Christians up to the seventeenth century "the view that man's duty is to preserve the face of the earth in 'beauty, usefulness and fruitfulness'."[20] Nor does he recognize as biblical or as Christian the compatible view that people may improve, or attempt to perfect the natural universe so long as they cooperate with its potentials (33, 185). Yet Glacken (192) locates just such a view in Basil's influential *Hexae- meron:* "... for the proper and natural adornment of the earth is its completion: com waving in the valleys - meadows green with grass and rich with many coloured flowers—fertile glades and hill-tops shaded by forests." Here human changes crown the landscape and complete God's work, almost as explicitly as the passage of the Hermetic *Asclepius,* in citing which Passmore acknowledges his debt to Glacken Basil's theme of man as the furnisher and perfecter of creation was echoed even more explicitly by Ambrose in the West and Theodoret in Syria.

As to the view of man as steward, Glacken finds this view most explicit of all (300 f.) in *The Christian Topography* of Cosmas Indicopleustes, according to whom God has prepared creation like a house and appoints man to complete and adorn it. The idea of the desirability of improving the land seems to have become a commonplace, being cited alongside many less elevated ones in connection both with forest clearance and with forest conservation throughout the Middle Ages (313—45). Far from contesting Glacken's interpretation of the sources mentioned in this and the preceding paragraph, Passmore does not mention them, with the exception of *Asclepius.* This is a strange omission, as they seem to establish, contrary to Passmore's assertions, that the traditions of stewardship and of cooperation with nature are mainstream Christian ones, and also to *strengthen* Passmore's claim that these "minority" traditions are well-rooted in the West.

Passmore's interpretation of Augustine's anti-Manichaean passage seems to be right. But he is probably wrong in ascribing to Augustine the view that the irrational exists

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[16] Marx, K. *The Poverty of Philosophy.* New York: International Publishers, 1963.

[17] Marx, K. *The Economic and Philosophic Manuscripts of 1844.* New York: International Publishers, 1964.

[18] Marx, K. *Capital.* 3 volumes, New York: International Publishers, 1967.

[19] Marx, K. *The Grundrisse.* London: Macmillan, 1971.

[20] Marx, K. *Theories of Surplus Value.* Part 3, Moscow: Progress Publishers, 1972.

solely for the sake of the rational (15), or the view that the conservation or improvement of the natural world counts tor nothing in God's eyes (32), unless he is just making the general point that to Augustine no works guarantee salvation. For Augustine commends "the thought that has been spent upon nature" in a passage from Book XXII of *The City of God* quoted by Glacken (299 f.), a passage which praises improvements in agriculture, navigation and, let it be admitted, weaponry, and in its enthusiasm for "exuberant invention" somewhat belies Passmore's criticism of Augustine's asceticism.[21] As to the view that everything is made to satisfy mankind's need or pleasure, Augustine explicitly rejects it. There is, he holds, an order of nature in which the intelligent are superior, e.g., to cattle, the sentient to trees, and living things to the lifeless; but each of these things has "value ... in itself in the scale of creation."[22] Moreover, "... it is not with respect to our own convenience or discomfort, but with respect to their own nature, that the creatures are glorifying to their Artificer." Again, Passmore claims that "Augustinian Christianity neither laid the task sc. of completing God's creation on man's shoulders nor promised him God's help if he should undertake it," and believes that the Genesis myth suggests that the Universe is completed simply by man's living therein But Augustine held that man participates in God's work through the arts and the sciences, agriculture among them; a teaching put into practice, as Glacken says, by Benedict.[3 3] Thus, though Augustine sometimes expressed a despotic attitude to fellow-creatures, his position, seen in the round, does not reflect "Stoic-Christian arrogance," and is largely of a piece with the ideas of Basil and Ambrose on the perfecting of creation. (There was, indeed, a Stoic precedent for this view of mankind's role in the teaching of Posidonius;[23] but it should be stressed that despite lapses Augustine rejected Stoic anthropocentrism and accepted the intrinsic value of nonhuman creatures.)

In actual medieval practice saintliness was associated with kindness to animals in the West as well as in the East.[24] Nor could a merely instrumental view of animals have been fostered by the various benedictions on stables and sick domestic animals, or the *Benedict io Deprecatoria* on pests, which C. W. Hume has collected from the medieval Roman liturgy.[25] Passmore relates (108) that hermits lived in the wildnerness because it was the last foe to be conquered; yet monasteries in wild places, as Glacken remarks (302-04), were also seen as restoring paradise. In particular, the monasteries of the Benedictine rule encouraged work aimed at enhancing the beauty and fruitfulness

[21] Oilman, B. *Alienation: Marx's Conception of Man in Capitalist Society.* London: Cambridge University Press, 1971.

[22] Oilman, B. "Marxism and Political Science: Prolegomenon to a Debate on Marx's Method," *Politics and Society,* 3 (1973), pp. 491-510.

[23] Piaget, J. *The Principles of Genetic Epistemology.* London: Routledge and Kegan Paul, 1972.

[24] Ricardo, D. *Principles of Political Economy.* London: Cambridge University Press, 1951.

[25] Oilman, B. "Marxism and Political Science: Prolegomenon to a Debate on Marx's Method," *Politics and Society,* 3 (1973), pp. 491-510.

of the landscape.[26] Nor was it assumed that human action could not damage the environment. In this matter G. P. Marsh's warnings[27] were anticipated not only by John Evelyn (see next section) but also by Albertus Magnus;[28] indeed Glacken closely documents regulations aimed at conservation in the Alpine valleys and elsewhere in this period (342, and 313-46 *passim).* Indeed, active measures, like building dikes and digging ditches, were recognized as vital for preserving the land. The warnings and the regulations would, of course, have been unnecessary if deforestation was not at times excessive, something which the very success of monastic agriculture seems to have promoted; yet the existence of conflicts over forestry shows that not everyone's attitude was oriented towards maximizing short-term profits without thought for considerations such as natural beauty or generations to come.

As to the attitudes of medieval divines, the period is, as Glacken relates, too complex to be described in bold strokes (253). Thus Bonaventura and others regarded nature as a system of symbols (237f.), but Albert the Great and others studied it for its own interest as well as for its usefulness (227-29). Peter Lombard, as also later John Calvin, held that everything was made for man;[29] but John the Scot saw the whole of nature as "a movement powered by love of God."[30] Francis, according to Bonaventura, held views similar to those of Chrysostom about the appropriateness of gentleness towards animals and about the common origins of man and beast,[31] but Aquinas held cruelty to animals to be wrong only because of its bad effects on the agent's character and the owner's property.[32] He did also claim, however, that Paul's remark about oxen means only that God does not care about them as rational creatures, not that they are excluded from his providence.[33] He also recognized the comeliness which God's adornment of the world with plants added to its original shapeless condition, and understood mankind's proper work as including the further adornment of the created earth.[34] Passmore is probably right to imply that Aquinas' views have encouraged insensitivity towards animals. But his belief that it is part of man's perfection to impart perfection to other creatures after their kind[35] coheres well with the longstanding tradition of Posidonius, Basil, and Ambrose. Indeed overall "Greco-Christian arrogance"

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[26] Sauer, C. *Agricultural Origins and Dispersals.* New York: American Geographical Society. 1952.

[27] Schmidt, A. *The Concept of Nature in Marx.* London: New Left Books, 1971.

[28] Spoehr, A. "Cultural Differences in the Interpretation of Natural Resources," in W. L. Thomas (ed.), *Man's Role in Changing the Face of the Earth.* Chicago: Chicago University Press, 1956.

[29] Tarascio, V. J. *Pareto's Methodological Approach to Economics.* Chapel Hill, North Carolina: University of North Carolina Press, 1966.

[30] Vogt, W. *The Road to Survival,* New York: W. Sloane Associates, 1948.

[31] Wittgenstein, L. *Philosophical Investigations.* Oxford: Oxford University Press, 1958.

[32] Zinke, G. W. *The Problem of Malthus: Must Progress End in Overpopulation.* University of Colorado Studies, Series in Economics, No. 5, Boulder, Colorado, 1967.

[33] Overseas Development Administration briefing.

[34] 'Less pesticides do not mean less rice' FAO press release, 11 May 1992.

[35] *CDC Development Report May 1993* (London: The Commonwealth Development Corporation 1993).

is an unsuitable characterization of the patristic and medieval attitudes to nature, which often, though falteringly, approximated to that of active stewardship approved (but not found in this period) by Passmore.[36]

IV Though Calvin held that everything in creation was made for human beings, this was denied by Descartes,[37] and solemn reminders of its falsity were issued in the same century by Henry More and John Ray, in the next century by Linnaeus, and in the nineteenth century by William Paley.[38] Indeed Calvin combined his anthropocentrism with a belief in stewardship over the whole earth, not just, as Passmore claims, over the reprobate (29). Thus he writes; "Man was created in this condition, that the earth was subject to him; but he enjoys it only when he understands that it has been leased to him by the Lord. .. . Now if I want to plunder the earth of what God has given it for the nourishment of men, ... I want to bring to nothing the goodness of God... ."[39] and his teaching was "Let every one regard himself as the steward of God in all things which he possesses."[40] Here the biblical belief in stewardship and responsible dominion is re-emphasized well before its expression, according to Passmore, for the first time among Christians by Sir Matthew Hale in 1677.

In a deservedly famous passage, Hale wrote that man was created as God's viceroy, steward, and bailiff and was given dominion to curb the fiercer animals, protect the tame and useful ones, to preserve and improve plant species, to check unprofitable vegetable growth, and "to preserve the face of the Earth in beauty, usefulness and fruitfulness."[41] Passmore regards Hale's acceptance of this latter duty as not typically Christian, but it was in fact in direct continuity with the views of Basil, Ambrose, and Theodoret. (Indeed, Passmore's view that the activist attitudes of Hale — and also of Bacon — were Pelagian and out of keeping with Augustinian Christianity (30f., 19) would seem to imply that Augustine himself, with his praise of human art and industry, as attested above, was a Pelagian!) It should be remarked, however, that Hale held that all creatures, whether high or low in the natural order, are adapted to one another's needs and convenience, and not only to those of mankind

With Francis Bacon and Rene Descartes we certainly encounter a more activist and somewhat more ruthless approach, and to these pioneers of modern science Passmore attributes the beginnings of an uncompromising application of the attitude that man is at liberty to modify nature as he will (17). Bacon certainly hoped that the application

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[36] Firey, W. *Man, Mind and the Land.* Glencoe, Illionis: Free Press, 1960.

[37] *World Bank World Development Report 1992* p. 135.

[38] Macer, R. and Bartie, L, *Crop Biology in the Developing World* (ICI Seeds, 1990). ˜[50] Macer, R. and Bartie, L, *A World Perspective on Population, Agriculture and Food* (ICI Seeds, 1989).

[39] Beringer, E., Bale, M., Hayes, P. and Lazarus. C., 'Assessing and monitoring the risk of releasing genetically manipulated organisms', first published in Proceedings of the Royal Society of Edinburgh B100, 1992 (Symposium: Opportunities and Problems in Plant Biotechnology) and then by ICI Seeds, 1992.

[40] Straughan, R., *Ethics, Morality and Crop Biotechnology* (ICI Seeds, 1992).

[41] The Royal Commission on Environmental Pollution, *The Release of Genetically Engineered Organisms to the Environment,* Report 13 (London: HMSO, July 1989) p. 36.

of science would lead to the restoration of man's dominion, and in the *New Atlantis* he cherished the aim of "the enlarging of the bounds of the Human Empire, to the effecting of all things possible."[42] He also (like Descartes) supported vivisection for the sake of medical research.[43] Yet his words must be read against his admonition about the ends of knowledge, which is not to be sought for pleasure, profit, fame, or power, "but for the benefit and use of life, and that they perfect and govern it in charity. For ... of charity there can be no excess."[44] Neither these words nor his commendation of reverence before nature are the sentiments of a man who believes that there are no moral constraints on human transactions with nature.

Descartes is often held, as by Passmore,[45] to have supposed that nonhuman animals lacked feelings altogether. That, unlike his follower Mal- ebranche, Descartes did not believe this had been convincingly argued by John Cottingham;[46] but their supposed lack of thought in such animals was held by Descartes to justify killing and eating them.[47] His aim that we should "render ourselves the masters and possessors of nature"[48] certainly has a despotic tone; yet he was no advocate of irresponsible ruthlessness. Thus Descartes held that it was right to forego benefits for the living for the sake of the long-term advantage of posterity,[49] one of the central emphases of modern environmental ethics; and he would have opposed short-term gains which threatened human health, one of his main preoccupations. He also stressed the requirement for humility to reflect on our faults and the infirmity of our nature,[50]' in a way lacking in many of his followers.

In 1662 the Royal Society was instituted in England to pursue science by Baconian methods. Its members regarded this pursuit as a means of glorifying God and discovering evidence of His handiwork. One of the first works of its members was John Evelyn's *Silva, or A Discourse on Forest Trees',* in it, as also in the official *French Forest Ordinance* of 1669, the dangers of excessive deforestation are stressed, and Evelyn urges the need to understand and preserve the forests both in the national interest and for the sake of natural beauty. A similar and perhaps more striking expression of his. concern to avoid the adverse side effects of human action is found in his *Fu-*

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[42] *Development Forum,* May-June 1989.

[43] Glacken, C. *Traces on the Rhodian Shore.* Berkeley: University of California Press, 1967.

[44] Ian Carruthers, 'Going, going, gone; tropical agriculture as we knew it', *CDC Magazine* no. 12, 1993; Bunting, A. H. 'What is this thing called development?' *CDC Magazine,* no. 3, 1991.

[45] Dregne, op. cit.

[46] Independent Commission on International Humanitarian Issues, *The Encroaching Desert: The Consequences of Human Failure* (Zed Books, London, 1986).

[47] R. Nelson, quoted in B. Forse, "The Myth of the Marching Desert," *New Scientist,* Feb. 4, 1989, p. 32.

[48] Ibid.

[49] N. Myers, *Gaia: An Atlas of Planet Management;* P. R. Ehrlich, A. H. Ehrlich, and J. P. Holdren, *Ecoscience: Population, Resources, Environment* (Freeman, San Francisco, 1977), p. 628.

[50] Godelier, M. *Rationality and Irrationality in Economics.* London: New Left Books, 1972.

mifugium, a discourse on atmospheric pollution in cities such as London.[51] In many ways Evelyn anticipated George P. Marsh's theme in *Man and Nature* (published in 1864) of the despoliation of nature by mankind. Thus the earliest adherents of modem science were far from believing that people could treat nature as they pleased. (Evelyn's theme was taken up in the eighteenth century by another theistic believer, J. G. Herder, who recognized that the land in North America had deteriorated as a result of human activity.)[52]

Passmore is, I believe, correct to interpret George Herbert as holding that nature is man's servant. But this was not the only attitude of all British poets of the seventeenth century. Thus the Welsh poet Henry Vaughan believed in the resurrection of all living creatures:

O knowing, glorious spirit! when
Thou shalt restore trees, beasts and men.
When thou shalt make all new again
Destroying onely death and pain,
Give him amongst thy works a place
Who in them lov'd and sought thy face!

while another of his poems bears as its title *Rom. Cap. 8 ver. 19,* and as its subtitle the Vulgate rendering of that verse, *Etenim res Creatae exerto Capite observantes expectant revelationem Filiorum Dei.* These poems make it clear that Paul's reflective views on the non-human creation were not altogether neglected among Christians until recent times.

Nor was consideration for animals restricted to those influenced by the Talmud such as the Leibnizian philosopher, A. G. Baumgarten.[53] Kant relates that Leibniz, after using a tiny worm for scientific observation "carefully replaced it with its leaf on the tree so that it should not come to harm through any act of his."[54] Leibniz was a Christian who believed that all created substances, whether high or low in the chain of being, had a perfection of their own to attain. (As to Kant himself, Passmore is correct that he denied duties to animals,[55] but gives a misleading impression by quoting without further qualification Kant's remark that .. supposing we regard nature as a teleological system, he (man) is born to be its ultimate end."[56] For in his third *Critique*

[51] R. Baker, "Famine: The Cost of Development," *Ecologist,* vol. 4, pp. 170-75 (June 1974).

[52] Ferguson and Ferguson, *Sacred Cows at the Public Trough.* Overstocking in the U.S. West has no significant human-population component, since the relatively tiny amount of beef produced does not go to hungry people or even allow pressures to be reduced on tropical forests being cleared for pasture. It is mostly a story of greed, stupidity, and the ignorance and incompetence of people ranging from senators to bureaucrats, as this fine book shows.

[53] Forestier, "The Degreening of China."

[54] The Everglades have been under threat for a long time; see J. Harte and R. Socolow, "The Everglades: Wilderness Versus Rampant Land Development in South Florida," in J. Harte and R. Socolow, eds., *Patient Earth* (Holt, Rinehart and Winston, New York, 1971), pp 181-202.

[55] A distinctive, pure white south-Florida population of the common great blue heron.

[56] G. V. N. Powell, A. H. Powell, and N. K. Paul, "Brother, Can You Spare a Fish?," *Natural History,*

Kant emphatically rejected the belief that man is the end of creation, denying at the same time that nature is a teleological system.) Passmore is correct in detecting a dramatic change to more humane attitudes to the treatment of nonhuman animals in the last two hundred years, and in tracing the origins of this rapid transition to utilitarians such as Hume and Bentham and to the Evangelicals. But the traditions of Christendom were less uniformly inhospitable to this change than Passmore represents them as being; indeed this shift in attitudes is the more intelligible if there existed some of the "seeds" of it within those traditions. Thus belief in the naturalness and rightness of compassion for animal suffering is found in William Wollaston and among the New England clergy.[57] Further, if, as Macaulay held, the Puritans hated bear-baiting because of the spectators' pleasure in it,[58] could they have altogether lacked, he also implies, sympathy for bears?

Coleman finds that seventeenth-century Christian apologetics endorsed capitalist enterprise and abandoned traditional Christian objections to the exploitation of man and nature. Of the three apologists cited (John Ray, William Derham, and Nehemiah Grew) only Ray wrote the relevant work in that century. All these writers traced the hand of providence in the wonders of science and the activity of man; and doubtless too much "Industry of Man" was eventually justified by these means in some quarters. Yet there is nothing exploitative about the passage which Coleman quotes from Ray; indeed, the tone is little different from that of Basil, who, as will be seen, had used many of the same phrases and the same scriptural quotation: "I persuade myself, that the bountiful and gracious Author of Man's Being and Faculties, and all Things else, delights in the Beauty of his Creation, and is well pleased with the Industry of Man, in adorning the Earth with beautiful Cities and Castles; with pleasant Villages and Country-Houses; with regular Gardens and Orchards, and Plantations of all Sorts of Shrubs, and Herbs, and Fruits, for Meat, Medicine, or moderate Delight; with shady Woods and Groves, and Walks set with Rows of elegant Trees; *with Pastures cloathed with Flocks, and Valleys covered with Corn,* and Meadows burthened with Grass, whatever else differenceth a civil and well-cultivated Region, from a barren and desolate Wilderness."[59] Granted also Ray's rejection of the view that everything was made for humans, Ray's posture cannot be regarded even as the foreshadowing of an exploitative attitude. How far, though, was such an attitude manifested in the next century?

February 1988, pp. 34-38.

[57] Harvey, D. *Social Justice and the City.* Baltimore: Johns Hopkins Press, 1973.

[58] U.S. Bureau of the Census, *Statistical Abstract of the United States: 1982-83 (103d ed.; Washington, D. C, 1982). The Chinese number is said to have increased to 3.2 million by 1985.*

[59] These estimates are based on 1986 statistics from WRI and IIED, *World Resources, 1988-89* (Basic Books, New York, 1988). Note that the assumptions in the statement include that energy-use differentials will remain the same as the babies grow up, and that technological changes will be parallel in all nations. Statistics are also very rough estimates, especially in the poorer nations, and a disproportionately larger fraction of damage from energy use is likely to come from *non-commercial* energy use (such as agricultural burning and the gathering of fuelwood by individual families). None of this changes the validity of the basic point.

Derham's writings were, as Coleman remarks, even more popular than Ray's; and they certainly include the endorsement as providential of a great diversity of human predispositions, including those to "Mechanics, Architecture, War, Navigation, Commerce and Agriculture."[60] Elsewhere Derham applied the language of stewardship to God's requirement for diligence in one's calling, whether as priest, "Gentleman, Tradesman, Mechanick or only Servant.' Human ingenuity in the various walks of life is providential because it guarantees that no opportunity will be neglected which could satisfy the "Necessities and Occasions of the World" and of civilization.[61]

Coleman rightly criticizes Derharn for placing all the various "callings," including war and commerce, on the same moral footing. "Derham", he proceeds to remark (33), "clearly portrays the ultimate adaptation of English church doctrine to the urgent needs of those who held economic expansion to be society's preferred objective." Indeed, at one point (35) he represents Derham as accepting here "a divine command to steel ourselves for a ruthless assault upon nature."

This assessment seems less than fair. Some of the time Derham simply reaffirmed (as George Herbert also had) the Pauline theme that talents should not be wasted and that mundane tasks should be performed as if for God. He sometimes wrote in a manner insufficiently critical of the new capitalism of his day; but we can hardly take him on the strength of this lapse to be favoring the deforestation and pollution of the planet, rather than the achievement of the kind of landscape praised by his friend Ray. Indeed, Derham's time and writings, to judge by papers cited by Coleman and by Glacken's account,[62] were occupied with neither social advocacy nor the defense of commerce but with amassing the painstaking detail of a cumulative design argument and with biological and astronomical observations conducted partly for the sake of this project and partly for their own sake. It also seems to have been for this teleological reasoning that Derham was read and remembered, and not for his subsidiary theme of the providential nature of human enterprise.

Nor does Coleman establish that Christianity in England abandoned its previous strictures on greed and self-aggrandizement and began to give unqualified backing to capitalist expansion. The overall picture is a complex one which cannot adequately be investigated here; but it is to be doubted if either Swift or Pope endorsed the attitudes ascribed by Coleman to Derham. Nehemiah Grew, botanist, theologian, and author of *The meanes of a most ample increase of the wealth and strength of England in a few years* (circa 17O7)[80] constitutes evidence in favor of Coleman's case; so too, perhaps, may John Locke's second *Treatise of Civil Government* with its defense of enclosures and property, though with Locke there were qualifications which would, if applied now, as Gregory Kavka has argued, severely curtail economic growth. There again, some Christians who turned to trade, such as the eighteenth-century Quaker

[60] P. 130.

[61] This is a tale told me by the distinguished Australian prehistorian, John Mulvaney. It is retold in Griffiths (199J) and Mulvaney (1991).

[62] As Jones (1991) suggests may well be the case

ironmasters, continued to observe constraints on the pursuit of profit, insisting on honesty in business dealings, foregoing the profit to be had from Sunday working, and showing concern for the working conditions of employees.[63]" Christians did not in general, then, embark on a relentless assault upon nature; and if, as Coleman holds, "the principal contribution of Christian doctrine to our environmental crisis was the creation and application of a new apologetic . . ." as put forward by Derham, then the empirical evidence which would be required to attest White's thesis as applied to the seventeenth and eighteenth centuries is still wanting.

V. Christian attitudes to nature have not typically been exploitative, *pace* White, Passmore, and Coleman. Positions held by Christians on the treatment of animals have, I should acknowledge, often been open to severe moral censure, and to some extent still remain so. (Meanwhile the conditions in which many animals are now being reared for food are nothing short of appalling; there is thus probably more maltreatment of animals for Christians and others to protest against now than ever before.) But efforts to establish a link between Christian ethics and our worldwide environmental problems have been inconclusive. If attitudes have contributed significantly to these problems at all, it is at least as cogent to cite belief in the inevitability of progress, especially where progress is construed as involving increasing consumption. This attitude is more easily correlated with, e.g., the geographical spread of industrial pollution, than with belief in man's God-given dominion or stewardship.

Lynn White seems hostile to any active approach to nature, even to the investigative activity of science, which he rightly finds Western Christianity to have eventually fostered. Passmore, by contrast, accepts that science and technology are of value, that people should take account of the side effects of their actions disclosed by science, and that they should not abandon technological activity in exercizing responsible dominion over nature, preserving both the earth and human civilization. But, like White, he is wrong to hold that Christians have usually held that people may treat nature as they please. Christians can accept that the survival of humanity is not supernaturally guaranteed, and indeed have the resources in their tradition to accept more far-reaching obligations with respect to future people and fellow-creatures than Passmore now accepts. None of this requires abandonment of the Judaeo-Christian belief in God's good purposes.

Belief in man's stewardship is far more ancient and has been far more constant among Christians than Passmore allows; and, though Coleman exaggerates Derham's position, he is correct in noticing that this belief can have far-reaching implications. Thus secular versions of the position that one's energy, talents and possessions are held in trust and are to be deployed responsibly occur frequently among contemporary writers seeking an ethic suited to environmental questions, and not least in the writings of Passmore.[81] I am not, however, claiming that all Christians have held any one view

[63] Hays, S. *The Conservation Movement and the Gospel of Efficiency.* Cambridge, Massachusetts: Atheneum, 1959.

of nature; too diverse, as Glacken says, are the positions which Christians have held. History bears out his claim that one must grant "the contradictions and difficulties in exploring that intractable subject, the Christian view of nature, once one has advanced beyond the first easy assertions." Yet not even the first easy assertions should find a despotic attitude to nature typical of Christians. The biblical position, which makes people responsible to God for the uses to which the natural environment is put, has never been entirely lost to view, and may properly be appealed to by the very people who rightly criticize the exploitative attitudes which prevail in many places throughout the contemporary world.[84]

Stanley L. Jaki, *Science and Creation* (Edinburgh, 1974).

God and the Secular: A Philosophical Assessment of Secular Reasoning from Bacon to Kant (Cardiff, 1978), Chap. 1.

TA, 198.

A.M. Allchin, *Wholeness and Transfiguration Illustrated in the Lives of St. Francis of Assisi and St. Seraphim of Sarov* (Oxford, 1974), 5.

John Rodman, "Animal Justice; the Counter-revolution in Natural Right and Law," *Inquiry,* **22** (1979), 3-22, at 3, 10, and 20, n. 2.

MR, 16f.

Passmore quotes the relevant passage at TA , 197.

MR, 31; cf. 185.

MR, 33, and 198, n. 12 to Chap. 2.

Glacken, 299, 300.

At MR, lllf.

MR, 188. See also the passage about the wonder and beauty of familiar creatures, cited by Glacken, 199 f., and those cited by Robert Nisbet at *History of the Idea of Progress* (London, 1980), 54—56.

The City of God, XII. 16, cited by Glacken, 198.

The City of God, XII 4, cited by Glacken, 198f.

MR, 33, 212; AN, 258.

Glacken, 200, 304-06.

MR, 33.

Glacken, 309-11.

C. W. Hume, *The Status of Animals in the Christian Religion* (London, 1957), 94-98.

Glacken, 302-04; Robert Nisbet, *The Social Philosophers* (London, 1974), 326-38, esp. 327 and 334.

MR, 23.

Glacken, 315.

AN, 253, MR, 13.

Glacken, 212.

Otto Karrer (ed.), *St. Francis of Assisi, The Legends and the Lauds,* translated by N. Wydenbruck (London, 1947), 161, cited by Andrew Linzey, *Animal Rights: A Christian Assessment of Man's Treatment of Animals* (London, 1976), 103, n. 22.

TA, 201.

Summa Theologiae, 1, q. 103, a5, ad2. As Rodman points out (3 and n. 3, p. 20) Aquinas also incorporated *verbatim* Ulpian's definition of *ius naturae,* and expounded it in terms of the instinct for self-preservation common to men and animals *(Summa Theologiae,* I, q. 94, a2).

Glacken, 234, nn. 196 and 198.

Summa Theologiae, I, q. 103 a6: also *ibid,* ad2.

MR, 185.

MR, 20.

Glacken, 424; cf. MR, 2 If.

Cited by Andre Bieler, *La pensee economique et sociale de Calvin* (Geneva, 1959, 432-35), and translated by Derr at *Ecology and Human Liberation,* 20.

Commentary on Genesis 2:15; quoted from a translation of 1847 by Welbourn at "Man's Dominion," 563.

Sir Matthew Hale. *The Primitive Origination of Mankind* (London, 1677), cited by Glacken at 481, by John Black, *The Dominion of Man: The Search for Ecological Responsibility* (Edinburgh, 1970), 56f, and by Passmore at **MR,** 30.

Glacken, 400.

Francis Bacon, *The Advancement of Learning and the New Atlantis,* ed. Arthur Johnston (Oxford, 1974). 239.

Ibid., 241 (from *New Atlantis).*

Francis Bacon, *The New Organon,* ed Fulton H. Anderson (Indianapolis and New York, 1960), 15f (from *The Great Instauratiori).*

Ibid., 16.

TA, 204.

John Cottingham, '"A Brute to the Brutes?' Descartes' Treatment of Animals," *Philosophy,* **53** (1978), 551-59.

Tom Regan and Peter Singer (eds.), *Animal Rights and Human Obligations* (Englewood Cliffs, N. Y, 1976), 66.

Rene Descartes, *Discourse on Method,* Part VI, from *The Philosophical Works of Descartes,* trans, by Elizabeth S. Haldane and G.T.R. Ross, 2 vols. (Cambridge, 1967), I, 119.

Haldane and Ross, I. 122; from *Discourse,* Part VI.

Haldane and Ross, I, 402: from *The Passions of the Soul,* Art. CLV

Glacken, 485-94.

Glacken, 540f.

MR, 31.

S.L. Bethell, *The Cultural Revolution of the Seventeenth Century* (London, 1949), 160, 157.

MR, 124; AN, 255; TA, 201f.

Immanuel Kant, *Lectures on Ethics,* trans, by Louis Infield (New York, 1963), 239-41, reprinted in Regan and Singer, 122f.

TA, 202.

MR, 15.

Glacken, 540f.

See Norman S. Fiering, "Irresistible Compassion: An Aspect of Eighteenth Century Sympathy and Humanitarianism," *JHI,* **37** (1976), 195-218; 204f. Passmore himself mentions Wollaston in a related connection of TA, 207.

TA, 195.

John Ray, *The Wisdom of God Manifested in the Works of Creation,* 11th ed. (London, 1743), 164f., cited by Coleman, 31. Glacken, 484, cites the same passage. William Derham, *Physico-Theology: or, A demonstration of the being and attributes of God, from his works of creation,* 10th ed. (London, 1742), 263, cited by Coleman, 33.

Coleman, 35f.

Coleman, 33-35.

A.D. Atkinson, "William Derham, F.R.S.," *Annals of Science,* 8 (1952), 368-92; J.J. Dahm, "Science and Apologetics in the early Boyle Lectures," *Church History,* **39** (1970), 172-86; Glacken, 421-25.

Cited by Coleman at 35, n. 16.

Gregory Kavka, "The Futurity Problem", in R.I. Sikora and Brian Barry, *Obligations to Future Generations* (Philadelphia, 1978), 180-203; 200f.

See Noel Coley's case study "Quaker Contributions to Eighteenth-century science and technology," in *Scientific Progress and Religious Dissent,* Block 3 of the Open University's course "Science and Belief: Copernicus to Darwin," Milton Keynes, 1974,79-92.

MR, 185.

These matters are more amply discussed in Robin Attfield, *The Ethics of Environmental Concern* (Oxford and New York, 1983).

3. The Land Ethic

Aldo Leopold

Source: Aldo Leopold, *A Sand County Almanac and Sketches Here and There.* Oxford: Oxford University Press, 1949, pp. 201226.

A sand county almanac is one of the classic texts of US environmental thinking, although it was published after the death of its author and was not widely read until the 1960s. Aldo Leopold (1887—1947) began his career with the US Forest Service and was responsible for managing Carson National Forest, New Mexico, during a period in which utilitarianism informed US conservation. He was party to the virtual war waged on wolves and other predators, designed to maintain the stock of deer for hunters. But during the 1930s he began to realize that wolves were a vital part of the ecosystem and he questioned the ethics of game management. In 1933 he took up a post at the University of Wisconsin and bought a small farm in the sand counties in the north of the state. There he fused detailed observation of nature with philosophical speculation on the relationship between humans and the environment. He thus joined a succession of naturalist-philosophers like Gilbert White, Henry Thoreau and John Muir, who based their thoughts on the intimate knowledge of particular landscapes. The *Almanac* includes a nature diary of his land in the course of the year in which poetic and scientific appreciation are combined. The land ethic, the idea that we should be citizens with the land rather than conquerors of it, therefore developed from the kind of close geographical observation admired by Sauer and Jackson Source. *A sand county almanac and sketches here and there.* Oxford Oxford University Press, 1949. Extract from pp. 201-26, special commemorative edition, Oxford, 1989.

When god-like Odysseus returned from the wars in Troy, he hanged all on one rope a dozen slave-girls of his household whom he suspected of misbehavior during his absence.

This hanging involved no question of propriety. The girls were property. The disposal of property was then, as now, a matter of expediency, not of right and wrong.

Concepts of right and wrong were not lacking from Odysseus' Greece: witness the fidelity of his wife through the long years before at last his black-prowed galleys clove the wine-dark seas for home. The ethical structure of that day covered wives, but had not yet been extended to human chattels. During the three thousand years which have since elapsed, ethical criteria have been extended to many fields of conduct, with corresponding shrinkages in those judged by expediency only.

The ethical sequence

This extension of ethics, so far studied only by philosophers, is actually a process in ecological evolution. Its sequences may be described in ecological as well as in philosophical terms. An ethic, ecologically, is a limitation on freedom of action in the struggle for existence. An ethic, philosophically, is a differentiation of social from anti-social conduct. These are two definitions of one thing. The thing has its origin in the tendency of interdependent individuals or groups to evolve modes of co-operation. The ecologist calls these symbioses. Politics and economics are advanced symbioses in which the original free-for-all competition has been replaced, in part, by co-operative mechanisms with an ethical content.

The complexity of co-operative mechanisms has increased with population density, and with the efficiency of tools. It was simpler, for example, to define the anti-social uses of sticks and stones in the days of the mastodons than of bullets and billboards in the age of motors.

The first ethics dealt with the relation between individuals; the Mosaic Decalogue is an example. Later accretions dealt with the relation between the individual and society. The Golden Rule tries to integrate the individual to society; democracy to integrate social organization to the individual.

There is as yet no ethic dealing with man's relation to land and to the animals and plants which grow upon it. Land, like Odysseus' slave-girls, is still property. The land-relation is still strictly economic, entailing privileges but not obligations.

The extension of ethics to this third element in human environment is, if I read the evidence correctly, an evolutionary possibility and an ecological necessity. It is the third step in a sequence. The first two have already been taken. Individual thinkers since the days of Ezekiel and Isaiah have asserted that the despoliation of land is not only inexpedient but wrong. Society, however, has not yet affirmed their belief. I regard the present conservation movement as the embryo of such an affirmation.

An ethic may be regarded as a mode of guidance for meeting ecological situations so new or intricate, or involving such deferred reactions, that the path of social expediency is not discernible to the average individual. Animal instincts are modes of guidance for the individual in meeting such situations. Ethics are possibly a kind of community instinct in-the-making.

The community concept

All ethics so far evolved rest upon a single premise: that the individual is a member of a community of interdependent parts. His instincts prompt him to compete for his place in that community, but his ethics prompt him also to co-operate (perhaps in order that there may be a place to compete for).

The land ethic simply enlarges the boundaries of the community to include soils, waters, plants, and animals, or collectively: the land.

This sounds simple: do we not already sing our love for and obligation to the land of the free and the home of the brave? Yes, but just what and whom do we love? Certainly not the soil, which we are sending helter-skelter downriver. Certainly not the waters, which we assume have no function except to turn turbines, float barges, and carry off sewage. Certainly not the plants, of which we extreminate whole communities without batting an eye. Certainly not the animals, of which we have already extirpated many of the largest and most beautiful species. A land ethic of course cannot prevent the alteration, management, and use of these 'resources,' but it does affirm their right to continued existence, and, at least in spots, their continued existence in a natural state.

In short, a land ethic changes the role of *Homo sapiens* from conqueror of the land-community to plain member and citizen of it. It implies respect for his fellow-members, and also respect for the community as such.

In human history, we have learned (I hope) that the conqueror role is eventually self-defeating. Why? Because it is implicit in such a role that the conqueror knows, *ex cathedra,* just what makes the community clock tick, and just what and who is valuable, and what and who is worthless, in community life. It always turns out that he knows neither, and this is why his conquests eventually defeat themselves.

In the biotic community, a parallel situation exists. Abraham knew exactly what the land was for: it was to drip milk and honey into Abraham's mouth. At the present moment, the assurance with which we regard this assumption is inverse to the degree of our education.

The ordinary citizen today assumes that science knows what makes the community clock tick; the scientist is equally sure that he does not. He knows that the biotic mechanism is so complex that its workings may never be fully understood.

That man is, in fact, only a member of a biotic team is shown by an ecological interpretation of history. Many historical events, hitherto explained solely in terms of human enterprise, were actually biotic interactions between people and land. The characteristics of the land determined the facts quite as potently as the characteristics of the men who lived on it.

Consider, for example, the settlement of the Mississippi valley. In the years following the Revolution, three groups were contending for its control: the native Indian, the French and English traders, and the American settlers.

Historians wonder what would have happened if the English at Detroit had thrown a little more weight into the Indian side of those tipsy scales which decided the outcome of the colonial migration into the cane-lands of Kentucky. It is time now to ponder the fact that the cane-lands, when subjected to the particular mixture of forces represented by the cow, plow, fire, and axe of the pioneer, became bluegrass. What if the plant succession inherent in this dark and bloody ground had, under the impact of these forces, given us some worthless sedge, shrub or weed? Would Boone and Kenton have held out? Would there have been any overflow into Ohio, Indiana, Illinois, and

Missouri? Any Louisiana Purchase? Any transcontinental union of new states? Any Civil War?

Kentucky was one sentence in the drama of history. We are commonly told what the human actors in this drama tried to do, but we are seldom told that their success, or the lack of it, hung in large degree on the reaction of particular soils to the impact of the particular forces exerted by their occupancy. In the case of Kentucky, we do not even know where the bluegrass came from - whether it is a native species, or a stowaway from Europe.

Contrast the cane-lands with what hindsight tells us about the Southwest, where the pioneers were equally brave, resourceful, and persevering. The impact of occupancy here brought no bluegrass, or other plant fitted to withstand the bumps and buffetings of hard use. This region, when grazed by livestock, reverted through a series of more and more worthless grasses, shrubs, and weeds to a condition of unstable equilibrium. Each recession of plant types bred erosion; each increment to erosion bred a further recession of plants. The result today is a progressive and mutual deterioration, not only of plants and soils, but of the animal community subsisting thereon. The early settlers did not expect this: on the cienegas of New Mexico some even cut ditches to hasten it. So subtle has been its progress that few residents of the region are aware of it. It is quite invisible to the tourist who finds this wrecked landscape colorful and charming (as indeed it is, but it bears scant resemblance to what it was in 1848).

This same landscape was 'developed' once before, but with quite different results. The Pueblo Indians settled the Southwest in pre-Columbian times, but they happened *not* to be equipped with range livestock. Their civilization expired, but not because their land expired.

In India, regions devoid of any sod-forming grass have been settled, apparently without wrecking the land, by the simple expedient of carrying the grass to the cow, rather than vice versa. (Was this the result of some deep wisdom, or was it just good luck? I do not know.)

In short, the plant succession steered the course of history; the pioneer simply demonstrated, for good or ill, what successions inhered in the land. Is history taught in this spirit? It will be, once the concept of land as a community really penetrates our intellectual life.

The ecological conscience

Conservation is a state of harmony between man and land. Despite nearly a century of propaganda, conservation still proceeds at a snail's pace; progress still consists largely of letterhead pieties and convention oratory. On the back forty we still slip two steps backward for each forward stride.

The usual answer to this dilemma is 'more conservation education.' No one will debate this, but is it certain that only the *volume* of education needs stepping up? Is something lacking in the *content* as well?

It is difficult to give a fair summary of its content in brief form, but, as I understand it, the content is substantially this; obey the law, vote right, join some organizations, and practice what conservation is profitable on your own land; the government will do the rest.

Is not this formula too easy to accomplish anything worth-while? It defines no right or wrong, assigns no obligation, calls for no sacrifice, implies no change in the current philosophy of values. In respect of land-use, it urges only enlightened self-interest. Just how far will such education take us? An example will perhaps yield a partial answer.

By 1930 it had become clear to all except the ecologically blind that southwestern Wisconsin's topsoil was slipping seaward. In 1933 the farmers were told that if they would adopt certain remedial practices for five years, the public would donate CCC labor to install them, plus the necessary machinery and materials. The offer was widely accepted, but the practices were widely forgotten when the five-year contract period was up. The farmers continued only those practices that yielded an immediate and visible economic gain for themselves.

This led to the idea that maybe farmers would learn more quickly if they themselves wrote the rules. Accordingly the Wisconsin Legislature in 1937 passed the Soil Conservation District Law. This said to farmers, in effect: *We, the public, will furnish you free technical service and loan you specialized machinery, if you will write your own rules for land-use. Each county may write its own rules, and these will have the force of law.* Nearly all the counties promptly organized to accept the proffered help, but after a decade of operation, *no county has yet written a single rule.* There has been visible progress in such practices as strip-cropping, pasture renovation, and soil liming, but none in fencing woodlots against grazing, and none in excluding plow and cow from steep slopes. The farmers, in short, have selected those remedial practices which were profitable anyhow, and ignored those which were profitable to the community, but not clearly profitable to themselves.

When one asks why no rules have been written, one is told that the community is not yet ready to support them; education must precede rules. But the education actually in progress makes no mention of obligations to land over and above those dictated by self-interest. The net result is that we have more education but less soil, fewer healthy woods, and as many floods as in 1937.

The puzzling aspect of such situations is that the existence of obligations over and above self-interest is taken for granted in such rural community enterprises as the betterment of roads, schools, churches, and baseball teams. Their existence is not taken for granted, nor as yet seriously discussed, in bettering the behavior of the water that falls on the land, or in the preserving of the beauty or diversity of the farm landscape. Land-usg ethics are still governed wholly by economic self-interest, just as social ethics were a century ago.

To sum up: we asked the farmer to do what he conveniently could to save his soil, and he has done just that, and only that. The farmer who clears the woods off a 75 per cent slope, turns his cows into the clearing, and dumps its rainfall, rocks, and soil into the community creek, is still (if otherwise decent) a respected member of society. If he puts lime on his fields and plants his crops on contour, he is still entitled to all the privileges and emoluments of his Soil Conservation District. The District is a beautiful piece of social machinery, but it is coughing along on two cylinders because we have been too timid, and too anxious for quick success, to tell the farmer the true magnitude of his obligations. Obligations have no meaning without conscience, and the problem we face is the extension of the social conscience from people to land.

No important change in ethics was ever accomplished without an internal change in our intellectual emphasis, loyalties, affections, and convictions. The proof that conservation has not yet touched these foundations of conduct lies in the fact that philosophy and religion have not yet heard of it. In our attempt to make conservation easy, we have made it trivial.

Substitutes for a land ethic

When the logic of history hungers for bread and we hand out a stone, we are at pains to explain how much the stone resembles bread. I now describe some of the stones which serve in lieu of a land ethic.

One basic weakness in a conservation system based wholly on economic motives is that most members of the land community have no economic value. Wildflowers and songbirds are examples. Of the 22,000 higher plants and animals native to Wisconsin, it is doubtful whether more than 5 per cent can be sold, fed, eaten, or otherwise put to economic use. Yet these creatures are members of the biotic community, and if (as I believe) its stability depends on its integrity, they are entitled to continuance.

When one of these non-economic categories is threatened, and if we happen to love it, we invent subterfuges to give it economic importance. At the beginning of the century songbirds were supposed to be disappearing. Ornithologists jumped to the rescue with some distinctly shaky evidence to the effect that insects would eat us up if birds failed to control them The evidence had to be economic in order to be valid.

It is painful to read these circumlocutions today. We have no land ethic yet, but we have at least drawn nearer the point of admitting that birds should continue as a matter of biotic right, regardless of the presence or absence of economic advantage to us.

A parallel situation exists in respect of predatory mammals, raptorial birds, and fish-eating birds. Time was when biologists somewhat overworked the evidence that these creatures preserve the health of game by killing weaklings, or that they control rodents for the farmer, or that they prey only on ‘worthless’ species. Here again, the evidence had to be economic in order to be valid. It is only in recent years that we

hear the more honest argument that predators are members of the community, and that no special interest has the right to exterminate them for the sake of a benefit, real or fancied, to itself. Unfortunately this enlightened view is still in the talk stage. In the field the extermination of predators goes merrily on: witness the impending erasure of the timber wolf by fiat of Congress, the Conservation Bureaus, and many state legislatures.

Some species of trees have been 'read out of the party' by economics- minded foresters because they grow too slowly, or have too low a sale value to pay as timber crops: white cedar, tamarack, cypress, beech, and hemlock are examples. In Europe, where forestry is ecologically more advanced, the non-commercial tree species are recognized as members of the native forest community, to be preserved as such, within reason. Moreover some (like beech) have been found to have a valuable function in building up soil fertility. The interdependence of the forest and its constituent tree species, ground flora, and fauna is taken for granted.

Lack of economic value is sometimes a character not only of species or groups, but of entire biotic communities: marshes, bogs, dunes, and 'deserts' are examples. Our formula in such cases is to relegate their conservation to government as refuges, monuments, or parks. The difficulty is that these communities are usually interspersed with more valuable private lands; the government cannot possibly own or control such scattered parcels. The net effect is that we have relegated some of them to ultimate extinction over large areas. If the private owner were ecologically minded, he would be proud to be the custodian of a reasonable proportion of such areas, which add diversity and beauty to his farm and to his community.

In some instances, the assumed lack of profit in these 'waste' areas has proved to be wrong, but only after most of them had been done away with. The present scramble to reflood muskrat marshes is a case in point.

There is a clear tendency in American conservation to relegate to government all necessary jobs that private landowners fail to perform. Government ownership, operation, subsidy, or regulation is now widely prevalent in forestry, range management, soil and watershed management, park and wilderness conservation, fisheries management, and migratory bird management, with more to come. Most of this growth in governmental conservation is proper and logical, some of it is inevitable. That I imply no disapproval of it is implicit in the fact that I have spent most of my life working for it. Nevertheless the question arises: What is the ultimate magnitude of the enterprise? Will the tax base carry its eventual ramifications? At what point will governmental conservation, like the mastodon, become handicapped by its own dimensions? The answer, if there is any, seems to be in a land ethic, or some other force which assigns more obligation to the private landowner..

Industrial landowners and users, especially lumbermen and stockmen, are inclined to wail long and loudly about the extension of government ownership and regulation to land, but (with notable exceptions) they show little disposition to develop the only visible alternative; the voluntary practice of conservation on their own lands.

When the private landowner is asked to perform some unprofitable act for the good of the community, he today assents only with outstretched palm. If the act cost him cash this is fair and proper, but when it costs only forethought, open-mindedness, or time, the issue is at least debatable. The overwhelming growth of land-use subsidies in recent years must be ascribed, in large part, to the government's own agencies for conservation education: the land bureaus, the agricultural colleges, and the extension services. As far as I can detect, no ethical obligation toward land is taught in these institutions.

To sum up: a system of conservation based solely on economic self-interest is hopelessly lopsided. It tends to ignore, and thus eventually to eliminate, many elements in the land community that lack commercial value, but that are (as far as we know) essential to its healthy functioning. It assumes, falsely, I think, that the economic parts of the biotic clock will function without the uneconomic parts. It tends to relegate to government many functions eventually too large, too complex, or too widely dispersed to be performed by government.

An ethical obligation on the part of the private owner is the only visible remedy for these situations.

The land pyramid

An ethic to supplement and guide the economic relation to land presupposes the existence of some mental image of land as a biotic mechanism. We can be ethical only in relation to something we can see, feel, understand, love, or otherwise have faith in.

The image commonly employed in conservation education is 'the balance of nature.' For reasons too lengthy to detail here, this figure of speech fails to describe accurately what little we know about the land mechanism. A much truer image is the one employed in ecology: the biotic pyramid. I shall first sketch the pyramid as a symbol of land, and later develop some of its implications in terms of land-use.

Plants absorb energy from the sun. This energy flows through a circuit called the biota, which may be represented by a pyramid consisting of layers. The bottom layer is the soil. A plant layer rests on the soil, an insect layer on the plants, a bird and rodent layer on the insects, and so on up through various animal groups to the apex layer, which consists of the larger carnivores.

The species of a layer are alike not in where they came from, or in what they look like, but rather in what they eat. Each successive layer depends on those below it for food and often for other services, and each in turn furnishes food and services to those above. Proceeding upward, each successive layer decreases in numerical abundance. Thus, for every carnivore there are hundreds of his prey, thousands of their prey, millions of insects, uncountable plants. The pyramidal form of the system reflects this numerical progression from apex to base. Man shares an intermediate layer with the bears, racoons, and squirrels which eat both meat and vegetables.

The lines of dependency for food and other services are called food chains. Thus soil-oak-deer-Indian is a chain that has now been largely converted to soil-corn-cow-farmer. Each species, including ourselves, is a link in many chains. The deer eats a hundred plants other than oak, and the cow a hundred plants other than corn. Both, then, are links in a hundred chains. The pyramid is a tangle of chains so complex as to seem disorderly, yet the stability of the system proves it to be a highly organized structure. Its functioning depends on the cooperation and competition of its diverse parts.

In the beginning, the pyramid of life was low and squat; the food chains short and simple. Evolution has added layer after layer, link after link. Man is one of thousands of accretions to the height and complexity of the pyramid. Science has given us many doubts, but it has given us at least one certainty: the trend of evolution is to elaborate and diversify the biota.

Land, then, is not merely soil; it is a fountain of energy flowing through a circuit of soils, plants, and animals. Food chains are the living channels which conduct energy upward; death and decay return it to the soil. The circuit is not closed; some energy is dissipated in decay, some is added by absorption from the air, some is stored in soils, peats, and long-lived forests; but it is a sustained circuit, like a slowly augmented revolving fund of life. There is always a net loss by downhill wash, but this is normally small and offset by the decay of rocks. It is deposited in the ocean and, in the course of geological time, raised to form new lands and new pyramids.

The velocity and character of the upward flow of energy depend on the complex structure of the plant and animal community, much as the upward flow of sap in a tree depends on its complex cellular organization. Without this complexity, normal circulation would presumably not occur. Structure means the characteristic numbers, as well as the characteristic kinds and functions, of the component species. This interdependence between the complex structure of the land and its smooth functioning as an energy unit is one of its basic attributes.

When a change occurs in one part of the circuit, many other parts must adjust themselves to it. Change does not necessarily obstruct or divert the flow of energy; evolution is a long series of self-induced changes, the net result of which has been to elaborate the flow mechanism and to lengthen the circuit. Evolutionary changes, however, are usually slow and local. Man's invention of tools has enabled him to make changes of unprecedented violence, rapidity, and scope.

One change is in the composition of floras and faunas. The larger predators are lopped off the apex of the pyramid; food chains, for the first time in history, become shorter rather than longer. Domesticated species from other lands are substituted for wild ones, and wild ones are moved to new habitats. In this world-wide pooling of faunas and floras, some species get out of bounds as pests and diseases, others are extinguished. Such effects are seldom intended or foreseen; they represent unpredicted and often untraceable readjustments in the structure. Agricultural science is largely

a race between the emergence of new pests and the emergence of new techniques for their control.

Another change touches the flow of energy through plants and animals and its return to the soil. Fertility is the ability of soil to receive, store, and release energy. Agriculture, by overdrafts on the soil, or by too radical a substitution of domestic for native species in the superstructure, may derange the channels of flow or deplete storage. Soils depleted of their storage, or of the organic matter which anchors it, wash away faster than they form. This is erosion.

Waters, like soil, are part of the energy circuit. Industry, by polluting waters or obstructing them with dams, may exclude the plants and animals necessary to keep energy in circulation.

Transportation brings about another basic change: the plants or animals grown in one region are now consumed and returned to the soil in another. Transportation taps the energy stored in rocks, and in the air, and uses it elsewhere; thus we fertilize the garden with nitrogen gleaned by the guano birds from the fishes of seas on the other side of the Equator. Thus the formerly localized and self-contained circuits are pooled on a world-wide scale.

The process of altering the pyramid for human occupation releases stored energy, and this often gives rise, during the pioneering period, to a deceptive exuberance of plant and animal life, both wild and tame. These releases of biotic capital tend to becloud or postpone the penalties of violence.

* * *

This thumbnail sketch of land as an energy circuit conveys three basic ideas:

(1) That land is not merely soil.

(2) That the native plants and animals kept the energy circuit open; others may or may not.

(3) That man-made changes are of a different order than evolutionary changes, and have effects more comprehensive than is intended or foreseen.

These ideas, collectively, raise two basic issues: Can the land adjust itself to the new order? Can the desired alterations be accomplished with less violence?

Biotas seem to differ in their capacity to sustain violent conversion. Western Europe, for example, carries a far different pyramid than Caesar found there. Some large animals are lost; swampy forests have become meadows or plowland; many new plants and animals are introduced, some of which escape as pests; the remaining natives are greatly changed in distribution and abundance. Yet the soil is still there and, with the help of imported nutrients, still fertile; the waters flow normally; the new structure seems to function and to persist. There is no visible stoppage or derangement of the circuit.

Western Europe, then, has a resistant biota. Its inner processes are tough, elastic, resistant to strain. No matter how violent the alterations, the pyramid, so far, has developed some new *modus vivendi* which preserves its habitability for man, and for most of the other natives.

Japan seems to present another instance of radical conversion without disorganization.

Most other civilized regions, and some as yet barely touched by civilization, display various stages of disorganization, varying from initial symptoms to advanced wastage. In Asia Minor and North Africa diagnosis is confused by climatic changes, which may have been either the cause or the effect of advanced wastage. In the United States the degree of disorganization varies locally; it is worst in the Southwest, the Ozarks, and parts of the South, and least in New England and the Northwest. Better land-uses may still arrest it in the less advanced regions. In parts of Mexico, South America, South Africa, and Australia a violent and accelerating wastage is in progress, but I cannot assess the prospects.

This almost world-wide display of disorganization in the land seems to be similar to disease in an animal, except that it never culminates in complete disorganization or death. The land recovers, but at some reduced level of complexity, and with a reduced carrying capacity for people, plants, and animals. Many biotas currently regarded as 'lands of opportunity' are in fact already subsisting on exploitative agriculture, i.e. they have already exceeded their sustained carrying capacity. Most of South America is overpopulated in this sense.

In arid regions we attempt to offset the process of wastage by reclamation, but it is only too evident that the prospective longevity of reclamation projects is often short. In our own West, the best of them may not last a century.

The combined evidence of history and ecology seems to support one general deduction: the less violent the man-made changes, the greater the probability of successful readjustment in the pyramid. Violence, in turn, varies with human population density; a dense population requires a more violent conversion. In this respect, North America has a better chance for permanence-than Europe, if she can contrive to limit her density.

This deduction runs counter to our current philosophy, which assumes that because a small increase in density enriched human life, that an indefinite increase will enrich it indefinitely. Ecology knows of no density relationship that holds for indefinitely wide limits. All gains from density are subject to a low of diminishing returns.

Whatever may be the equation for men and land, it is improbable that we as yet know all its terms. Recent discoveries in mineral and vitamin nutrition reveal unsuspected dependencies in the up-circuit: incredibly minute quantities of certain substances determine the value of soils to plants, of plants to animals. What of the down-circuit? What of the vanishing species, the preservation of which we now regard as an esthetic luxury? They helped build the soil; in what unsuspected ways may they be essential to its maintenance? Professor Weaver proposes that we use prairie flowers to reflocculate the wasting soils of the dust bowl; who knows for what purpose cranes and condors, otters and grizzlies may some day be used?

Land health and the A-B cleavage

A land ethic, then, reflects the existence of an ecological conscience, and this in turn reflects a conviction of individual responsibility for the health of the land. Health is the capacity of the land for self-renewal. Conservation is our effort to understand and preserve this capacity.

Conservationists are notorious for their dissensions. Superficially these seem to add up to mere confusion, but a more careful scrutiny reveals a single plane of cleavage common to many specialized fields. In each field one group (A) regards the land as soil, and its function as commodityproduction; another group (B) regards the land as a biota, and its function as something broader. How much broader is admittedly in a state of doubt and confusion.

In my own field, forestry, group A is quite content to grow trees like cabbages, with cellulose as the basic forest commodity. It feels no inhibition against violence; its ideology is agronomic. Group B, on the other hand, sees forestry as fundamentally different from agronomy because it employs natural species, and manages a natural environment rather than creating an artificial one. Group B prefers natural reproduction on principle. It worries on biotic as well as economic grounds about the loss of species like chestnut, and the threatened loss of the white pines. It worries about a whole series of secondary forest functions: wildlife, recreation, watersheds, wilderness areas. To my mind, Group B feels the stirrings of an ecological conscience.

In the wildlife field, a parallel cleavage exists. For Group A the basic commodities are sport and meat; the yardsticks of production are cipher of take in pheasants and trout. Artificial propagation is acceptable as a permanent as well as a temporary recourse - if its unit costs permit. Group B, on the other hand, worries about a whole series of biotic side-issues. What is the cost in predators of producing a game crop? Should we have further recourse to exotics? How can management restore the shrinking species, like prairie grouse, already hopeless as shootable game? How can management restore the threatened rarities, like trumpeter swan and whooping crane? Can management principles be extended to wildflowers? Here again it is clear to me that we have the same A-B cleavage as in forestry.

In the larger field of agriculture I am less competent to speak, but there seem to be somewhat parallel cleavages. Scientific agriculture was actively developing before ecology was born, hence a slower penetration of ecological concepts might be expected. Moreover the farmer, by the very nature of his techniques, must modify the biota more radically than the forester or the wildlife manager. Nevertheless, there are many discontents in agriculture which seem to add up to a new vision of 'biotic farming '

Perhaps the most important of these is the new evidence that poundage or tonnage is no measure of the food-value of farm crops; the products of fertile soil may be qualitatively as well as quantitatively superior. We can bolster poundage from depleted soils by pouring on imported fertility, but we are not necessarily bolstering food-value.

The possible ultimate ramifications of this idea are so immense that I must leave their exposition to abler pens.

The discontent that labels itself 'organic farming,' while bearing some of the earmarks of a cult, is nevertheless biotic in its direction, particularly in its insistence on the importance of soil flora and fauna.

The ecological fundamentals of agriculture are just as poorly known to the public as in other fields of land-use. For example, few educated people realize that the marvelous advances in technique made during recent decades are improvements in the pump, rather than the well. Acre for acre, they have barely sufficed to offset the sinking level of fertility.

In all of these cleavages, we see repeated the same basic paradoxes: man the conqueror *versus* man the biotic citizen; science the sharpener of his sword *versus* science the searchlight on his universe; land the slave and servant *versus* land the collective organism. Robinson's injunction to Tristram may well be applied, at this juncture, to *Homo sapiens* as a species in geological time:

Whether you will or not

You are a King. Tristram, for you are one Of the time-tested few that leave the world, When they are gone, not the same place it was. Mark what you leave.

The outlook

It is inconceivable to me that an ethical relation to land can exist without love, respect, and admiration for land, and a high regard for its value. By value, I of course mean something far broader than mere economic value; I mean value in the philosophical sense.

Perhaps the most serious obstacle impeding the evolution of a land ethic is the fact that our educational and economic system is headed away from, rather than toward, an intense consciousness of land. Your true modern is separated from the land by many middlemen, and by innumerable physical gadgets. He has no vital relation to it; to him it is the space between cities on which crops grow. Turn him loose for a day on the land, and if the spot does not happen to be a golf links or a 'scenic' area, he is bored stiff. If crops could be raised by hydroponics instead of farming, it would suit him very well. Synthetic substitutes for wood, leather, wool, and other natural land products suit him better than the originals. In short, land is something he has 'outgrown.'

Almost equally serious as an obstacle to a land ethic is the attitude of the farmer for whom the land is still an adversary, or a taskmaster that keeps him in slavery. Theoretically, the mechanization of farming ought to cut the farmer's chains, but whether it really does is debatable.

One of the requisites for an ecological comprehension of land is an understanding of ecology, and this is by no means co-extensive with 'education'; in fact, much higher education seems deliberately to avoid ecological concepts. An understanding of ecology

does not necessarily originate in courses bearing ecological labels; it is quite as likely to be labeled geography, botany, agronomy, history, or economics. This is as it should be, but whatever the label, ecological training is scarce.

The case for a land ethic would appear hopeless but for the minority which is in obvious revolt against these 'modern' trends.

The 'key-log' which must be moved to release the evolutionary process for an ethic is simply this: quit thinking about decent land-use as solely an economic problem. Examine each question in terms of what is ethically and esthetically right, as well as what is economically expedient. A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.

It of course goes without saying that economic feasibility limits the tether of what can or cannot be done for land. It always has and it always will. The fallacy the economic determinists have tied around our collective neck, and which we now need to cast off, is the belief that economics determines *all* land-use. This is simply not true. An innumerable host of actions and attitudes, comprising perhaps the bulk of all land relations, is determined by the land-users' tastes and predilections, rather than by his purse. The bulk of all land relations hinges on investments of time, forethought, skill, and faith rather than on investments of cash. As a land-user thinketh, so is he.

I have purposely presented the land ethic as a product of social evolution because nothing so important as an ethic is ever 'written.' Only the most superficial student of history supposes that Moses 'wrote' the Decalogue; it evolved in the minds of a thinking community, and Moses wrote a tentative summary of it for a 'seminar.' I say tentative because evolution never stops.

The evolution of a land ethic is an intellectual as well as emotional process. Conservation is paved with good intentions which prove to be futile, or even dangerous, because they are devoid of critical understanding either of the land, or of economic land-use. I think it is a truism that as the ethical frontier advances from the individual to the community, its intellectual content increases.

The mechanism of operation is the same for any ethic: social approbation for right actions: social disapproval for wrong actions.

By and large, our present problem is one of attitudes and implements. We are remodeling the Alhambra with a steam-shovel, and we are proud of our yardage. We shall hardly relinquish the shovel, which after all has many good points, but we are in need of gentler and more objective criteria for its successful use.

4. The Ethics of Respect for Nature

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I present the foundation structure for a life-centered theory of environmental ethics. The structure consists of three interrelated components. First is the adopting of a certain ultimate moral attitude toward nature, which I call "respect for nature." Second is a belief system that constitutes a way of conceiving of the natural world and of our place in it. This belief system underlies and supports the attitude in a way that makes it an appropriate attitude to take toward the Earth's natural ecosystems and their life communities. Third is a system of moral rules and standards for guiding our treatment of those ecosystems and life communities, a set of normative principles which give concrete embodiment or expression to the attitude of respect for nature. The theory set forth and defended here is, I hold, structurally symmetrical with a theory of human ethics based on the principle of respect for persons.

I Human-centered and life-centered systems of environmental ethics

In this paper I show how the taking of a certain ultimate moral attitude toward nature, which I call "respect for nature," has a central place in the foundations of a life-centered system of environmental ethics. I hold that a set of moral norms (both standards of character and rules of conduct) governing human treatment of the natural world is a rationally grounded set if and only if, first, commitment to those norms is a practical entailment of adopting the attitude of respect for nature as an ultimate moral attitude, and second, the adopting of that attitude on the part of all rational agents can itself be justified. When the basic characteristics of the attitude of respecl for nature are made clear, it will be seen that a life-centered system of environmental ethics need not be holistic or organicist in its conception of the kinds of entities that are deemed the appropriate objects of moral concern and consideration. Nor does such a system require that the concepts of ecological homeostasis, equilibrium, and iritegrity provide us with normative principles from which could be derived (with the addition of factual knowledge) our obligations with regard to natural ecosystems. The "balance of nature is not itself a moral norm, however important may be the role it plays in our general outlook on the natural world that underlies the attitude of respect for nature. I argue that finally it is the good (well-being, welfare) of individual organisms,

considered as entities having inherent worth, that determines our moral relations with the Earth's wild communities of life.

In designating the theory to be set forth as life-centered, I intend to contrast it with all anthropocentric views. According to the latter, human actions affecting the natural environment and its nonhuman inhabitants are right (or wrong) by either of two criteria: they have consequences which are favorable (or unfavourable) to human well-being, or they are consistent (or inconsistent) with the system of norms that protect and implement human rights. From this hum an-centered standpoint it is to humans and only to humans that all duties are ultimately owed. We may have responsibilities *with regard to* the natural ecosystems and biotic communities of our planet, but these responsibilities are in every case based on the contingent fact that our treatment of those ecosystems and communities of life can further the realization of human values and/or human rights. We have no obligation to promote or protect the good of nonhuman living things, independently of this contingent fact.

A life-centered system of environmental ethics is opposed to humancentered ones precisely on this point. From the perspective of a life-centered theory, we have prima facie moral obligations that are owed to wild plants and animals themselves as members of the Earth's biotic community. We are morally bound (other things being equal) to protect or promote their good for *their* sake. Our duties to respect the integrity of natural ecosystems, to preserve endangered species, and to avoid environmental pollution stem from the fact that these are ways in which we can help make it possible for wild species populations to achieve and maintain a healthy existence in a natural state. Such obligations are due those living things out of recognition of their inherent worth. They are entirely additional to and independent of the obligations we owe to our fellow humans. Although many of the actions that fulfill one set of obligations will also fulfill the other, two different grounds of obligation are involved. Their well-being, as well as human well-being, is something to be realized *as an end in itself.*

If we were to accept a life-centered theory of environmental ethics, a profound reordering of our moral universe would take place. We would begin to look at the whole of the Earth's biosphere in a new light. Our duties with respect to the "world" of nature would be seen as making prima facie claims upon us to be balanced against our duties with respect to the "world" of human civilization. We could no longer simply take the human point of view and consider the effects of our actions exclusively from the perspective of our own good.

IT Ihe good of a being and the concept of inherent worth

What would justify acceptance of a life-centered system of ethical principles? In order to answer this it is first necessary to make clear the fundamental moral attitude

that underlies and makes intelligible the commitment to live by such a system. It is then necessary to examine the considerations that would justify any rational agent's adopting that moral attitude.

Two concepts are essential to the taking of a moral attitude of the sort in question. A being which does not "have" these concepts, that is, which is unable to grasp their meaning and conditions of applicability, cannot be said to have the attitude as part of its moral outlook. These concepts are, first, that of the good (well-being, welfare) of a living thing, and second, the idea of an entity possessing inherent worth. I examine each concept in turn.

(1) Every organism, species population, and community of life has a good of its own which moral agents can intentionally further or damage by their actions. To say that an entity has a good of its own is simply to say that, without reference to any *other* entity, it can be benefited or harmed. One can act in its overall interest or contrary to its overall interest, and environmental conditions can be good for it (advantageous to it) or bad for it (disadvantageous to it). What is good for an entity is what "does it good" in the sense of enhancing or preserving its life and well-being. What is bad for an entity is something that is detrimental to its life and well-being.[1]

We can think of the good of an individual nonhuman organism as consisting in the full development of its biological powers. Its good is realized to the extent that it is strong and healthy. It possesses whatever capacities it needs for successfully coping with its environment and so preserving its existence throughout the various stages of the normal life cycle of its species. The good of a population or community of such individuals consists in the population or community maintaining itself from generation to generation as a coherent system of genetically and ecologically related organisms whose average good is at an optimum level for the given environment. (Here *average good* means that the degree of realization of the good of *individual organisms* in the population or community is, on average, greater than would be the case under any other ecologically functioning order of interrelations among those species populations in the given ecosystem.)

The idea of a being having a good of its own, as I understand it, does not entail that the being must have interests or take an interest in what affects its life for better or for worse. We can act in a being's interest or contrary to its interest without its being interested in what we are doing to it in the sense of wanting or not wanting us to do it. It may, indeed, be wholly unaware that favorable and unfavorable events are taking place in its life. I take it that trees, for example, have no knowledge or desires or feelings. Yet is is undoubtedly the case that trees can be harmed or benefited by our actions. We can crush their roots by running a bulldozer too close to them. We can see to it that they get adequate nourishment and moisture by fertilizing and watering the soil around them. Thus we can help or hinder them in the realization of their good. It is the good of trees themselves that is thereby affected. We can similarly act so as to

[1] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

further the good of an entire tree population of a certain species (say, all the redwood trees in a California valley) or the good of a whole community of plant life in a given wilderness area, just as we can do harm to such a population or community.

When construed in this way, the concept of a being's good is not coextensive with sentience or the capacity for feeling pain. William Frankena has argued for a general theory of environmental ethics in which the ground of a creature's being worthy of moral consideration is its sentience. I have offered some criticisms of this view elsewhere, but the full refutation of such a position, it seems to me, finally depends on the positive reasons for accepting a life-centered theory of the kind I am defending in this essay.

It should be noted further that I am leaving open the question of whether machines - in particular, those which are not only goal-directed, but also self-regulating - can properly be said to have a good of their own.[2] Since I am concerned only with human treatment of wild organisms, species populations, and communities of life as they occur in our planet's natural ecosystems, it is to those entities alone that the concept "having a good of its own" will here be applied. I am not denying that other living things, whose genetic origin and environmental conditions have been produced, controlled, and manipulated by humans for human ends, do have a good of their own in the same sense as do wild plants and animals. It is not my purpose in this essay, however, to set out or defend the principles that should guide our conduct with regard to their good. It is only insofar as their production and use by humans have good or ill effects upon natural ecosystems and their wild inhabitants that the ethics of respect for nature comes into play.

(2) The second concept essential to the moral attitude of respect for nature is the idea of inherent worth. We take that attitude toward wild living things (individuals, species populations, or whole biotic communities) when and only when we regard them as entities possessing inherent worth. Indeed, it is only because they are conceived in this way that moral agents can think of themselves as having validly binding duties, obligations, and responsibilities that are *owed* to them as their *due.* I am not at this juncture arguing why they *should* be so regarded; I consider it at length below. But so regarding them is a presupposition of our taking the attitude of respect toward them and accordingly understanding ourselves as bearing certain moral relations to them. This can be shown as follows:

What does it mean to regard an entity that has a good of its own as possessing inherent worth? Two general principles are involved: the principle of moral consideration and the principle of intrinsic value.

According to the principle of moral consideration, wild living things are deserving of the concern and consideration of all moral agents simply in virtue of their being members of the Earth's community of life. From the moral point of view their good must be taken into account whenever it is affected for better or worse by the conduct of rational agents. This holds no matter what species the creature belongs to. The good

[2] Engels, F. *The Dialectics of Nature.* New York: International Publishers, 1940.

of each is to be accorded some value and so acknowledged as having some weight in the deliberations of all rational agents. Of course, it may be necessary for such agents to act in ways contrary to the good of this or that particular organism or group of organisms in order to further the good of others, including the good of humans. But the principle of moral consideration prescribes that, with respect to each being an entity having its own good, every individual is deserving of consideration.

The principle of intrinsic value states that, regardless of what kind of entity it is in other respects, if it is a member of the Earth's community of life, the realization of its good is something *intrinsically* valuable. This means that its good is prima facie worthy of being preserved or promoted as an end in itself and for the sake of the entity whose good it is. Insofar as we regard any organism, species population, or life community as an entity having inherent worth, we believe that it must never be treated as if it were a mere object or thing whose entire value lies in being instrumental to the good of some other entity. The well-being of each is judged to have value in and of itself.

Combining these two principles, we can now define what it means for a living thing or group of living things to possess inherent worth. To say that it possesses inherent worth is to say that its good is deserving of the concern and consideration of all moral agents, and that the realization of its good has intrinsic value, to be pursued as an end in itself and for the sake of the entity whose good it is.

The duties owed to wild organisms, species populations, and communities of life in the Earth's natural ecosystems are grounded on their inherent worth. When rational, autonomous agents regard such entities as possessing inherent worth, they place intrinsic value on the realization of their good and so hold themselves responsible for performing actions that will have this effect and for refraining from actions having the contrary effect.

Ill The attitude of respect for nature

Why should moral agents regard wild living things in the natural world as possessing inherent worth? To answer this question we must first take into account the fact that, when rational, autonomous agents subscribe to the principles of moral consideration and intrinsic value and so conceive of wild living things as having that kind'of worth, such agents are *adopting a certain ultimate moral attitude toward the natural world.* This is the attitude I call "respect for nature." It parallels the attitude of respect for persons in human ethics. When we adopt the attitude of respect for persons as the proper (fitting, appropriate) attitude to take toward all persons as persons, we consider the fulfillment of the basic interests of each individual to have intrinsic value. We thereby make a moral commitment to live a certain kind of life in relation to other

persons. We place ourselves under the direction of a system of standards and rules that we consider validly binding on all moral agents as such.[3]

Similarly, when we adopt the attitude of respect for nature as an ultimate moral attitude we make a commitment to live by certain normative principles. These principles constitute the rules of conduct and standards of character that are to govern our treatment of the natural world. This is, first, an *ultimate* commitment because it is not derived from any higher norm. The attitude of respect for nature is not grounded on some other, more general, or more fundamental attitude. It sets the total framework for our responsibilities toward the natural world. It can be justified, as I show below, but its justification cannot consist in referring to a more general attitude or a more basic normative principle.

Second, the commitment is a *moral* one because it is understood to be a disinterested matter of principle. It is this feature that distinguishes the attitude of respect for nature from the set of feelings and dispositions that comprise the love of nature. The latter stems from one's personal interest in and response to the natural world. Like the affectionate feelings we have toward certain individual human beings, one's love of nature is nothing more than the particular way one feels about the natural environment and its wild inhabitants. And just as our love for an individual person differs from our respect for all persons as such (whether we happen to love them or not), so love of nature differs from respect for nature. Respect for nature is an attitude we believe all moral agents ought to have simply as moral agents, regardless of whether or not they also love nature. Indeed, we have not truly taken the attitude of respect for nature ourselves unless we believe this. To put it in a Kantian way, to adopt the attitude of respect for nature is to take a stance that one wills it to be a universal law for all rational beings. It is to hold that stance categorically, as being validly applicable to every moral agent without exception, irrespective of whatever personal feelings toward nature such an agent might have or might lack.

Although the attitude of respect for nature is in this sense a disinterested and universalizable attitude, anyone who does adopt it has certain steady, more or less permanent dispositions. These dispositions, which are themselves to be considered disinterested and universalizable, comprise three interlocking sets: dispositions to seek certain ends, dispositions to carry on one s practical reasoning and deliberation in a certain way, and dispositions to have certain feelings. We may accordingly analyze the attitude of respect for nature into the following components, (a) The disposition to aim at, and to take steps to bring about, as final and disinterested ends, the promoting and protecting of the good of organisms, species populations, and life communities in natural ecosystems. (These ends are "final" in not being pursued as means to further ends. They are "disinterested" in being independent of the self-interest of the agent.) (b) The disposition to consider actions that tend to realize those ends to be prima facie obligatory *because* they have that tendency, (c) The disposition to experience positive

[3] Firey, W. *Man, Mind and the Land.* Glencoe, Illionis: Free Press, 1960.

and negative feelings towards states of affairs in the world *because* they are favorable or unfavorable to the good of organisms, species populations, and life communities in natural ecosystems.

The logical connection between the attitude of respect for nature and the duties of a life-centered system of environmental ethics can now be made clear. Insofar as one sincerely takes that attitude and so has the three sets of dispositions, one will at the same time be disposed to comply with certain rules of duty (such as nonmaleficence and noninterference) and with standards of character (such as fairness and benevolence) that determine the obligations and virtues of moral agents with regard to the Earth's wild living things. We can say that the actions one performs and the character traits one develops in fulfilling these moral requirements are the way one *expresses* or *embodies* the attitude in one's conduct and character. In his famous essay, "Justice as Fairness," John Rawls describes the rules of the duties of human morality (such as fidelity, gratitude, honesty, and justice) as "forms of conduct in which recognition of others as persons is manifested." I hold that the rules of duty governing our treatment of the natural world and its inhabitants are forms of conduct in which the attitude of respect for nature is manifested.

IV The justifiability of the attitude of respect for nature

I return to the question posed earlier, which has not yet been answered: why *should* moral agents regard wild living things as possessing inherent worth? I now argue that the only way we can answer this question is by showing how adopting the attitude of respect for nature is justified for all moral agents. Let us suppose that we were able to establish that there are good reasons for adopting the attitude, reasons which are intersubjectively valid for every rational agent. If there are such reasons, they would justify anyone's having the three sets of dispositions mentioned above as constituting what it means to have the attitude. Since these include the disposition to promote or protect the good of wild living things as a disinterested and ultimate end, as well as the disposition to perform actions for the reason that they tend to realize that end, we see that such dispositions commit a person to the principles of moral consideration and intrinsic value. To be disposed to further, as an end in itself, the good of any entity in nature just because it is that kind of entity, is to be disposed to give consideration to *every* such entity and to place intrinsic value on the realization of its good. Insofar as we subscribe to these two principles we regard living things as possessing inherent worth. Subscribing to the principles is what it *means* to so regard them. To justify the attitude of respect for nature, then, is to justify commitment to these principles and thereby to justify regarding wild creatures as possessing inherent worth.

We must keep in mind that inherent worth is not some mysterious sort of objective property belonging to living things that can be discovered by empirical observation or scientific investigation. To ascribe inherent worth to an entity is not to describe it by citing some feature discernible by sense perception or inferable by inductive reasoning. Nor is there a logically necessary connection between the concept of a being having a good of its own and the concept of inherent worth. We do not contradict ourselves by asserting that an entity that has a good of its own lacks inherent worth. In order to show that such an entity "has" inherent worth we must give good reasons for ascribing that kind of value to it (placing that kind of value upon it, conceiving of it to be valuable in that way). Although it is humans (persons, valuers) who must do the valuing, for the ethics of respect for nature, the value so ascribed is not a human value. That is to say, it is not a value derived from considerations regarding human well-being or human rights. It is a value that is ascribed to nonhuman animals and plants themselves, independently of their relationship to what humans judge to be conducive to their own good.

Whatever reasons, then, justify our taking the attitude of respect for nature as defined above are also reasons that show why we *should* regard the living things of the natural world as possessing inherent worth. We saw earlier that, since the attitude is an ultimate one, it cannot be derived from a more fundamental attitude nor shown to be a special case of a more general one. On what sort of grounds, then, can it be established?

The attitude we take toward living things in the natural world depends on the way we look at them, on what kind of beings we conceive them to be, and on how we understand the relations we bear to them. Underlying and supporting our attitude is a certain *belief system* that constitutes a particular world view or outlook on nature and the place of human life in it. To give good reasons for adopting the attitude of respect for nature, then, we must first articulate the belief system which underlies and supports that attitude. If it appears that the belief system is internally coherent and well-ordered, and if, as far as we can now tell, it is consistent with all known scientific truths relevant to our knowledge of the object of the attitude (which in this case includes the whole set of the Earth's natural ecosystems and their communities of life), then there remains the task of indicating why scientifically informed and rational thinkers with a developed capacity of reality awareness can find it acceptable as a way of conceiving of the natural world and our place in it. To the extent we can do this we provide at least a reasonable argument for accepting the belief system and the ultimate moral attitude it supports.

I do not hold that such a belief system can be *proven* to be true, either inductively or deductively. As we shall see, not all of its components can be stated in the form of empirically verifiable propositions. Nor is its internal order governed by purely logical relationships. But the system as a whole, I contend, constitutes a coherent, unified, and rationally acceptable "picture" or "map of a total world. By examining each of its

main components and seeing how they fit together, we obtain a scientifically informed and well- ordered conception of nature and the place of humans in it.

This belief system underlying the attitude of respect for nature I call (for want of a better name) "the biocentric outlook on nature." Since it is not wholly analyzable into empirically confirmable assertions, it should not be thought of as simply a compendium of the biological sciences concerning our planet's ecosystems. It might best be described as a philosophical world view, to distinguish it from a scientific theory or explanatory system. However, one of its major tenets is the great lesson we have learned from the science of ecology: the interdependence of all living things in an organically unified order whose balance and stability are necessary conditions for the realization of the good of its constituent biotic communities.

Before turning to an account of the main components of the biocentric outlook, it is convenient here to set forth the overall structure of my theory of environmental ethics as it has now emerged. The ethics of respect for nature is made up of three basic elements: a belief system, an ultimate moral attitude, and a set of rules of duty and standards of character. These elements are connected with each other in the following manner. The belief system provides a certain outlook on nature which supports and makes intelligible an autonomous agent's adopting, as an ultimate moral attitude, the attitude of respect for nature. It supports and makes intelligible the attitude in the sense that, when an autonomous agent understands its moral relations to the natural world in terms of this outlook, it recognizes the attitude of respect to be the only *suitable* or *fitting* attitude to take toward all wild forms of life in the Earth's biosphere. Living things are now viewed as *the appropriate objects of the attitude of respect* and are accordingly regarded as entities possessing inherent worth. One then places intrinsic value on the promotion and protection of their good. As a consequence of this, one makes a moral commitment to abide by a set of rules of duty and to fulfill (as far as one can by one's own efforts) certain standards of good character. Given one's adoption of the attitude of respect, one makes that moral commitment because one considers those rules and standards to be validly binding on all moral agents. They are seen as embodying forms of conduct and character structures in which the attitude of respect for nature is manifested.

This three-part complex which internally orders the ethics of respect for nature is symmetrical with a theory of human ethics grounded on respect for persons. Such a theory includes, first, a conception of oneself and others as persons, that is, as centers of autonomous choice. Second, there is the attitude of respect for persons as persons. When this is adopted as an ultimate moral attitude it involves the disposition to treat every person as having inherent worth or "human dignity." Every human being, just in virtue of her or his humanity, is understood to be worthy of moral consideration, and intrinsic value is placed on the autonomy and well-being of each. This is what Kant meant by conceiving of persons as ends in themselves. Third, there is an ethical system of duties which are, acknowledged to be owed by everyone to everyone. These duties

are forms of conduct in which public recognition is given to each individual's inherent worth as a person.

This structural framework for a theory of human ethics is meant to leave open the issue of consequentialism (utilitarianism) versus nonconsequential- ism (deontology). That issue concerns the particular kind of system of rules defining the duties of moral agents toward persons. Similarly, I am leaving open in this paper the question of what particular kind of system of rules defines our duties with respect to the natural world.

V The biocentric outlook on nature

The biocentric outlook on nature has four main components. (1) Humans are thought of as members of the Earth's community of life, holding that membership on the same terms as apply to all the nonhuman members. (2) The Earth's natural ecosystems as a totality are seen as a complex web of interconnected elements, with the sound biological functioning of each being dependent on the sound biological functioning of the others. (This is the component referred to above as the great lesson that the science of ecology has taught us). (3) Each individual organism is conceived of as a teleological center of life, pursuing its own good in its own way. (4) Whether we are concerned with standards of merit or with the concept of inherent worth, the claim that humans by their very nature are superior to other species is a groundless claim and, in the light of elements (1), (2), and (3) above, must be rejected as nothing more than an irrational bias in our own favor.

The conjunction of these four ideas constitutes the biocentric outlook on nature. In the remainder of this paper I give a brief account of the first three components, followed by a more detailed analysis of the fourth. I then conclude by indicating how this outlook provides a way of justifying the attitude of respect for nature.

VI Humans as members of the earth's community of life

We share with other species a common relationship to the Earth. In accepting the biocentric outlook we take the fact of our being an animal species to be a fundamental feature of our existence. We consider it an essential aspect of the human condition." We do not deny the differences between ourselves and other species, but we keep in the forefront of our consciousness the fact that in relation to our planet's natural ecosystems we are but one species population among many. Thus we acknowledge our origin in the very same evolutionary process that gave rise to all other species and we recognize ourselves to be confronted with similar environmental challenges to those that confront them. The laws of genetics, of natural selection, and of adaptation apply equally to all of us as biological creatures. In this light we consider ourselves as one with

them, not set apart from them. We, as well as they, must face certain basic conditions of existence that impose requirements on us for our survival and well-being. Each animal and plant is like us in having a good of its own. Although our human good (what is of true value in human life, including the exercise of individual autonomy in choosing our own particular value systems) is not like the good of a nonhuman animal or plant, it can no more be realized than their good can without the biological necessities for survival and physical health.

When we look at ourselves from the evolutionary point of view, we see that not only are we very recent arrivals on Earth, but that our emergence as a new species on the planet was originally an event of no particular importance to the entire scheme of things. The Earth was teeming with life long before we appeared. Putting the point metaphorically, we are relative newcomers, entering a home that has been the residence of others for hundreds of millions of years, a home that must now be shared by all of us together.

The comparative brevity of human life on Earth may be vividly depicted by imagining the geological time scale in spatial terms. Suppose we start with algae, which have been around for at least 600 million years. (The earliest protozoa actually predated this by several *billion* years.) If the time that algae have been here were represented by the length of a football field (300 feet), then the period during which sharks have been swimming in the world's oceans and spiders have been spinning their webs would occupy three quarters of the length of the field; reptiles would show up at about the center of the field; mammals would cover the last third of the field; hominids (mammals of the family *Hominidae)* the last two feet; and the species *Homo sapiens* the last six inches.

Whether this newcomer is able to survive as long as other species remains to be seen. But there is surely something presumptuous about the way humans look down on the "lower" animals, especially those that have become extinct. We consider the dinosaurs, for example, to be biological failures, though they existed on our planet for 65 million years. One writer has made the point with beautiful simplicity

We sometimes speak of the dinosaurs as failures; there will be time enough for that judgment when we have lasted even for one tenth as long.. .[4]

The possibility of the extinction of the human species, a possibility which starkly confronts us in the contemporary world, makes us aware of another respect in which we should not consider ourselves privileged beings in relation to other species. This is the fact that the well-being of humans is dependent upon the ecological soundness and health of many plant and animal communities, while their soundness and health does not in the least depend upon human well-being. Indeed, from their standpoint the very existence of humans is quite unnecessary. Every last man, woman, and child could disappear from the face of the Earth without any significant detrimental consequence for the good of wild animals and plants. On the contrary, many of them would be

[4] Godelier, M. *Rationality and Irrationality in Economics.* London: New Left Books, 1972.

greatly benefited. The destruction of their habitats by human "developments" would cease. The poisoning and polluting of their environment would come to an end. The Earth's land, air, and water would no longer be subject to the degradation they are now undergoing as the result of large-scale technology and uncontrolled population growth. Life communities in natural ecosystems would gradually return to their former healthy state. Tropical forests, for example, would again be able to make their full contribution to a life-sustaining atmosphere for the whole planet. The rivers, lakes, and oceans of the world would (perhaps) eventually become clean again. Spilled oil, plastic trash, and even radioactive waste might finally, after many centuries, cease doing their terrible work. Ecosystems would return to their proper balance, suffering only the disruptions of natural events such as volcanic eruptions and glaciation. From these the community of life could recover, as it has so often done in the past. But the ecological disasters now perpetrated on it by humans— disasters from which it might never recover—these it would no longer have to endure.

If, then, the total, final, absolute extermination of our species (by our own hands?) should take place and if we should not carry all the others with us into oblivion, not only would the Earth's community of life continue to exist, but in all probability its well-being would be enhanced. Our presence, in short, is not needed. If we were to take the standpoint of the community and give voice to its true interest, the ending of our six-inch epoch would most likely be greeted with a hearty "Good riddance!"

VII The natural world as an organic system

To accept the biocentric outlook and regard ourselves and our place in the world from its perspective is to see the whole natural order of the Earth's biosphere as a complex but unified web of interconnected organisms, objects, and events. The ecological relationships between any community of living things and their environment form an organic whole of functionally interdependent parts. Each ecosystem is a small universe itself in which the interactions of its various species populations comprise an intricately woven network of. cause-effect relations. Such dynamic but at the same time relatively stable structures as food chains, predator-prey relations, and plant succession in a forest are self-regulating, energy-recycling mechanisms that preserve the equilibrium of the whole.

As far as the well-being of wild animals and plants is concerned, this ecological equilibrium must not be destroyed. The same holds true of the well-being of humans. When one views the realm of nature from the perspective of the biocentric outlook, one never forgets that in the long run the integrity of the entire biosphere of our planet is essential to the realization of the good of its constituent communities of life, both human and nonhuman.

Although the importance of this idea cannot be overemphasized, it is by now so familiar and so widely acknowledged that I shall not further elabo- ratic on it here.

However, I do wish to point out that this "holistic" view of the Earth's ecological systems does not itself constitute a moral norm. It is a factual aspect of biological reality, to be understood as a set of causal connections in ordinary empirical terms. Its significance for humans is the same as its significance for nonhumans, namely, in setting basic conditions for the realization of the good of living things. Its ethical implications for our treatment of the natural environment lie entirely in the fact that our *knowledge* of these causal connections is an essential *means* to fulfilling the aims we set for ourselves in adopting the attitude of respect for nature. In addition, its theoretical implications for the ethics of respect for nature lie in the fact that it (along with the other elements of the biocentric outlook) makes the adopting of that attitude a rational and intelligible thing to do.

VIII Individual organisms as teleological centers of life

As our knowledge of living things increases, as we come to a deeper understanding of their life cycles, their interactions with other organisms, and the manifold ways in which they adjust to the environment, we become more fully aware of how each of them is carrying out its biological functions according to the laws of its species-specific nature. But besides this, our increasing knowledge and understanding also develop in us a sharpened awareness of the uniqueness of each individual organism. Scientists who have made careful studies of particular plants and animals, whether in the field or in laboratories, have often acquired a knowledge of their subjects as identifiable individuals. Close observation over extended periods of time has led them to an appreciation of the unique "personalities" of their subjects. Sometimes a scientist may come to take a special interest in a particular animal or plant, all the while remaining strictly objective in the gathering and recording of data. Nonscientists may likewise experience this development of interest when, as amateur naturalists, they make accurate observations over sustained periods of close acquaintance with an individual organism. As one becomes more and more familiar with the organism and its behavior, one becomes fully sensitive to the particular way it is living out its life cycle. One may become fascinated by it and even experience some involvement with its good and bad fortunes (that is, with the occurrence of environmental conditions favorable or unfavorable to the realization of its good). The organism comes to mean something to one as a unique, irreplaceable individual. The final culmination of this process is the achievement of a genuine understanding of its point of view and, with that understanding, an ability to "take" that point of view. *Conceiving of it as a center of life, one is able to look at the world from its perspective.*

This development from objective knowledge to the recognition of individuality, and from the recognition of individuality to full awareness of an organism's standpoint, is

a process of heightening our consciousness of what it means to be an individual living thing. We grasp the particularity of the organism as a teleological center of life, striving to preserve itself and to realize its own good in its own unique way.

It is to be noted that we need not be falsely anthropomorphizing when we conceive of individual plants and animals in this manner. Understanding them as teleological centers of life does not necessitate "reading into" them human characteristics. We need not, for example, consider them to have consciousness. Some of them may be aware of the world around them and others may not. Nor need we deny that different kinds and levels of awareness are exemplified when consciousness in some form is present. But conscious or not, all are equally teleological centers of life in the sense that each is a unified system of goal-oriented activities directed toward their preservation and well-being.

When considered from an ethical point of view, a teleological center of life is an entity whose "world" can be viewed from the perspective of *its* life. In looking at the world from that perspective we recognize objects and events occurring in its life as being beneficent, maleficent, or indifferent. The first are occurrences which increase its powers to preserve its existence and realize its good. The second decrease or destroy those powers. The third have neither of these effects on the entity. With regard to our human role as moral agents, we can conceive of a teleological center of life as a being whose standpoint we can take in making judgments about what events in the world are good or evil, desirable or undesirable. In making those judgments it is what promotes or protects the being's own good, not what benefits moral agents themselves, that sets the standard of evaluation. Such judgments can be made about anything that happens to the entity which is favorable or unfavorable in relation to its good. As was pointed out earlier, the entity itself need not have any (conscious) *interest* in what is happening to it for such judgments to be meaningful and true.

It is precisely judgments of this sort that we are disposed to make when we take the attitude of respect for nature. In adopting that attitude those judgments are given weight as reasons for action in our practical deliberation. They beconje morally relevant facts in the guidance of our conduct.

IX The denial of human superiority

This fourth component of the biocentric outlook on nature is the single most important idea in establishing the justifiability of the attitude of respect for nature. Its central role is due to the special relationship it bears to the first three components of the outlook. This relationship will be brought out after the concept of human superiority is examined and analyzed.[5]

[5] Harvey, D. *Social Justice and the City.* Baltimore: Johns Hopkins Press, 1973.

In what sense are humans alleged to be superior to other animals? We are different from them in having certain capacities that they lack. But why should these capacities be a mark of superiority? From what point of view are they judged to be signs of superiority and what sense of superiority is meant? After all, various nonhuman species have capacities that humans lack. There is the speed of a cheetah, the vision of an eagle, the agility of a monkey. Why should not these be taken as signs of *their* superiority over humans?

One answer that comes immediately to mind is that these capacities are not as *valuable* as the human capacities that are claimed to make us superior. Such uniquely human characteristics as rational thought, aesthetic creativity, autonomy and self-determination, and moral freedom, it might be held, have a higher value than the capacities found in other species. Yet we must ask: valuable to whom, and on what grounds?

The human characteristics mentioned are all valuable to humans. They are essential to the preservation and enrichment of our civilization and culture. Clearly it is from the human standpoint that they are being judged to be desirable and good. It is not difficult here to recognize a begging of the question. Humans are claiming human superiority from a strictly human point of view, that is, from a point of view in which the good of humans is taken as the standard of judgment. All we need to do is to look at the capacities of nonhuman animals (or plants, for that matter) from the standpoint of *their* good to find a contrary judgment of superiority. The speed of the cheetah, for example, is a sign of its superiority to humans when considered from the standpoint of the good of its species. If it were as slow a runner as a human, it would not be able to survive. And so for all the other abilities of nonhumans which further their good but which are lacking in humans. In each case the claim to human superiority would be rejected from a nonhuman standpoint.

When superiority assertions are interpreted in this way, they are based on judgments of *merit.* To judge the merits of a person or an organism one must apply grading or ranking standards to it. (As I show below, this distinguishes judgments of merit from judgments of inherent worth.) Empirical investigation then determines whether it has the "good-making properties" (merits) in virtue of which it fulfills the standards being applied. In the case of humans, merits may be either moral or non-moral. We can judge one person to be better than (superior to) another from the moral point of view by applying certain standards to their character and conduct. Similarly, we can appeal to nonmoral criteria in judging someone to be an excellent piano player, a fair cook, a poor tennis player, and so on. Different social purposes and roles are implicit in the making of such judgments, providing the frame of reference for the choice of standards by which the nonmoral merits of people are determined. Ultimately such purposes and roles stem from a society's way of life as a whole. Now a society's way of life may be thought of as the cultural form given to the realization of human values. Whether moral or nonmoral standards are being applied, then, all judgments of people's merits finally depend on human values. All are made from an exclusively human standpoint.

The question that naturally arises at this juncture is: why should standards that are based on human values be assumed to be the only valid criteria of merit and hence the only true signs of superiority? This question is especially pressing when humans are being judged superior in merit to nonhumans. It is true that a human being may be a better mathematician than a monkey, but the monkey may be a better tree climber than a human being. If we humans value mathematics more than tree climbing, that is because our conception of civilized life makes the development of mathematical ability more desirable than the ability to climb trees. But is it not unreasonable to judge nonhumans by the values of human civilization, rather than by values connected with what it is for a member of *that* species to live a good life? If all living things have a good of their own, it at least makes sense to judge the merits of nonhumans by standards derived from *their* good. To use only standards based on human values is already to commit oneself to holding that humans are superior to nonhumans, which is the point in question.

A further logical flaw arises in connection with the widely held conviction that humans are *morally* superior beings because they possess, while others lack, the capacities of a moral agent (free will, accountability, deliberation, judgment, practical reason). This view rests on a conceptual confusion. As far as moral standards are concerned, only beings that have the capacities of a moral agent can properly be judged to be *either* moral (morally good) *or* immoral (morally deficient). Moral standards are simply not applicable to beings that lack such capacities. Animals and plants cannot therefore be said to be morally inferior in merit to humans. Since the only beings that can have moral merits *or be deficient in such merits* are moral agents, it is conceptually incoherent to judge humans as superior to nonhumans on the ground that humans have moral capacities while nonhumans don't.

Up to this point 1 have been interpreting the claim that humans are superior to other living things as a grading or ranking judgment regarding their comparative merits. There is, however, another way of understanding the idea of human superiority. According to this interpretation, humans are superior to nonhumans not as regards their merits but as regards their inherent worth. Thus the claim of human superiority is to be understood as asserting that all humans, simply in virtue of their humanity, have *a greater inherent worth* than other living things.

The inherent worth of an entity does not depend on its merits.[6] To consider something as possessing inherent worth, we have seen, is to place intrinsic value on the realization of its good. This is done regardless of whatever particular merits it might have or might lack, as judged by a set of grading or ranking standards. In human affairs, we are all familiar with the principle that one's worth as a person does not vary with one's merits or lack of merits. The same can hold true of animals and plants. To regard such entities as possessing inherent worth entails disregarding their merits

[6] Hays, S. *The Conservation Movement and the Gospel of Efficiency.* Cambridge, Massachusetts: Atheneum, 1959.

and deficiencies, whether they are being judged from a human standpoint or from the standpoint of their own species.

The idea of one entity having more merit than another, and so being superior to it in merit, makes perfectly good sense. Merit is a grading or ranking concept, and judgments of comparative merit are based on the different degrees to which things satisfy a given standard. But what can it mean to talk about one thing being superior to another in inherent worth? In order to get at what is being asserted in such a claim it is helpful first to look at the social origin of the concept of degrees of inherent worth.

The idea that humans can possess different degrees of inherent worth originated in societies having rigid class structures. Before the rise of modern democracies with their egalitarian outlook, one's membership in a hereditary class determined one's social status. People in the upper classes were looked up to, while those in the lower classes were looked down upon. In such a society one's social superiors and social inferiors were clearly defined and easily recognized.

Two aspects of these class-structured societies are especially relevant to the idea of degrees of inherent worth. First, those born into the upper classes were deemed more worthy of respect than those born into the lower orders. Second, the superior worth of upper class people had nothing to do with their merits nor did the inferior worth of those in the lower classes rest on their lack of merits. One's superiority or inferiority entirely derived from a social position one was born into. The modern concept of a meritocracy simply did not apply. One could not advance into a higher class by any sort of moral or nonmoral achievement. Similarly, an aristocrat held his title and all the privileges that went with it just because he was the eldest son of a titled nobleman. Unlike the bestowing of knighthood in contemporary Great Britain, one did not earn membership in the nobility by meritorious conduct.

We who live in modern democracies no longer believe in such hereditary social distinctions. Indeed, we would wholeheartedly condemn them on moral grounds as being fundamentally unjust. We have come to think of class systems as a paradigm of social injustice, it being a central principle of the democratic way of life that among; humans there are no superiors and no inferiors. Thus we have rejected the whole conceptual framework in which people are judged to have different degrees of inherent worth. That idea is incompatible with our notion of human equality based on the doctrine that all humans, simply in virtue of their humanity, have the same inherent worth. (The belief in universal human rights is one form that this egalitarianism takes.)

The vast majority of people in modern democracies, however, do not maintain an egalitarian outlook when it comes to comparing human beings with other living things. Most people consider our own species to be superior to all other species and this superiority is understood to be a matter of inherent worth, not merit. There may exist thoroughly vicious and depraved humans who lack all merit. Yet because they are human they are thought to belong to a higher class of entities than any plant or animal. That one is bom into the species *Homo sapiens* entitles one to have lordship over those who are one's inferiors, namely, those bom into other species. The parallel with

hereditary social classes is very close Implicit in this view is a hierarchical conception of nature according to which an organism has a position of superiority or inferiority in the Earth's community of life simply on the basis of its genetic background. The "lower" orders of life are looked down upon and it is considered perfectly proper that they serve the interests of those belonging to the highest order, namely humans. The intrinsic value we place on the well-being of our fellow humans reflects our recognition of their rightful position as our equals. No such intrinsic value is to be placed on the good of other animals, unless we choose to do so out of fondness or affection for them. But their well-being imposes no moral requirement on us. In this respect there is an absolute difference in moral status between ourselves and them.

This is the structure of concepts and beliefs that people are committed to insofar as they regard humans to be superior in inherent worth to all other species. I now wish to argue that this structure of concepts and beliefs is completely groundless. If we accept the first three components of the biocentric outlook and from that perspective look at the major philosophical traditions which have supported that structure, we find it to be at bottom nothing more than the expression of an irrational bias in our own favor. The philosophical traditions themselves rest on very questionable assumptions or else simply beg the question. I briefly consider three of the main traditions to substantiate the point. T hese are classical Greek humanism, Cartesian dualism, and the Judeo-Christian concept of the Great Chain of Being.

The inherent superiority of humans over other species was implicit in the Greek definition of man as a rational animal. Our animal nature was identified with "brute" desires that need the order and restraint of reason to rule them (just as reason is the special virtue of those who rule in the ideal state). Rationality .was then seen to be the key to our superiority over animals. It enables us to live on a higher plane and endows us with a nobility and worth that other creatures lack. This familiar way of comparing humans with other species is deeply ingrained in our Western philosophical outlook. The point to consider here is that this view does not actually provide an argument *for* human superiority but rather makes explicit the framework of thought that is implicitly used by those who think of humans as inherently superior to nonhumans. The Greeks who held that humans, in virtue of their rational capacities. have a kind of worth greater than that of any nonrational being, never looked at rationality as but one capacity of living things among many others. But when we consider rationality from the standpoint of the first three elements of the ecological outlook, we see that its value lies in its importance for *human* life. Other creatures achieve their species-specific good without the need of rationality, although they often make use of capacities that humans lack. So the humanistic outlook of classical Greek thought does not give us a neutral (nonquestion-begging) ground on which to construct a scale of degrees of inherent worth possessed by different species of living things.

The second tradition, centering on the Cartesian dualism of soul and body, also fails to justify the claim to human superiority. That superiority is supposed to derive from the fact that we have souls while animals do not. Animals are mere automata

and lack the divine element that makes us spiritual beings. I won't go into the now familiar criticisms of this two-substance view. I only add the point that, even if humans are composed of an immaterial, unextended soul and a material, extended body, this in itself is not a reason to deem them of greater worth than entities that are only bodies. Why is a soul substance a thing that adds value to its possessor? Unless some theological reasoning is offered here (which many, including myself, would find unacceptable on epistemological grounds), no logical connection is evident. An immaterial something which thinks is better than a material something which does not think only if thinking itself has value, either intrinsically or instrumentally. Now it is intrinsically valuable to humans alone, who value it as an end in itself, and it is instrumentally valuable to those who benefit from it, namely humans.

For animals that neither enjoy thinking for its own sake nor need it for living the kind of life for which they are best adapted, it has no value. Even if "thinking" is broadened to include all forms of consciousness, there are still many living things that can,do without it and yet live what is for their species a good life. The anthropocentricity underlying the claim to human superiority runs throughout Cartesian dualism.

A third major source of the idea of human superiority is the Judeo- Christian concept of the Great Chain of Being. Humans are superior to animals and plants because their Creator has given them a higher place on the chain. It begins with God at the top, and then moves to the angels, who are lower than God but higher than humans, then to humans, positioned between the angels and the beasts (partaking of the nature of both), and then on down to the lower levels occupied by nonhuman animals, plants, and finally inanimate objects. Humans, being "made in God's image," are inherently superior to animals and plants by virtue of their being closer (in their essential nature) to God.

The metaphysical and epistemological difficulties with this conception of a hierarchy of entities are, in my mind, insuperable. Without entering into this matter here, I only point out that if we are unwilling to accept the metaphysics of traditional Judaism and Christianity, we are again left without good reasons for holding to the claim of inherent human superiority.

The foregoing considerations (and others like them) leave us with but one ground for the assertion that a human being, regardless of merit, is a higher kind of entity than any other living thing. This is the mere fact of the genetic makeup of the species *Homo sapiens.* But this is surely irrational and arbitrary. Why should the arrangement of genes of a certain type be a mark of superior value, especially when this fact about an organism is taken by itself, unrelated to any other aspect of its life? We might just as well refer to any other genetic makeup as a ground of superior value. Clearly we are confronted here with a wholly arbitrary claim that can only be explained as an irrational bias in our own favor.

That the claim is nothing more than a deep-seated prejudice is brought home to us when we look at our relation to other species in the light of the first three elements of the biocentric outlook. Those elements taken conjointly give us a certain overall view

of the natural world and of the place of humans in it. When we take this view we come to understand other living things, their environmental conditions, and their ecological relationships in such a way as to awake in us a deep sense of our kinship with them as fellow members of the Earth's community of life. Humans and nonhumans alike are viewed together as integral parts of one unified whole in which all living things are functionally interrelated. Finally, when our awareness focuses on the individual lives of plants and animals, each is seen to share with us the characteristic of being a teleological center of life striving to realize its own good in its own unique way.

As this entire belief system becomes part of the conceptual framework through which we understand and perceive the world, we come to see ourselves as bearing a certain moral relation to nonhuman forms of life. Our ethical role in nature takes on a new significance. We begin to look at other species as we look at ourselves, seeing them as beings which have a good they are striving to realize just as we have a good we are striving to realize. We accordingly develop the disposition to view the world from the standpoint of their good as well as from the standpoint of our own good. Now if the groundlessness of the claim that humans are inherently superior to other species were brought clearly before our minds, we would not remain intellectually neutral toward that claim but would reject it as being fundamentally at variance with our total world outlook. In the absence of any good reasons for holding it, the assertion of human superiority would then appear simply as the expression of an irrational and self-serving prejudice that favors one particular species over several million others.

Rejecting the notion of human superiority entails its positive counterpart: the doctrine of species impartiality. One who accepts that doctrine regards all living things as possessing inherent worth—the *same* inherent worth, since no one species has been shown to be either '"higher" or "lower" than any other. Now we saw earlier that, insofar as one thinks of a living thing as possessing inherent worth, one considers it to be the appropriate object of the attitude of respect and believes that attitude to be the only fitting or suitable one for all moral agents to take toward it.

Here, then, is the key to understanding how the attitude of respect is rooted in the biocentric outlook on nature. The basic connection is made through the denial of human superiority. Once we reject the claim that humans are superior either in merit or in worth to other living things, we are ready to adopt the attitude of respect. The denial of human superiority is itself the result of taking the perspective on nature built into the first three elements of the biocentric outlook.

Now the first three elements of the biocentric outlook, it seems clear, would be found acceptable to any rational and scientifically informed thinker who is fully "open" to the reality of the lives of nonhuman organisms. Without denying our distinctively human characteristics, such a thinker can acknowledge the fundamental respects in which we are members of the Earth's community of life and in which the biological conditions necessary for the realization of our human values are inextricably linked with the whole system of nature. In addition, the conception of individual living things as teleological centers of life simply articulates how a scientifically informed thinker comes

to understand them as the result of increasingly careful and detailed observations. Thus, the biocentric outlook recommends itself as an acceptable system of concepts and beliefs to anyone who is clear-minded, unbiased, and factually enlightened, and who has a developed capacity of reality awareness with regard to the lives of individual organisms. This, I submit, is as good a reason for making the moral commitment involved in

VALUING NATURE. AND ENVIRONMENTAL ETHICS adopting the attitude of respect for nature as any theory of environmental ethics could possibly have.

X Moral rights and the matter of competing claims

I have not asserted anywhere in the foregoing account that animals or plants have moral rights. This omission was deliberate. I do not think that the reference class of the concept, bearer of moral rights, should be extended to include nonhuman living things. My reasons for taking this position, however, go beyond the scope of this paper. I believe I have been able to accomplish many of the same ends which those who ascribe rights to animals or plants wish to accomplish. There is no reason, moreover, why plants and animals, including whole species populations and life communities, cannot be accorded *legal* rights under my theory. To grant them legal protection could be interpreted as giving them legal entitlement to be protected, and this, in fact, would be a means by which a society that subscribed to the ethics of respect for nature could give public recognition to their inherent worth.

There remains the problem of competing claims, even when wild plants and animals are not thought of as bearers of moral rights. If we accept the biocentric outlook and accordingly adopt the attitude of respect for nature as our ultimate moral attitude, how do we resolve conflicts that arise from our respect for persons in the domain of human ethics and our respect for nature in the domain of environmental ethics? This is a question that cannot adequately be dealt with here. My main purpose in this paper has been to try to establish a base point from which we can start working toward a solution to the problem. I have shown why we cannot just begin with an initial presumption in favor of the interests of our own species. It is after all within our power as moral beings to place limits on human population and technology with the deliberate intention of sharing the Earth's bounty with other species. That such sharing is an ideal difficult to realize even in an approximate way does not take away its claim to our deepest moral commitment.

5. The Land Ethic

A critical appraisal

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Aldo Leopold's "Land Ethic" centers on the maxim: "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise." I contribute to the critical appraisal of this maxim by providing answers to the following questions: (1) what is referred to by the phrase "the integrity, stability, and beauty of the biotic community"? (2) What "things" tend to preserve or threaten the integrity, stability, and beauty of the biotic community? (3) Are the integrity, stability, and beauty of the biotic community goods such that preserving them is right and failing to do so wrong?

There are flood and drouth Over the eyes and in the mouth, Dead water and dead sand Contending for the upper hand. The parched eviscerate soil Gapes at the vanity of toil, Laughs without mirth.

This is the death of earth.

T. S. Eliot[1]

No maxim is more often cited in discussions of environmental ethics than Aldo Leopold's: "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise."[2] Yet relatively little has been done by way of sustained critical appraisal of this principle.[3] In this essay I contribute to the task of appraisal by answering three questions: (1) what is referred to by the phrase "the integrity, stability, and beauty of the biotic community"? (2) What "things" tend to preserve or threaten the integrity, stability, and beauty of the biotic community? (3) Are the integrity, stability, and beauty of the biotic community goods such that preserving them is right and failing to do so wrong?

I

In his essay "The Land Ethic" Leopold asserts: "All ethics so far'evolved rest upon a single premise: that the individual is a member of a community of interdependent

[1] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

[2] Cole, H. S. D., C. Freeman, M. Jahoda, and K. L. R. Pavitt. *Thinking about the Future: A Critique of the Limits to Growth,* London: Chatto and Windus, 1973.

[3] Engels, F. *The Dialectics of Nature.* New York: International Publishers, 1940.

parts."[4] What is distinctive about the land ethic, he continues, is that it "enlarges the boundaries of the community to include soils, waters, plants, and animals, or collectively: the land."[5] Since Leopold includes the nonliving environment in his notion of the *biotic community,* he can be understood to be referring to what contemporary ecologists call an *ecosystem.* For example, G. Tyler Miller, Jr. in his *Living in the Environment* defines an ecosystem as a "community of living things interacting with one another and with their physical environment (solar energy, air, water, soil, heat, wind, and various essential chemicals)."[6] Some examples of ecosystems are forests, ponds, lakes, rivers, grasslands, deserts, even the entire planet Earth. This last example, the totality of terrestrial ecosystems, is often called the *biosphere.*

Of the triad of characteristics—integrity, stability, and beauty—only stability seems to have found a secure place in ecological literature. In his *Fundamentals of Ecology.* Eugene Odum defines *stability* as the "tendency for biological systems to resist change and to remain in a state of equilibrium."[7] Miller defines it as the "ability to withstand or to recover from externally imposed changes or stresses."[8] Moreover, Miller maintains that stability implies "persistence of structure over time."[9] In similar fashion Leopold speaks of "land health" as the "capacity of the land for selfrenewal."[10] Leopold also suggests a connection between structure and stability:

Structure means the characteristic numbers, as well as the characteristic kinds and functions, of the component species. This interdependence between the complex structure of the land and its smooth functioning as an energy unit is one of its basic attributes.[11]

The characteristic structure of an ecosystem seems to be what Leopold means by its integrity, for he suggests that the "stability (of an ecosystem) depends on its integrity." He seems also to think of the complex structure of an ecosystem as its beauty; for he refers to "the incredible intricacies of the plant and animal community" as "the intrinsic beauty of the organism called America."[12]

Hence, when Leopold talks of preserving the "integrity, stability, and beauty of the biotic community" he is referring to preserving the characteristic structure of an ecosystem and its capacity to withstand change or stress. Moreover, maintaining the characteristic structure of the ecosystem, its objective beauty, is the key to preserving its stability.

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[4] Firey, W. *Man, Mind and the Land.* Glencoe, Illionis: Free Press, 1960.

[5] Glacken, C. *Traces on the Rhodian Shore.* Berkeley: University of California Press, 1967.

[6] Godelier, M. *Rationality and Irrationality in Economics.* London: New Left Books, 1972.

[7] Hays, S. *The Conservation Movement and the Gospel of Efficiency.* Cambridge, Massachusetts: Atheneum, 1959.

[8] Hudson, W. D. *Modern Moral Philosophy.* London: Macmillan, 1970.

[9] Humboldt, A. von. *Essai Politique sur le Royaume de la Nouvelle Espagne.* Paris: F. Schoell, 1811.

[10] Jacks, G. V. and R. O. Whyte. *Vanishing Lands.* New York: Doubleday, 1939.

[11] Kapp, K. W. *The Social Costs of Private Enterprise.* Cambridge, Massachusetts: Harvard University Press, 1950.

[12] Keynes, J. M. *The General Theory of Employment, Interest and Money.* New York: Harcourt

II

The claim that the stability of an ecosystem is a function of its structural complexity is related to a hypothesis frequently discussed in ecological literature, viz., the "diversity-stability" hypothesis. The initial plausibility of this hypothesis is explained in the following fashion by Miller:

Intuitively it seems that species diversity (the number of different species and their relative abundance) and food-web complexity should help stabilize ecosystems. With so many different species and ecological niches, risk is widely spread; the system should have more ways to respond to environmental stress, and it should be more efficient in capturing and using matter and energy. The diversity of negative feedback controls should tend to keep the ecosystem functioning smoothly. A complex food-web should also promote stability. If one species is eliminated many predators can shift to another food source. In other words, it seems intuitively obvious that it is better not to have all of one's eggs in the same basket.[13]

However, if the diversity-stability hypothesis is taken to mean that the more diverse an ecosystem is the more stable it is, there has been some disconfirming evidence. One of the most diverse ecosystems yet investigated is the tropical rainforest; yet it also appears to be the most fragile, in that clearing a sufficiently large area for agriculture or too frequently clearing a small area leads to complete breakdown. David Ehrenfeld in *The Arrogance of Humanism* reports that mathematical modeling of the diversity-stability hypothesis has shown that "the most diverse systems ought to be the most delicate; they were the ones at greatest risk of collapse following human-induced change."[14] Moreover, according to Ehrenfeld, there is direct evidence from conservation work that "the diverse, 'mature' communities were almost always the first to fall apart under heavy human-imposed stress and were always the most difficult to protect."[15] This kind of evidence leads ecologists like Miller to treat the diversity-stability hypothesis with caution. Miller says: "The idea that diversity leads to ecosystem stability may be valid in some types of ecosystems, especially if stress is not enough to wipe out the dominant species. But we should be wary of applying this idea to all situations."[16] John Passmore expresses similar reservations in his *Man's Responsibility for Nature:*

There are, then, two principles which seem to be untenable: the first, that it is always better to increase the diversity of an ecosystem; the second, that it is never better to do so. All that can be properly said is that m modifying the degree of diversity there are always inherent dangers, biological dangers, and there is also the

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Brace, 1936.

[13] Keynes, J. M. *Essays in Biography.* New York' Meridian Books, 1951.

[14] Kneese, A. V., R. U. Ayres, and R. C. D'Arge. *Economics and the Environment.* Washington, D.C.: Resources for the Future. 1970.

[15] Kuhn, T. S. *The Structure of Scientific Revolutions.* Chicago: Chicago University Press, 1962.

[16] Levi-Strauss, C. *Tristes Tropiques.* New York: Atheneum, 1973.

real risk of destroying the 'character' of a landscape, the complex set of relationships which constitute its attractiveness.[17]"

It might be objected, however, that Leopold's ethical directive implies no commitment to the diversity-stability hypothesis unless *diversity* is understood to mean "characteristic diversity." It seems plausible to claim that the stability of an ecosystem is a function of its characteristic diversity. The charactenstic diversity of an ecosystem cannot be raised (e.g.. by introducing exotic species) or lowered (e.g., by removing indigenous species) without disturbing its integrity; and that in turn may, in Leopold's judgment, threaten its stability.

It also needs to be pointed out that stability is a relational property. Ecosystems are stable relative to the characteristic climactic, geological, and biological fluctuations in which they have evolved. No ecosystem is stable relative to all possible fluctuations. For example, no terrestrial ecosystem could withstand the stress induced by the burning out of the sun. Along the same lines, ecosystems that are stable relative to characteristic fluctuations or stresses in which they have evolved may not be stable relative to human- induced stress no matter how diverse they are, simply because shifts in the characteristic diversity induced by high technology or large population influxes are not the kinds of stress to which even the most diverse ecosystems have evolved a resistance.

Thus, we have a reply to the second question raised above: what "things" tend to preserve or threaten the integrity, stability, and beauty of the biotic community? They are the things that preserve or threaten the characteristic structure and characteristic diversity of ecosystems, or things that involve uncharacteristic stresses. Examples of such things are rife: depletion of the ozone layer in the atmosphere, eutrophication of lakes and other bodies of water, elimination of important species by pesticides or herbicides, introduction of certain exotic species, and desertification.

Leopold's principle proscribes such "things" and any activities that lead to such changes. Proscribed actions would probably include the use of fluorocarbons in aerosal sprays, the dumping of industrial wastes in fresh water, the use of broad-spectrum pesticides and herbicides in agriculture, and the overgrazing of pasture lands. Presumably to refrain from activities that threaten ecosystem stability is the best way to preserve it.

III

Now that we have examined the' principal concepts of Leopold's maxim we can deal with the last question: are the integrity, stability, and beauty of the biotic community goods such that preserving them is right and failing to do so wrong?

In general a thing may be either good in itself, i.e., intrinsically good, or good because it leads to something good in itself, i.e., instrumentally good. There is relatively

[17] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

little difficulty in showing that the integrity, stability, and beauty of the biosphere are instrumentally good for human beings and other forms of life. Ecology has acquainted us with the various ways in which the continuance of life on this planet depends on the integrity and stability of the biosphere. For example, J. E. Lovelock has argued that if the proportion of oxygen in the atmosphere were to be increased to twenty-five percent by destruction of the biological controls on oxygen, the planet would be plagued by virtually uncontrollable lightning-initiated fires that would destroy almost everything flammable in a relatively short time.[18] The integrity and stability of the biosphere, then, are instrumentally good in that they constitute the conditions within which life can continue.

With regard to lesser ecosystems the task of establishing that their integrity and stability is instrumentally good for human life is not so easy. The modification of ecosystems in agriculture certainly is a case in which the destruction or at least radical reduction in the integrity and stability of a wild ecosystem leads to good for human life. The flooding of a wild river canyon for a reservoir is an instance in which the integrity and stability of riparian and other habitat are destroyed for the human goods of flood control, hydroelectric power, irrigation water, and boating. Sometimes the preservation of individual ecosystems may be good for human beings either economically (habitat for valuable species) or scientifically (natural laboratory) or aesthetically (especially beautiful places) or recreationally (places for hiking). But one would be hard pressed to show that the preservation of ecosystems always leads to something good for humans. Often, the opposite is the case, that the destruction of the integrity and stability of an ecosystem leads to good for humans. For example, the city of Los Angeles derives the benefit of water from the destruction of Mono Lake and numerous people derive recreational benefits from the destruction of desert habitats by trail bikes and other off-road vehicles.

Recognizing this last difficulty a number of philosophers have been led to attempt to establish that the integrity, stability, and beauty of an ecosystem are intrinsic goods. This is perhaps what Leopold meant by "value in the philosophical sense":

> It is inconceivable to me that an ethical relation to land can exist without love, respect, and admiration for land, and a high regard for its value By value, I of course mean something far broader than mere economic value; I mean value in the philosophical sense.[19]

Some philosophers have thought that to say that the integrity, stability, and beauty of an ecosystem are intrinsic goods is incomprehensible. For such philosophers the concept of intrinsic goods (or bads) is intimately bound up with concept of benefits

[18] Malthus, T. R. *An Essay on the Principle of Population and a Summary View of the Principle of Population.* Harmondsworth, Middlesex: Penguin Books, 1970.

[19] Malthus, T. R. *Principles of Political Economy.* New York: Augustus Kelley, 1968.

(or harms). For example, William Frankena in a critique of reverence-for-life ethics says the following:

The difficulty about it, to my mind, is that I can see no reason, from the moral point of view, why we should respect something that is alive but has no conscious sentiency and so can experience no pleasure or pain, joy or suffering, unless perhaps it is potentially a consciously sentient being, as in the case of a fetus. Why, if leaves and trees have no capacity to feel pleasure or to suffer, should I tear no leaf from a tree? Why should I respect its location any more than that of a stone in my driveway, if no benefit or harm comes to any person or sentient being by my moving it?[20]

Frankena seems here to be committed to a principle something like the following: it is only possible to benefit or harm a consciously sentient being or one that is potentially so.

Peter Singer takes a similar position in his *Animal Liberation'.*

The capacity for suffering and enjoyment is a *prerequisite for having interests at all,* a condition that must be satisfied before we can speak of interests in a meaningful way. It would be nonsense to say that it was not in the interests of a stone to be kicked along the road by a schoolboy. A stone does not have interests because it cannot suffer. Nothing that we can do it could possibly make any difference to its welfare. A mouse, on the other hand, does have an interest in not being kicked along the road, because it will suffer if .. • 22 It IS.

Thus far then we seem to be left with the dilemma: either a creature is consciously sentient (at least potentially) or it is incapable of being benefited or harmed. Since ecosystems are not consciously sentient, they are incapable of being benefited or harmed.

Recently Kenneth Goodpaster has argued contra Frankena and Singer that it is possible to benefit or harm anything that is alive:

There is no absurdity in imagining the representation of the needs of a tree for sun and water in the face of a proposal to cut it down or pave its immediate radius for a parking lot... In the face of their obvious tendencies to maintain and heal themselves, it is very difficult to reject the idea of interests on the part of trees (and plants generally) in remaining alive.[21]

Similar remarks can be made about ecosystems and the biosphere as a whole. Peter Singer is aware that it is possible to speak of the ‘ needs” or “interests” of plants, but considers it to be a loose way of talking with absurd consequences:

While there may be a loose sense of the term in which we can say that it is in the interests of a tree to be watered, this attenuated sense of the term is not the sense covered by the principle of equal consideration of interests. All we mean when we say that it is in the interests of a tree to be watered is that the tree needs water if it is to continue to live and grow normally; if we regard this as evidence that the tree has

[20] Marx, K. *The Poverty of Philosophy.* New York: International Publishers, 1963.

[21] Engels, F. *The Dialectics of Nature.* New York: International Publishers, 1940.

interests, we might almost as well say that it is in the interest of a car to be lubricated regularly because the car needs lubrication if it is to run properly. In neither case can we really mean (unless we impute consciousness to trees or cars) that the tree or car has any preference about the matter.'[22]

However, Singer fails to note that a car has no interest in running properly because it is really we who have the interest in its running properly. The "interests" of machines that have no autonomous goals are really our interests. But plants, for example, certainly have an autonomous interest in staying alive that is not really our interest. They grow, develop, nourish themselves, and reproduce autonomously, spontaneously, without our programming them to do so. Indeed a plant's interest in growth, development, and reproduction may conflict with our interests in uncluttered gardens or root-free drainage systems.

Currently existing machines (as opposed to those imagined by sciencefiction writers) do not have the interests in growth, development, nourishment, and reproduction that living things have. Nor do they exhibit the interest in stability that ecosystems manifest. These differences between living things and ecosystems, on the one hand, and machines, on the other, suggest, according to Goodpaster, that "the core of moral concern lies in respect for self-sustaining organization and integration in the face of pressures toward high entropy."[23]

At this point, then, it seems appropriate to claim, contra Frankena and Singer, that living things and even ecosystems, are things that have interests and, hence, may be benefited or harmed by having their interests nurtured or thwarted, even though these things are not sentient creatures. Notice that in arguing that it is not possible to harm a nonsentient being Frankena talks about plucking a leaf from a tree or not respecting its location. But these examples are both things not (at least, not necessarily) harmful to trees. Plucking a leaf and transplanting may both be done without harming a tree, whereas girdling or uprooting may not.

If those things that can be benefited or harmed are those things that have intrinsic value, then ecosystems and their inhabitants have intrinsic value. If this is true, then preserving the integrity, stability, and beauty of an ecosystem is right. Not to do so is wrong But this last claim raises a further problem.

The problem is this: is Leopold proposing a new standard of right and wrong that will replace or supplement the old? For example, he may be suggesting: "Hitherto we have used benefit or harm to human beings as the intrinsic good to be done or evil to be avoided, but I now propose to replace benefit and harm to human beings by benefit and harm to ecosystems as the intrinsic good to be done or evil to be avoided." Or he may be suggesting: ' Hitherto we have used benefit or harm to human beings as the sole intrinsic good to be done or evil to be avoided, but I now propose to supplement

[22] Firey, W. *Man, Mind and the Land.* Glencoe, Illionis: Free Press, 1960.

[23] Marx, K. *Theories of Surplus Value.* Part 3, Moscow: Progress Publishers, 1972.

benefit and harm to human beings with benefit and harm to ecosystems as another intrinsic good to be done or evil to be avoided."

If the former interpretation were the correct one it would have morally unacceptable consequences, for it would imply that the standard against which our actions are measured would be benefit and harm to ecosystems. On this interpretation, then, feeding starving peoples on the African Sahel would be wrong precisely insofar as their continued existence leads to deterioration of the ecosystems they inhabit through their practices of wood gathering and dung burning. Agriculture, except of the most primitive kind, would be wrong precisely insofar as cultivation threatens the integrity and stability of wild ecosystems. Indeed, almost the only right actions on this interpretation of Leopold's principle would be the cessation of most human projects and the setting up of wilderness preserves.

In his recent article "Animal Liberation: A Triangular Affair"[24] J. Baird Callicott appears to support this interpretation of Leopold. He argues that Leopold's land ethic may be superior to other environmental ethics in that it, like ecology, is holistic. In so far as this is simply asserting that wholes like ecosystems have intrinsic value, what I have said thus far in this paper is in agreement. However, Callicott seems to mean more: not only is the integrity, stability, and beauty of an ecosystem *a* good; it is, he asserts, "the *summum bonum."* He thinks this is an advantage:

An environmental ethic which takes as its *summum bonum* the integrity, stability, and beauty of the biotic community is not conferring moral value on something *else* besides plants, animals, soils, and waters. Rather, the former, the good of the community as a whole, serves as a standard for the assessment of the relative value and relative ordering of its constitutive parts and therefore provides a means of adjudicating the often mutually contradictory demands of the parts considered separately for equal consideration. ... Animals of these species, which like fhe honey bee, function in ways critically important to the economy of nature, moreover, would be granted a greater claim to moral attention than psychologically more complex and sensitive ones, say, rabbits and moles, which seem to be plentilul, globally distributed, reproductively efficient, and only routinely integrated into the natural economy.[25]

It is difficult to know how far Callicott wishes to take this view. One wonders whether human beings "function in ways critically important to the economy of nature" in the sense of contributing significantly to preserving the integrity and stability of the biosphere. In view of their increasing abuse of the environment to satisfy their desires, it is hard to avoid the conclusion that they do not. But if the integrity, stability, and beauty of the biotic community is the *summum bonum,* the best thing we can do is to find some ecologically sound way of disposing of the human race or at least of drastically reducing the human population. Perhaps, however, this is unfair to Callicott. Perhaps,

[24] Meadows, D. H,, D. L. Meadows, J. Randers, and W. W. Behrens, *The Limits to Growth.* New York: Universe Books, 1972.

[25] Mesjaros, I. "Ideology and Social Science," *Socialist Register,* 1972.

he is only asserting, in an exaggerated fashion, that the integrity, stability, and beauty of the biotic community are intrinsic values to be considered alongside the intrinsic value of human life. This is indicated by his remarks appropos of Edward Abbey's misanthropy:

Edward Abbey in his enormously popular *Desert Solitaire* bluntly states that he would sooner shoot a man than a snake. Abbey may not be simply depraved; this is perhaps only his way of dramatically making the point that the human population has become so disproportionate from the biological point of view that if one has to choose between a specimen of Homo sapiens and a specimen of a rare even if unattractive species the choice would be moot.[26]

This may be nothing more than a dramatic presentation of a familiar dictum that we need not take extraordinary measures to preserve human life. For example, suppose an aged, senile person can only be kept alive by constant injection of a serum prepared from an endangered plant species. One can imagine deciding here not to use the serum. On the other hand, suppose a population of children can be saved from a virulent plague only by a serum prepared from eggs of the endangered California condor. Here, one would probably prepare the serum.[27]

This line of thought suggests that the more acceptable interpretation of Leopold's maxim is the second one introduced above in which ecosystemic good is to be weighed along with human good in deciding the rightness or wrongness of actions. An indication that Leopold intended his maxim to be taken in this way is the following:

A land ethic of course cannot prevent the alteration, management, and use of these 'resources', (i.e., soil, water, plants, and animals), but it does affirm their right to continued existence, and, at least in spots, their continued existence in a natural state.[28]

The second interpretation of Leopold's maxim avoids the morally unacceptable implications of the first interpretation suggested above, but it does so at a price. On the second interpretation there are numerous goods to be considered alongside human good, i.e., the good of ecosystems and the good of their nonhuman components, and these goods can conflict with one another. Perhaps then Leopold should be interpreted as proposing a new rule of conduct, but a rule having exceptions, because on occasion it can conflict with other rules, e.g., "A thing is right when it tends to preserve the life of an innocent human being. It is wrong when it tends otherwise." A classical example of conflict between rules is the conflict between the rule regarding promise keeping and that of preserving human life: a person to whom I have promised a gun has decided to use the gun to hold up a store. Should I give the person the gun and thus keep my promise or withhold the gun and thus protect human lives?

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[26] Mill, J. S. *Principles of Political Economy.* Toronto: University of Toronto Press, 1965. «

[27] Oilman, B. *Alienation: Marx's Conception of Man in Capitalist Society.* London: Cambridge University Press, 1971.

[28] Oilman, B. "Marxism and Political Science: Prolegomenon to a Debate on Marx's Method," *Politics and Society,* 3 (1973), pp. 491-510.

Some philosophers have tried to deal with exceptions to rules by claiming that they are *prima facie* rules of conduct, not *actual* rules of conduct.[29] They are rules to be followed unhesitatingly, just in case no other rules apply to the situation. This condition is represented by saying that rules of conduct have an implicit *ceteris paribus* clause ("other things being equal"). So, for example, provided that in doing so I commit no wrong, it is right to keep a promise. And, providing that I am not avoiding a supervening moral wrong, it is wrong not to keep a promise.

Some philosophers have attempted to provide ranking systems, e.g., claiming that preventing a death is more important than keeping a promise. However, others have been persuaded by the complexity of actual situations to forego the attempt to rank these rules and claim that such rules indicate wrong-making (or right-making) features that may be outweighed in various circumstances by other such features. Thus, if an act involves breaking a promise, that is a moral stroke against it; but that may be outweighed by other strokes for or against it, i.e., that it involves saving a life. On this interpretation Leopold may be viewed as offering a *prima facie* rule of conduct: "Provided that in doing so I commit no greater wrong, a thing is right when it tends to preserve the integrity, stability, and beauty of an ecosystem."

Now this interpretation of Leopold's maxim rids it of the absurd consequence of condoning the refusal to feed a people that is destroying its ecosystem, but it does so, perhaps at the price of rendering it innocuous or unhelpful in moral decision making. Because moral rules, on this interpretation, do not prescribe or proscribe an act on all occasions or because a set of moral rules does not come with a precise ranking, they are considered useless. This, however, is like arguing that geometrical relationships are useless in construction because no physical structure precisely embodies them. Such rules can guide moral thinking without determining it. For example, guided by the rule that there is *prima facie* wrong involved in interfering with the integrity, stability, and beauty of an ecosystem, I disapprove of the use of ORVs in desert landscapes because, although recreation is important, it can be gotten in other ways. I do not disapprove of agriculture (at least not in a blanket way) since it is not clear that humans can be fed without it. However, even in agriculture I am on the lookout for ways of raising food that are less destructive of ecosystems than current energy-intensive methods. I do suppose this means that one might permit or acquiesce in the destruction of ecosystems to save human lives.

But this does not mean that saving human lives always outweighs preserving the integrity and stability of ecosystems. I think most people would find it absurd to turn the Appalachian or the John Muir trails into asphalt highways on the grounds that it contributes to the preservation of human life by making rescue operations easier. To say that the integrity and stability of ecosystems and human lives are intrinsic values does not imply that everything must be sacrificed to preserve them.

[29] Orans, M. "Surplus," *Human Organization,* 25 (1966), pp. 24—32.

To say that something is intrinsically valuable is to say that, *ceteris paribus,* to preserve it is right, to destroy it wrong. But in life, as in ecology, *ceteris non paribus.* In certain circumstances it may not be wrong not to destroy an ecosystem and in certain circumstances it may not be wrong not to satisfy a human interest. The human interest in ORV recreation perhaps should be sacrificed to the integrity, stability, and beauty of the Mojave desert, whereas the stability of the tall grass prairie may have to yield to the reduced stability of the cornfield. The human interest in the convenience of fluorocarbon aerosols should yield to the interests of the biosphere, whereas I find it difficult to recognize as an ethic one that condones not giving aid to a country simply on the grounds that is destroying its own ecosystems.

Perhaps we can venture a general principle at this point: the survival interests of human beings ought to outweigh those of the rest of the biotic community and the survival interests of the rest of the biotic community ought to outweigh the nonsurvival interests of human beings. This helps decide some cases. For example, the human interest in attractive shoes should not outweigh the survival interests of alligators, for clearly an interest in *attractive* shoes is not a survival interest, but the interest in some kind of food for native Africans may for a time outweigh the preservation of rainforest ecosystems, for the interest in food is a survival interest in human beings. Of course, widespread destruction of rainforests could lead to an upset in the integrity of the biosphere and this lends some urgency to finding ways of feeding people or reducing their numbers that do not involve destruction of the rainforests.

I am not sanguine about the possibility of providing a rule so precisely formulated that all cases of conflict can be easily resolved, but even an imprecise rule provides guidance, without determination, in many cases, i.e., those cases in which it is clear that the human interest at stake is or is not a survival interest and/or the ecosystemic interest is or is not a survival interest.

IV

In this essay I have provided a critical analysis of Aldo Leopold's land ethic as summarized in the maxim: "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise." Current ecological literature suggests a rephrasing of this maxim as follows: "A thing is right when it tends to preserve the characteristic diversity and stability of an ecosystem (or the biosphere). It is wrong when it tends otherwise." Those things that threaten the stability of an ecosystem tend not to be minor changes in the structure, i.e., in the "characteristic numbers, as well as the characteristic kinds and function, of the component species," but rather major ones. Ecological science cannot supply us with a simple way of characterizing stability-threatening activities, not, for instance, through the "diversity-stability hypothesis." Nonetheless, in practice numerous examples of such activities are easy to find.

Against those philosophers who contend that the stability of an ecosystem is not an intrinsic value, since it is not possible to harm or benefit anything not at least potentially sentient, I have argued, following Goodpaster, that it is possible to harm or benefit anything that exhibits "self-sustaining organization and integration in the face of pressures toward high entropy." Lastly I have argued that it is more appropriate to interpret Leopold as offering an additional prima facie rule of conduct rather than a single new standard of right and wrong. The latter way of interpreting the maxim has, in my estimation, immoral consequences, whereas the former way allows recognition of the intrinsic value of the stability of ecosystems without the consequence that it is never permissible to sacrifice the stability of ecosystems. While this interpretation does not make our duties toward ecosystems precisely calculable, that seems only reasonable. "Weighing the alternatives" has always seemed to me a metaphor for hard thinking rather than something we can do precisely.

6. A Refutation of Environmental Ethics

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An environmental ethic holds that some entities in nature or in natural states of affairs are intrinsically valuable. I argue that proposals for an environmental ethic either fail to satisfy requirements which any ethical system must satisfy to be an ethic or they fail to give us reason to suppose that the values they promote are intrinsic values. If my arguments are correct, then environmental ethics is not properly ethics at all.

In "The Shallow and the Deep, Long Range Ecology Movement" Arne Naess distinguishes between two responses to ecological degradation. The shallow response recommends that we be nice to nature so that nature will be nice for us. The deep ecological response, on the other hand, insists that a proper appreciation of nature leads to a recognition that "the equal right to live and blossom is an intuitively clear and obvious value axiom".[1]

Following Naess, a considerable number of philosophers and others have chosen the deep ecology path, and they have understood this to require the development of an ethic which values things in nature for their own sake. John Rodman expresses a common motivation for having such an ethic:

I need only to stand in the midst of a clearcut forest, a stripmined hillside, a defoliated jungle, or a dammed canyon to feel uneasy with assumptions that could yield the conclusion that no human action can make any difference to the welfare of anything but sentient animals.[2]

Vai and Richard Routley in "Human Chauvinism and Environmental Ethics" argue that only a truly environmental ethic which regards natural systems or their properties as valuable in themselves can adequately express the standpoint of those who want to preserve wilderness and who abhor strip-mined hillsides and defoliated jungles.[3] More recently Holmes Rolston, III in *Environmental Ethics** and Paul W. Taylor in *Respect for Nature*[4] have both argued for an ethic which recognizes value in nature.

[1] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

[2] Cole, H. S. D., C. Freeman, M. Jahoda, and K. L. R. Pavitt. *Thinking about the Future: A Critique of the Limits to Growth,* London: Chatto and Windus, 1973.

[3] Engels, F. *The Dialectics of Nature.* New York: International Publishers, 1940.

[4] Glacken, C. *Traces on the Rhodian Shore.* Berkeley: University of California Press, 1967.

An environmental ethic, as I understand it, is an ethic which holds that natural entities and/or states of affairs are intrinsically valuable, and thus deserve to be the object of our moral concern. What exactly it means to say that something is intrinsically valuable depends on the account given of what values are and where they come from At a minimum, however, those who find intrinsic value in nature are claiming two things: first, that things and states which are of value are valuable for what they are in themselves and not because of their relations to us (and in particular, not because they provide us with pleasure and satisfaction). Second, the intrinsic value which these states of nature have is objective in the sense that its existence is not a matter of individual taste or personal preference. Any rational, morally sensitive person ought to be able to recognize that it is there. This means, of course, that those who claim that intrinsic value exists in nature must provide some criteria for identifying what is of value and some reasons for believing that the things and states in question are valuable.

In general, an ethic is supposed to tell us two things: (1) what states of affairs, things, and properties are intrinsically desirable or valuable (as opposed to what is valuable as a means to an end); and (2) what we should do or not do in order to promote, protect, or bring into existence that which is of intrinsic value. Given that an ethic is supposed to tell us these things, it must satisfy the following formal requirements in order to count as an ethic at all:

(1) *The Requirement of Consistency.* If a thing or state of affairs is thought to be intrinsically valuable, then all things that are like it in relevant respects must also be judged to have intrinsic value. On the other hand, if something is thought not to have intrinsic value, then all things that are like that thing in relevant respects must be regarded as not having intrinsic value. Supporters of animal liberation and environmental ethics have made heavy use of the consistency requirement in their condemnations of "human chauvinism." They argue, for example, that if human beings are regarded as being intrinsically valuable, and if some animals are like human beings in all respects that seem relevant, then a consistent ethic must regard these animals as valuable. If animals are not regarded as being valuable, then those human beings that are like animals in relevant respects (babies, children, the mentally retarded) must be judged by a consistent ethic not to have intrinsic value.

The requirement of consistency presupposes that the ethic in question has provided us with an account of what differences and similarities are relevant and why. If that ethic is to have any claim to being objective, then that account must not seem arbitrary. In other words, if something is thought to be of value and another thing is not, then there must be reason for believing that the differences between them justify making that judgment, and if two things are regarded to be of equal value then the similarities they have must be such so that this judgment can reasonably be made.

(2) *The Requirement of Non-Vacuity.* The criteria for determining what things or states of affairs are intrinsically valuable must not be such so that it turns out that every thing and every state of affairs counts as equally valuable. The reason why this

requirement must be satisfied should be clear. An ethic is supposed to tell us what we ought or ought not to do; however, it cannot do so if it turns out that all things and states of affairs are equally valuable, for if they are, then there is no reason to do one thing rather than another, to bring about one state of affairs rather than another.

(3) *The Decidability Requirement.* The criteria of value which an ethic offers must be such that in most cases it is possible to determine what counts as valuable and what does not. Probably all ethical systems will have problems with borderline cases. For example, an ethic which regards sentient creatures as objects of moral concern and their well-being as something that we should promote may have difficulties determining what counts as a sentient creature and what the well-being of a particular creature consists of. Nevertheless, in general it is usually clear what satisfies the criteria and what does not. A more serious difficulty arises if the criteria leave us in doubt in most cases. If this happens, then we do not simply have a problem within an ethic, but a problem regarding something as an ethic in the first place.[5] The reason for having a decidability requirement is much the same as the reason for requiring non-vacuity. If an ethic is to make prescriptions, then we have to have a good idea of what we are supposed to be promoting and avoiding. If an ethic can't tell us this, if it leaves us uncertain in too many cases about what things or states of affairs are valuable and which are more valuable than others, then its claim to be an ethic is brought into question.

My claim is that proposals for an environmental ethic either fail to satisfy one or more of these formal criteria or fail to give us reason to suppose that the values they promote are intrinsic values. It should be noted that my objection to environmental ethics is not that its ideas about what is valuable are implausible, or that rational, morally sensitive people should not value what environmental ethicists tell them to value. Rather, if my arguments are correct, what is called environmental ethics is not properly ethics at all.

What can go wrong with environmental ethics is illustrated by an argument presented by Paul Taylor in *Respect for Nature.* The argument is meant to establish that there is no good reason for thinking that sentient creatures alone have intrinsic value *{inherent worth),* indeed, that there is no reason to deny that nonsentient creatures—plants, lower animals—have less intrinsic value than sentient creatures. Human beings, Taylor admits, have properties that many living things do not have—e.g., intelligence—and some philosophers, most notoriously Descartes, have believed that human beings are distinguished from all other creatures by the possession of mind. Apart from the question of whether other creatures do not have minds, however, there is no reason in nature why we should regard the qualities that human beings happen to have as making them more valuable than living creatures that do not have these qualities—no reason why creatures who can think or feel should be regarded as more valuable than plants and other nonsentient creatures/

[5] Hays, S. *The Conservation Movement and the Gospel of Efficiency.* Cambridge, Massachusetts:

A natural response to this argument is to ask, "Why stop here?" Why should we regard rocks, rivers, volcanoes, molecules as being of less value simply because they happen to lack the properties associated with life? Why indeed should we say that anything is more valuable than any other thing? The argument Taylor uses to overthrow human chauvinism seems to undermine the very possibility of an ethic. We might conclude that if we leave it up to nature to tell us what we should or should not value, that we get no answer—that we can only find nature to be valuable insofar as natural states of affairs are related to us: to our interests and concerns, or more generally the interests and concerns of sentient creatures. This is in fact the position I hold, but to establish it requires much more argument, for environmental ethicists do think that they can give us criteria for discovering objective value in nature, criteria which do not set us on the slipperly slope into inconsistency, vacuity, or undecidability.

There are two ways in which environmental ethicists have tried to establish their thesis that there are intrinsic values in nature. The first is to argue by analogy. Taylor (and sometimes Rolston) does this. Let us assume that human individuals are intrinsically valuable and that it is desirable that their well-being be promoted. The reason we think that this is so (the argument goes) is that human individuals have interests, preferences, purposes—a good that can be frustrated or furthered. But if this is our criterion for having value, then in all consistency we must recognize that since some animals also have interests, preferences, and purposes, they too should count as having intrinsic value. Plants, nonsentient creatures, may not have interests in a true sense, but they do have a good (unlike a rock). "Once we come to understand the life cycle of a butterfly," Taylor says, "and know the environmental conditions it needs to survive in a healthy state, we have no difficulty speaking about what is beneficial to it and what might be harmful to it."[6] The same can be said about bacteria or plants. Furthermore, the good that a butterfly and a blue gum have is a good of their own. Unlike machines, the good of which is determined by human purposes, we can say what is good for a natural organism without reference to any other entity. Thus, we can understand how nonsentient organisms can be candidates for having intrinsic value, and once we come to appreciate their nature and the role that they play in environmental systems, we will be inclined to say that they do have intrinsic value.[7]'

The second approach to environmental ethics is not to argue by analogy but simply to try to persuade us as valuers that there are certain things or states of affairs in nature that we as rational, morally sensitive people ought to regard as having a value independent of our needs and interests and that there are other states of affairs (like defoliated jungles or exotic pine plantations) that we ought to regard as having a disvalue. We simply have to come to recognize that these values or disvalues are there, and the job of the proponent of environmental ethics is to encourage us to do this

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Atheneum, 1959.

[6] Humboldt, A. von. *Essai Politique sur le Royaume de la Nouvelle Espagne.* Paris: F. Schoell, 1811.

[7] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

by persuading us to appreciate certain aspects of nature and by trying to show us that an ethic which does not acknowledge these values cannot satisfy our intuitive understanding of what is bad or good, right or wrong. The Routleys take this approach, and so do Rodman and sometimes Rolston.

The Routleys argue in "Human Chauvinism and Environmental Ethics" that environmental systems are to be valued according to their possession of a mix of factors: diversity, naturalness, integrity, stability, and harmony, and that people who appreciate wilderness, who are reluctant to destroy natural systems even if the destruction does not harm sentient creatures, should accept this criterion of value. Rolston maintains that not only organisms as self-maintaining systems deserve to be valued, but also species as entities with a history and an essence and ecosystems as "integrated cybernetic systems." He argues that only if we are prepared to value these things for themselves do we have an ethical basis for preserving and protecting what many sensitive people want to preserve and protect

Because both approaches claim to be laying the foundations of an environmental ethic, it is presupposed that they can satisfy the formal requirements of an ethic. Indeed, it seems that they do satisfy these requirements. Each claims to have the virtue of consistency—unlike ethics which are described as being "human chauvinist." Each tells us that some things or states of affairs are valuable and some are not; and each presents criteria that we are supposed to be able to use to decide what is valuable and to what extent.

But what exactly is valuable? On this matter environmental ethicists do not speak with one voice. Taylor insists that it is individual organisms that have intrinsic value and not environmental systems or species. The Routleys regard environmental systems as holders of value. Rolston thinks that individual organisms, species, and ecosystems all have value, though perhaps to different degrees. Is this disagreement about what in nature has value a little problem that environmental ethicists should be able to solve among themselves, or is it a symptom of a larger difficulty? To answer this question let us look more closely at each of the two approaches.

Once again I take Taylor's argument as illustrating what goes wrong with the analogical approach. Taylor argues that if a thing has a good of its own, then it is a candidate for having intrinsic value. He assumes that it is individual living organisms and only individual living organisms that can have this value. But there is nothing in the criterion, or the mode of argument used to support it, that requires this limitation. It is not difficult to use Taylor s way of determining what is of value to insist that other kinds of things must also have the same intrinsic value if we are to be true to the consistency requirement.

Why can't we say, for example, that hearts, lungs, livers, and kidneys have intrinsic value and thus deserve in themselves to be objects of our moral concern? Once we come to appreciate how a kidney or some other internal organ develops within the embryo, how it functions and maintains itself, what makes it flourish and what harms

it, then surely as in the case of the butterfly or the bacteria we have to recognize that it has a good of its own.

But isn't the good of a kidney defined in terms of the good of the organism that has the kidney? It is true that my own good and the good of my kidneys are intimately related. We depend upon each other (though modern technology has made it possible for me to get on without my kidneys and my kidneys to continue to exist without me). But my purposes and goals do not define what is good for a kidney. This can be determined independently to the same extent that the good of a wood-boring insect can be determined independently of the good of the tree it feeds on or that the good of intestinal bacteria can be defined independently of the good of the intestine or the good of the creature who has the intestine. Kidneys, like insects and bacteria, need certain kinds of nourishment; they are healthy under some conditions and are caused harm by others. These conditions can be specified without mentioning the organism in which the organs reside.

So using the same kind of argument which Taylor uses to persuade us that organisms have a good of their own. we have to conclude that internal organs have such a good too. For the same reason, it seems that we also ought to say that individual leaves, buds, and bits of bark have a good of their own and are equally candidates for having intrinsic value. And what will stop us from saying that a piece of skin, a bodily cell, or a DNA molecule has a good of its own?

Why discriminate against rocks? Once we appreciate how crystals form according to a pattern determined by molecular structure, what conditions make it possible for this pattern to form in a characteristic way, what maintains its structural integrity, and what conditions cause it to be deformed or to break up, then surely we will want to say that in an extended sense of the phrase a crystal has a "good of its own." It is true that it sounds odd to say this. But why should we be any more impressed by the fact that crystals, strictly speaking, do not have a good of their own than Taylor is impressed by the fact that nonsentient creatures, strictly speaking, do not have interests? Surely it is the relevant similarities between bacteria, cells, and crystals that should be crucial for our ethical reasoning, just as it is the relevant similarities between sentient creatures and nonsentient creatures that are crucial for Taylor. The same thing that is said about crystals can be said about any natural entity, whether a rock, a molecule, an atom, or a solar system. Each has an integrity of its own which it can maintain under certain conditions, but which will be destroyed under others.

It is time to reassess the status of machines. Although it is true that we think that the purpose of a machine is to serve a human need, the matter is really not so simple, for machines, because of their structure, have a potential, a way of doing things, of their own, and in order to accomplish their purposes people often have to conform to the ways of the machine. In fact, it is frequently the case that people have to redefine their goals or are caused to discover new ones as a consequence of realizing the potential of a machine or in the course of adapting themselves to it. It seems as if the good of a machine is best defined in terms of the structures and capacities it has and what

operations will realize its potential and which ones will tend to destroy it or not allow it to fulfill its potential. Moreover, if a machine has a good of its own, then so do the parts of a machine for the same reason that a liver or a heart have a good of its own.

What can be said about a machine might also be said about other constructed entities like social institutions and societies, for these also have a structure, a potential, a way of operating which the individuals in them don't necessarily appreciate. The same can be said of ecological systems. Taylor objects to regarding systems as being objects of respect, probably because he assumes that the good of a system is reducible to the goods of the individual animal and plant populations that make it up; however, ecological systems, like social systems, have a potential for change and development and a dynamic which may be compatible with the destruction of particular populations— as when a forest develops toward a climax state. So why not admit that ecological systems have a good of their own and are thus in themselves candidates for our moral concern? If ecological systems are entitles with a good of their own, then why not parts of ecological systems— e.g., the relation between a predator population and a prey population? Why not a whole wilderness? Why not the relations between plants and animals on a continent? Why not nature as a whole?

One of the problems which this vigourous use of analogy brings out in the open is the problem of determining what should count as an individual for the purposes of environmental ethics. It is perhaps natural to think that particular plants and animals are the individuals that we need to be concerned with. But why shouldn't we count the parts of an animal or plant as individuals, their cells, organs, or molecules? Why not the complex consisting of an animal or a plant and its various parasites and bacteria? Why not the plant and the soil that nourishes it? Why not an interrelated system of animals and plants? There doesn't seem to be any good reason why one thing should be counted as an individual and others not. How we divide up the world depends upon context and convenience. But surely an environmental ethic which claims to discover intrinsic value in nature shouldn't depend upon the way we happen to look at things.

Once we do (somehow) pick out the individuals we are concerned with it is still a problem to decide what is good for them. So far, like Taylor, I have assumed that this is generally obvious. However, there is another way of viewing the matter. An individual plant or animal has a genetic potential to manifest a range of properties, but what properties it realizes depends on its environment. Why should we regard it to be for the good of a plant if it realizes one aspect of its potential rather than another? Once again it is natural to think that it is for the good of a plant to be raised in conditions which encourage it to be vigourous and healthy and that disease and poor nutrition are bad for a plant. Nevertheless, a diseased plant displays properties, realizes -a potential, which it would not have manifested if it had been healthy. Why should we regard it as a worse thing for it if it has these properties? The answer might be that if the ability of a plant to survive and reproduce is threatened, then this is not to its good. However, if this is our criterion of what is bad for natural things, why

should we say that it is bad for the plant's sake that it dies of disease rather than that this is bad for its genes or bad for the species? Moreover, why should it be bad for the plant's sake to live a short time rather than a longer time? One reason why we find it so natural to suppose that it is better for an organism's sake that it be healthy and have a long, productive life is because this is what we want for ourselves and what we want for the plants we grow. Nevertheless, plants don't want anything. Thus, as this discussion shows, determining what a nonsentient organism's own good is is not as straightforward as it sometimes appears and this difficulty throws into question the analogy between sentient creatures and nonsentient organisms upon which Taylor's approach to environmental ethics depends.

Other attempts to argue by analogy have not been any more successful. Rolston suggests that what living creatures from the most complex to the simplest have in common is that they are self-contained systems and that it is this which makes them deserving of respect. Nevertheless, virtually anything can be regarded as a self-contained system in the same sense, be it a liver, a molecule, or a solar system. Moreover, Rolston, like Taylor, faces the problem of determining in a nonarbitrary way what states of a system count as good.

Because of these problems, I conclude that neither Taylor nor Rolston succeed in providing the foundations for an environmental ethic. The criteria they use to determine what is of value not only fail to rule out many things that they would probably wish to exclude (e.g., lungs and livers), but also fail to satisfy the formal requirements of an ethic. First, their proposals probably fail to satisfy the requirement of non-vacuity, for if we push the analogies that they depend upon to their logical conclusion, then we end up regarding virtually everything as valuable. Second, even if we can somehow resist this result, it is clear that the proposals won't satisfy the decidability requirement, for the criteria leave us radically uncertain about what counts as an object of moral concern and what states of affairs should be regarded as good.

Of course, the fact that a few proponents of environmental ethics have failed to establish that there can be such an ethic is not conclusive. Is there a way of improving the argument from analogy and/or sharpening up the criteria of value so that they satisfy the requirements? It might be suggested that environmental ethicists should simply declare that what is of intrinsic value are living creatures, or wilderness, or ecological systems. The obvious problem with this idea, however, is that in making this declaration they would be committing the same sin of arbitrariness which they accuse human chauvinists of committing. If they claim to be uncovering intrinsic values in nature, then we are entitled to get an answer to the question "What is it about living creatures or wilderness that is valuable?" and when the answer is given, in attempting to satisfy the consistency requirement for the ethic, they are likely once again to encounter the problems I have already discussed above.

Maybe the environmental ethicist can give a better answer than the ones so far considered. What distinguishes living things from nonliving things is their complexity. They are not only self-contained systems, but also systems with parts that are related

in a complex way, systems which carry out complex processes. Perhaps we should say that something is intrinsically valuable if it has a certain degree of complexity, or that things are valuable according to their degree of complexity. The latter is sometimes suggested by Rolston.

If we adopt the complexity criterion, we might be able to satisfy the requirement of non-vacuity. However, accusations of arbitrariness can still be made. Why should the cutoff point that determines what is of value or what degree of value something has be in one place rather than another? Why should a slightly lesser degree of complexity be regarded as a relevant difference? In addition, it is doubtful whether the criterion can satisfy the decidability requirement. How is complexity to be defined in general and how are we to compare the complexity of different kinds of things? Is an individual less complex than the ecological system or social institution to which he/she/it belongs? Is a heart or liver or brain less complex than the creature it belongs to? Moreover, it is not clear what systems we are talking about. Virtually anything, as I have pointed out, can be regarded as a system: an individual animal or plant, the relationship between several animals and plants, an ecological system, the planet Earth, a heart or kidney, a molecule, an interacting system of molecules, etc. Until we know what we are comparing and how, it is not going to be possible to answer the question, "What should be the object of our moral concern?" Finally, even if we can determine what systems we ought to be concerned with, there remains the difficulty of how we should determine, in a nonarbitrary way, what states of these systems count as good.

Given that there are so many problems with the analogical approach to environmental ethics, one might suppose that the second approach is bound to be preferable. 1 argue, however, that it encounters the same difficulties. Let us begin with the Routleys' multifactored criterion for evaluating natural systems: diversity, naturalness, integrity, stability, and harmony. The Routleys allow that there can be difficulties in determining how these different factors should be weighed, for example, whether and in what cases a greater diversity can make up for a lack of naturalness. They would also undoubtedly admit that there may be difficulties in determining what "stability" or "harmony" amount to in a dynamic system. But they do claim that this criterion gives us clear reasons for preferring a wilderness over a monoculture pine plantation and for condemning the defoliation of a jungle or the clear-cutting of a forest, and they argue that the judgments that we make using it correspond to our intuitions about what is of value in nature.

That the Routleys don't escape the problems we have already encountered becomes evident as soon as we ask the question: "What is it exactly that we are supposed to be evaluating?" Although they assume that their criterion applies primarily to large environmental systems, such as wilderness, why should we assume this? What prevents us from applying the criterion more widely?[8] For example, compost and dung heaps

[8] Keynes, J. M. *The General Theory of Employment, Interest and Money.* New York: Harcourt Brace, 1936.

are little environmental systems that can be evaluated according to the diversity of creatures or processes which they contain, their naturalness, integrity, stability, and harmony. Likewise, individual animals and plants can be regarded as environmental systems containing a greater or lesser diversity of parts and functions, parts that tend to maintain harmony and stability. And, of course, parts of these systems, e.g., livers and lungs, are also systems with a complexity of parts, with an integrity, harmony, etc. of their own. Finally, why should we suppose that the criterion must apply only to systems of living things? How about a solar system, a molecule, or an atom? Why can't a society be regarded as a diverse, stable, harmonious cybernetic system?

Once again we have a problem of determining and limiting the scope of the application of the value criterion. It won't do any good to insist that it is only to be applied to ecological systems. This is a mere piece of legislation. If other systems are like ecological systems in relevant respects, then they too should be judged as valuable. If we don't want to say that they are valuable, then we have to find a relevant respect in which they are different.

The difficulty involved in determining what should be the objects of our moral concern translates into a difficulty about what states of affairs we should be promoting. Is the diversity, integrity, naturalness, etc. contained in a compost heap or a tree less worthy of our concern than the diversity, integrity, naturalness, etc. of a forest? Is a monoculture pine plantation full of creatures, which in themselves have diversity, integrity, etc., necessarily of less worth than the wilderness that it replaced?

Even if we focus on ecological systems, it is difficult to determine what ought to be preserved and protected and why. If we degrade an environmental system, make it less diverse, natural, stable, etc., then we have rendered it less valuable according to our criterion. But in the future this system may recover, becoming as diverse and integrated as before (though perhaps with different species), or another system just as diverse, etc. may eventually replace it (perhaps in a thousand or a million years). If we have good reason to think that this will happen, then why should we be terribly concerned about what we now do to our environment? What counts as harm?

One answer might be that a state of affairs is worse if it is brought about by our tampering. What environmental ethics above all wants to condemn is unnecessary human interventions in nature. Its message is "Leave it alone." The Routleys, for example, place a lot of weight on "naturalness." Even if our interventions increase the diversity of a system and do not damage its stability and harmony, they can still be condemned because they make it less natural.

It is puzzling that an ethic which purports to find objective value in nature should be so concerned about what states of affairs human beings bring about. Although it is true that human actions do have a detrimental effect on environmental systems, so do storms, floods, volcanoes, and glaciers. Exotic species can be introduced into a system by winds or the migration of birds. Given these natural disturbances, how can environmental ethicists justify condemning a human action when it does not (in the long term, at least) make a system any less stable, diverse, harmonious, etc.? Moreover, why

aren't they concerned to prevent (if possible) natural occurrences that threaten the stability, integrity, and diversity of an environmental system? The emphasis environmental ethicists place on limiting human interventions, on preserving and protecting the natural communities which we are in contact with, suggests that their real concern is to encourage a better relationship between humans and their environment. Their ideas about what we should value and why—that, for example, we should value the creatures and systems that now happen to exist—depend on a covert reference to the human point of view, to our interests and concerns.

Other recent attempts to develop a criterion for making value judgments have been no more successful than the Routleys' criterion. Rolston, for example, argues that species deserve to be respected because they are discrete entities with a history of their own. A species, he says, is a kind of an essence.[9] But what history a species has, what turns out to be its essence, depends upon the environmental forces which act upon it. Why should one outcome be regarded as better than another? Why should existing species be regarded as better than others that could take their place (whether now or in several thousand or million years)? If a species is an essence, then why not say that any population with a distinct genetic character is an essence? Why not an individual, etc.?

Although I cannot rule out the possibility that someone might someday state a criterion of value which would include in its scope all and only those things and states that environmental ethicists want included and which would satisfy the formal requirements of ethics, it seems to me to be unlikely. The problem, as I have suggested, is that how we view the world, how we divide it up into individuals and systems, what we regard as good or bad for an individual or a system is too arbitrary—i.e., too dependent on point of view, interest, and convenience—to support an ethic that purports to be based on value in nature independent of our interests and concerns. Every criterion of environmental value seems to depend for its application on our taking a particular point of view, or on using a particular set of concepts, and there does not seem to be any nonarbitrary reason (as far as ethics is concerned) for taking up one point of view or using one set of concepts rather than another. As a result, the attempt to be objective and to avoid assuming an interest or a point of view risks vacuity or at the very least producing something too indeterminate in scope to be useful as an ethic.

If there is something so fundamentally wrong with environmental ethics, then two questions are critical. First, is any ethic possible at all? If environmental ethics is flawed, then what reason do we have for supposing that a nonenvironmental ethic is any less arbitrary or any more likely to satisfy formal requirements? Second, if environmental ethics is impossible, what we are going to say about those practices—our destruction of wilderness, species, environmental systems, creatures—which environmental ethicists believe that they need an environmental ethics to condemn?

[9] Keynes, J. M. *Essays in Biography.* New York' Meridian Books, 1951.

To establish the possibility of ethics it is enough to give an example of a system of ethics which satisfies the formal criteria for an ethic and includes reference to intrinsic values. I believe that an ethic which takes individuals who have a point of view (i.e., that are centers of consciousness) as having intrinsic value—an ethic which supports the satisfaction of the interests, needs, and preferences of those individuals—-is such an ethic. The fact that individuals have a point of view, and can therefore be caused anguish, frustration, pleasure, or joy as the result of what we do, is one good reason for valuing such individuals and requiring that their interests and preferences be a matter of moral concern to all rational, morally sensitive agents. Equally important, in satisfying the formal requirements of an ethic, is the fact that individuals with a point of view—with consciousness, desires, feelings, goals, etc.—are self-defining. What in the framework of the ethic counts as an individual is not an arbitrary matter, not a question of the valuer's point of view. That they have a point of view decides the matter. It is also not an arbitrary matter, not a question of the valuer's point of view, what counts as the good of such individuals. They themselves define their good by how they feel, what they say, by how they behave. Because we are able to use the value criteria of this ethic consistently, nonvacuously, and without any overwhelming problems of undecidability, it is clear that a nonarbitrary ethic is possible, though, of course, much more discussion is needed to determine what an ethic which values sentient beings requires of us.[10]

If environmental ethics is nonviable, if we are stuck with a sentient-being- centered ethic, then what about the needs of the environment? What do we say about the intuitions and attitudes of those people who think that we ought to preserve wilderness, species, and nonsentient organisms even when these things have no instrumental value for human beings or other sentient creatures? Do we really need an environmental ethic in order to do justice to the standpoint of the environmentalist who abhors a defoliated jungle or a strip-mined hillside?

Perhaps the reason why so many people think we do is because they are operating within an unnecessarily narrow conception of what is instrumentally valuable. They think that within the framework of a humancentered or sentient-being-centered ethic we can only value natural things if they satisfy a well-defined need which we (or some other sentient creatures) have. Dissatisfied with this ethic, they mistakenly want to argue for the preservation of something that is not valuable in this sense and thus feel obliged to embark on the project of constructing an environmental ethic. Fortunately, there is another possibility. We might be able to argue that something is valuable and therefore ought to be preserved because our lives and our conception of ourselves will be enhanced—in a spiritual sense—if we learn to appreciate it for what it is and we learn how to live with it in harmony.[11] Although such an approach does not pretend to go beyond the human point of view, beyond our concerns and interests, it is not confined to

[10] Glacken, C. *Traces on the Rhodian Shore.* Berkeley: University of California Press, 1967.

[11] Kuhn, T. S. *The Structure of Scientific Revolutions.* Chicago: Chicago University Press, 1962.

a concern with obvious and traditional material and psychological needs, for it permits us to define a new conception of what we are as individuals and what a good life is. My view is that those who want to develop a deep approach to environmental concerns have everything to gain and nothing to lose by following this approach. Environmental ethics is not only a dead end, but also an unnecessary diversion.

7. Artefacts and Functions

A note on the value of nature

Eric Katz

Source: *Environmental Values* 2(1993): 223-232.

Abstract: This paper examines and compares the ontological and axiological character of artefacts - human creations - with nonhuman natural entities. The essential difference between artefacts and natural entities is that the former are always the result of human intention and design, while the latter are independent of human purpose. Artefacts have functions; natural entities do not.

The connection to human intentional purpose implies a different kind of value for artefacts. Artefacts are evaluated solely by their instrumental (and anthropocentric) use, while natural entities can be appreciated for their independent and autonomous existence.

This distinction has normative implications, especially for environmental policy and the development of an environmental ethic. Intervention in natural processes, even to 'improve' nature, must be limited, for human action changes natural entities and systems into artefacts. A moral imperative requires respect for the autonomy of nature and resistance to the human domination of nature.

I

Consider the character of artefacts as human creations. Artefacts are conceived and designed to meet the demands of human need or purpose; they are tools for the achievement of human tasks. Not all artefacts actually fulfil the purposes for which they were intended; often, artefacts designed for one purpose are used in unforeseen or different contexts. Nevertheless, the artefact would not exist at all if some purpose had not been foreseen for it; artefacts are created to meet a specific human need.

Artefacts thus stand in a necessary *ontological* relationship with human purpose. The existence of a human purpose, a human intention, is a *necessary* condition for the existence of the artefact. Human purpose and intention are clearly not *sufficient* conditions for the characterization of an entity as an artefact, for some things are the result of human intentions although we would hesitate to call them artefacts. Human infants, for example, may be the result of intention and purpose. Inter-human relationships — for example, my friendship with John - may also be intentional.

However, although human creations other than artefacts may exhibit intentionality, natural entities do not. Natural entities, insofar as they are natural, are not the result of human intentions. The necessary ontological relationship with human purpose serves to distinguish artefacts from natural entities. In this essay I examine the nature of this distinction and its normative implications.

II

An anthropocentric world-view places humanity and human interests at the centre of value. From the perspective of anthropocentrism, the world exists for humanity; the world is the complex of objects and systems that form the material for human achievements. Technology - the design and creation of artefacts - is a central project in the development of this anthropocentric world; technology shapes the material of the world to meet human concerns, to satisfy human desires, wants, and needs. Broadly conceived, technology is any social or cultural artefact used by humans for the organization and control of nature and the world.[1]

Technological products - artefacts - are thus fundamentally anthropocentric, by which I mean that their existence, purpose, and meaning all derive from the concerns of human agents, either as individual persons or as social institutions. A proper understanding of artefacts is tied inextricably to an analysis of function and purpose. Artefacts are instruments or tools for the betterment of human life. They can only be understood as anthropocentric instruments.

The anthropocentric instrumentality of artefacts is completely different from the basic characteristics of natural entities, species, and ecosystems. Natural entities exist independently from human purpose or design. Living natural entities and systems of entities evolve to fill ecological niches in the biosphere, not to meet human needs or interests. More clearly, non-living natural entities such as rock formations, rivers, canyons, soils (and so on) simply *exist,* without any evolutionary 'fit' at all. Non-living natural entities, although subject to change, do not 'evolve' or adapt to changing conditions in their local ecosystems. It is thus difficult even to ascribe the notion of function or purpose to natural entities.

The consideration of function and the comparison of artefacts and natural entities leads Andrew Brennan to argue that natural entities are 'intrinsically functionless'. Natural entities were not created for a particular purpose, nor did they evolve for a specific reason, design, or plan; natural entities have no set manner of use, no role to play in natural ecosystems. We often speak as if natural individuals and species (e.g., predators) have roles or functions to perform in the maintenance of ecosystemic wellbeing (e.g., preserving the equilibria of optimum population levels), but such talk is either metaphorical or fallacious. No one created or designed the mountain lion as

[1] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

a regulator of the deer population.[2] Natural entities are not instruments, although we humans may use them instrumentally. When we do, we graft our designs, so to speak, on to the naturally functionless entity. But outside considerations of human use, the natural entity has no purpose; since it is not an artefact, since it is not the result of a design or plan, it has no 'intrinsic function'.

It may be objected that the preceding analysis of the difference between humanly created artefacts and natural entities reinforces the very separation between humanity and nature that environmental philosophy (and an enlightened environmental policy) seeks to overcome. For too long, humanity has apparently believed that it can exist independently of natural processes. But humans are part of the natural system, and require a wellfunctioning natural environment to survive. Humans are themselves the products of natural evolution, the objection continues, so that human artefacts are likewise natural.

Although this objection introduces a valid concern into the proper basis of environmental policy - the interdependence of humanity and nature - an overemphasis on this useful hortatory rhetoric of the environmental movement only tends to obscure a clear analysis of the differences between the results of human action in the environment and the outcomes produced by natural processes. Humanity itself is a product of evolution, but the primary sphere of human activity is the realm of culture, the complex system of social arrangements and artefacts that was created by humanity for the furtherance of human ends. Although human cultural artefacts may exist along a continuous spectrum with natural evolving entities - my steel hammer is related to the bone, stick, or rock used by a chimpanzee in the wild - there is indeed a distinction to be made between human artefacts - machines, institutions, ideas - and the natural evolving entities of the biosphere. Human artefacts do not evolve. To say that I am using a third generation personal computer to write this essay, and that this PC evolved from earlier PCs or indeed from Turing's idea of a thinking machine, is to speak in metaphors. Real evolution only occurs in biological systems and entities, not in artefacts. Humans may use evolutionary principles as they 'redesign' living artefacts, such as food crops, but here again the distinction between a process driven by human intention and one driven by natural selection is clear. Humans are in some sense natural beings; humanity requires a functioning nature to survive; but not everything humans do or make is natural. It is thus important to understand how and why human creations or artefacts are different from natural entities. Without a proper understanding of the distinction, we will lack a basis for a moral environmental policy.

[2] Cole, H. S. D., C. Freeman, M. Jahoda, and K. L. R. Pavitt. *Thinking about the Future: A Critique of the Limits to Growth,* London: Chatto and Windus, 1973.

III

Since artefacts are designed for a human purpose, while natural entities evolve with no design or purpose, the lack of what Brennan terms 'intrinsic function is the distinguishing characteristic that separates natural entities from artefacts. An example from practical environmental policy can begin to demonstrate the significance of this distinction for an ontological and axiological understanding of nature. The comparison between artefacts and natural entities reveals the foundation of natural value; the comparison explains the value of nature.

Consider[3] the policy of sustainable forestry.[4] As its name implies, sustainable forestry is a land-management policy that advocates the wise use and restoration of forests as sustainable and renewable resources. It is thus opposed to the short term expediency of present day forestry practices. Current policies often involve a maximum harvest with little regard for the restoration or maintenance of the forest as an ecosystem. Forests are treated as if they were agricultural products, tree plantations. Advocates of sustainable forestry seek to re-model the practice of forest management along the lines of natural evolution, restoration, and ecosystemic development.

From the perspective of environmentalists, sustainable forestry would appear to be a good policy, well worth advocating as a corrective to an exploitative and disrespectful misuse of natural ecosystems. But a deeper examination shows that sustainable forestry is not an appropriate improvement over short-term development, for both policies treat the forest as an artefact, an instrument for the furtherance of human interests. An analysis of sustainable forestry only reveals the wide gulf between natural entities and human-centred artefacts.

The artefactual treatment of nature within sustainable forestry policy is clearly demonstrated in Chris Maser's *The Redesigned Forest?* Maser, a former research scientist for the United States Department of Interior Bureau of Land Management, argues that we must redesign forests according to natural ecological principles, so that we become true foresters and not 'plantation managers'. Maser's position is instructive precisely because it exhibits the tension between a policy based on natural evolutionary principles and a policy based on short-term human interests. Unlike the 'forest-plantation manager', Maser attempts to create a forest policy that respects natural processes. Nevertheless, his argument and language are disturbing; the text is pervaded by an artefactual and instrumental conception of the natural forest environment.

Maser's first error is the comparison of the human design of forests with Nature's design: "we are redesigning our forests from Nature's blueprint to humanity's blueprint".[5] Nature, of course, does not have a blueprint, nor a design, and as a zoologist, Maser knows this. His language is merely metaphorical, and it is dangerous, for it-implies that we can discover the plan of natural processes and mould them to our human purposes.

[3] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

[4] Engels, F. *The Dialectics of Nature.* New York: International Publishers, 1940.

[5] Glacken, C. *Traces on the Rhodian Shore.* Berkeley: University of California Press, 1967.

Maser's second error is the comparison of nature to a mechanism. In his criticism of current forestry practices, Maser claims that when we turn forests into plantations we assume that our design for the forest mechanism is better than nature's. Maser correctly argues that "forests are not automobiles in which we can tailor artificially substituted parts for original parts".[6] But his argument against the substitution of artificial parts is empirical: "A forest cannot be 'rebuilt' and remain the same forest, but we could probably rebuild a forest similar to the original if we knew how. No one has ever done it .. . [W]e do not have a parts catalog, or a maintenance manual..." The implication is that if we did have a catalogue and manual, if nature were as well known as an artefactual machine, then the restoration and redesign of forests would be practically and morally acceptable.

For Maser, restoration or sustainable forestry is acceptable because it more likely furthers human long-term interests. Thus, the third problem in this argument for the redesign of forests and forestry policy is that its foundation is irredeemably anthropocentric. The central problem with current practices is that they are "exclusive of all other human values except the production of fast-grown woodfiber".[7] What concerns Maser is the elimination of other human values and interests. "We need to learn to see the forest as the factory that produces raw materials ..." to meet our "common goal[:] ... a sustainable forest for a sustainable industry for a sustainable environment for a sustainable human population".[8] Sustainable restoration forestry is necessary because it is the best method for achieving the human goods that are extracted from nature. By using the complex knowledge of forest ecology, foresters will achieve the goal of building a better 'factory-forest'.

As an environmental policy, the idea of rebuilding and redesigning sustainable forests is, at the very least, extremely odd. Even a cursory examination of the concept of sustainable restoration forestry reveals the anthropocentric value system that lies at its core. The management and control of natural systems alters their natural character; management and control creates artefactual systems, which, at best, *resemble* nature. The redesign and management of natural systems is thus a paradox: once human intervention occurs, there is no longer a natural system to be preserved, there is only an artefactual system.

The example of sustainable forestry thus serves to illustrate the conceptual distinction between artefacts and natural entities. The goal of sustainable forestry is the creation of forests that best suit human purposes; these forests are thus artefacts, designed and developed for a human function, even in the limiting case where the *sole* purpose for the creation of the forest was the replication of the natural. The managed sustainable forest is (arguably) an improvement over a forest plantation; but the managed forest is still different from a natural forest, even if it appears similar, even if it

[6] Godelier, M. *Rationality and Irrationality in Economics.* London: New Left Books, 1972.

[7] Hays, S. *The Conservation Movement and the Gospel of Efficiency.* Cambridge, Massachusetts: Atheneum, 1959.

[8] Hudson, W. D. *Modern Moral Philosophy.* London: Macmillan, 1970.

develops according to the same evolutionary and ecological principles. The managed forest, as an artefact, owes its existence to intentions of human agents; the natural forest exists independently of human intention. The natural forest exists because of a historical and evolutionary process, not as the result of a human plan or design. The natural forest has no purpose, no intrinsic function: unlike an artefact, or an artefactual system, it is ontologically independent from humanity.

IV

The human, intervention in and management of natural systems thus creates artefacts whose value is centred on human interests and purposes. A consideration of these artefacts, as in the policy of sustainable forestry, reveals the difference between human-centred artefacts and independent natural entities. This analysis of the difference in the ontological and axiological character of artefacts and natural entities has clear implications for normative ethics, and ultimately, for environmental policy. I argue that there is a moral obligation to preserve non-artefactual natural value, even as it exists independently from human projects, plans, and interests.

The central normative issue in this discussion is the possibility of the moral 'consideration' of nonhuman and non-living natural entities. This non-traditional and nonhuman-based moral consideration requires the determination of a plausible non-arbitrary criterion for nonhuman moral value. Since its inception, the field of environmental ethics has attempted to broaden the notion of moral considerability beyond the traditional limits of human-based criteria (such as language ability, rationality, or selfconsciousness). Thus Paul Taylor has argued for a biocentric ethic which entails moral respect for all living (natural) entities.[9] The basis of this bio- centric attitude of respect is the recognition that every living entity has a good-of-its-own; each living being is a "teleological centre of life".[10] Similarly, Robin Attfield has argued for "the good of trees" on essentially Aristotelian grounds: "the good life for a living organism turns on the fulfilment of its nature".[11] But the notion that non-conscious (and non-rational) living entities have an intrinsic or inherent good has been questioned. R. G. Frey, for example, suggests that a broadened notion of welfare, good, or interests cannot be limited to animals and other living entities. If we are going to talk of the good for nonhuman animals and plants, then we are also going to have to talk of the good for machines and other human artefacts: a tractor 'needs' oil to run well; oil is a good that enables the tractor to fulfil its nature.[12]

[9] Humboldt, A. von. *Essai Politique sur le Royaume de la Nouvelle Espagne.* Paris: F. Schoell, 1811.

[10] Jacks, G. V. and R. O. Whyte. *Vanishing Lands.* New York: Doubleday, 1939.

[11] Kapp, K. W. *The Social Costs of Private Enterprise.* Cambridge, Massachusetts: Harvard University Press, 1950.

[12] Jacks, G. V. and R. O. Whyte. *Vanishing Lands.* New York: Doubleday, 1939.

The possibility of determining value for natural entities thus requires a clear distinction between artefacts - such as Frey's tractor - and living entities as teleological centres of life and activity. Gary Varner has recently argued for the consistency of this distinction by focusing on the 'biological functions' of living entities as opposed to the 'artificial' functions of machines and artefacts. Unlike a machine, a living entity has needs, interests, and goods because it has biotogical functions, adaptive subsystems that served an evolutionary purpose in the survival of its ancestors. The interests and goods of the living entity are based on the aetiology of the species; the interests and goods — if we want to call them that — of the artefact depend on the purposes ascribed to the artefact by human beings.[13] Holmes Rolston reaches the same conclusion by a consideration of organisms as 'self-maintaining systems' within ecosystems and habitats: "there exist . .. systemic requirements by which the organism is tested as fit or misfit". The ecosystemic fitness of an organism is part of its nature. Artefacts have no nature of their own, merely the purposes given to them by human interests. [f] Biological and ecosystemic functions are thus the distinguishing characteristics of living entities (as opposed to artefacts); this distinction permits the possibility of the moral consideration of nonhuman living entities without the problematic inclusion of artefacts.

But the distinction between artefacts and natural *living* entities is not by itself an adequate basis for the determination of moral value in nature. First, considerations of natural teleology, biological function, and ecosystemic fitness exclude artefacts from moral consideration at the cost of excluding *nonliving* natural entities. Such an exclusion is too broad: the consideration of nonliving natural entities must be part of any comprehensive environmental ethic. There *is* a difference between artefacts and natural nonliving entities, but this difference is not describable in terms of ecosystemic or biological function, because none of these entities are alive. Nonetheless, the distinction is important for understanding the moral basis of environmental policy. A broadly conceived environmental ethic follows the holistic model of Aldo Leopold, so as to include soils, waters, mountains, the atmosphere - in sum, what Leopold termed 'the land' - in the domain of moral value and moral consideration.[14] It is an ethic that is concerned with both the living and nonliving elements of the biotic system, and with the relationships between them. Thus a principle of 'biological function' which eliminated the nonliving elements of the environment would exclude too much. A second problem is that the Leopoldian environmental ethic which I seek to elaborate will exclude so-called 'living artefacts', such as domesticated animals, biologically engineered species, and forest plantations. These human created entities have no place in an environmental ethic since they are not natural entities. The crucial distinction then is not

[13] Kneese, A. V., R. U. Ayres, and R. C. D'Arge. *Economics and the Environment.* Washington, D.C.: Resources for the Future. 1970.

[14] Levi-Strauss, C. *Tristes Tropiques.* New York: Atheneum, 1973.

between living beings (with biological functions) and nonliving 'things', but between artefacts and natural entities, considered as living or not.

The ethical importance of the distinction between artefacts and natural entities is thus derived from the anthropocentric nature of artefacts, their ontological reliance on human interests, plans, and projects. In contrast to natural entities, artefacts, as human instruments, are always a *means* to the furtherance of some human *end.* The normative implication of this relationship can be found in the practical moral philosophy of Kant, if we are willing to look beyond the boundaries of human rational subjects. The second formulation of the categorical imperative states that we are to treat moral subjects as ends-in-themselves, never as a mere means. If the categorical imperative is applied to a treatment of artefacts and natural entities we find a crucial difference: artefacts must be treated as means, for their existence and value only exists in a dependent relationship with human aims and goals; but natural entities, existing apart from human projects, can be considered as ends-in-themselves. Kant teaches us that the possibility of moral consideration lies in. an entity's independence from rational control and design, its existence as an end-in-itself.

This consideration of Kantian moral concepts *suggests* that two crucial notions in the development of an ethical environmental policy are the Kantian ideal of 'autonomy', and its moral opposite, domination. In analysing the value of natural organisms, Rolston writes: "the values that attach to organisms result from their nonderivative, genuine autonomy ... as spontaneous natural systems."[15] This is not true merely for organisms. Complex holistic natural systems and communities also exhibit autonomy, in that they are independent from external design, purpose, and control. Even non-living natural entities, which do not, in themselves, develop, grow, or achieve selfrealization, are essential components of autonomous natural systems. When humans intervene in nature, when we create artefacts or attempt to manage environmental systems (such as forests), we destroy that natural autonomy by imposing a system of domination. As Eugene Hargrove notes: "Historically, manipulation of nature, even to improve it, has been considered subjugation or domination."[16]

But why is the domination of nature a moral evil? Why are the products of the domination of nature less valuable than the products of a free and autonomous nature? It is clear that in the realm of human social and political thought, domination is an evil that restricts or denies individual (and social) freedom. Can the metaphor of domination be translated into the realm of nonhuman natural processes? Yes: within environmental policy, domination is the anthropocentric alteration of natural processes. The entities and systems that comprise nature are not permitted to be free, to pursue their independent and unplanned courses of development, growth, and change. Thus, the existence of domination results in the denial of free and unhindered growth and

[15] Losch, A. *The Economics of Location.* New Haven: Yale University Press, 1954.

[16] Malthus, T. R. *An Essay on the Principle of Population and a Summary View of the Principle of Population.* Harmondsworth, Middlesex: Penguin Books, 1970.

development. Wherever the process of domination exists, either in nature or in human culture, it attacks the pre-eminent value of self-realization.

I am not claiming that all self-realization is a moral good; even some forms of human self-realization can be morally evil. Thus a much larger question, for both environmental policy and normative human ethics generally, concerns the exploration of criteria for justifiable intervention in the free and

VALUING NATURE, AND ENVIRONMENTAL ETHICS autonomous development of human beings, natural organisms, and natural systems. I do not claim to establish a 'criterion for intervention' in this essay. My point here is more simple: the denial of the self-realization of natural processes is a crucial part of the human domination of nature.

The creation of artefacts is thus central to the human project of the domination and subjugation of the natural world. Artefacts enable humanity to control the forces of nature for the betterment of human life. Generally, this artefactual control of natural forces is not a moral evil: the processes of agriculture, engineering, and medicine are necessary for the fullest possible development of human life - *human* self-realization. But the management, alteration, and redesign of nature results in the imposition of our anthropocentric purposes on areas and entities that exist outside human society. Intervention in nature creates environments based on models of human desire. This is the human project of the domination of nature: the reconstruction of the natural world in our own image, to suit our human goals and purposes.

The ontological and axiological distinctions between artefacts and natural entities are drawn most clearly when we consider the artefactual reconstruction and control of natural entities and ecosystems - when we turn wild and natural forests into tree plantations or 'sustainable' woodland. Artefacts are fundamentally connected to human concerns and interests, in both their existence and their value. Natural entities and systems have a value in their own right, a value that transcends the instrumentality of human projects and interests. Nature is not merely the physical matter which is the *object* of human artefactual practice; nature is a *subject,* with its own history of development independent of human cultural intervention. As with any autonomous subject, nature thus has a value that can be subverted and destroyed by the process of human domination The normative implication for environmental policy is that this value ought to be preserved.

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8. Intrinsic Value, Quantum Theory and Environmental Ethics

J. Baird Callicott

Source: *Environmental Ethics,* 7(3) (1985): 257-275.

The central and most recalcitrant problem for environmental ethics is the problem of constructing an adequate theory of intrinsic value for nonhuman natural entities and for nature as a whole. In part one, I retrospectively survey the problem, review certain classical approaches to it, and recommend one as an adequate, albeit only partial, solution. In part two, I show that the classical theory of inherent value for nonhuman entities and nature as a whole outlined in part one is inconsistent with a contemporary scientific world view because it assumes the validity of the classical Cartesian partition between subject and object which has been overturned by quantum theory. Based upon the minimalistic Copenhagen Interpretation of quantum theory, I then develop a theory of inherent value which does not repose upon the obsolete subject/object and ancillary fact/value dichotomies. In part three, I suggest that a more speculative metaphysical interpretation of quantum theory—one involving the notion of real internal relations and a holistic picture of nature—permits a principle of "axiological complementary," a theory of "intrinsic"—as opposed to "inherent"—value in nature as a simple extension of ego.

I

In a programmatic paper published in 1973 Richard Routley dramatically delineated, but did not attempt to solve, the central theoretical problem for any future environmental ethics.[1] What Routley called "dominant Western ethical traditions," or what might better be labeled "normal Western ethics," provide, he claimed in effect, only instrumental, not intrinsic value, for nonhuman natural entities and nature as a whole. Routley informally or intuitively demonstrated the universal assumption of an axiology in which only people are intrinsically valuable in normal Western ethics by appeal to his last man' or "last people" thought experiment. Actions wantonly destructive of the natural environment undertaken by the last people or *in extremus* last person could not, in the context of normal moral theory, be morally censurable since,

[1] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

by hypothesis, no other people (future generations, in the former case, contemporaries in the latter) would be adversely affected by them. Hence, from the point of view of normal Western ethics, the last people or the last person would do nothing *morally* wrong, for example, by systematically extirpating species. Routley, thus, suggested that a genuinely *environmental* ethic would be both "new" and involve as a centtai or "core" feature an axiology that vested intrinsic value in nature.

More recently, Tom Regan reiterated the centrality of the axiological problem for environmental ethics: "[T]he development of what can properly be called an environmental ethic requires that we postulate inherent value in nature."' Otherwise, according to Regan, a putative environmental ethic would collapse into a "management ethic," an ethic for the "use of the environment," not an ethic the beneficiary of which is the environment *per se.* In his discussion Regan defines *inherent value* in the strongest possible terms and then expresses doubts that a "rationally coherent" theory of inherent value in nature is philosophically attainable. According to Regan, inherent value must be either a property of an inherently valuable natural entity or be grounded in its actual properties, and it must be objective and *independent of any valuing consciousness.* Regan thus insists that any theory of inherent value in nature must be limited in effect to some version of naturalism or its objectivist alternative, non-naturalism.

Classical naturalistic axiologies ground the inherent value of some beings, very often only human beings, in properties like reason, self-consciousness, and moral autonomy. More liberal or inclusive theories associate intrinsic value with sentiency or consciousness, life or the will to live, organization or, more recently, "richness."

The nemesis of any naturalistic theory of inherent or intrinsic value, however, is, of course, G. E. Moore's naturalistic fallacy. Regan tacitly invokes the naturalistic fallacy in criticizing Kenneth Goodpaster's proposal for a nonanthropocentric axiology for environmental ethics. Goodpaster argued that life is intrinsically valuable and thus that all *living* moral beings should be granted moral considerability.[2] But according to Regan, "(Limiting the class of beings which have inherent value to the class of living beings seems to be an arbitrary decision... ,"[3] Of course, the same could be said with equal force and finality of any actual objective property or set of properties proposed to be the ground of intrinsic value. It seems arbitrary to say, following Kant, that only rational beings are intrinsically valuable because reason is objectively good, or following Bentham, that only sentient beings are intrinsically valuable because pleasure is objectively good, or following Plato and Leibniz that only ordered things are intrinsically valuable because order is objectively good and so on. A sincere skeptic is always entitled to ask why reason, pleasure, order, or whatever z'y good and/or why rational, sentient, organized, etc., beings should therefore be intrinsically valuable. In the end, all a naturalistic advocate can do is to commend a property to our evaluative faculty of judgment or evaluative sensibilities. Peter Miller's recent attempt to provide

[2] Engels, F. *The Dialectics of Nature.* New York: International Publishers, 1940.

[3] Firey, W. *Man, Mind and the Land.* Glencoe, Illionis: Free Press, 1960.

a naturalistic theory of value for environmental ethics is painfully illustrative of the bankruptcy of a naturalistic approach.[4] According to Miller, "richness" is the property which makes people, other organisms, ecosystems, and nature as a whole intrinsically valuable. Miller very fully and enthusiastically characterizes or *describes* ' richness,' but he does not adequately explain why richness, apart from some subjective judgment or conscious preference, is *per se* the ground of intrinsic value in nature.

The bankruptcy of the naturalistic approach to a fitting axiology for environmental ethics is, I wish to emphasize, quite general. The problem is not with the metaethically revolutionary axiological goal, which is to provide intrinsic value for *nonhuman* natural entities, nor with the sincerity and industry of revolutionary naturalistic theorists like Goodpaster and Miller, but with the general theoretical approach itself. Normal naturalistic axiolo- gies which provide intrinsic value only for human beings are no less suspect than Goodpaster's or Miller's more inclusive naturalistic axiologies; they are only more familiar and self-serving. In isolation from all valuational consciousness, it seems no less quixotic to claim that reason is good and that rational beings are intrinsically valuable or that pleasure is good and sentient beings are intrinsically valuable than to claim that life is good and living things are intrinsically valuable or that richness is good and that rich ecosystems are intrinsically valuable.

If intrinsic value cannot be logically equated with some objective natural property or set of properties of an entity, independently of any reference to a subjective or conscious preference for that property or set of properties, the only way to rescue the objectivity and independence of intrinsic value is desperately metaphysical: one may say that goodness or intrinsic value is a primitive or irreducible objective *nonnatural* property of some entities. Natural properties of objects may be recognized or discovered empirically or by reasoning based upon experience. We know, for example, that an entity is rectangular by immediate experience and that it is radioactive by inference from other immediate experiences (like Geiger-counter reports). The nonnatural objective property of inherent goodness or intrinsic value, however, cannot by definition (that is the force of saying it is a nonnatural property) be empirically apprehended or inferred from ordinary sensory experience. It can only be known or discovered, thus, by some mystical intuitive faculty. If such a capacity for moral intuition were generally distributed in everyone alike, there would be as little controversy about the intrinsic value of sperm whales as there is about the color of the sky. Since the intrinsic value of various things is far from a settled matter, the intuitive faculty for its apprehension must be either vested in only a few gifted moral seers or, though

INTRINSIC VALUE, QUANTUM THEORY generally distributed, wildly variable from individual to individual, such that what appears intrinsically valuable to one does not to another. In either case, the hope of moral persuasion based upon rational discussion is aborted. One can only say I (or the moral adept to whom I defer) "see" the intrinsic value of X and if you don't, you are morally blind. We are thus left with

[4] Glacken, C. *Traces on the Rhodian Shore.* Berkeley: University of California Press, 1967.

undefended, entrenched opinions philosophically tricked out as intuitions of irreducible, nonnatural moral properties.

Facing up to these apparently insurmountable logical impediments to axiological objectivism, I have attempted, in a recent series of papers, to elaborate a less ambitious, but also less problematic, subjectivist approach to the problem of an appropriate axiology for environmental ethics based upon and inspired by the land ethic of Aldo Leopold.[5] Working backward historically, I have traced the axiological kernel of the land ethic through Darwin (whose thought about the nature and origin of ethics manifestly influenced Leopold) back to Hume (whose analysis of ethics Leopold may or may not have known or consciously considered, but which certainly, in turn, directly informed Darwin). If my historical reading is correct, the seminal paradigm for contemporary environmental ethics, the Leopold land ethic, rests upon Humean axiological foundations.

According to Hume, moral value, like aesthetic value, is in the eye of the beholder. Good and evil, like beauty and ugliness, rest in the final analysis upon feelings or sentiments which are, as it were, projected onto objects, persons, or actions and affectively "color" them. "You never can find it," Hume wrote of the vice or evil of willful murder, "till you turn your reflexion into your own breast, and find a sentiment of disapprobation, which arises in you. towards this action":

Here is a matter of fact; but 'tis the object of feeling, not of reason. It lies in yourself, not in the object. So that when you pronounce any action or character to be vicious, you mean nothing, but that from the constitution of your nature you have a feeling or sentiment of blame from the contemplation of it.

If the integrity of environmental ethics turns on the development of a theory of value which provides *intrinsic* or *inherent* value for nonhuman natural entities and nature as a whole as Routley and Regan have variously insisted, then a naked, unadorned subjectivism like Hume's, however honest, simple, and straightforward, seems hardly a promising point of departure. The very words *inherent* and *intrinsic* mean respectively "the essential character of something" or "belonging to the essential nature or constitution of a thing."[6] Thus, the very sense of the hypothesis that inherent or intrinsic value exists in nature seems to be that value *inheres* in natural objects as an intrinsic characteristic, i.e., as part of the constitution of things. To assert that something is inherently or intrinsically valuable seems, indeed, to entail that its value is objective. Hence, if values are, as Hume has claimed, really referred or projected feelings or sentiments which originate with and depend upon a valuing subject and do not really belong at all to valuable objects, then there simply is no inherent or intrinsic value in nature and the cause is lost before the campaign gets fairly underway.

As I have been at pains to point out, however, a crucially important distinction may be overlooked in such a hasty rejection of axiological subjectivism as an approach to

[5] Godelier, M. *Rationality and Irrationality in Economics.* London: New Left Books, 1972.

[6] Hays, S. *The Conservation Movement and the Gospel of Efficiency.* Cambridge, Massachusetts:

the central theoretical problem of environmental ethics—the construction of a coherent and persuasive theory of intrinsic or inherent value in nature. Intrinsic or inherent value in nature in the strict, objective sense of the terms must by definition be abandoned if one assumes a Humean subjectivist axiology. Nevertheless, in an important sense, consistently with this axiology, persons certainly and other natural beings may be valued *for themselves* as well as for the utility they afford those who value them.

To take a concrete example, consider a newborn infant. Let us assume, for the sake of clarity and simplicity, that the infant yet lacks self-consciousness and hence does not value itself and that there is no God who superordinately values it. According to Hume's classical subjectivist axiology, then, the value of the newborn infant of our example is wholly conferred upon it by its parents, other relatives, the family dog, family friends, and perhaps impersonally and anonymously by some unrelated and unacquainted members of society.

To be sure, part of the value of the newborn infant is merely instrumental. At a crass material or economic level it is valuable as a "human resource" to "society" because one day it will fill an empty chair in a schoolroom, perhaps serve in the armed forces, or maybe even discover a cure for cancer. To its parents who may economically value it as, say, a future helping hand on the family farm, it is also a "little bundle of joy," that is, it is the occasion of valued psycho-spiritual experiences *for them.* But if the parents of the infant of our example are like my parents and, as a parent myself, like me, and like most of the parents of my acquaintance the foregoing account of the value of the hypothetical newborn infant leaves something out. Almost certainly its parents, most probably its other relatives, family friends, and benignly disposed strangers value it *for itself,* above and beyond either its material- economic or psycho-spiritual utility. Assuming axiological subjectivism, it lacks in principle intrinsic value objectively construed, since all value, according to axiological subjectivism, is subjective. But it "has"—that is, there is conferred or projected upon it, by those who value it for its own sake— *something more* than instrumental value, since it is valued for itself as well as for the joy or other utility it affords them.

Let me seize upon the confusing accident that two terms, *inherent* and *intrinsic,* with virtually identical lexical definitions have been promiscuously employed by philosophers to discriminate the value of something in and for itself from the instrumental value it has in and for others and stipulatively distinguish between them. Let something be said to possess *intrinsic* value, on the one hand, if its value is objective and independent of all valuing consciousness. On the other, let something be said to possess *inherent* value, if (while its value is *not* independent of all valuing consciousness) it is valued *for itself* and not only and merely because it serves as a means to satisfy the desires, further the interests, or occasion the preferred experiences of the valuers. Hume's classical subjectivist axiology theoretically provides in general for both instrumental and inherent value, so defined, but not for intrinsic value?

Atheneum, 1959.

According to Hume, in addition to the several passions gathered under the head of "self-love," there are the social sentiments and the sentiment of morality which have other beings than oneself as their direct objects. Hence, though all value may be of subjective provenance, it is not the case, upon Hume's account, either (1) that only valuing subjects and/or (2) that only the feelings of valuing subjects are valuable.[7] Valuing subjects for the most part do value themselves, but they may, and very often do, value other things equally with or even more highly than themselves. And while valuing subjects value certain of their own feelings, joy, for example, the *valuing* feelings *per se* are not self-referential; they are not themselves the *objects* of value. The moral sentiment, the social sentiments, and the sentiments of self-love are *intentional* and never themselves their own objects except perhaps in derivative and paradoxical cases, as when we say that someone is in love with love. Normally to love something, including oneself, is not to love love, rather the grammar of an intentional feeling like love requires in its normal paradigm instances an object other than itself.

Hume's subjectivist axiology is entirely adequate for environmental ethics proper because it provides a very genuine and vivid distinction between instrumental and inherent value. Darwin provided Hume's subjective and affective axiology with an evolutionary explanation and a kind of genotypic fixity. And Leopold later employed Darwin's development of Hume's axiology to establish inherent value in nature.

In the previously quoted remark from the *Treatise,* Hume suggests that the values you project onto objects are not arbitrary, but arise spontaneously in you because of the "constitution of your nature." The affective constitution of human nature, Darwin plausibly argued, is standardized by natural selection. *Homo sapiens* is an intensely social species and so certain sentiments were naturally selected in a social environment which permitted and facilitated growth in the size and complexity of society. The social sentiments, however, though fixed by natural selection, are open-ended. There is more than just a little room for the cultural determination of their objects. Thus, just what is of value, either instrumentally or inherently is partly determined by what Hume called "reason," but what might be better called "cultural representation." Aldo Leopold masterfully played upon our open social and

VALUING NATURE, AND ENVIRONMENTAL ETHICS moral sentiments by representing plants and animals, soils, and waters as "fellow members" of our maximally expanded "biotic community." Hence, to those who are ecologically well-informed, nonhuman natural entities are inherently valuable—as putative members of one extended family or society. And nature as a whole is inherently valuable—as the one great family or society to which we belong as members or citizens.

Thus, for those who participate in the expansive evolutionary and ecological representation of nature, the blue whale, the Bridger wilderness, and other natural entities may, therefore, be said in a quite definite, straightforward sense to own inherent value,

[7] Humboldt, A. von. *Essai Politique sur le Royaume de la Nouvelle Espagne.* Paris: F. Schoell, 1811.

i.e., to be valued *for themselves,* quite independently from the satisfying aesthetic, religious, or epistemic experiences they may occasion in nature aesthetes, nature worshipers, or natural scientists. Upon this account of inherent value, environmental ethics does not collapse (as Regan rightly points out that it would without some coherent account of inherent value in nature) into a management ethic, an ethic for the use of the environment, as opposed to an ethic of the environment. Environmental policy decisions, because they may thus be based upon a genuine environmental ethic, may thus be rescued from reduction to costbenefit analyses in which valued natural aesthetic, religious, and epistemic *experiences* are shadow priced and weighed against the usually overwhelming material and economic benefits of development and exploitation. Upon this account of inherent value, Routley's last people or even last man would indeed do wrong to wantonly destroy an ecosystem or a species. At least it would be as wrong for the last man to destroy an ecosystem or a species upon the Hume-Darwin-Leopold subjectivist axiology as it would be for the last man to wantonly murder the newborn infant of the late last woman. The last man may not value for themselves the orphaned infant, the ecosystem, or the species in question, but since the last woman did, or indeed, since now we do, it is possible for her and us to imagine the murder and mayhem of the depraved and boorish last man (as now we may justifiably call him) and forejudge them to be wrong because they are destructive of inherently valuable things, i.e., things we mothers and environmentalists value for the sake of themselves, independently of what they do for us.

In the literature of normal metaethics the line on subjectivism is that it necessarily degenerates into a morally intolerable radical relativism.[8] If value originates in subjects and is projected onto objects, then the same object may be differently valued by different subjects. Thus, while willful murder may appall and disgust you and me so that we color it evil, it may fascinate and delight an insane criminal who may thus color it good. Our condemnation of murder as evil cannot be more true than the criminal's commendation of it as good, since there is no fact to which these conflicting value judgments can be compared to see which *corresponds.* Hence, universal value judgments cannot be supported by subjectivism and the imposition of "our" moral values on so-called "criminals" appears to be altogether arbitrary and rationally indefensible.

That this putative necessary association between subjectivism and radical moral relativism has held sway in the literature of normal metaethics is, I suspect, because of the nearly universal inattention of philosophers to what E. O. Wilson has called the biologization of ethics" which began with Darwin and has very lately been put on a much more rigorous footing by Wilson and other sociobiologists.[9] There may be no "truth" or "falsity" to value judgments, since there are no objective or intrinsic values to which value judgments may or may not correspond. However, there does exist a functional

[8] Jacks, G. V. and R. O. Whyte. *Vanishing Lands.* New York: Doubleday, 1939.

[9] Kapp, K. W. *The Social Costs of Private Enterprise.* Cambridge, Massachusetts: Harvard University Press, 1950.

equivalent in what 1 have elsewhere called a "consensus of feeling."[10] Human feelings like human fingers, human ears, and human teeth, though both individually variable and open to information by cultural manipulation, have been standardized by natural selection. There are, of course, occasional psychological sports of nature whose feelings are deranged just as there are physical sports whose bodies are deformed. Hence, radically eccentric value judgments may be said to be abnormal or even incorrect in the same sense that we might say that someone's radically curved spine is abnormal or incorrect.

While the alleged arbitrariness of value judgments as they are represented by subjectivism has thus been obviated by the compelling biological account of the standardization through natural selection of the moral sentiments and social instincts. Holmes Rolston, III has also pointed out, symmetrically, that there are, after all, on the side of the object, characteristics which are naturally fit to be valued. In a paper published in 1981 Rolston seemed somewhat reluctantly to concede that values "are only in the human response to the world . . . only in people."[11] Yet, he quite correctly points out that even though "[w]e may not want to say that the valuing of nature is a descriptive registering of properties, . . . neither do we value nature altogether oblivious of its descriptions. We make something a target merely by aiming at it. But our interest in apples is not so arbitrary. It depends in part on something which it found there."[12] Rolston then goes on to provide a ten-category taxonomy of "values in nature," i.e., the sorts of general characteristics actually present in nature which people appropriately find valuable. On the subjective side, the moral sentiments, albeit individually variable and certainly open to information by cultural representation, are fixed by natural selection, according to Wilson *et al.,* and on the objective side, the actual properties of objects may or may not be fit to value, according to Rolston. Thus, value in nature, though subjective, is not radically relative, although, of course, it may be, as actually we find it to be, culturally relative.

II

That Leopold rested his land qthic upon Humean axiological foundations was not historically accidental or philosophically whimsical. Leopold was a professionally trained forester and served in the U.S. Forest Service. He later became a self-educated applied ecologist and inaugurated and professed "game management" (now less tendentiously called "wildlife ecology") at the University of Wisconsin. Although he shed many of the utilitarian values bequeathed to American forestry by Gifford

[10] Keynes, J. M. *The General Theory of Employment, Interest and Money.* New York: Harcourt Brace, 1936.

[11] Keynes, J. M. *Essays in Biography.* New York' Meridian Books, 1951.

[12] Kneese, A. V., R. U. Ayres, and R. C. D'Arge. *Economics and the Environment.* Washington, D.C.: Resources for the Future. 1970.

Pinchot, Leopold never abandoned a general, normal scientific outlook or world view. The land ethic itself is, indeed, thoroughly embedded in and logically integrated with classical scientific naturalism as Leopold explicitly avers in the foreword to *A Sand County Almanac.* Now it is a well-known dogma of classical scientific naturalism that nature, in the broadest sense of the word, from atoms to galaxies and from elemental matter to the most complex life forms is value free, axiologically neutral. In formulating the land ethic, an objectivist axiology was, therefore, simply not a scientifically respectable option open to Leopold.

One of the cornerstones constituting the metaphysical foundations of classical modern science is the firm distinction, first clearly drawn by Descartes, between object and subject, between the *res extensa* and the *res cogi- tans.* The famous distinction of Hume between fact and value, and Hume's development of a subjectivist axiology may be historically interpreted as an application or extension to ethics of Descartes' more general metaphysical and epistemic distinction. Logically interpreted, the object-subject dichotomy is a more general conceptual distinction to which the fact-value dichotomy is ancillary. Axiological subjectivism, indeed, may be clearly formulated only if the objective and subjective realms, the *res extensa* and the *res cogi- tans,* are clearly distinguished. How could it be meaningful to claim that values are not objective, that they are, rather, projected affections, feelings, or sentiments ultimately originating in valuing subjects, if subjects and objects are not clearly separate and distinct?

I am indebted to Peter Miller for pointing out to me that since revolutionary developments in twentieth-century science, especially in quantum theory, have forced the abandonment of the simple, sharp distinction between object and subject (between the *res extensa* and *res cogitans),* the ancillary simple, sharp distinction between fact and value (between intrinsically value-free objects and intentionally valuing subjects) is no longer tenable.[13] Hence, although Hume's classical subjectivist axiology, evolutionarily explained by Darwin, and ecologically informed by Leopold, provides for inherent value in nature and thus a serviceable axiology for a properly *environmental* ethic, it is not consistent with a *contemporary* or *post-revolutionary* scientific world view. Moreover, as Warwick Fox has recently argued, ecology and certain interpretations of quantum theory provide "structurally similar" or

INTRINSIC VALUE, QUANTUM THEORY analogous representations of terrestrial organic nature and cosmic microphysical nature, respectively.[14] The essentially Humean axiological foundation of Leopold s land ethic is actually, therefore, an insidious theoretical legacy of classical mechanics in a larger fabric of ideas which has succeeded and indeed transcended mechanism. Though consistent with Leopold's prerevolutionary scientific naturalism, Hume's subjectivist axiology betrays the deeper intuitions of Leopold's essentially ecological and organic vision of reality.

[13] Kuhn, T. S. *The Structure of Scientific Revolutions.* Chicago: Chicago University Press, 1962.
[14] Levi-Strauss, C. *Tristes Tropiques.* New York: Atheneum, 1973.

A fully consistent contemporary environmental ethic thus requires a theory of the noninstrumental value of nature which is neither subjectivist nor objectivist. It requires a wholly new axiology which does not rest, either explicitly or implicitly, upon Descartes' obsolete bifurcation. Perhaps quantum theory may serve as a constructive paradigm for a value theory for an ecologically informed environmental ethic, as well as an occasion for the deconstruction of the classical Cartesian metaphysical paradigm and its Humean axiological interpretation. To put this thought in the interrogative, if quantum theory negates the object-subject, fact-value dichotomies, what more positively might it imply for the ontology of natural values?

Although I have so far represented the insight that quantum theory negates the object-subject, fact-value dichotomies to which modern value theory has dutifully conformed as original with Miller and unheralded until this moment, the idea has been broached in the previously published literature of environmental ethics. In 1979 Don Marrietta provocatively remarked that the "notion of brute, theory-free facts is an obsolete concept, no longer useful in science or the philosophy of science. Both factual and valuational observations of the world are constituted together by consciousness."[15] In 1980 Richard and Vai Routley, though making no allusion to quantum theory, attempted to articulate an elaborate theory of value in nature for environmental ethics based on philosophically fashionable cross-world semantics. The Routleys suggested that we "call the resulting account, which is neither objective, nor .. . subjective, *nonjective."* a term which, they admit, "is ugly, but memorable."[16] And in 1982 Holmes Rolston, III seemed to repudiate his earlier, less than wholehearted, alliance with subjectivism as the only scientifically respectable axiology and attempted "to defend all the objectivity I can for natural value."[17] In the course of his dazzling acrobatic effort to tease all the objectivity he could out of natural science for natural value, Rolston, more fully than Marrietta, discussed the implications of revolutionary science—quantum theory (and relativity as well)—for axiology. Rolston, in my judgment, put virtually all the pieces in place for a constructive value theory consistent with the new metaphysical foundations forced upon scientific naturalism by quantum theory, but he backed off at that point from doing so and turned instead to the biological sciences for the conceptual foundations for his enterprise. While Rolston's defense of objectivity for natural values, ably utilizing the conceptual resources of the sciences of the "middle-level" world, is a philosophical *tour de force* and is very rewarding to read, the bottom line appears to me to be that as long as the metaphysical dichotomy of classical modern normal science between subject and object remains an unchallenged background assumption, the axiological dichotomy of modern normal ethics between value and fact will remain intractable.

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[15] Losch, A. *The Economics of Location.* New Haven: Yale University Press, 1954.

[16] Malthus, T. R. *An Essay on the Principle of Population and a Summary View of the Principle of Population.* Harmondsworth, Middlesex: Penguin Books, 1970.

[17] Malthus, T. R. *Principles of Political Economy.* New York: Augustus Kelley, 1968.

Rolston's stated reason for turning aside from a more fully developed, vigorously prosecuted axiological program informed by the metaphysical implications of quantum theory is his surprising conclusion that *as a result* of relativity and quantum theory "[tjhe subjectivists have won all the chips," and that "[subjectivity has eaten up everything."'[18] The appropriate and usual conclusion is not this one—that the subjectivists have emerged victorious—it is rather that since the distinction between subject and object is untenable, then the sorting of experience into one or the other category is nonsensical. Subjectivists haven't won all the chips; they have simply been dealt out of the game. The factoring of experience into either exclusively subjective or objective components will be as otiose for future philosophers as the factoring of properties into the categories of essential and accidental has been for modem philosophers.

The fate of Descartes' apparently innocent and natural distinction between the *res cogitans* and *res extensa,* between subject and object, was sealed when Max Plank discovered that energy was quantized and that there was in nature a least quantum of energy. Plank's constant, *h:* At the meso- and macro-levels of phenomena, i.e., at the levels of billiard balls, planets, and stars to which the investigations of early modern physics were largely confined, the illusion of a wholly passive, non-participating observer could be maintained. As more and more sophisticated experimental techniques permitted investigation into smaller and smaller levels of phenomena, it became increasingly evident that to make an observation energy must be exchanged between the object of observation and the observer. That energy is, among other things, information and information energy physicalizes knowledge and consciousness. The *res cogitans* collapses, thus, into the *res extensa.* The physicalization of our knowledge of nature at the very least might have revived with renewed intensity Descartes' most recalcitrant unsolved metaphysical problem, the problem of the causal interaction between the *res extensa* and the *res cogitans.* As long as the informative exchange of energy is imagined to run only in a one-way direction from object to subject, discussion of the metaphysical assumptions of classical normal science, however problematical, might remain merely "philosophical" and positive normal science could pursue its programs and leave such problems to the metaphysicists.

However, if the object of observation is so small as to be of an order of magnitude (please remember here Einstein's equivalency of mass and energy) comparable to Plank's constant, then in interacting with the sensory

INTRINSIC VALUE, QUANTUM THEORY extensions, the experimental apparatus, of the observing subject, the object will *necessarily* be appreciably affected and the observing subject's knowledge of it thus necessarily rendered appreciably "uncertain." Now, because it is impermissable in positive normal science to posit the actual existence of things that cannot in principle be empirically observed, this unavoidable uncertainty has untoward ontological as well as epistemological implications.

[18] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

The most well-known illustration of the ontological implications of the uncertainty principle, on the side of the erstwhile independently existing object, concerns the properties of velocity and location of leptons (of which the electron is the most familiar species). *One or the other, but not both* properties may be known *definitely, or both* may be known *approximately.* Hence, an electron cannot therefore be said to *actually have* a definite position and a definite velocity! Its actual properties are, thus, to some degree chosen for it by the observer, since the observer may choose to know its position definitely or its velocity definitely or a little of both. Its reality is thus in some sense constituted by the observer. It is in this sense, primarily, that object and subject cannot be clearly dissociated in the new physics as they were in the old.

Rolston pointed out in his paper on environmental value theory published in 1982 that the tripartite distinction developed by Locke, a self-styled underlaborer to the great Newton, to categorize experienced properties had been modified and extended by Samuel Alexander in 1933 to value properties.[19] According to Locke, an object's primary or wholly objective properties are its mass, its location, velocity, and so on. Its so-called secondary qualities are its color, flavor, odor, and so on which depend for their realization upon the effect of the primary qualities on consciousness. Locke also introduced the concept of tertiary qualities by which he meant the causal efficacies of objects to affect other objects as fire melts wax. As this third species of Lockean quality lapsed into philosophical disuse, Alexander refitted it to mean an object's value properties. Thus, in Alexander's system, an object's state of motion was among its primary qualities, its flavor among its secondary qualities, and its beauty among its tertiary qualities.

The new physics, in effect, collapses the distinction between primary and secondary qualities. Location and velocity are potential properties of an electron variously actualized in various experimental situations as color and flavor are potential properties of an apple awaiting the eye and tongue (and all the neural apparatus that goes with eyes and tongues) of a conscious being for their realization. Wilson and his colleagues have convincingly argued that our receptivity to value is every bit as much a part of our adaptive vertebrate biology as the capacity to see and taste, and Rolston has convincingly argued that an object's value is every bit as much dependent on the object's properties as on the valuing subject's psychological constitution. Hence, Alexander's tertiary qualities, like classical normal science's primary qualities, also gravitate toward the model of the secondary qualities. *All* properties, in short, should be conceived as the classical secondary qualities were supposed to be, not dichotomous, existing actually either on the side of the object or on the side of the subject, but potential and dipolar requiring for their realization the interaction between erstwhile subjects and erstwhile objects. To borrow a metaphor from Plato, actual reality in its quantitative qualitative, and valuational manifestations is the issue, the progeny of a marriage, not of Heaven and Earth or form and matter, but of two complementary potentialities: receptive but

[19] Marx, K. *Capital.* 3 volumes, New York: International Publishers, 1967.

active consciousness and an exciting but excitable physical plenum. Mass and motion, color and flavor, good and evil, beauty and ugliness, all alike, are equally potentialities which are actualized in relationship to us or to other similarly constituted organisms.

Let me now return directly to the problem with which this discussion began, the most critical and most recalcitrant theoretical problem of environmental ethics, the problem of intrinsic value in nature. From the perspective of the emerging world view of contemporary revolutionary science, we may certainly not assert that value in nature is intrinsic, i.e., ontologically objective and independent of consciousness. However, that is to concede nothing of consequence, since *no* properties in nature are strictly intrinsic, i.e., ontologically objective and independent of consciousness. Borrowing now from the vocabulary of quantum theory, we may assert, rather, that values are virtual. Virtual value is an ontological category encompassing all values. Within its purview fall the entire spectrum of instrumental and inherent values as previously defined. In other words, nature affords a range of potential value; some things are potentially instrumentally valuable, i.e., valued for their utility, as either economic-material resources or psychospiritual resources; and some things (sometimes but not always the same things) are *inherently* valuable, i.e., are in themselves potentially valuable for their own sakes.

The difference between this account of inherent value and the account of axiological subjectivism is less practical than theoretical. On both accounts, practically speaking, nature may be valued for its own sake. According to axiological subjectivism, inherent value is an intentional affection originating in consciousness and projected onto objectively value-free nature, while according to my suggested quantum theoretical axiology, inherent value is a virtual value in nature actualized upon interaction with consciousness. The advantage of the quantum theoretical axiology lies in the fact that it renders an account of value which puts values on an ontological par with other properties, including culturally revered quantitative properties. In Rolston's words therefore, "there is just as little or as much reason to think that physics is objective as that value theory is."[20] Physics and ethics are, in other words, equally descriptive of nature.

III

The foregoing account of the implications of quantum theory for the ontology of values is intended to be as conservatively and uncontroversially stated as possible. It relies only upon the most salient, well-established, and central features of the new physics, Plank's constant and Heisenberg's uncertainty principle. It assumes no speculative interpretation of the new physics unless one wishes to insist that the essentially Aristotelian ontological notions of potentiality and actuality as applied in the Copen-

[20] Marx, K. *The Grundrisse.* London: Macmillan, 1971.

hagen Interpretation of quantum theory to natural properties constitute by themselves a speculative interpretation of quantum theory.[21]'

There is another approach to an axiology for environmental ethics which does assume a more speculative interpretation of quantum theory and does go beyond the standard, minimalistic Copenhagen Interpretation. This alternative approach to an axiology for environmental ethics, albeit more speculative and therefore more controversial, is more conceptually resonant with the representation of middle-sized living nature in ecology.

In his celebrated popular exposition of the metaphysical implications of the new physics, Fritjof Capra writes:

A careful analysis of the process of observation in atomic physics has shown that subatomic particles have no meaning as isolated entities, but can only be understood as interconnections between the preparation of an experiment and the subsequent measurement. Quantum theory thus reveals a basic oneness in the universe. It shows that we cannot decompose the world into independently existing smallest units. As we penetrate into matter nature does not show us any isolated "basic building blocks," but rather appears as a complicated web of relations between the various parts of the whole. These relations always include the observer in an essential way. The human observer constitutes the final link in the chain of observational processes, and the properties of any atomic object can only be understood in terms of the object's interaction with the observer. This means that the classical ideal of an objective description of nature is no longer valid. The Cartesian partition between the I and the world, between the observer and the observed, cannot be made when dealing with atomic matter. In atomic physics we can never speak about nature without, at the same time, speaking about ourselves.[22]

Capra here confirms much of what I have less eloquently and authoritatively set out respecting the implications of quantum theory for the Cartesian subject-object dichotomy in relation to which the Humean fact-value dichotomy is logically and historically ancillary. But he goes further. "A basic oneness in the universe" is also implied which "includefs] the observer [the <'] in an essential way." It is this'unity, holism, and integration of self and world suggested by quantujn theory to which Fox refers when he claims that ecology and the new physics each provide at different levels a similar structure of reality.

Compare Paul Shepard's equally celebrated, eloquent, and authoritative characterization of the metaphysical implications of ecology with Capra's just quoted characterization of the metaphysical implications of quantum theory:

Ecological thinking . . . requires a kind of vision across boundaries. The epidermis of the skin is ecologically like a pond surface or a forest soil, not a shell so much

[21] Cole, H. S. D., C. Freeman, M. Jahoda, and K. L. R. Pavitt. *Thinking about the Future: A Critique of the Limits to Growth,* London: Chatto and Windus, 1973.

[22] Cole, H. S. D., C. Freeman, M. Jahoda, and K. L. R. Pavitt. *Thinking about the Future: A Critique of the Limits to Growth,* London: Chatto and Windus, 1973.

as a delicate interpenetration. It reveals the self ennobled and extended rather than threatened . . . because the beauty and complexity of nature are continuous with ourselves. . . . The ... self [is] a center of organization, constantly drawing on and influencing the surroundings, whose skin and behavior are soft zones contacting the world instead of excluding it."

Shepard's comments on "ecological thinking" clearly convey the same general metaphysical concepts as Capra's on the thinking of atomic physics; nature is unified and we, erstwhile monadic individuals, are, actually, continuous with it.

The holistic quantum theoretical world view and the holistic ecological world view as portrayed by Capra and Shepard, respectively, both centrally involve a doctrine of real, internal relations. Therein lies their structural similarity, Capra declares that nature is "a complicated *web of relations* between the various parts of the whole." Shepard subsequently declares that "relationships of things are as real as the things."[23] Real relations are the glue which binds the *relata,* the things or entities, of organic and microphysical nature, respectively, into a united whole. Relations, moreover, are in both sciences, not only real, but ontologically prior to the *relata-.* at both the organic and microphysical levels of nature, things (organisms and subatomic particles respectively) are what they are because of their relations with other things - in quantum theory with other physical states and with the experimental process itself and in ecology with the physical, chemical, and climatic regimes of their niches. Shepard, driving home this point, applies the doctrine of prior, real, internal relations not only to the human soma, but, as in quantum theory, to the human psyche itself: "The mind of a primate," he suggests, "is an extension of natural complexity, ... the variety of plants and animals and the variety of nerve cells [are] organic extensions of each other."[24] Nature is a unity, a whole, and the self, the "1" (mentally as well as physically construed), is not only continuous with it, but constituted by it. Nature and I are conceptually as well as metaphysically integrated.

Paul Shepard, accordingly, endorses Alan Watts' memorable summary of ecology's implications for the relationship of self and world, viz., that "the world is your body."[25]" The conventional separation between self and world, Watts suggested, cannot withstand the reflective implications of contemporary science, both physical and ecological.

If these more speculatively analogous or structurally similar metaphysical interpretations of ecology and quantum theory are warranted, they bear directly on the central axiological problem of environmental ethics. Kenneth Goodpaster has forcefully argued that in modern normal ethics axiological egoism has not been thought to require justification.[26] The intrinsic value of oneself has for some reason been taken for granted; how to theoretically account for the intrinsic value of "others," rather, has

[23] Marx, K. *The Poverty of Philosophy.* New York: International Publishers, 1963.

[24] Oilman, B. *Alienation: Marx's Conception of Man in Capitalist Society.* London: Cambridge University Press, 1971.

[25] Engels, F. *The Dialectics of Nature.* New York: International Publishers, 1940.

[26] Orans, M. "Surplus," *Human Organization,* 25 (1966), pp. 24—32.

been regarded as problematic. I have pointed out, in a recent discussion, that Goodpaster was wrong to have included Hume, who regarded the other-oriented sentiments as equally primitive with self-love;[27] nevertheless, I am convinced that Goodpaster is correct to claim that in the two major modern traditions stemming from Kant and Bentham, but not Hume, egoism *is* regarded as primitive and moral considerability is reached by the process of generalization he (Goodpaster) describes. The Routleys have argued that "some values at least must be intrinsic, . .. some values are irreducible," on the grounds, apparently, that the existence of instrumentally valuable things (means) logically entails the existence of intrinsically valuable beings (ends).[28] The Routleys would not necessarily agree that in every system the ego is intrinsically valuable, but the claim that the ego is intrinsically valuable seems to have been treated very often as a privileged immediate datum of awareness, like the claim that I have a headache. Not a few modern and contemporary moral theorists have even equated self-interestedness with rationality, such that to act rationally is to act in ways that are self-serving.[29] The implication is that altruistic behavior is in some sense irrational or that, at the very least, its rationality is problematic and in need of justification.

Now if we assume, (a) with Shepard and Capra that nature is one and continuous with the self, and (b) with the bulk of modern moral theory that egoism is axiologically given and that self-interested behavior has a *prima facie* claim to be at the same time rational behavior, then the central axiological problem of environmental ethics, the problem of intrinsic value in nature may be directly and simply solved. If quantum theory and ecology both imply in structurally similar ways in both the physical and organic domains of nature the continuity of self and nature, and if the self is intrinsically valuable, then nature is intrinsically valuable. If it is rational for me to act in my own best interest, and I and nature are one, then it is rational for me to act in the best interests of nature.

Borrowing once more from the terminology of quantum theory, let us call this integral self-world value precept of an environmental ethic informed by the mutually reinforcing holistic metaphysical interpretations of quantum theory and ecology, the principle of axiological complementarity. It should now be clear how as one contemplates the destruction of biomes and the consequent loss of perhaps hundreds of thousands of species that the palpable disvalue of the prospect is at once personal, but transcends the conventional limits of proprietary personal concern. I personally feel a very real loss of value *to myself* as I reflect upon the progressive destruction of the natural environment. But this palpable diminution of value *to me* cannot be plausibly reduced to a deprivation of my monadic aesthetic, epistemic, or religious *experience* or to a threat to my monadic material well-being. The injury *to me* of environmental de-

[27] Pearson, H. "The Economy Has No Surplus: A Critique of a Theory of Development," in K. Polanyi, C. M. Arensberg, and H. W. Pearson. *Trade and Market in Early Empires.* Glencoe, Illinois: Free Press, 1957.

[28] Piaget, J. *Structuralism.* New York: Harper, 1970.

[29] Piaget, J. *The Principles of Genetic Epistemology.* London: Routledge and Kegan Paul, 1972.

struction transcends the secondary, indirect injury to the conventional, constricted ego encapsulated in this bag of skin and all the functioning organs it contains. Rather, the injury *to me* of environmental destruction is primarily and directly to my extended self, to the larger body and soul with which "I" (in the conventional narrow and constricted sense) am continuous. Aldo Leopold captured this ecological idea, as so many others, in his inimitable epigrammatic style: "One of the penalties of an ecological education is that one lives alone in a world of wounds."[30]

Frustrated by the anemic results of the reduction of environmental values to the desires, interests, or preferences of environmentalists, environmentalists have correctly insisted upon the intrinsic value of nonhuman natural entities and nature as a whole, but hopelessly supposed that such objective intrinsic value could be persuasively established independently of self. The principle of axiological complementarity posits an essential unity between self and world and establishes the problematic intrinsic value of nature in relation to the axiologically privileged intrinsic value of self. Since nature is the self fully extended and diffused, and the self, complementarily, is nature concentrated and focused in one of the intersections, the "knots," of the web of life or in the trajectory of one of the world lines in the four dimensional space-time continuum, nature is intrinsically valuable, to the extent that the self is intrinsically valuable.

[30] Ricardo, D. *Principles of Political Economy.* London: Cambridge University Press, 1951.

9. The Role of "i"

Gary Zukav

Source: G. Zukav, *The Dancing Wu Li Masters: an overview of the new physics.* London: Fontana, 1979, pp. 114—136.

In the days before Copernicus discovered that the earth revolves around the sun, the common belief was that the sun, along with the rest of the universe, revolved around the earth. The earth was the fixed center of everything. At a still earlier time in India, this geocentric position was given to people. That is, each person, psychologically speaking, was recognized as being the center of the universe. Although this sounds like an egotistical point of view, it was not since *every* person was recognized as a divine manifestation.

A beautiful Hindu painting shows Lord Krishna dancing in the moonlight on the bank of the Yamuna. He moves in the center of a circle of fair Vraja women. They are all in love with Krishna and they are dancing with him. Krishna is dancing with all of the souls of the world—man is dancing with himself. To dance with god, the creator of all things, is to dance with ourselves. This is a recurrent theme of eastern literature.

This is also the direction toward which the new physics, quantum mechanics and relativity, seems to point. From the revolutionary concepts of relativity and the logic-defying paradoxes of quantum mechanics an ancient paradigm is emerging. In vague form, we begin to glimpse a conceptual framework in which each of us shares a paternity in the creation of physical reality. Our old self-image as impotent bystander, one who sees but does not affect, is dissolving.

We are watching perhaps the most engaging act in our history. Amid the powerful purr of particle accelerators, the click of computer printouts, and dancing instrument gauges, the old "science" that has given us so much, including our sense of helplessness before the faceless forces of bigness, is undermining its own foundations.

With the awesome authority that we have given it, science is telling us that our faith has been misplaced. It appears that we have attempted the impossible, to disown our part in the universe. We have tried to do this by relinquishing our authority to the Scientists. To the Scientists we gave the responsibility of probing the mysteries of creation, change, and death. To us we gave the everyday routine of mindless living.

The Scientists readily assumed their task. We readily assumed ours, which was to play a role of impotence before the ever-increasing complexity of "modern science" and the ever-spreading specialization of modern technology.

Now, after three centuries, the Scientists have returned with their discoveries. They are as perplexed as we are (those of them who have given thought to what is happening).

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"We are not sure," they tell us, "but we have accumulated evidence which indicates that the key to understanding the universe is you."

This is not only different from the way that we have looked at the world for three hundred years, it is *opposite.* The distinction between the "in here" and the "out there" upon which science was founded, is becoming blurred. This is a puzzling state of affairs. Scientists, using the "in here—out there" distinction, have discovered that the "in here—out there" distinction may not exist! What is "out there" apparently depends, in a rigorous mathematical sense as well as a philosophical one, upon what we decide "in here".

The new physics tells us that an observer cannot observe without altering what he sees. Observer and observed are interrelated in a real and fundamental sense. The exact nature of this interrelation is not clear, but there is a growing body of evidence that the distinction between the "in here" and the "out there" is illusion.

The conceptual framework of quantum mechanics, supported by massive volumes of experimental data, forces contemporary physicists to express themselves in a manner that sounds, even to the uninitiated, like the language of mystics.

Access to the physical world is through experience. The common denominator of all experiences is the "I" that does the experiencing. In short, what we experience is not external reality, but our *interaction* with it. This is a fundamental assumption of "complementarity".

Complementarity is the concept developed by Niels Bohr to explain the wave-particle duality of light. No one has thought of a better one yet. Wavelike characteristics and particle-like characteristics, the theory goes, are mutually exclusive, or complementary aspects of light. Although one of them always excludes the other, *both* of them are necessary to understand light. One of them always excludes the other because light, or anything else, cannot be both wave-like and particle-like at the same time.(1)

How can mutually exclusive wave-like and particle-like behaviors both be properties of one and the same light? They are not properties of light. They are properties of our *interaction* with light. Depending upon our choice of experiment, we can cause light to manifest either particle-like properties or wave-like properties. If we choose to demonstrate the wave-like characteristics of light, we can perform the double-slit experiment which produces interference. If we choose to demonstrate the particle-like characteristics of light, we can perform an experiment which illustrates the photoelectric effect. We can cause light to manifest both wave-like properties and particle-like properties by performing Arthur Compton's famous experiment.

(1) Strictly speaking, Newton's laws do not disappear totally in the subatomic realm: they remain valid as operator equations. Also, in some experiments involving subatomic particles Newton's laws may

In 1923, Compton played the world's first game of billiards with subatomic particles, and, in the process, confirmed Einstein's seventeen-year-old photon theory of light. His experiment was not conceptually difficult. He simply fired x-rays, which everybody knows are waves, at electrons. To the surprise of most people, the x-rays bounced off the electrons as if they (the x-rays) were particles! For example, the x-rays which struck the electrons glancing blows were deflected only slightly from their paths. They did not lose much energy in the collision. However, those x-rays which collided more nearly head-on with electrons were deflected sharply. These x-rays lost a considerable amount of their kinetic energy (the energy of motion) in the collision.

Compton could tell just how much energy the deflected x-rays lost by measuring their frequencies before and after the collision, the frequencies of those x-rays involved in near head-on collisions were noticeably lower after the collision than before it. This meant that they had less energy after the collision than they had before the collision. Compton's x-rays were impacting with electrons exactly the way that billiard balls impact with other billiard balls.

Compton's discovery was intimately related to quantum theory. Compton could not have revealed the particle-like behavior of x-rays if Planck had not discovered his fundamental rule that higher frequency means higher energy. This rule permitted Compton to prove that the x-rays in his experiment lost energy in a particle-like collision (because their frequencies were lower after the collision than before the collision).

COMPTON SCATTERING SEEN AS A WAVE PHENOMENON

PROJECTILE PHOTONS'
COMPTON SCATTERING SEEN AS A PARTICLE PHENOMENON

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9

- SCATTERED
- PHOTONS

(LOWER ENERGY)

The conceptual paradox in Compton's experiment shows how deeply the wave-particle duality is embedded in quantum mechanics. Compton proved that electromagnetic radiations, like x-rays, have particle-like characteristics by measuring their frequencies! Of course, "particles" don't have frequencies. Only waves have frequencies. The phenomenon which Compton discovered is called Compton scattering, in honor of what happens to the x-rays.

In short, we can demonstrate that light is particle-like with the photoelectric effect, that it is wave-like with the double-slit experiment, and that it is both particle-like

be taken as good approximations in the description of what is happening.

and wave-like with Compton scattering. Both of these complementary aspects of light (wave and particle) are necessary to understand the nature of light. It is meaningless to ask which one of them, alone, is the way light really is. Light behaves like waves or like particles depending upon which experiment we perform.

The "we" that does the experimenting is the common link that connects light as particles and light as waves. The wave-like behavior that we observe in the double-slit experiment is not a property of light, it is a property of our interaction with light. Similarly, the particle-like characteristics that we observe in the photoelectric effect are not a property of light. They, too, are a property of our interaction with light. Wave-like behavior and particle-like behavior are properties of *interactions.*

Since particle-like behavior and wave-like behavior are the only properties that we ascribe to light, and since these properties now are recognized to belong (if complementarity is correct) not to light itself, but to our interaction with light, then it appears that light has no properties independent of us! To say that something has no properties is the same as saying that it does not exist. The next step in this logic is inescapable. Without us, light does not exist.

Transferring the properties that we usually ascribe to light to our interaction with light deprives light of an independent existence. Without us, or by implication, anything else to interact with, light does not exist. This remarkable conclusion is only half the story. The other half is that, in a similar manner, without light, or, by implication, anything else to interact with, we *do not exist*\ As Bohr himself put it:

... an independent reality in the ordinary physical sense can be ascribed neither to the phenomena nor to the agencies of observation.[1]

By "agencies of observation", he may have been referring to instruments, not people, but philosophically, complementarity leads to the conclusion that the world consists not of things, but of interactions. Properties belong to interactions, not to independently existing things, like "light". This is the way that Bohr solved the wave-particle duality of light. The philosophical implications of complementarity became even more pronounced with the discovery that the wave-particle duality is a characteristic of *everything.*

When we left off telling the story of quantum mechanics, the tale had progressed as follows: In 1900, Max Planck, studying blackbody radiation, discovered that energy is absorbed and emitted in chunks, which he called quanta. Until that lime, radiated energy, like light, was thought to be wavelike. This was because Thomas Young, in 1803, showed that light produces interference (the double-slit experiment), and only waves can do that.

Einstein, stimulated by Planck's discovery of quanta, used the photoelectric effect to illustrate his theory that not only are the processes of energy absorption and emission quantized, but that *energy itself* comes in packages of certain sizes. Thus physicists were confronted with two sets of experiments (repeatable experiences) each of which

[1] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

seemed to disprove the other other. This is the famous wave-particle duality which is fundamental to quantum mechanics.

While physicists were trying to explain how waves can be particles, a young French prince, Louis de Broglie, dropped a bomb which demolished what was left of the classical view. Not only are waves particles, he proposed, but particles are also waves!

De Broglie's idea (which was contained in his doctoral thesis) was that matter has waves which "correspond" to it. The idea was more than philosophical speculation, it was also mathematical speculation. Using the simple equations of Planck and Einstein, de Broglie formulated a simple equation of his own.(2) It determines the wave-length of the "matter waves" that "correspond" to matter. It says simply that the greater the momentum of a particle, the shorter is the length of its associated wave.

This explains why matter waves are not evident in the macroscopic world. De Broglie's equation tells us that the matter waves corresponding to even the smallest object that we can see are so incredibly small compared to the size of the object that their effect is negligible. However, when we get down to something as small as a subatomic particle, like an electron, the size of the electron itself is smaller than the length of its associated wave!

Under these circumstances, the wave-like behavior of matter should be clearly evident, and matter should behave differently than "matter" as we are used to thinking of it. This is exactly what happens.

Only two years after de Broglie presented this hypothesis, an experimenter named Clinton Davisson, working with his assistant, Lester Germer, at the Bell Telephone Laboratories, verified it experimentally. Both Davisson and de Broglie got Nobel Prizes, and physicists were left to explain not only how waves can be particles, but also how particles can be waves.

The famous Davisson-Germer experiment, which was done by accident, showed electrons reflecting off" a crystal surface in a manner that could be explained only if the electrons were waves. But, of course, electrons are particles.

Today, electron diffraction, an apparent contradiction in terms, is a common phenomenon. When a beam of electrons is sent through tiny openings, like the spaces between the atoms in a metal foil, which are as small or smaller than the wavelengths of the electrons (isn't this ridiculous— "particles" *don't have* wavelengths!), the beam diffracts exactly the way a beam of light diffracts. Although, classically speaking, it can't happen, here is a picture of it.(3)

It was disconcerting enough when light, which is made of waves, began to behave like particles, but when electrons, which *are* particles, began to behave like waves, the plot became unbearably thick.

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(2) Strictly speaking, Newton's laws do not disappear totally in the subatomic realm: they remain valid as operator equations. Also, in some experiments involving subatomic particles Newton's laws may be taken as good approximations in the description of what is happening.

(3) Strictly speaking, Newton's laws do not disappear totally in the subatomic realm: they remain

The unfolding of quantum mechanics was (and still is) a drama of high suspense. Werner Heisenberg wrote:

I remember discussions with Bohr [in 1927] which went through many hours till very late at night and ended almost in despair; and when at the end of the discussion I went alone for a walk in the neighboring park I repeated to myself again and again the question: Can nature' possibly be as absurd as it seemed to us in these atomic expenmen ts.

Subsequent experiments were to reveal that not only subatomic particles, but atoms and molecules as well have associated matter waves. The title of Donald Hughes' pioneer book, *Neutron Optics,* provides eloquent testimony of the merger between waves and particles to which Prince de Broglie's doctoral thesis gave birth. Theoretically, in fact, *everything* has a wavelength— baseballs, automobiles, and even people—although their wavelengths are so small that they are not noticeable.

De Broglie himself was not very helpful in explaining his theory. It predicted what the Davisson-Germer experiment proved: that matter, like electrons, has a wave-like aspect. His equation even foretold the wavelength of these waves. Nonetheless, no one knew what these waves actually were (no one does yet). De Broglie called them waves which "correspond" to matter, but he did not explain what "correspond" meant.

Is it possible for a physicist to predict something, calculate equations which describe it, and still not know what he is talking about?

Yes. As Bertrand Russell put it:

Mathematics may be defined as the subject in which we never know what we are talking about, nor whether what we are saying is true.[2]

This is why the physicists at Copenhagen decided to accept quantum mechanics as a complete theory even though it gives no explanation of what the world is "really like", and even though it predicts probabilities and not actual events. They accepted quantum mechanics as a complete theory because quantum mechanics correctly correlates experience. Quantum mechanics, and, according to the pragmatists, all science, is the study of correlations between experiences. De Broglie's equation correctly correlates experiences.

De Broglie merged the wave-particle paradox which came to light through the genius of Thomas Young (double-slit experiment) and Albert Einstein (photon theory). In other words, he connected the two most revolutionary phenomena of physics, the quantum nature of energy and the wave-particle duality.

De Broglie presented his matter-wave theory in 1924. During the next three years quantum mechanics crystallized into what it essentially is today. The world of Newtonian physics, simple mental pictures, and common sense disappeared. A new physics took form with an originality and force that left the mind reeling.

[2] Engels, F. *The Dialectics of Nature.* New York: International Publishers, 1940.

valid as operator equations. Also, in some experiments involving subatomic particles Newton's laws may be taken as good approximations in the description of what is happening.

After de Broglie's matter waves came the Schrodinger wave equation.

De Broglie's matter waves seemed to Erwin Schrodinger, the Viennese physicist, a much more natural way of looking at atomic phenomena than Bohr's planetary model of the atom. Bohr's model of hard, spherical electrons revolving around a nucleus at specific levels and emitting photons by jumping from one level to another explained the color spectrum of simple atoms, but it said nothing about why each shell contains only a certain number of electrons, no more and no less. It also did not explain *how* the electrons do their jumping (for example, what is happening to them between shells).[4]

Stimulated by de Broglie's discovery, Schrodinger hypothesized that electrons are not spherical objects, but *patterns of standing waves.*

Standing waves are familiar phenomena to anyone who has played with a clothesline. Suppose that we tie one end of a rope to a pole, and then pull it tight. On this rope there are no waves at all, either standing or traveling. Now suppose that we flick our wrist sharply downward and then upward. A hump appears in the rope and travels down the rope to the pole where it turns upside down and returns to our hand. This traveling hump (figure A) is a traveling wave. By sending a series of humps down the rope, we can set up the patterns of standing waves shown below, and more that are not shown.

The simplest of these is the pattern shown in figure B. This pattern is formed by the superposition of two traveling waves, a direct one and a reflected one traveling in the opposite direction. It is the pattern, not the rope, which does not move. The widest point in I he standing wave remains "stationary", and so do the points at the ends of the standing wave. These points are called nodes. There are two of them in the simplest standing pattern, one at our hand and one at the pole where the rope is attached. These stationary patterns, superpositions of traveling waves, are called standing waves. ,

No matter how long or short our rope is, there can be only a whole number of standing waves on it. That is, it can have a pattern of one standing wave, or a pattern of two standing waves, or a pattern of three, four, five, and so on, standing waves, but it can never have a pattern of one and one half standing waves, or a pattern of two and one fourth standing waves. The standing waves must divide the rope evenly into whole sections. Another way to say this is that we can increase or decrease the number of standing waves on a rope only by a whole number of them. This means that the only way that the number of standing waves on a rope can increase or decrease is *discon tinuously* \

Furthermore, standing waves on a rope cannot be just any size. They always will be restricted to those lengths which divide the rope evenly. The actual size of the waves depends upon how long the rope is, but no matter what length the rope, there will be only certain lengths which divide it evenly.

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[4] Strictly speaking, Newton's laws do not disappear totally in the subatomic realm: they remain valid as operator equations. Also, in some experiments involving subatomic particles Newton's laws may

All of this was old stuff in 1925. Plucking a guitar string establishes patterns of standing waves on it. Blowing air into an organ pipe creates standing wave patterns in it. What was new was Schrodinger's realization that *standing waves are "quantized" the same way that atomic phenomena are*\ In fact, Schrodinger proposed that electrons *are* standing waves.

In retrospect, this is not as fantastic as it first sounds. At the time, however, it was a stroke of genius. Picture an electron in orbit around a nucleus. Each time the electron completes a journey around the nucleus, it travels a certain distance. That distance is a certain length, like our rope was a certain length. Similarly, only a whole number of standing waves, never a fraction of one, can form in this length. (Length of what is an unanswered question).

Schrodinger proposed that each of these standing waves is an electron! In other words, he proposed that electrons are the segments of vibrations bounded by the nodes.

So far, we have talked about standing waves on a line, like a clothesline or a guitar string, but standing waves also occur in other mediums, like water. Suppose that we throw a rock into a round pool. Waves radiate from its point of entry. These waves are reflected, sometimes more than once, off different sides of the pool. When the reflected traveling waves interfere with each other they create a complex pattern of standing waves which is our old friend, interference.

Where the crest of one wave meets the trough of another wave, they cancel each other and the surface of the water along this line of interaction is calm. These calm areas are the nodes which separate the standing waves. In the double-slit experiment, the nodes are the dark bands in the pattern of alternating light and dark areas. The light bands are the crests of the standing waves.

Schrodinger chose the model of a small tub of water with its complex and intricate interference pattern to explain the nature of the atom. This model is, as he put it, an "analogue" of electron waves in an atom-sized basin.

The ingenious but nevertheless somewhat artificial assumptions of [Bohr's model of the atom]... are replaced by a much more natural assumption in de Broglie's wave phenomena. The wave phenomenon forms the real "body" of the atom. It replaces the individual puncti- form [pointlike] electrons, which in Bohr's model swarm around the nucleus.

Standing waves on clotheslines have two dimensions: length and width. Standing waves in mediums like water, or on the head of a conga drum, have three dimensions: length, width, and depth. Schrodinger analyzed the standing wave patterns of the simplest atom, hydrogen, which has only one electron. In hydrogen alone he calculated, using his new wave equation, a multitude of different possible shapes of standing waves. All of the standing waves on a rope are identical. This is not true of the standing waves in an atom. All of them are three-dimensional and all of them are different. Some of

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be taken as good approximations in the description of what is happening.

them look like concentric circles. Some of them look like butterflies, and others look like mandalas (next page).

Shortly before Schrodinger's discovery, another Austrian physicist, Wolfgang Pauli, discovered that no two electrons in an atom can be exactly alike. The presence of an electron with one particular set of properties ("quantum numbers") excludes the presence of another electron with exactly the same properties (quantum numbers) within the same atom. For this reason, Pauli's discovery became known as the Pauli exclusion principle. In terms of Schrodinger's standing wave theory, Pauli's exclusion principle means that once a particular wave pattern forms in an atom, it excludes all others of its kind.

Schrodinger's equation, modified by Pauli's discovery, shows that there are only two possible wave patterns in the lowest of Bohr's energy levels, or shells. Therefore, there can be only two electrons in it. There are eight different standing-wave patterns possible in the next energy level, therefore there can be only eight electrons in it, and so on.

These are exactly the numbers of electrons that Bohr's model assigns to these energy levels. In this respect, the two models are alike. In another important way, however, they are different.[5]

From *Modern College Physics,* Harvey White, N.Y., Van Nostrand, 1972.

Bohr's theory was entirely empirical. That is, he built it around the experimentally observed facts to explain them. In contrast, Schrodinger built his theory on de Broglie's matter-wave hypothesis. Not only does it yield mathematical values which have been verified experimentally, but it also provides a consistent explanation for them.

For example, there are only a certain number of electrons in each energy level, because there are only a certain number of standing wave patterns possible at each energy level. The energy level of an atom jumps only from certain specific values to other certain specific values, because standing-wave patterns of only certain dimensions can form with the atom, and none other.

Although Schrodinger was sure that electrons were standing waves, he was not sure what was waving.[6] He was convinced, nonetheless, that *something* was waving, and he called it *psi,* a Greek letter pronounced "sigh". (A "wave function" and a "psi function" are the same thing).

To use the Schrodinger wave equation, we feed it certain characteristics of the atom in question. It then gives us the evolution in time of standing-wave patterns which occur in the atom. If we prepare an atom in an initial state and let it propagate in isolation, that initial state, while propagating in isolation, evolves in time into different

[5] Strictly speaking, Newton's laws do not disappear totally in the subatomic realm: they remain valid as operator equations. Also, in some experiments involving subatomic particles Newton's laws may be taken as good approximations in the description of what is happening.

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standing-wave patterns. The order of these patterns is calculable. The Schrodinger wave equation is the mathematical device which physicists use to calculate the order of these patterns. Said another way, the development of standing wave patterns in an atom is deterministic. Given initial conditions, one pattern always follows another in accordance with the Schrodinger wave equation.!

The Schrodinger wave equation also provides a self-consistent explanation of the size of the hydrogen atom. According to it, the wave pattern of a system with one electron and one proton, which is what we call a hydrogen atom, in its lowest energy state, has an appreciable magnitude only within a sphere which is just the diameter of the smallest Bohr orbit. In other words, such a wave pattern turns out to be the same size as the ground state of a hydrogen atom!

Although Schrodinger's wave mechanics became a pillar of today's quantum mechanics, the useful aspects of Bohr's model of subatomic phenomena still are used when the wave theory does not yield appropriate results. In such cases, physicists simply stop thinking in terms of standing waves and start thinking again in terms of particles. No one can say that they are not adaptable in this matter (wave).

Schrodinger was convinced that his equations described real things, and not mathematical abstractions. He pictured electrons as actually being spread out over their wave patterns in the form of a tenuous cloud. If the picture is limited to the one-electron hydrogen atom, whose standing waves have only three dimensions (length, width, and depth), this is possible to imagine. However, the standing waves in an atom with two electrons exist in six mathematical dimensions; the standing waves in an atom with four electrons exist in twelve dimensions, etc. To visualize this is quite an exercise.

At this point Max Bom, a German physicist, put the final touch to the new wave interpretation of subatomic phenomena. According to him, it is not necessary or possible to visualize these waves because they are *not* real things, they are *probability waves.*

.. . the whole course of events is determined by the laws of probability; to a state in space there corresponds a definite probability, which is given by the de Broglie wave associated with the state.[3]

To obtain the probability of a given state we square (multiply by itself) the amplitude of the matter wave associated with the state.

The question of whether de Broglie's equations and Schrodinger's equations represent real things or abstractions was clear to Born. It did not make sense to him to try to think of a real thing that exists in more than three dimensions.

We have two possibilities. Either we use waves in spaces of more than three dimensions ... or we remain in three-dimensional space, but give up the simple picture of the wave amplitude as an ordinary physical magnitude, and replace it by a purely abstract mathematical concept... into which we cannot enter.[4]

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[3] Glacken, C. *Traces on the Rhodian Shore.* Berkeley: University of California Press, 1967.

[4] Godelier, M. *Rationality and Irrationality in Economics.* London: New Left Books, 1972.

This is exactly what he did. "Physics," he wrote, is in the nature of the case indeterminate, and therefore the affair of statistics.[5]

This is the same idea (probability waves) that Bohr, Kramers, and Slater had thought of earlier. This time, however, using the mathematics of de Broglie and Schrodinger, the numbers came out right.

Born's contribution to Schrodinger's theory is what enables quantum mechanics to predict probabilities. Since the probability of a state is found by squaring the amplitude of the matter wave associated with it, and. given initial conditions, the Schrodinger equation predicts the evolution of these wave patterns, the two taken together give a determinable evolution of probabilities. Given any initial state, physicists can predict the probability that an observed system will be observed to be in any other given state at any particular time. Whether or not the observed system is observed to be in that state, however, even if that state is the most probable state for that time, is a matter of chance. In other words, the "probability" of quantum mechanics is the probability of observing an observed system in a given state at a given time if it was prepared in a given initial state.(7)

Thus it was that the wave aspect of quantum mechanics developed Just as waves have particle-like characteristics (Planck, Einstein), particles also have wave-like characteristics (de Broglie). In fact, particles can be understood in terms of standing waves (Schrodinger). Given initial conditions, a precise evolution of standing-wave patterns can be calculated via the Schrodinger wave equation. Squaring the amplitude of a matter wave (wave function) gives the probability of the state that corresponds to that wave (Born). Therefore, a sequence of probabilities can be calculated from initial conditions by using the Schrodinger wave equation and Born's simple formula.

We have come a long way from Galileo's experiments with falling bodies. Each step along the path has taken us to a higher level of abstraction: first to the creation of things that no one has ever seen (like electrons), and then to the abandonment of all attempts even to picture our abstractions.

The problem is, however, that human nature being what it is, we do not stop trying to picture these abstractions. We keep asking "What are these abstractions of?", and then we try to visualize whatever that is.

Earlier we dismissed Bohr's planetary model of the atom with the promise that we later would see "how physicists currently think of an atom". Well, the time has come, but the task is a thorny one. We gave up our old picture of the atom so easily because we assumed that it would be replaced by one more meaningful, but equally as lucid. Now it develops that our replacement picture is not a picture at all, but an unvisualizable abstraction. This is uncomfortable because it reminds us that atoms

[5] Harvey, D. *Social Justice and the City.* Baltimore: Johns Hopkins Press, 1973.

(7) Strictly speaking, Newton's laws do not disappear totally in the subatomic realm: they remain valid as operator equations. Also, in some experiments involving subatomic particles Newton's laws may be taken as good approximations in the description of what is happening.

were never "real" things anyway. Atoms are hypothetical entities constructed to make experimental observations intelligible. No one, not one person, has ever seen an atom. Yet we are so used to the *idea* that an atom is a thing that we forget that it is an idea. Now we are told that not only is an atom an idea, it is an idea that we cannot even picture.

Nonetheless, when physicists refer to mathematical entities in English (or German or Danish), the words that they use are bound to create images for laymen who hear them, but who are not familiar with the mathematics to which they refer. Therefore, given this lengthy explanation of why it cannot be done, we come now to how physicists today picture an atom.

An atom consists of a nucleus and electrons. The nucleus is located at the center of the atom. It occupies only a small part of the atom's volume, but almost all of its mass. This is the same nucleus as in the planetary model. As in the planetary model, electrons move in the general area of the nucleus. In this model, however, the electrons may be anywhere within an "electron cloud". The electron cloud is made of various standing waves which surround the nucleus. These standing waves are not material. They are patterns of potential. The shape of the various standing waves which comprise the electron cloud tells physicists the probability of finding the point electron at any given place in the cloud.

In short, physicists still think of an atom as a nucleus around which move electrons, but the picture is not so simple as that of a tiny solar system. The electron cloud is a mathematical concept which physicists have constructed to correlate their experiences. Electron clouds may or may not exist within an atom. No one really knows. However, we do know that the concept of an electron cloud yields the probabilities of finding the electron at various places around the nucleus of an atom, and that these probabilities have been determined empirically to be accurate.

In this sense, electron clouds are like wave functions. A wave function also is a mathematical concept which physicists have constructed to correlate their experiences. Wave functions may or may not "actually exist". (This type of statement assumes a qualitative difference between thought and matter, which may not be a good assumption). However, the concept of a wave function undeniably yields the probabilities of observing a system to be in a given state at a given time if it was prepared in a given way.

Like wave functions, electron clouds generally cannot be visualized. An electron cloud containing only one electron (like the electron cloud of a hydrogen atom) exists in three dimensions. All other electron clouds, however, contain more than one electron and therefore exist in more than three dimensions. The nucleus of the simple carbon atom, for example, with its six electrons, is surrounded by an electron cloud with eighteen dimensions. Uranium, with ninety-two electrons, has an electron cloud of 276 dimensions. (Similarly, a wave function contains three dimensions for each possibility that it represents). The situation, in terms of mental pictures, is clearly unclear.

This ambiguity results from attempting to depict with limited concepts (language) situations which are not bound by the same limitations. It also masks the fact that *we do not know* what actually is going on in the invisible subatomic realm. The models that we use are "free creations of the human mind", to use Einstein's words (page 35), that satisfy our innate need to correlate experience rationally. They are guesses about what "really" goes on inside the unopenable watch. It is extremely misleading to think that they actually describe anything.

In fact, a young German physicist, Werner Heisenberg, decided that we *never* can know what actually goes on in the invisible subatomic realm, and that, therefore, we should "abandon all attempts to construct perceptual models of atomic processes."[6] All that we legitimately can work with, according to this theory, is what we observe directly. All we know is what we have at the beginning of an experiment, and what we have at the end of it. Any explanation of what actually happens between these two states—which are the observables (page 94)—is speculation.

Therefore, about the same time (1925), but independently of de Broglie and Schrodinger, the twenty-five-year-old Heisenberg set about developing a means of organizing experimental data into tabular form. He was fortunate in that sixty-six years earlier an Irish mathematician named W. R. Hamilton had developed a method of organizing data into arrays, or mathematical tables, called matrices. At that time, Hamilton's matrices were considered the fringe of pure mathematics. Who could have guessed that one day they would fit, like a precut piece, into the structure of a revolutionary physics?

To use Heisenberg's tables, we simply read from them, or calculate from them, what probabilities are associated with what initial conditions. Using this method, which Heisenberg called matrix mechanics, we deal only with physical observables, which means those things that we know at the beginning of an experiment, and those things that we know about it at the end. We make no speculation about what happens in between.

After twenty-five years of struggling for a theory to replace Newtonian physics, physicists suddenly found themselves with two different theories, each one a unique way of approaching the same thing: Schrodinger's wave mechanics, based on de Broglie's matter waves, and Heisenberg's matrix mechanics, based on the unanalyzability of subatomic phenomena.

Within a year after Heisenberg developed his matrix mechanics, Schrodinger discovered that it was mathematically equivalent to his own wave mechanics. Since both of these theories were valuable tools for subatomic research, both of them were incorporated into the new branch of physics which became known as quantum mechanics.

Much later, Heisenberg applied matrix mathematics to the particle collision experiments of high-energy particle physics. Because such collisions always result in a

[6] Hays, S. *The Conservation Movement and the Gospel of Efficiency.* Cambridge, Massachusetts: Atheneum, 1959.

scattering of particles, it was called the Scattering Matrix, which was shortened to the S Matrix. Today, physicists have two ways to calculate the transition probabilities between what they observe at the beginning of a quantum mechanical experiment and what they observe at the end of it.

The first method is the Schrodinger wave equation, and the second method is the S Matrix. The Schrodinger wave equation describes a temporal development of possibilities, one of which suddenly actualizes when we make a measurement in the course of a quantum mechanical experiment. The S Matrix gives directly the transition probabilities between the observables without giving any indication of a development in time, or the lack of it, or anything else. Both of them work.[8]

As important as was Heisenberg's introduction of matrix mathematics into the new physics, his next discovery shook the very foundations of "the exact sciences". He proved that, at the subatomic level, there is no such thing as "the exact sciences".

Heisenberg's remarkable discovery was that there are limits beyond which we cannot measure accurately, at the same time, the processes of nature. These limits are not imposed by the clumsy nature of our measuring devices or the extremely small size of the entities that we attempt to measure, but rather by the very way that nature presents itself to us. In other words, there exists an ambiguity barrier beyond which we never can pass without venturing into the realm of uncertainty. For this reason, Heisenberg's discovery became known as the "uncertainty principle".

The uncertainty principle reveals that as we penetrate deeper and deeper into the subatomic realm, we reach a certain point at which one part or another of our picture of nature becomes blurred, and there is no way to reclarify that part without blurring another part of the picture! It is as though we are adjusting a moving picture that is slightly out of focus. As we make the final adjustments, we are astonished to discover that when the right side of the picture clears, the left side of the picture becomes completely unfocused and nothing in it is recognizable. When we try to focus the left side of the picture, the right side starts to blur and soon the situation is reversed. If we try to strike a balance between these two extremes, both sides of the picture return to a recognizable condition, but in no way can we remove the original fuzziness from them.

The right side of the picture, in the original formulation of the uncertainty principle, corresponds to the position in space of a moving particle. The left side of the picture corresponds to its momentum. According to the uncertainty principle, we cannot measure accurately, at the same time, both the position *and* the momentum of a moving particle. The more precisely we determine one of these properties, the less we know about the other. If we precisely determine the position of the particle, then, strange as it sounds, there is *nothing* that we can know about its momentum. If we precisely determine the momentum of the particle, there is no way to determine its position.

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[8] Strictly speaking, Newton's laws do not disappear totally in the subatomic realm: they remain valid as operator equations. Also, in some experiments involving subatomic particles Newton's laws may

To illustrate this strange statement, Heisenberg proposed that we imagine a super microscope of extraordinarily high resolving power—powerful enough, in fact, to be able to see an electron moving around in its orbit. Since electrons are so small, we cannot use ordinary light in our microscope because the wavelength of ordinary light is much too long to "see" electrons, in the same way that long sea waves barely are influenced by a thin pole sticking out of the water.

If we hold a strand of hair between a bright light and the wall, the hair casts no distinct shadow. It is so thin compared to the wavelengths of the light that the light waves bend around it instead of being obstructed by it. To see something, we have to obstruct the light waves we are looking with. In other words, to see something, we have to illuminate it with wavelengths smaller than it is. For this reason, Heisenberg substituted gamma rays for visible light in his imaginary microscope. Gamma rays have the shortest wavelength known, which is just what we need for seeing an electron. An electron is large enough, compared to the tiny wavelength of gamma rays, to obstruct some of them: to make a shadow on the wall, as it were. This enables us to locate the electron.

The only problem, and this is where quantum physics enters the picture, is that, according to Planck's discovery, gamma rays, which have a much shorter wavelength than visible light, also contain much more energy than visible light. When a gamma ray strikes the imaginary electron, it illuminates the electron, but unfortunately, it also knocks it out of its orbit and changes its direction and speed (its momentum) in an unpredictable and uncontrollable way. (We cannot calculate precisely the angle of rebound between a particle, like the electron, and a wave, like the gamma ray). In short, if we use light with a wavelength short enough to locate the electron, we cause an undeterminable change in the electron's momentum.

The only alternative is to use a less energetic light. Less energetic light, however, causes our original problem: Light with an energy low enough not to disturb the momentum of the electron will have a wavelength so long that it will not be able to show us where the electron is! There is no way that we can know simultaneously the position *and* the momentum of a moving particle. All attempts to observe the electron alter the electron.

This is the primary significance of the uncertainty principle. At the subatomic level, *we cannot observe something without changing it.* There is no such thing as the independent observer who can stand on the sidelines watching nature run its course without influencing it.

In one sense, this is not such a surprising statement. A good way to make a stranger turn and look at you is to stare intently at his back. All of us know this, but we often discredit what we know when it contradicts what we have been taught is possible. Classical physics is based on the assumption that our reality, independently of us, runs its course in space and time according to strict causal law. Not only can w§

be taken as good approximations in the description of what is happening.

observe it, unnoticed, as it unfolds, we can predict its future by applying causal laws to initial conditions. In this sense, Heisenberg's uncertainty principle is a *very* surprising statement.

We cannot apply Newton's laws of motion to an individual particle that does not have an initial location and momentum, which is exactly what the uncertainty principle shows us that we cannot determine. In other words, it is impossible, even in principle, ever to know enough about a particle in the subatomic realm to apply Newton's laws of motion which, for three centuries, were the basis of physics. *Newton's laws do not apply to the subatomic realm*[(9)] (Newton's *concepts* do not even apply in the subatomic realm). Given a beam of electrons, quantum theory can predict the probable distribution of the electrons over a given space at a given time, but quantum theory cannot predict, even in principle, the course of a single electron. The whole idea of a causal universe is undermined by the uncertainty principle.

In a related context, Niels Bohr wrote that quantum mechanics, by its essence, entails:

... the necessity of a final renunciation of the classical ideal of causality and a radical revision of our attitude toward the problem of physical reality.[7]

Yet there is another startling implication in the uncertainty principle. The concepts of position and momentum are intimately bound up with our idea of a thing called a moving particle. If, as it turns out, we cannot determine the position and momentum of a moving particle, as we always have assumed that we could, then we are forced to admit that this thing that we have been calling a moving particle, whatever it is, is *not* the "moving particle" we thought it was, because "moving particles" always have both position and momentum.

As Max Born put it:

... if we can never actually determine more than one of the two properties (possession of a definite position and of a definite momentum), and if when one is determined we can make no assertion at all about the other property for the same moment, so far as our experiment goes, then we are not justified in concluding that the "thing" under examination can actually be described as a particle in the usual sense of the term.'[0]

Whatever it is that we are observing *can* have a determinable momentum, and it *can* have a determinable position, but of these two properties, *we must choose,* for any given moment, which one we wish to bring into focus. This means, in reference to "moving particles" anyway, that we can never see them the way they "really are", but only the way we choose to see them!

As Heisenberg wrote:

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[7] Hudson, W. D. *Modern Moral Philosophy.* London: Macmillan, 1970.

(9) Strictly speaking, Newton's laws do not disappear totally in the subatomic realm: they remain valid as operator equations. Also, in some experiments involving subatomic particles Newton's laws may be taken as good approximations in the description of what is happening.

What we observe is not nature itself, but nature exposed to our method of questioning."

The uncertainty principle rigorously brings us to the realization that there is no "My Way" which is separate from the world around us. It brings into question the very existence of an "objective" reality, as does complementarity and the concept of particles as correlations.

The tables have been turned. "The exact sciences" no longer study an objective reality that runs its course regardless of our interest in it or not, leaving us to fare as best we can while it goes its predetermined way. Science, at the level of subatomic events, is no longer exact, the distinction between objective and subjective has vanished, and the portals through which the universe manifests itself are, as we once knew a long time ago, those impotent, passive witnesses to its unfolding, the 'T's, of which we, insignificant we, are examples. The Cogs in the Machine have become the Creators of the Universe.

If the new physics has led us anywhere, it is back to ourselves, which, of course, is the only place that we could go.

10. The Varieties of Intrinsic Value*

J. O'Neill

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To hold an environmental ethic is to hold that non-human beings and states of affairs in the natural world have intrinsic value. This seemingly straightforward claim has been the focus of much recent philosophical discussion of environmental issues. Its clarity is, however, illusory. The term 'intrinsic value' has a variety of senses and many arguments on environmental ethics suffer from a conflation of these different senses: specimen hunters for the fallacy of equivocation will find rich pickings in the area. This paper is largely the work of the underlabourer. I distinguish different senses of the concept of intrinsic value, and, relatedly, of the claim that non-human beings in the natural world have intrinsic value; I exhibit the logical relations between these claims and examine the distinct motivations for holding them. The paper is not however merely an exercise in conceptual underlabouring. It also defends one substantive thesis: that while it is the case that natural entities have intrinsic value in the strongest sense of the term, i.e., in the sense of value that exists independently of human valuations, such value does not as such entail any obligations on the part of human beings. The defender of nature's intrinsic value still needs to show that such value contributes to the well-being of human agents.

I

The term 'intrinsic value' is used in at least three different basic senses: (1) **Intrinsic value!** Intrinsic value is used as a synonym for non-instrumental value. An object has instrumental value insofar as it is a means to some other end. An object has intrinsic value if it is an end in itself. Intrinsic goods are goods that other goods are good for the sake of. It is a well rehearsed point that, under pain of an infinite regress, not everything can have only instrumental value. There must be some objects that have intrinsic value. The defender of an environmental ethic argues that among the entities that have such non-instrumental value are non-human beings and states. It is this claim that Naess makes in defending deep ecology:

The well-being of non-human life on Earth has value in itself. This value is independent of any instrumental usefulness for limited human purposes.[1]

[1] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

(2) **Intrinsic value.** Intrinsic value is used to refer to the value an object has solely in virtue of its 'intrinsic properties'. The concept is thus employed by G. E. Moore:

To say a kind of value is 'intrinsic' means merely that the question whether a thing possesses it, and in what degree it possesses it, depends solely on the intrinsic nature of the thing in question.[2]

This account is in need of some further clarification concerning what is meant by the 'intrinsic nature' of an object or its 'intrinsic properties'. I discuss this further below. However, as a first approximation, I will assume the intrinsic properties of an object to be its non-relational properties, and leave that concept for the moment unanalysed. To hold that non-human beings have intrinsic value given this use is to hold that the value they have depends solely on their non-relational properties.

(3) Intrinsic value, Intrinsic value is used as a synonym for 'objective value' i.e., value that an object possesses independently of the valuations of valuers. As I show below, this sense itself has sub-varieties, depending on the interpretation that is put on the term 'independently'. Here I simply note that if intrinsic value is used in this sense, to claim that non-human beings have intrinsic value is not to make an ethical but a meta-ethical claim. It is to deny the subjectivist view that the source of all value lies in valuers—in their attitudes, preferences and so on.

Which sense of 'intrinsic value' is the proponent of an environmental ethic employing? To hold an environmental ethic is to hold that non-human beings have intrinsic value in the first sense: it is to hold that non-human beings are not simply of value as a means to human ends. However, it might be that to hold a defensible ethical position about the environment, one needs to be committed to the view that they also have intrinsic value in the second or third senses. Whether this is the case is the central concern of this paper.

II

In much of the literature on environmental ethics the different senses of 'intrinsic value' are used interchangeably. In particular senses 1 and 3 are often conflated. Typical is the following passage from Worster's *Nature's Economy. ,*

One of the most important ethical issues raised anywhere in the past few decades has been whether nature has an order, a pattern, that we humans are bound to understand and respect and preserve. It is the essential question prompting the environmentalist movement in many countries. Generally, those who have answered 'yes' to the question have also believed that such an order has an intrinsic value, which is to say that not all value comes from humans, that value can exist independently of us: it is not something we bestow. On the other hand, those who have answered 'no' have tended to be in an instrumentalist camp. They look on nature as a storehouse of 'resources' to be

[2] Cole, H. S. D., C. Freeman, M. Jahoda, and K. L. R. Pavitt. *Thinking about the Future: A Critique of the Limits to Growth,* London: Chatto and Windus, 1973.

organised and used by people, as having no other value than the value some human gives it.

In describing the 'yes' camp Worster characterises the term in sense 3. However, in characterising the 'no's' he presupposes an understanding of the term in both senses 1 and 3. The passage assumes that to deny that natural patterns have value independently of the evaluations of humans is to grant them only instrumental value: a subjectivist meta-ethics entails that nonhumans can have only instrumental value. This assumption is widespread.[3] It also underlies the claims of some critics of an environmental ethic who reject it on meta-ethical grounds thus: To claim that items in the non-human world have intrinsic values commits one to an objectivist view of values; an objectivist view of values is indefensible; hence the non-human world contains nothing of intrinsic value.[4]

The assumption that a subjectivist meta-ethics commits one to the view that nonhumans have only instrumental value is false. Its apparent plausibility is founded on a confusion of claims about the source of values with claims about their object.[5] The subjectivist claims that the only sources of value are the evaluative attitudes of humans. But this does not entail that the only ultimate objects of value are the states of human beings. Likewise, to be an objectivist about the source of value, i.e., to claim that whether or not something has value does not depend on the attitudes of valuers, is compatible with a thoroughly anthropocentric view of the object of value—that the only things which do in fact have value are humans and their states, such that a world without humans would have no value whatsoever.

To enlarge, consider the emotivist as a standard example of a subjectivist. Evaluative utterances merely evince the speaker's attitudes with the purpose of changing the attitudes of the hearer. They state no facts. Within the emotivist tradition Stevenson provides an admirably clear account of intrinsic value. Intrinsic value is defined as non-instrumental value: '"intrinsically good" is roughly synonymous with "good for its own sake, as an end, as distinct from good as a means to something else" '.[6] Stevenson then offers the following account of what it is to say something has intrinsic value:

'X is intrinsically *good* asserts that the speaker approves of X intrinsically, and acts emotively to make the hearer or hearers likewise approve of X intrinsically.[7]

There are no reasons why the emotivist should not fill the X place by entities and states of the non-human world. There is nothing' in the emo- tivist's meta-ethical position that precludes her holding basic attitudes that are biocentric. Thus let the H! operator express hurrah attitudes and B! express boo attitudes. Her ultimate values might for example include the following:

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[3] Firey, W. *Man, Mind and the Land.* Glencoe, Illionis: Free Press, 1960.

[4] Glacken, C. *Traces on the Rhodian Shore.* Berkeley: University of California Press, 1967.

[5] Godelier, M. *Rationality and Irrationality in Economics.* London: New Left Books, 1972.

[6] Harvey, D. *Social Justice and the City.* Baltimore: Johns Hopkins Press, 1973.

[7] Hays, S. *The Conservation Movement and the Gospel of Efficiency.* Cambridge, Massachusetts: Atheneum, 1959.

H* (The existence of natural ecosystems)

B! (The destruction of natural ecosystems by humans).

There is no reason why the emotivist must assume that either egoism or humanism is true, that is that she must assign non-instrumental value only to her own or other humans' states.[8]

It might be objected, however, that there are other difficulties in holding an emotivist meta-ethics and an environmental ethic. In making humans the source of all value, the emotivist is committed to the view that a world without humans contains nothing of value. Hence, while nothing logically precludes the emotivists assigning non-instrumental value to objects in a world which contains humans, it undermines some of the considerations that have led to the belief in the need to assign such value. For example, the standard last man arguments" in defence of an environmental ethic fail: the last man whose last act is to destroy a rain forest could on a subjectivist account of value do no wrong, since a world without humans is without value.

This objection fails for just the same reason as did the original assumption that subjectivism entails non-humans have only instrumental value. It confuses the source and object of value. There is nothing in emotivism that forces the emotivist to confine the objects of her attitudes to those that exist at the time at which she expresses them. Her moral utterances might evince attitudes towards events and states of affairs that might happen after her death, for example,

H! (My great grand-children live in a world without poverty). Likewise her basic moral attitudes can range over periods in which humans no longer exist, for example,

H! (Rain forests exist after the extinction of the human species). Like the rest of us she can deplore the vandalism of the last man. Her moral utterances might evince attitudes not only to other times but also to other possible worlds. Nothing in her meta-ethics stops her asserting with Leibniz that this world is the best of aU possible worlds, or, in her despair at the destructiveness of humans, expressing the attitude I hat it would have been better had humans never existed

H! (the possible world in which humans never came into existence). That humans are the source of value is not incompatible with their assigning value to a world in which they do not exist. To conclude, nothing in the emotivist's meta-ethics dictates the content of her attitudes.

Finally it needs to be stressed that while subjectivism does not rule out non-humans having non-instrumental value, objectivism does not rule it in. To claim that moral utterances have a truth value is not to specify which utterances are true. The objectivist can hold that the moral facts are such that only the states of humans possess value in themselves: everything else has only instrumental value. Ross, for example, held that only states of conscious beings have intrinsic value;

[8] Humboldt, A. von. *Essai Politique sur le Royaume de la Nouvelle Espagne.* Paris: F. Schoell, 1811.

Contemplate any imaginary universe from which you suppose mind entirely absent, and you will fail to find anything in it you can call good in itself.[9]

Moore allowed that without humans the world might have some, but only very insignificant, value.[10] It does not follow from the claim that values do not have their source in humans that they do not have humans as their sole ultimate object.

The upshot of this discussion is a very traditional one, that meta-ethical commitments are logically independent of ethical ones. However, in the realm of environmental ethics it is one that needs to be re-affirmed. No meta- ethical position is required by an environmental ethic in its basic sense, i.e., an ethic which holds that non-human entities should not be treated merely as a means to the satisfaction of human wants. In particular, one can hold such an ethic and deny objectivism. However, this is not to say that there might not be other reasons for holding an objectivist account of ethics and that some of these reasons might appear particularly pertinent when considering evaluative statements about non-humans. It has not been my purpose in this section of the paper to defend ethical subjectivism and in section IV I defend a version of objectivism about environmental values. First, however, I discuss briefly intrinsic value in its Moorean sense, intrinsic value$_2$—for this sense of the term is again often confused with intrinsic value].

III

In its second sense intrinsic value refers to the value an object has solely in virtue of its 'intrinsic properties': it is value that 'depends solely on the intrinsic nature of the thing in question'.[11] 1 suggested earlier that the intrinsic properties of an object are its non-relational properties. What is meant by 'non-relational properties'? There are two interpretations that might be placed on the phrase:

(i) The non-relational properties of an object are those that persist regardless of the existence or non-existence of other objects (weak inteipretation).

(ii) The non-relational properties of an object are those that can be characterised without reference to other objects (strong interpretation).[12]

The distinction between the two senses will not concern me further here, although a similar distinction will take on greater significance in the following section.

If any property is irreducibly relational then rarity is. The rarity of an object depends on the non-existence of other objects, and the property cannot be characterised without reference to other objects. In practical concern about the environment a spe-

[9] Kapp, K. W. *The Social Costs of Private Enterprise.* Cambridge, Massachusetts: Harvard University Press, 1950.

[10] Keynes, J. M. *The General Theory of Employment, Interest and Money.* New York: Harcourt Brace, 1936.

[11] Keynes, J. M. *Essays in Biography.* New York' Meridian Books, 1951.

[12] Kneese, A. V., R. U. Ayres, and R. C. D'Arge. *Economics and the Environment.* Washington, D.C.: Resources for the Future. 1970.

cial status is ascribed to rare entities. The preservation of endangered species of flora and fauna and of unusual habitats and ecological systems is a major practical environmental problem. Rarity appears to confer a special value to an object. This value is related to that of another irreducibly relational property of environmental significance, i.e., diversity. However, it has been argued that such value can have no place in an environmental ethic which places intrinsic value on natural items. The argument runs something as follows:

1. To hold an environmental ethic is to hold that natural objects have intrinsic value.

2. The values objects have in virtue of their relational properties, e.g., their rarity, cannot be intrinsic values.

Hence:

3. The value objects have in virtue of their relational properties have no place in an environmental ethic.[13]

This argument commits a fallacy of equivocation. The term 'intrinsic value' is being used in its Moorean sense, intrinsic value$_2$ in the second premise, but as synonym for non-instrumental value, intrinsic value$_1$ in the first. The senses are distinct. Thus, while it may be true that if an object has only instrumental value it cannot have intrinsic value in the Moorean sense, it is false that an object of non-instrumental value is necessarily also of intrinsic value in the Moorean sense We might value an object in virtue of its relational properties, for example its rarity, without thereby seeing it as having only instrumental value for human satisfactions.

This point can be stated with greater generality. We need to distinguish:

(1) values objects can have in virtue of their relations to other objects; and (2) values objects can have in virtue of their relations to human beings.

The second set of values is a proper subset of the first. Moreover, the second set of values is still not co-extensive with

(3) values objects can have in virtue of being instrumental for human satisfaction.

An object might have value in virtue of its relation with human beings without thereby being of only instrumental value for humans. Thus, for example, one might value wilderness in virtue of its not bearing the imprint of human activity, as when John Muir opposed the damming of the Hetch Hetchy valley on the grounds that wild mountain parks should lack 'all. . . marks of man's work'.[14] To say 'x has value because it is untouched by humans' is to say that it has value in virtue of a relation it has to humans and their activities. Wilderness has such value in virtue of our absence. However, the value is not possessed by wilderness in virtue of its instrumental usefulness for the satisfaction of human desires. The third set of values is a proper subset of both the second and the first. Intrinsic value in the sense of non-instrumental value need not then be intrinsic in the Moorean sense.

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[13] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

[14] Losch, A. *The Economics of Location.* New Haven: Yale University Press, 1954.

What of the relation between Moorean intrinsic value and objective value? Is it the case that if there is value that 'depends solely on the intrinsic nature of the thing in question' then subjectivism about values must be rejected? If an object has value only in virtue of its intrinsic nature, does it follow that it has value independently of human valuations? The answer depends on the interpretation given to the phrases 'depends solely on' and 'only in virtue of. If these are interpreted to exclude the activity of human evaluation, as I take it Moore intended, then the answer to both questions is immediately 'yes'. However, there is a natural subjectivist reading to the phrases. The subjectivist can talk of the valuing agent *assigning* value to objects solely in virtue of their intrinsic natures. Given a liberal interpretation of the phrases, a subjectivist can hold that some objects have intrinsic value in the Moorean sense.

IV

In section III argued that the claim that nature has non-instrumental value does not commit one to an objectivist meta-ethics. However, I left open the question as to whether there might be other reasons particularly pertinent in the field of environmental ethics that would lead us to hold an objectivist account of value. I will show in this section that there are.

The ethical objectivist holds that the evaluative properties of objects are real properties of objects, that is, that they are properties that objects possess independently of the valuations of valuers. What is meant by 'independently of the valuations of valuers'? There are two readings of the phrase which parallel the two senses of 'non-relational property' outlined in the last section:

(1) The evaluative properties of objects are properties that exist in the absence of evaluating agents. (Weak interpretation)

(2) The evaluative properties of objects can be characterised without reference to evaluating agents. (Strong interpretation)

The distinction is a particular instance of a more general distinction between two senses in which we can talk of a property being a real property of an object:

(1) A real property is one that exists in the absence of any being experiencing that object. (Weak interpretation)

(2) A real property is one that can be characterised without reference to the experiences of a being who might experience the object. (Strong interpretation)

Is there anything about evaluations of the environment that make the case for objectivism especially compelling? I begin by considering the case for the weak version of objectivism. For the purpose of the rest of the discussion I will assume that only human persons are evaluating agents.

1. Weak Objectivity

A popular move in recent work on environmental ethics has been to establish the objectivity of values by invoking an analogy between secondary qualities and evaluative properties in the following manner:

(1) The evaluative properties of objects are analogous to secondary qualities. Both sets of properties are observer dependent.

(2) The Copenhagen interpretation of quantum mechanics has shown the distinction between primary qualities and secondary qualities to be untenable. All the properties of objects are observer dependent.

Hence,

(3) the evaluative properties of objects are as real as their primary qualities.[15]

The argument fails at every stage. In the first place the conclusion itself is too weak to support objectivism about values: it is no argument for an objectivist theory of values to show that all properties of objects are observer dependent. The second premise should in any case be rejected. Not only is it the case that the Copenhagen interpretation of quantum theory is but one amongst many,[16] it is far from clear that the Copenhagen interpretation is committed to the ontological extravagance that all properties are observer dependent. Rather it can be understood as a straightforward instrumentalist interpretation of quantum theory. As such it involves no ontological commitments about the quantum domain/'

More pertinent to the present discussion, there are also good grounds for rejecting the first premise. The analogy between secondary qualities and values has often been used to show that values are not real properties of objects. Thus Hume remarks:

Vice and virtue ... may be compared to sounds, heat and cold, which, according to modern philosophy, are not qualities in objects, but perceptions in the mind ...

For the Humean, both secondary qualities and evaluative properties are not real properties of objects, but, rather, illustrate the mind's 'propensity to spread itself on external objects': as Mackie puts it, moral qualities are the 'projection or objectification of moral attitudes'.[17] The first premise of the argument assumes this Humean view of the analogy between secondary qualities and values. However, there are good grounds for inverting the analogy and that inversion promises to provide a more satisfactory argument for objectivism than that outlined above.

On the weak interpretation of the concept of a real property, secondary qualities are real properties of objects. They persist in the absence of observers. Objects do not lose their colours when we no longer perceive them. In the kingdom of the blind the grass is still green. Secondary qualities are dispositional properties of objects to appear in a certain way to ideal observers in ideal conditions. So, for example, an object is green

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[15] Malthus, T. R. *An Essay on the Principle of Population and a Summary View of the Principle of Population.* Harmondsworth, Middlesex: Penguin Books, 1970.

[16] Malthus, T. R. *Principles of Political Economy.* New York: Augustus Kelley, 1968.

[17] Marx, K. *Capital.* 3 volumes, New York: International Publishers, 1967.

if and only if it would appear green to a perceptually ideal observer in perceptually ideal conditions.[18] It is consistent with this characterisation of secondary qualities that an object possesses that quality even though it may never actually be perceived by an observer. Thus, while in the strong sense of the term secondary qualities are not real properties of objects—one cannot characterise the properties without referring to the experiences of possible observers—in the weak sense of the term they are.[19]

This point opens up the possibility of an inversion of the Humean analogy between secondary and evaluative qualities which has been recently exploited by McDowell and others/[20] Like the secondary qualities, evaluative qualities are real properties of objects. An object's evaluative properties are similarly dispositional properties that it has to produce certain attitudes and reactions in ideal observers in ideal conditions. Thus, we might tentatively characterise goodness thus: x is good if and only if x would produce feelings of moral approval in an ideal observer in ideal conditions. Likewise, beauty might be characterised thus: x is beautiful if and only if x would produce feelings of aesthetic delight in ideal observers in ideal conditions. Given this characterisation, an object is beautiful or good even if it never actually appears as such to an observer. The evaluative properties of objects are real in just the same sense that secondary qualities are. Both sets of properties are independent of observers in the sense that they persist in the absence of observers. The first premise of the argument outlined above should therefore be rejected. Furthermore, in rejecting this premise, one arrives at a far more convincing case for the reality of evaluative properties than that provided by excursions into quantum mechanics.

However, the promise of this line of argument for environmental ethics is, I believe, limited. There are a variety of particular arguments that might be raised against it. For example, the Humean might respond by suggesting that the analogy between secondary and evaluative properties is imperfect. The arguments for and against the analogy I will not rehearse here.[21] For even if the analogy is a good one, it is not clear to me that any point of substance about the nature of values divides the Humean and his opponent. The debate is one about preferred modes of speech, specifically about how the term 'real property' is to be read. For the Humean such as Mackie, the term 'real property' is understood in its strong sense. It is a property that can be characterised without reference to the experiences of an observer. Hence neither secondary qualities nor values are real properties of objects. The opponent of the Humean in employing the analogy to establish the reality of evaluative properties merely substitutes a weak interpretation of Teal property' for the strong interpretation. There may be good reasons for doing this, but nothing about the nature of values turns on this move. Moreover, there seems to be nothing about evaluative utterances concerning the natural environment which

[18] Marx, K. *The Grundrisse.* London: Macmillan, 1971.
[19] Marx, K. *Theories of Surplus Value.* Part 3, Moscow: Progress Publishers, 1972.
[20] Godelier, M. *Rationality and Irrationality in Economics.* London: New Left Books, 1972.
[21] Mesjaros, I. "Ideology and Social Science," *Socialist Register,* 1972.

adds anything to this debate. Nothing about specifically environmental values tells for or against this argument for objectivism.

2. Strong objectivity

A more interesting question is whether there are good reasons for believing that there are objective values in the strong sense: are there evaluative properties that can be characterised without reference to the experiences of human observers? I will now argue that there are and that uses of evaluative utterances about the natural world provide the clearest examples of such values.

Consider the gardener's use of the phrase 'x is good for greenfly'. The term 'good for' can be understood in two distinct ways. It might refer to what is conductive to the destruction of greenfly, as in 'detergent sprays are good for greenfly', or it can be used to describe what causes greenfly to flourish, as in 'mild winters are good for greenfly'. The term 'good for' in the first use describes what is instrumentally, good for the gardener: given the ordinary gardener's interest in the flourishing of her rosebushes, detergent sprays satisfy that interest. The second use describes what is instrumentally good for the greenfly, quite independently of the gardener's interests. This instrumental goodness is possible in virtue of the fact that greenflies are the sorts of things that can flourish or be injured. In consequence they have their own goods that are independent of both human interests and any tendency they might have to produce in human observers feelings of approval or disapproval.[22] Such goods I will follow Von Wright in terming the 'goods of X'.[23]

What is the class of entities that can be said to possess such goods? Von Wright in an influential passage offers the following account:

A being, of whose good it is meaningful to talk, is one who can meaningfully be said to be well or ill, to thrive, to flourish, be happy or miserable . . . the attributes, which go along with the meaningful use of the phrase 'the good of X', may be called *biological* in a broad sense. By this I do not mean that they were terms, of which biologists make frequent use. 'Happiness' and 'welfare' cannot be said to belong to the professional vocabulary of biologists. What I mean by calling the terms 'biological' is that they are used as attributes of beings, of whom it is meaningful to say they have a *life.* The question 'What kinds or species of being have a good?' is therefore broadly identical with the question 'What kinds or species of being have a life'.[24]

This biological use of the terms 'good for' and 'good of is at the centre of Aristotelian ethics. The distinction between 'good for' and 'good of itself corresponds to the Aristotelian distinction between goods externally instrumental to a being's flourish-

[22] Oilman, B. *Alienation: Marx's Conception of Man in Capitalist Society.* London: Cambridge University Press, 1971.

[23] Oilman, B. "Marxism and Political Science: Prolegomenon to a Debate on Marx's Method," *Politics and Society,* 3 (1973), pp. 491-510.

[24] Orans, M. "Surplus," *Human Organization,* 25 (1966), pp. 24—32.

ing and those that are constitutive of a being's flourishing.[25] And the central strategy of Aristotle's ethics is to found ethical argument on the basis of this broadly biological use of the term 'good'. I discuss this further below.

The terms 'good' and 'goods' in this biological context characterise items which are real in the strong interpretation of the term. In order to characterise the conditions which are constitutive of the flourishing of a living thing one need make no reference to the experiences of human observers. The goods of an entity are given rather by the characteristic features of the kind or species of being it is. A living thing can be said to flourish if it develops those characteristics which are normal to the species to which it belongs in the normal conditions for that species. If it fails to realise such characteristics then it will be described by terms such as 'defective 'stunted', 'abnormal' and the like. Correspondingly, the truth of statements about what is good for a living thing, what is conducive to its flourishing, depend on no essential reference to human observers. The use of the evaluative terms in the biological context does then provide good reasons for holding that some evaluative properties are real properties on the strong interpretation of the phrase. Hence, evaluative utterances about living things do have a particular relevance to the debate about the objectivity of values. Specifically biological values tell for objectivism.

However, while the use of value terms in the specifically biological context provides the clearest examples of the existence of objective goods, the class of entities that can be meaningfully said to have such goods is not confined to the biological context. Von Wright's claim that the question 'What kinds or species of being have a good?' is identical with the question 'What kinds or species of being have a life' should be rejected. The problem case for this identity claim is that of collective entities. Von Wright is willing to entertain the possibility that such entities have their own good but only if they can also be said to have their own life in a non-metaphorical sense.

But what shall we say of social units such as the family, the nation, the state. Have they got a life 'literally' or 'metaphorically' only? 1 shall not attempt to answer these questions. I doubt whether there is any other way of answering them except by pointing out existing analogies of language. It is a fact that we speak about the life and also the good (welfare) of the family, the nation and the state. This fact about the use of language we must accept and with it the idea that the social units in question *have* a life and a good. What is arguable, however, is whether the life and *a fortiori* also the good (welfare) of a social unit is not somehow 'logically reducible' to the life and therefore the good of the beings—men or animals—who are 33 its members/

This passage conflates two distinct issues: whether collective entities have a life and whether they have their own goods. It does not appear to me that we can talk of collective entities having a life in anything but a metaphorical sense. They clearly lack

[25] Pearson, H. "The Economy Has No Surplus: A Critique of a Theory of Development," in K. Polanyi, C. M. Arensberg, and H. W. Pearson. *Trade and Market in Early Empires.* Glencoe, Illinois: Free Press, 1957.

those properties typical of living things— reproduction, growth, death and such like. However, it does make sense to talk about the conditions in which collective entities flourish and hence of their goods in a non-metaphorical sense. Correspondingly, we can meaningfully talk of what is damaging to them. Furthermore, the goods of collective entities are not reducible to the goods of their members. Thus for example we can refer to the conditions in which bureaucracy flourishes while believing this to be bad for its constituent members. Or to take another example, what is good for members of a workers' cooperative can be quite at odds with what is good for the cooperative itself: the latter is constituted by its relative competitive position in the market place, and members of cooperatives might find themselves forced to forego the satisfaction of their own interests to realise this.[26] The question 'What class of beings has a good?' is identical with the question 'What class qf beings can be said to flourish in a non-metaphorical sense?' The class of living things is a proper subset of this class.

This point is central to environmental questions. It makes sense to talk of the goods of collective biological entities—colonies, ecosystems and so on— in a way that is irreducible to that of its members. The realisation of the good of a colony of ants might in certain circumstances involve the death of most of its members. It is not a condition for the flourishing of an individual animal that it be eaten: it often is a condition for the flourishing of the ecosystem of which it is a part. Relatedly, a point central to Darwin's development of the theory of evolution was that living beings have a capacity to reproduce that outstrips the capacity of the environment to support them. Most members of a species die in early life. This is clearly bad for the individuals involved. But it is again essential to the flourishing of the ecosystems of which they are a part. Collective entities have their own goods. In defending this claim one need not show that they have their own life.[27]

Both individual living things and the collective entities of which they are members can be said, then, to have their own goods. These goods are quite independent of human interests and can be characterised without reference to the experiences of human observers. It is a standard at this juncture of the argument to assume that possession of goods entails moral considerability: 'moral standing or considerability belongs to whatever has a good of its own'.[28] This is mistaken. It is possible to talk in an objective sense of what constitutes the goods of entities, without making any claims that these ought to be realised. We can know what is 'good for X' and relatedly what constitutes 'flourishing for X' and yet believe that X is the sort of thing that ought not to exist and hence that the flourishing of X is just the sort of thing we ought to inhibit. The case of the gardener noted earlier is typical in this regard. The gardener knows what it is for greenfly to flourish, recognises they have their own goods, and has a practical knowledge of what is good for them. No moral injunction follows. She

[26] Piaget, J. *The Principles of Genetic Epistemology.* London: Routledge and Kegan Paul, 1972.

[27] Ricardo, D. *Principles of Political Economy.* London: Cambridge University Press, 1951.

[28] Ricardo, D. *The Works and Correspondence of David Ricardo.* Volume 2. London: Cambridge University Press, 1951.

can quite consistently believe they ought to be done harm. Likewise one can state the conditions for the flourishing of dictatorship and bureaucracy. The anarchist can claim that 'war is the health of the state'. One can discover what is good both for rain forests and the AIDS virus. One can recognise that something has its own goods, and quite consistently be morally indifferent to these goods or believe one has a moral duty to inhibit their development.[29] That Y is a good of X does not entail that Y should be realised unless we have a prior reason for believing that X is the sort of thing whose good ought to be promoted. While there is not a logical gap between facts and values, in that some value statements are factual, there is a logical gap between facts and oughts. 'Y is a good' does not entail 'Y ought to be realised'.[30]

This gap clearly raises problems for environmental ethics. The existence of objective goods was promising precisely because it appeared to show that items in the non-human world were objects of proper moral concern. The gap outlined threatens to undermine such concern. Can the gap be bridged? There are two ways one might attempt to construct such a bridge. The first is to invoke some general moral claim that linked objective goods and moral duties. One might for example invoke an objectivist version of utilitarianism: we have a moral duty to maximise the total amount of objective good in the world There are a number of problems of detail with such an approach: What are the units for comparing objective goods? How are different goods to be weighed? However, it also has a more general problem that it shares with hedonistic utilitarianism. Thus, the hedonistic utilitarian must include within his calculus pleasures that ought not to count at all e.g., those of a sadist who gets pleasure from needless suffering. The hedonistic utilitarian fails to allow that pleasures themselves are the direct objects of ethical appraisal. Similarly, there are some entities whose flourishing simply should not enter into any calculations—the flourishing of dictatorships and viruses for example. It is not the case that the goods of viruses should count, even just a very small amount. There is no reason why these goods should count at all as ends in themselves (although there are of course good *instrumental* reasons why some viruses should flourish, in that many are indispensable to the ecosystems of which they are a part). The flourishing of such entities is itself a direct object of ethical appraisal. The quasiutihtanan approach is unpromising.

A second possible bridge between objective goods and oughts is an Aristotelian one. Human beings like other entities have goods constitutive of their flourishing, and correspondingly other goods instrumental to that flourishing. The flourishing of many other living things ought to be promoted because they are constitutive of our own flourishing. This approach might seem a depressingly familiar one. It looks as if we have taken a long journey into objective value only to arrive back at a narrowly anthropocentric ethic. This however would be mistaken. It is compatible with an Aristotelian ethic that we value items in the natural world for their own sake, not simply as an external means

[29] Sauer, C. *Agricultural Origins and Dispersals.* New York: American Geographical Society. 1952.
[30] Schmidt, A. *The Concept of Nature in Marx.* London: New Left Books, 1971.

to our own satisfaction. Consider Aristotle's account of the relationship of friendship to human flourishing.[31] It is constitutive of friendship of the best kind that we care for friends for their own sake and not merely for the pleasures or profits they might bring. To do good for a friend purely because one thought they might later return the compliment not for their own sake is to have an ill-formed friendship. Friendship in turn is a constitutive component of a flourishing life. Given the kind of beings we are, to lack friends is to lack part of what makes for a flourishing human existence. Thus the egoist who asks 'why have friends?' or 'why should I do good for my friends' has assumed a narrow range of goods—'the biggest share of money, honours and bodily pleasures'[32]—and asked how friends can bring such goods. The appropriate response is to point out that he has simply misidentified what the goods of a human life are.

The best case for an environmental ethic should proceed on similar lines. For a large number of, although not all, individual living things and biological collectives, we should recognise and promote their flourishing as an end in itself.[33] Such care for the natural world is constitutive of a flourishing human life. The best human life is one that includes an awareness of and practical concern with the goods of entities in the non-human world. On this view, the last man's act of vandalism reveals the man to be leading an existence below that which is best for a human being, for it exhibits a failure to recognise the goods of non-humans. To outline such an approach is, however, only to provide a promissory note. The claim that care for the natural world for its own sake is a part of the best life for humans requires detailed defence. The most promising general strategy would be to appeal to the claim that a good human life requires a breadth of goods. Part of the problem with egoism is the very narrowness of the goods it involves. The ethical life is one that incorporates a far richer set of goods and relationships than egoism would allow. This form of argument can be made for a connection of care for the natural world with human flourishing: the recognition and promotion of natural goods as ends in themselves involves just such an enrichment.[34]

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[31] Tarascio, V. J. *Pareto's Methodological Approach to Economics.* Chapel Hill, North Carolina: University of North Carolina Press, 1966.

[32] Vogt, W. *The Road to Survival,* New York: W. Sloane Associates, 1948.

[33] Wittgenstein, L. *Philosophical Investigations.* Oxford: Oxford University Press, 1958.

[34] Zinke, G. W. *The Problem of Malthus: Must Progress End in Overpopulation.* University of Colorado Studies, Series in Economics, No. 5, Boulder, Colorado, 1967.

11. A Green Theory of Value

Robert Goodin

Source: R. Goodin, *Green Political Theory.* Cambridge: Polity Press, 1992, pp. 19-55.

The good and the valuable

Let us begin by reflecting upon the nature of a 'theory of value' more generally. A theory of value is, quite simply, a theory of the Good. Much is asked of such a theory. Ideally, it should tell us both *what* is to be valued and *why.* We expect any truly comprehensive theory of the Good to tell us not only which things are good and which are not; we expect it also to tell us for what reasons, or in respect of what attributes, those things are supposed to be considered good.

It is important to recognize, right from the start, that not all theories of the Good - try as they might - necessarily succeed in providing theories that are altogether complete in such ways. That incompleteness, in turn, gives rise to possibilities (which advocates of each of the theories involved might, and usually will, find highly embarrassing) for legitimately mixing and matching ostensively incompatible theories. I shall say more about those possibilities later. For now, though, let us confine ourselves to the pure cases.

It is also important to recognize, from the outset, that a theory of the Good is not necessarily all there is to moral evaluation. Philosophers standardly say that morality is a theory both of the Right and of the Good.[1] Different philosophers differ in the emphasis that they accord to each of those components and, indeed, some attempt to subsume one wholly within the other. Thus from a certain ('deontological') perspective we can exhaustively analyse the Good in terms of the Right: on this analysis, good states of affairs are just those which are produced when all moral agents perform right actions. Similarly, from the opposite ('consequentialistic') perspective we can exhaustively analyse the Right in terms of the Good: right actions are just those actions which would produce maximally good consequences. In what follows, I want so far as possible to avoid taking sides on those larger issues.

Still, it must be admitted that what I shall be investigating is indisputably a theory of the Good. So even if I were to demonstrate conclusively that the particular theory

[1] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

of the Good that I shall be discussing is the very best available, the moral significance of that conclusion inevitably remains somewhat uncertain. After all, how important a component of overall morality that theory of the Good will turn out to be depends on how important one supposes considerations of the Good ought to be, relative to considerations of the Right, in the final moral mix.

Nothing I shall say here will address the concerns of those who would accord literally *no* independent role at all to considerations of the Good in their moral reckoning. But that fact hardly needs to worry us unduly, since virtually no one is prepared to embrace quite such an extravagant position, anyway. Hardly anyone would really want to assert that any action is right or wrong literally *'whatever* the consequences'.[2] Virtually everyone concedes a place in moral evaluation to considerations of the Good and to the calculations of consequences that derive from them. And of course, in so far as deontologists are prepared to concede even in that very limited way a moral role to the assessment of consequences, a theory of the Good is to that extent morally relevant even within their ethical outlook.

What I shall really be discussing is, as I have said, a theory of the Good. But rather than phrasing my arguments in those terms, I shall henceforth talk instead in terms of a 'theory of value'. I do not intend anything subtle or sneaky by that shift in terminology. On the contrary, I take those terms to be absolutely equivalent, or nearly enough so for present purposes. Where the one talks about what is good and why, the other talks about what is valuable and why. It is a distinction without a difference, so far as we are here concerned.

Or, I should say, the difference is a purely practical one. Economists simply seem to feel more comfortable with - and hence more threatened by - arguments couched in terms of a theory of value than a theory of the Good. And, of course, connecting with the discourse of economists is crucial in environmental contexts. After all, it is economists who are, intellectually, the most direct targets of 'green' political movements, certainly on this narrower point and arguably more broadly as well.[3] The dominance of a particular and peculiarly economic theory of value is, green theorists would say, what leads us to overvalue material prosperity and to undervalue all that is sacrificed in pursuit of it.[4]

That economic theory of value does, of course, have deeper philosophical underpinnings. Indeed, in many respects its underlying theory of the Good amounts to little more than a stripped-down form of Bentham's hedonic calculus. Much can be said against that deeper philosophical theory. But so much already has been said against it that those who still do not see the problems with crude Benthamite utilitarianism probably never will. It would almost certainly prove pointless to try yet again to join issue with economists on that deeper philosophical plane.

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[2] Cole, H. S. D., C. Freeman, M. Jahoda, and K. L. R. Pavitt. *Thinking about the Future: A Critique of the Limits to Growth,* London: Chatto and Windus, 1973.

[3] Engels, F. *The Dialectics of Nature.* New York: International Publishers, 1940.

[4] Firey, W. *Man, Mind and the Land.* Glencoe, Illionis: Free Press, 1960.

From a pragmatic point of view, surely it would be more fruitful to try to meet the dominant practitioners of the pernicious art on their own chosen ground. If talking about a theory of value rather than a theory of the Good helps us join issue with them more directly, little is lost and much gained by translating our arguments into those terms.

Of course economists are notoriously reluctant to join issue with philosophers, or anyone else, on these or any other issues. They jealously guard their exclusive sphere of special expertise. They staunchly deny the relevance of contributions from anyone outside that narrow faith to any of the questions that centrally concern them. Thus, for the same reason that economists refuse to talk in more philosophical terms of a theory of the Good, they will also inevitably resist philosophers' attempts to meet them on their own ground.

The excuse that they are most likely to offer is that the philosophical challenge blurs a distinction, crucial in their self-conception, between 'positive' and 'normative' theories of value. The economic theory of value, they will assert, is no more than a predictive device in positive economics. Its function is merely to allow us to explain and predict the rate at which various things will exchange for one another.[5] The philosopher's theory of value, in contrast, is normative. It purports to tell us values, not just prices. It tells us how much things are really worth, not merely how much they actually cost.

If any such sharp distinction between positive and normative theories of value could be sustained, and if economists were systematically operating within the former just as philosophers surely are within the latter, then economists would be right to resist philosophers' intrusions into their domain. Translating philosophical points about the Good into the language of value would amount to little more than a pun. The 'value' in question would still be the wrong sort of value - normative rather than positive - to engage with the arguments of economists.

As it happens, though, none of that is true. Whether the distinction between positive and normative theories of value ever could be sustained is a larger issue, and one into which we need not venture here. Suffice it to say, for present purposes, that in practice it is not sustained in the ordinary discourse of economists. They simply do not stick nearly as faithfully as they would have us believe to a purely positive theory of value in their discussions. For all their positivistic pretensions, economists' choice of normatively loaded terminology gives their game away. A theory of value, for economists as much as for philosophers, is what is *and ought to be* of value. That is certainly true in the various economic theories of value I shall be discussing in the next section of this chapter.[6]

All of that is merely to say that it is doubly propitious to couch the ethical arguments of the greens in terms of a green theory of value. Not only does that formulation best

[5] Glacken, C. *Traces on the Rhodian Shore.* Berkeley: University of California Press, 1967.

[6] Godelier, M. *Rationality and Irrationality in Economics.* London: New Left Books, 1972.

capture the core concerns of greens themselves, as I shall argue in chapter 3 below. It also enables green theories to engage directly, in ways that cannot decently be evaded, with the arguments of economists that have been responsible for so much of the environmental despoliation that greens bemoan.

A taxonomy of theories of value

Approaching the problem of the Good from this vaguely economistic angle, there are essentially three distinct bases on which we might ground a theory of value - consumer satisfaction, labour inputs or natural resource inputs.[7] These options correspond to a 'capitalist' theory of value, a 'Marxist' theory of value and a 'green' theory of value, respectively.

Those latter labels are adopted purely for expository convenience, and I should warn at the outset that they may be misleading. Naming as they do three historically warring camps, such labels may make those options seem more mutually exclusive than they actually are. Here, as with the clash between theories of the Right and of the Good, there is no particular reason to suppose that we must inevitably favour any one option absolutely to the exclusion of others. In the end, we may want to - in the end, we may have to - concoct some mixed theory of value drawing on all of these theories, and perhaps more besides.[8] Even if we do end up mixing and matching the theories, though, it is nonetheless important to see clearly from the start the character of the three distinct components that are being intermixed.

First, then, we have the 'capitalist' - or, if you prefer, 'neoclassical welfare economic' - theory of value. This is essentially a *consumer* based theory. It traces the value of things to values which people derive in the course of partaking of them.

There are myriad variations on that basic theme. Some crudely link value to subjective mental states, like happiness. (That is the Benthamite version, of course.) Others link it, less crudely, to satisfaction of subjectively felt desires, where there is no assumption that want satisfaction equates necessarily to 'happiness'. (You can take satisfaction in having discharged well a nasty duty.) Others link it, less crudely still, to the capacity of something to satisfy desires that are or will be or otherwise would be subjectively felt. (Eating before you feel hungry preemptively satisfies your desires.)[9]

There are important differences between all these alternative ways of filling out the basic logic of that consumer-based theory of value, of course. Much philosophical ink has been spilt debating their relative merits. Happily, though, we can afford to skirt those issues here, since our present concern is simply with the common theoretical core

[7] Harvey, D. *Social Justice and the City.* Baltimore: Johns Hopkins Press, 1973.

[8] Hays, S. *The Conservation Movement and the Gospel of Efficiency.* Cambridge, Massachusetts: Atheneum, 1959.

[9] Hudson, W. D. *Modern Moral Philosophy.* London: Macmillan, 1970.

that all of those variations share. At root, all are essentially *consumer* based theories of value. That category forms our first broad class of value theories.

Second is the 'Marxist' - or, if you prefer, 'Ricardian' - theory of value. This is a *producer* based theory. [a] It traces the value of things to values that people impart to them in the course of producing those things.

In principle, these values might derive from any number of different attributes of producers or productive activities. In practice, though, this sort of theory almost always amounts to a labour theory of value. Certainly that is its most familiar form, both in its Marxian and in its more general Ricardian-cum-Lockean forms.

Here again, there are endless variations on the theme. The basic idea is that the value of an object corresponds to the amount of labour time invested in producing it. But more subtle versions of the theory might differentiate between skilled and unskilled labour time, between the amount of time actually spent producing a thing and that which is 'socially necessary' to produce it, and so on.[10] Again, though, the many and subtle variations should not blind us to what all of them have in common: these theories are all, at root, *producer* based theories of value.

Third and nowadays less familiar is the class of value theories that I associate with the 'green' theory of value. This is a *natural resource* based theory of value. This links the value of things to some naturally occurring properties of the objects themselves.

I use the phrase 'natural resource' purely in deference to the standard economistic way of partitioning inputs into the production process. The literal-minded will find it misleading, though. For literally, of course, calling something a 'resource' implies that it is 'instrumentally useful for producing human satisfaction' - which would reduce this third theory of value back to the first, straightaway. Obviously, that is not what is here intended. A more awkward but technically more correct way of describing this third theory is to say it is a 'natural attribute based' (or, at the risk of question begging, 'nature based') theory of value. I shall avoid that awkwardness by sticking to the 'natural resource based' terminology. But remember that it is only an imprecise shorthand.

Here, as before, there are countless variations on the basic theme, depending on what exactly it is about naturally occurring properties of objects that is said to give them value. Some theories point, disingenuously I believe, to objective attributes of objects - the 'hardness' of diamonds, and suchlike - in this regard." Another variation on these broad themes, one which is perhaps historically the most famous, is the physiocrats' claim that land alone has the capacity for producing value.[11]

The 'green' answer that I shall be sketching below constitutes yet another way of filling out that same basic formula.[12] I happen to think it is the most satisfactory way of

[10] Humboldt, A. von. *Essai Politique sur le Royaume de la Nouvelle Espagne.* Paris: F. Schoell, 1811.

[11] Kapp, K. W. *The Social Costs of Private Enterprise.* Cambridge, Massachusetts: Harvard University Press, 1950.

[12] Keynes, J. M. *The General Theory of Employment, Interest and Money.* New York: Harcourt Brace, 1936.

filling out a natural resource based theory of value at this point. But I should emphasize at the outset that it is only one way among many possible ways of explicating what it is about naturally occurring properties that makes them so valuable.

In any case, it ought to be tolerably clear by now how a theory of value that is natural resource based, the green theory of value being an instance, is to be distinguished from the other two general sorts of value theory already discussed. It differs from a producer based theory of value in so far as it insists that those value-imparting properties are natural, rather than being somehow artefacts of human activities.[13] And it differs from a consumer based theory ot value in so far as it insists that those value-imparting qualities somehow inhere in the objects themselves, rather than in any mental states (actual or hypothetical, now or later) of those who partake of those objects.

Of course, hard-line proponents of each sort of value theory will naturally try either to discount or to reduce the others to their own. Thus, for example, Marxists would emphasize in reply to greens that natural resources are of no use to anyone until they have been shaped by human hands to human purposes: in the classically Lockean version of this tale, even acorns must be picked up off the ground before they can be eaten. And neoclassical welfare economists would emphasize, in reply to both Marxists and greens, that while they may well be right about *why* people value objects, what it *is* for a thing to have value is intimately connected with the consumption act: at the end of the day, there can be no value without valuers; and in Adam Smith's memorable example, if someone is dying of thirst, diamonds are not nearly as valuable to that person as is water, whatever the productive histories, intrinsic properties or objective scarcities of the two commodities.

Such refutations and reductions may work well or badly. Or, more likely, they may force us to tell a rather more nuanced story about value, distinguishing *inter alia* between what it means for something to have value, where that value comes from, how it is realized, and so on. By seeing all these competing theories of value as answers to slightly different questions about value, we might be able to concoct a composite theory that combines the strengths of all.' I do not want - or need - to contend that the particular theory of value I am investigating here is correct utterly to the exclusion of all others. I shall merely be insisting that it has a legitimate place, alongside others perhaps, in any larger mixed theory of value.

History and Process as Sources of Value

Taxonomies are not arguments. The taxonomy just produced is even less of one than most. It has merely served to situate the green theory of value in relation to other, more familiar ones. The green theory of value is a particular instantiation of the 'natural resource based theory of value' The distinctive feature characterizing such

[13] Keynes, J. M. *Essays in Biography.* New York' Meridian Books, 1951.

theories in general is that they trace the value of a thing to some attribute of the natural resources comprising it, rather than to any facts about the'people who have produced or will consume it. ,

Nothing I have said so far, however, specifies what exactly it is about natural resources that makes them valuable. The different answers they provide to that question serve to distinguish all the various 'natural resource based' theories of value from one another. There are many ways of filling out the more general 'natural resource based' theory of value, at that point. The green theory of value offers one solution, but it is only one among many.

According to the distinctively green variant, what it is that makes natural resources valuable is their very naturalness. That is to say, what imparts value to them is not any physical attributes or properties that they might display. Rather, it is the history and process of their creation. What is crucial in making things valuable, on the green theory of value, is the fact that they have a history of having been created by natural processes rather than by artificial human ones.[14]

By focusing in this way on the history and process of its creation as the special feature of a naturally occurring property that imparts value, the green theory of value shows itself to be an instantiation of yet another pair of other more general theories of value - a *process* based theory of value, on the one hand, and a *history* based theory of value, on the other.[15] Before going on to say what is so valuable about a thing's having the *particular* sort of history that the green theory favours, I should first say something to ease disquiet about those larger classes of value theory.

This task is made harder through the association, in recent social philosophy, of such theories with the 'historical entitlement' theory of distributivejustice advanced by Robert Nozick.[16] For Nozick, a distribution is just so long as everything within it was originally acquired justly by its first owner and was subsequently transferred justly from each owner to the next, all the way down the line.

That is, at least potentially, a deeply conservative theory of justice.[17] Many take strong exception to it. Those who do often let their repugnance for Nozick's conclusions spill over to his methodology as well. But of course that is a mistake. While Nozick's theory of justice certainly is one example of a process based, history based ethical theory, his is hardly the only way of fleshing out such a theory. Those who are appalled by the use to which Nozick puts such methods ought not necessarily be put off from that larger class of value theories in consequence.

In light of those potentially off-putting associations, then, it is particularly important to recall some of the other more positive associations which such value theories also enjoy. In many of those other connections, it seems perfectly familiar, natural and

[14] Kuhn, T. S. *The Structure of Scientific Revolutions.* Chicago: Chicago University Press, 1962.

[15] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

[16] Losch, A. *The Economics of Location.* New Haven: Yale University Press, 1954.

[17] Malthus, T. R. *An Essay on the Principle of Population and a Summary View of the Principle of Population.* Harmondsworth, Middlesex: Penguin Books, 1970.

plausible to suppose that process based and history based considerations are indeed crucial in fixing the value of things. Recognizing that fact will usefully clear the ground for my own green theory of value.

Consider, first, the rule of process based considerations in imparting legitimacy to the outcomes of political deliberations. Decisions largely devoid of substantive merits are reckoned nonetheless worthy of respect just so long as they have arisen through the workings of democratic processes. In a democracy, it is the history of the process by which a decision has been reached that serves to confer legitimacy on any given action of a regime. Similarly, administrative actions are typically deemed socially acceptable, to a surprisingly large extent regardless of their substantive merits, just so long as the canons of 'due process' have been respected in reaching them. There, too, it is the history of the process by which the decision hds been reached that serves to confer legitimacy on the actions of administrative agencies.[18]

Some might query whether this is an apt example for present purposes. 'Conferring legitimacy' (which is what having the right process-based history seems to do) is, they may say, importantly different from 'imparting value' (which is what the green theory of value requires). Far from valuing those outcomes more highly on account of their histories, what we are actually doing when accepting those outcomes as 'legitimate' might be no more than merely saying that we are prepared to accept even less valuable outcomes, just so long as they have the right histories. Or so our doubters might suppose.

But why should we be willing to accept less valuable outcomes, just because they have the right histones? Only, presumably, because we attach some independent *value* to the process of the creation of those outcomes. If so, then what is really going on is just this: outcomes which are less valuable to us, in purely substantive terms, nonetheless turn out to be more valuable to us overall once the extra value derived from the process of their creation has been added in. In other words, then, it is not just legitimacy but also (and more importantly, for present purposes) *value* that, at the end of the day, familiar political theories of democracy and due process must be asserting attaches to outcomes by virtue of the history surrounding the process of their creation.

For another very different example, consider next the problem, from the realm of aesthetics. What value ought we attach to fakes, forgeries, replicas, reproductions and restorations? The answer is easy, the explanation less so. We standardly suppose that such things are less valuable - not just contingently but *necessarily* less valuable - than the original which they replicate. But why?

Surely that is not just a matter of copies necessarily being, to some greater or lesser extent, bad copies. For we can imagine (even if we can never make*) an absolutely perfect copy, one that reproduces all observable features of the original absolutely

[18] Malthus, T. R. *Principles of Political Economy.* New York: Augustus Kelley, 1968.

perfectly. Surely, though, most of us would still suppose that a perfect replica of the *Pieta* was less valuable than the masterpiece that sits in St Peter's.[19]

Supposing that it really is a perfect replica, though, there can be none of the standard aesthetic grounds for that judgement. *Ex hypothesi,* all of its observable features - colour, texture, line, shape, etc. - are identical to those of the original. So if the replica is less valuable, that can only be so on account of its history. The grounds for devaluing replicas, fakes and forgeries have to do, once again, with the history of the process by which they were created.[20]

The particularly potent value-imparting feature of the Vatican *Pieta* which no other *Pieta* can replicate is the fact that it was created by the hand of Michelangelo. Similarly, the *Mona Lisa* has the peculiar value it does because of the history of who painted it. Were it to turn out that the copy hanging in the Louvre is a Napoleonic-era forgery, the image would remain the same but the significance of the painting would nonetheless have altered. It would have lost the value it once had for us as a manifestation of Leonardo's genius/[21]

In aesthetics as well as in politics, then, history and process impart value. An original was created by the master's hand - and necessarily so, for that is what it means for it to be an 'original'. The fake, forgery or replica was not - and necessarily so, for that is what it means for it to be a 'fake', 'forgery' or 'replica'. And it is necessarily having that history that, in turn, makes the one sort of object necessarily more valuable than the other.[22]

Naturalness as a source of value

All of that is merely by way of working up some intuitions for the plausibility - and, more especially, of undermining intuitions about the implausibility of attaching value to a thing by virtue of the history of the process by which it has come about. Hopefully, the upshot of the previous discussion will have been to show that, Nozick notwithstanding, there is nothing outrageous about that as a general value stance.

That said, however, the question remains why we should attach special value to the *particular* sort of history which greens identify as a source of value. What is so especially valuable about something having come about through natural rather than through artificial human processes? In the words of one memorable title, 'What's wrong with plastic trees?'[23]

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[19] Marx, K. *Capital.* 3 volumes, New York: International Publishers, 1967.

[20] Marx, K. *The Grundrisse.* London: Macmillan, 1971.

[21] Glacken, C. *Traces on the Rhodian Shore.* Berkeley: University of California Press, 1967.

[22] Meadows, D. H,, D. L. Meadows, J. Randers, and W. W. Behrens, *The Limits to Growth.* New York: Universe Books, 1972.

[23] Mesjaros, I. "Ideology and Social Science," *Socialist Register,* 1972.

We might make a start on this question by assimilating it to the problem of fakes and forgeries.[24] The title just mentioned refers to events that are real, not merely feared or fantasized. When the city fathers discovered that real trees could no longer survive the polluted air surrounding the Los Angeles freeways, they tried planting plastic ones there instead. When they found that those plastic trees kept being chopped down, they professed genuine surprise. If so, I suspect that they were just about the only ones to be surprised.[25]

Most of us, confronting schemes involving the destruction of some especially unique bit of the natural landscape, would leap almost automatically to protest at its loss. But perhaps we are too quick to protest. Not so long ago, the Queensland government was proposing to allow the mining of sand on Fraser Island - the only purely sand island on the Great Barrier Reef. When the scheme met with fierce protests, the Deputy Prime Minister of Australia of the time ventured the opinion that such mining could be resumed just as soon as 'the community becomes more informed and more enlightened as to what reclamation work-is being carried out by mining companies'. The same is often said by, or anyway on behalf of. a frequent despoiler of the American landscape, the DS Army Corps of Engineers.[26]

Now, we might doubt those claims on any of several grounds. When confronting a particularly notorious mining company or the Army Corps of Engineers making such claims, we might well doubt their sincerity, or their capacity; or their willingness. But let us set all those doubts to one side.

Let us imagine, purely for the sake of argument, a best-case scenario. Let us suppose - *per impossibile,* perhaps - that the developers in question offer an iron-clad, legally binding promise to recreate that landscape just as it was, once they have finished. Let us suppose that they provide detailed plans for how they would go about doing so. Let us suppose that we find those plans absolutely convincing. In short, let us suppose that we have no doubt that the landscape will indeed look just the same after they have finished as it did before they began.

Still, I think, we are inclined to object to the proposal. ' Even if we are convinced that the landscape will look the same, still it will not really *be* the same. Previously it has been the work of nature; afterwards, it will have become the work of humanity. However talented as restorationists the developers' landscape architects might be, the one thing that they cannot possibly replicate is history. They might be able to restore something perfectly in every other respect, but the very act of restoration itself necessarily alters irrevocably a thing's history.

Just as a talented forger might replicate the *Mona Lisa* perfectly, so too might landscape architects replicate nature perfectly. But just as the one amounts to 'faking'

[24] Mill, J. S. *Principles of Political Economy.* Toronto: University of Toronto Press, 1965. «

[25] Oilman, B. *Alienation: Marx's Conception of Man in Capitalist Society.* London: Cambridge University Press, 1971.

[26] Oilman, B. "Marxism and Political Science: Prolegomenon to a Debate on Marx's Method," *Politics and Society,* 3 (1973), pp. 491-510.

a painting, so too does the other amount to 'faking' nature.[27] Fakes might look the same as the originals but they cannot possibly be the same, for they have different histories and different origins. And in so far as the historical origins of the original are what matter to us, neither can those fakes possibly have the same value for us.

The point of producing fakes, in general, is presumably always to substitute (and, indeed, to attempt to pass off) something less valuable for something more valuable. But whereas in the case of the faked *Mona Lisa* the fake might exist without the original being extinguished, in the case of the faked landscape here in view the fake - the restored landscape - would be in place of the original. It is not just a matter of creating in the world something extra, with less (but nonetheless real) value. It is there a matter of extinguishing something more valuable and replacing it with something less valuable. To adapt the examples from aesthetics discussed earlier, it is as if we were to make a cast of the *Pietd* through some process which would destroy the original. Even if we could, using that cast, produce a perfect replica'of the *Pietd* - even if we could produce such replicas in virtually unlimited quantities - I take it that few would be tempted by the prospect.

Putting the point in terms of 'fakery' rather begs the question, of course. By pretending to be something that they are not, fakes necessarily concede their own inferiority. The things which they pretend to be must be somehow superior to that which they actually are, or else there simply would be no point in the pretence.

But it is not just the element of fraud that makes fakes, forgeries and counterfeits less valuable. The same is true (to a lesser but nonetheless significant extent) with restorations, reproductions and replicas, where the element of fraud is absent. It is the very act of copying something else which, in the end, crucially concedes the superiority of that which is copied. What is the point of copying, if you could have done better all by yourself, starting from scratch?

The developers in our hypothetical example can thus ill afford to accept 'faking nature' as a description of what they propose doing. That much was probably obvious from the start. The more surprising implication of those observations just offered is that it is not merely the pejorative description which the developers must shun. If they are to avoid conceding the necessary inferiority of the landscape which they will leave, as compared to that which they had found, they must not even try to recreate the original. They must instead assert that they will create something different from and better than - or, anyway, not comparable to - the natural landscape which their handiwork will replace.

Landscape architects themselves may well suffer just such hubris. They may well regard that claim, however immodest, as being nonetheless perfectly true. Still, few firms proposing to despoil the natural environment would be willing to take any such

[27] Pearson, H. "The Economy Has No Surplus: A Critique of a Theory of Development," in K. Polanyi, C. M. Arensberg, and H. W. Pearson. *Trade and Market in Early Empires.* Glencoe, Illinois: Free Press, 1957.

stance publicly. That does not necessarily mean that they think that it is untrue, of course. They might merely regard it as impolitic. But even for such a claim to be impolitic, it is necessarily the case that it must be seen as untrue - indeed, untrue to the point of outrage - in the eyes of the public at large.

Why should that be so? There are many possible reasons, of very different characters. In practice, such attitudes may reflect no more than well-founded scepticism about the strictly limited capacities of restorationists. We may suppose that the technology is simply not (or, anyway, not yet) up to the task.

That is undoubtedly true at present. As long as it remains so, that is a sufficiently compelling consideration in and of itself: there is hardly any pragmatic need to search for further arguments against any proposal involving destroying-then-recreating nature.

It that were all that was involved in objections to those proposals, though, then objections to restoring nature would be merely contingent rather than analytically necessary ones - as the parenthetical 'anyway, not yet' in the earlier formulation was meant to emphasize. Suppose technology someday makes sufficient strides to enable it, finally, to replicate nature perfectly.[28] Once a perfect replica really can be produced, we would have no basis for continuing-to object - on these grounds, at least - to a strategy of destroying- then-recreating nature.

For larger philosophical purposes, then, we need to probe further. In the w orld as we know it, it may well be enough to say that the restorers just are not good enough. But for deeper theoretical purposes, we must try - however hard it may be - to contemplate a world where the restorer's art really has been mastered to perfection. Would we still have any objections, even if restorers could guarantee with complete certainty to restore the natural world to precisely its original state, after developers had despoiled it? And if so, how might we ground such objections?

For a clue, let us return to the problem of the value of the fake *Mona Lisa* as compared to that of the original. Intuitively, we want to say that the original is necessarily more valuable because of who painted it - Leonardo rather than some second-rate imitator. But if the agent responsible for the fake were so talented as to be able to reproduce the image *perfectly,* then she must be awfully good indeed. As sports commentators might say, 'on the day' she was every bit as good as Leonardo himself. And if it is talent - as represented in the capacity to paint a picture like *Mona Lisa* - that makes us value paintings created by Leonardo, why not value equally paintings done by others who were, at least on the day the painting was done, every bit as good as Leonardo himself? After all, the painter of the perfect copy painted a *Mona Lisa.* too.

In the case of the fake *Mona Lisa,* the reason for rejecting that line of thought is clear enough, I suppose. The reason we value Leonardo's works especially highly has to do not only with their own merits, taken individually, but also with who their creator was and with *all else* that he did. We value the *Mona Lisa* in part as a beautiful painting,

[28] Piaget, J. *Structuralism.* New York: Harper, 1970.

in its own right. But we also value it, in part, as a 'manifestation of Leonardo's genius', as I said in introducing this example.

It might at first seem odd to suggest that, had Leonardo accomplished less, we would value the *Mona Lisa* less: after all, it would retain all its ethereal beauty, even as a one-off. In other ways, however, this theory is far from counterintuitive. We undoubtedly do tend to value lesser works from the hand of Leonardo more than on their purely aesthetic merits we ought to do, just because they are from his hand.[29]-By the same token, we seem not to value paintings of considerable merit from those who produced only one such masterpiece in their lives as much as we do similar works from those who have produced a substantial corpus of such works - and, once again, this sort of analysis seems to help explain why.

Transpose that argument, now, from the realm of art into the realm of the natural environment. The analogy would suggest that one reason we might not be satisfied with restorers' recreation of nature is that they could only do it on a one-off basis. They might be able to reproduce any *particular* element in the natural world - just as the artistic forger might fortuitously manage to reproduce any particular image. But they would not be able to recreate nature as a whole, across the board, any more than the cleverest forger could manage to reproduce perfectly all of Leonardo's many works. And in so far as their talents are limited in this way, they deserve less respect than does the master craftsman whose talents are not similarly circumscribed.

This sort of argument carries us a considerable distance. But the philosopher's philosopher might insist - rightly, alas - that it still constitutes a merely contingent objection to a strategy of destroying-then-recreating nature. For it is a purely contingent matter that our capacity to create a perfect replica of nature as a whole is limited in this way. Although that is undeniably true, I am not at all sure that we need to be particularly embarrassed by that fact. After all, though a mere contingency, that contingency is virtually certain to be true for as long as any present policy-maker cares to contemplate. Still, for those who demand cast-iron arguments to show that nature's products are *necessarily* superior to humanity's, this argument will not (quite) suffice.

Much the same objection proves even more telling against another initially plausible analysis of this problem. Another reason for valuing Leonardo's original works more highly than the talented copyist's perfect reproductions has to do with their very *originality.* This analysis, too, would have us accord Leonardo's *Mona Lisa* extra value on account of who Leonardo was - but on this approach not merely, or even mainly, on account of what Leonardo actually did so much as on account of what all else he *might* have done. Even if the copyist can reproduce perfectly each work that Leonardo actually executed, copyists by their nature require an original from which to copy. They may be able to paint a perfect *Mona Lisa* once they have seen Leonardo's, but they could never have come up with the image themselves in the first place. That, on one

[29] Piaget, J. *The Principles of Genetic Epistemology.* London: Routledge and Kegan Paul, 1972.

plausible account, is why the copyists' work must necessarily be disvalued compared to that of the original artists whose work they copy.[30]

Something very much like that might be said about the special value of naturally occurring properties. Much of the sense of wonder that people feel in confronting the natural world has to do with the endless variation and rich complexity that they find within it. And if that is any large part of what we value about natural, then simply being able to restore or recreate or replicate nature perfectly is not good enough. In supplanting nature, we have not just taken away what was actually there; we will also have taken away what all else might have been or might yet be there.

However plausible that may be as an argument in the aesthetics, it probably has to be regarded as fatally flawed in its environmental application. There, it is not just the philosopher's philosopher who would rightly worry about the possibility that artificial processes might be able someday to mimic natural ones perfectly.[31] As regards living organisms, at least, it seems that modem technology is - alas - every bit as capable of generating genetic variation, by inducing mutations, as is any naturally occurring process. Furthermore, through the further perfecting of recombinant DNA technology we might even be able to meet or beat nature's capacity for 'creativity'. None of this is necessarily meant as praise for those modern technologies, mind you. But praise or criticism, those observations nonetheless undermine any analysis that traces the peculiar value of nature to its unique variability or creativity.

There is a parallel problem with various other ways of characterizing what is valuable about nature in terms of 'diversity', 'complexity' or 'fecundity'. Certainly those are attributes of natural creation, and certainly they are valued ones. But of course genetic engineering can (in principle, and probably even in practice) generate just as much diversity, complexity and fecundity - yet it would not be the same. It is not diversity, complexity or fecundity *as such,* that we value. It is instead the diversity, complexity and fecundity of natural processes and their products. The value of such attributes derives from the fact that they result from natural processes, rather than the other way around. Pointing to such attributes cannot, then, explain why we value the natural processes that manifest them.

To explain that, we are, I think, driven to an argument along the following lines. (1) People want to see some sense and pattern to their lives. (2) That requires, in turn, that their lives be set in some larger context. (3) The products of natural processes, untouched as they are by human hands, provides precisely that desired context.[32] In what follows, I shall discuss each of these propositions in turn.

The first step in that argument is a familiar philosophical theme growing out of recent critiques of utilitarianism. In the now-familiar objection, utilitarianism as sometimes construed would seem to recommend that people be constantly investing the

[30] Ricardo, D. *Principles of Political Economy.* London: Cambridge University Press, 1951.

[31] Ricardo, D. *The Works and Correspondence of David Ricardo.* Volume 2. London: Cambridge University Press, 1951.

[32] Harvey, D. *Social Justice and the City.* Baltimore: Johns Hopkins Press, 1973.

next ounce of their energies wherever it would do the most good for humanity at the margin. People following that advice would be spending twelve minutes raising money for starving Eritreans, two-and-a- half minutes feeding their own children, ten seconds signing a petition for world disarmament, eighteen minutes sweeping the floors of the local charity hospital, and so on. Such a life might be utility maximizing for the world at large. But from the inside, such a life would seem deeply unsatisfying. It would lack unity, coherence, purpose.[33] How telling that proposition is as a critique of utilitarianism is unclear.[34] But the truth of that basic proposition seems indisputable. What makes people's lives seem valuable to those who are living them is the unity and coherence of the projects comprising them.

The Green theory of value next adds a second thought closely related to that first one. Just as people want to see some unity and coherence among the various plans and projects that comprise their lives, so too do they want to see those plans and projects set in some larger context outside their own lives.[35] That is not necessarily to say that they want to 'change the world' or even necessarily that they want to 'make their mark on the world'. It is just to say that, whatever the source of people's undeniable desire to see some coherence within their lives, the same thing would naturally lead them to want to see some continuity between their inner worlds and the external world. Whatever makes people strive for harmony within their own lives would also lead them to strive to lead their lives in harmony with the external world.[36]

The third and final step in the argument is just to say that natural processes provide just such a larger context. The products of a purely natural process are ones that are, by definition, not the product of deliberate human design.[37] Things that are natural in that sense therefore provide a context of something outside of ourselves - a larger context within which we can set our own life plans and projects.[38]

The idea that what is especially valuable about the products of natural processes is that they are products of something larger than ourselves is, of course, a familiar enough theme throughout history. Its most powerful restatement among recent green writers comes in Bill McKibben's *The End of Nature.* 'We have deprived nature of its independence, and that is fatal to its meaning,' McKibben writes. 'Nature's independence *is* its meaning; without it there is nothing but us.' Consequently, 'We can no longer imagine that we are part of something larger than ourselves - that is what all this boils down to.'[39]

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[33] Spoehr, A. "Cultural Differences in the Interpretation of Natural Resources," in W. L. Thomas (ed.), *Man's Role in Changing the Face of the Earth.* Chicago: Chicago University Press, 1956.

[34] Tarascio, V. J. *Pareto's Methodological Approach to Economics.* Chapel Hill, North Carolina: University of North Carolina Press, 1966.

[35] Vogt, W. *The Road to Survival,* New York: W. Sloane Associates, 1948.

[36] Wittgenstein, L. *Philosophical Investigations.* Oxford: Oxford University Press, 1958.

[37] Zinke, G. W. *The Problem of Malthus: Must Progress End in Overpopulation.* University of Colorado Studies, Series in Economics, No. 5, Boulder, Colorado, 1967.

[38] Overseas Development Administration briefing.

[39] 'Less pesticides do not mean less rice' FAO press release, 11 May 1992.

One particularly striking illustration of this theme is humanly engineered changes to the global climate. 'The greenhouse effect is', for McKibben, 'a more apt name than those who coined it imagined... We have built a greenhouse, a *human creation,* where once there bloomed a sweet and wild garden.'[40] McKibben continues,

By changing the weather, we make every spot on earth man-made and artificial... A child born now will never know a natural summer, a natural autumn, winter, or spring. Summer is going extinct, replaced by something else that will be called 'summer'. This new summer will retain some of its relative characteristics - it will be hotter than the rest of the year, for instance, and the time of year when crops grow - but it will not be summer, just as even the best prosthesis is not a leg. *

In short, not even the weather can any longer be seen as a manifestation of some forces that are larger than ourselves.

When I join writers like McKibben in saying that we value the products of natural processes precisely because they are the products of something larger than ourselves, I trust that no questions are being begged by the word 'larger'. That is the standard way of putting the point, to be sure. But for my purposes, it-would do equally well to say that the processes in question are things outside' of ourselves.[41] The point is merely that such natural processes, and our relation to them, serve to fix our place in the external world. They help to 'locate the self, in a deep psychological sense that matters enormously to people.[42]

To say they 'give meaning to our lives' would be to skate dangerously near thin theological ice. Some green writers, of course, have no hesitation in casting their case in explicitly spiritual terms.[43] But that makes green arguments dependent upon, and (since arguments are only as strong as their weakest links) no stronger than, the arguments such writers might offer for those larger theological propositions. Those are notoriously contentious matters, on which opinion is deeply divided and knock-down arguments apparently impossible. Linking the green case to spiritual values in this way thus seems to borrow an awful lot of trouble - and unnecessarily so, as it happens.

For my part, therefore, I would wish to remain as agnostic as possible as regards any possible metaphysical load that such arguments might be asked to bear. There may or may not be any 'meaning' or 'purpose' underlying the larger natural order. There might not even be very much orderliness to the natural order. As John Stuart Mill inveighs, 'Even the lover of "order" which is thought to be a following of the ways of Nature, is in fact a contradiction of them. All which people are accustomed

[40] *CDC Development Report May 1993* (London: The Commonwealth Development Corporation 1993).

[41] *World Bank World Development Report 1992* p. 135.

[42] Overseas Development Administration briefing.

[43] Beringer, E., Bale, M., Hayes, P. and Lazarus. C., 'Assessing and monitoring the risk of releasing genetically manipulated organisms', first published in Proceedings of the Royal Society of Edinburgh B100, 1992 (Symposium: Opportunities and Problems in Plant Biotechnology) and then by ICI Seeds, 1992.

to deprecate as "disorder" and its consequences, is precisely a counterpart of Nature's ways. Anarchy and the Reign of Terror are overmatched in injustice, ruin, and death, by a hurricane and a pestilence.'[44] Be all that as it may, it is nonetheless undeniably true that there are forces in nature operating independently of us - and, increasingly, in spite of us. And whether people regard them as friend or foe or as being oblivious to their fate, it is nonetheless undeniably true that they derive deep satisfaction from seeing their lives as being set in some such larger contexts, however meaningless or disorderly they might be.

How all of this would impinge upon arguments for respecting nature should be clear enough. Suppose that what people value about nature's creation is that it was produced by processes larger than (or merely outside of) humanity. Then an object loses that value-imparting property once it has been restored, replicated or recreated through human interventions.

Restoration may still be preferable to the alternatives. Restoring as best we can a once 'wild and scenic river' to its former glory may well be better than devising a new and wholly artificial watercourse; reclaiming waste land to create a New Forest, rather like the old that used to be there, might be better (especially after several decades of letting nature take its course) than planting .a wholly artificial ornamental garden on the site. Letting clear-cut lands regenerate vegetation might be better than letting cattle or sheep continue grazing them to the ground. Given the degraded state of various environments which have been bequeathed to us, 'environmental restoration' absorbs much of the energy of the environmental movement as a whole.[45]

Nonetheless, a restored bit of nature is necessarily not as valuable as something similar that has been 'untouched by human hands'. Even if we simply stand back and 'let nature take its course' once again, and even if after several decades most of what we see is the handiwork of nature rather than of humanity, there will almost inevitably still be human residues in the final product. Even if we subsequently 'let nature take its course', *which* course it has taken will typically have been dictated by that human intervention in the causal history. To the extent that that is true, even things that are largely the product of natural regeneration are still to some (perhaps significant) degree the product of human handiwork. And they are, on the green theory of value, that much less valuable for their being so.

Humanity and nature

Two related sorts of objections can easily be anticipated to the general line of argument that I have here been developing. Because they are so easily to be anticipated, and so substantively important, it is worth sketching in advance my general response

[44] Straughan, R., *Ethics, Morality and Crop Biotechnology* (ICI Seeds, 1992).

[45] 54 Brown, M. and Goldin, L, *The Future of Agriculture, Developing Country Implications* (Paris: Organisation for Economic Co-Operation and Development, Development Centre, 1992).

to each. And, as it happens, this turns out to be more than a purely negative exercise of parrying attacks. Responding to these challenges actually gives me an opportunity to develop my own positive analysis of green value theory in some practically important directions.

Both of the objections I have in view here pertain to the question of the place of humanity in nature. The second objection, which I shall address shortly, queries the artificiality of any separation between humanity and nature. People are part of nature, too, it insists - and, I think, rightly so. I think I can concede that point and still sustain all the arguments that I really want to be making here. Before addressing that issue, however, let us consider an even more predictable complaint from self-styled 'deep ecologists'.

Values and valuers

The most stinging form that that objection might take would be to assert that, on the account of it just given, the green theory of value would reduce right back to the neoclassical welfare economic one. That complaint is all the more stinging for its being partially true. Both the neoclassical welfare economic theory and the green theory of value as I have presented it link the value of nature to the satisfaction that consumers derive from it, in one way or another

But when I say that people derive deep satisfaction from seeing their lives being set in some larger context, 'deep' satisfaction ought not to be read simply as 'great' satisfaction. The point of calling it deep is that all other sorts of satisfaction are somehow parasitic upon this sort, in turn. People must be able to see some sense and pattern in their own lives if they are to be able to see sense or value in any other more specific project they might pursue as part of their larger life plans. And that in turn presupposes that their lives form part of something outside of themselves, individually or collectively.

Even if my version of the green theory of value does not reduce back to the neoclassical welfare economic one, though, it still seems to come down decisively on the 'shallow' side of the 'deep ecology' debate. The question at the centre of that dispute, recall, is whether natural objects have value in and of themselves or whether they have value only in relation to people and their 54 purposes.

The green theory of value, on my analysis of it, would seem to deny the former and affirm the latter. It traces the value of nature to its value to human beings and the place it occupies in their lives. That conclusion runs contrary to the self-conception of most greens - certainly, at least, to the self-conceptions of the most vociferous and dedicated among them, who most assuredly see themselves as deep ecologists.[46]

Let us not allow the terms of this debate to polarize too strongly too quickly, though. Most of all, let us not allow the debate to be decided by cheap rhetorical tricks. Surely, we might naively assume, anyone who genuinely cares about the environment should be a deep ecologist. Surely 'shallow' ecologists are simply lacking in moral fibre; they

[46] Glacken, C. *Traces on the Rhodian Shore.* Berkeley: University of California Press, 1967.

are just insufficiently committed to the cause. Surely that follows straight-forwardly, just from the meaning of the terms 'shallow' and deep' respectively. Or at least so greens suppose, I suspect, in signing so unanimously and so firmly on to the principles of deep ecology.

But if that is all there is to the argument, then it is an argument that works just through a 'persuasive definitions' alone. Were the description of each respective position actually warranted, then the conclusion that true greens should shun shallow ecology would indeed follow straight-forwardly. After all, who would embrace a shallow view of any subject which one genuinely cares about, when a deeper view is available[47]

The question, though, is whether or not the description really is warranted. Implicit in the shallow/deep dichotomy is, in effect, an assertion that the deeper view of the matter contains all the truths of the shallower view, plus some additional ones as well. The truth of the matter is, of course, otherwise. The shallow view is in no sense a proper subset of the deep one. Rather, the two are simply *different* views. Which is the right view is, therefore, a genuinely open question. And I see no reason, in principle, why greens themselves - once they have overcome the prejudicially loaded language involved in the deep ecology debate — should not be prepared to consider shallower versions of the deep ecology creed.

That last phrase has been cast in comparative terms quite deliberately. In assessing these issues, it is important to realize that there are a great many gradations of shallowness and depth, here as elsewhere. The deepest ecology, perhaps, would be one claiming that things have value quite independently of the existence of any conscious valuers. Thus, the deepest ecologists would say, it would be wrong for the 'last person' left on earth to push the nuclear button to destroy all non-human creation as that person was about to expire.[48] Conversely, the shallowest ecologist - an economist, perhaps - would say that things can have value only in relation to human uses, and things should be saved (if at all) only for possible subsequent human use. In between those extremes are a variety of intermediate positions.

The green theory of value that I have been advancing here is one such halfway house. It does indeed entail the proposition that things can only have value *'in relation to* us'. But that is very different from the proposition, favoured by the shallowest ecologist-cum-economist, that things can 'only have value *to* us' or *"for* us'.[49] Saying that things

[47] These estimates are based on 1986 statistics from WRI and IIED, *World Resources, 1988-89* (Basic Books, New York, 1988). Note that the assumptions in the statement include that energy-use differentials will remain the same as the babies grow up, and that technological changes will be parallel in all nations. Statistics are also very rough estimates, especially in the poorer nations, and a disproportionately larger fraction of damage from energy use is likely to come from *non-commercial* energy use (such as agricultural burning and the gathering of fuelwood by individual families). None of this changes the validity of the basic point.

[48] Brown M. and Goldin, I., *The Future of Agriculture, Developing Country Implications (Paris-*. OECD, 1992).

[49] Dregne, op. cit.

can have value only in relation to us is very different from saying that the value of nature reduces to purely human interests.[5U]

The proposition I am advancing asserts merely that: (1) values presuppose valuers, that valuing presupposes consciousness; and, perhaps slightly more tendentiously, (2) human beings are the only beings on earth with a 'sufficiently sophisticated consciousness' for this purpose.[50] That being so, it is necessarily the case that 'human beings figure essentially' in deriving value from nature. But to say that the Good of nature can only be realized through interactions with human consciousness is not to say that nature is 'good' merely because it is, in some crassly material way or even in some deeply spiritual way either, 'good for' the human beings involved.[51]

So much for distinguishing my view from that of the shallowest ecologist. Now let me say something less purely defensively and more positively to suggest how my view might be regarded as at least moderately deep. In contrast to the claims of the most shallow ecologists, it is not my view that values are all in people's heads. The existence of people, as valuers, may be crucial in imparting value. But some feature of nature, existing independently of human beings, is crucial in this process, also. Just as you cannot reduce the value of nature wholly to natural values (as the deepest ecologists might attempt), neither can you reduce the value of nature wholly to human values (as the shallowest ecologists would wish). There are two independent factors at work here.

On my analysis, natural objects have certain value-imparting characteristics. They actually create value when - *only* when - in the presence of (human) consciousness. But those characteristics of nature that, on my analysis, are crucial in imparting value is the characteristic of something 'being part -of something larger than/outside of ourselves'. That characteristic, by definition, must necessarily be separate from and independent of humanity. Hence, those value-imparting properties (if not the values themselves) exist independently of humanity. And that, I submit, is sufficient to qualify mine as at least a 'moderately deep ecology'.

Humanity as part of nature

So much for the first easily foreseen objection to my analysis of the green theory of value. Let us now consider a second objection, still very much a variation on the general theme of the place of humanity in nature.

One way of describing the green theory of value I have been advancing is to say - as I have myself been saying, as a convenient kind of shorthand - that it attaches special value to those parts of natural creation that have been untouched by human hands. But 'human hands', it might reasonably be objected, are part of the natural order too. When someone insists that some bit of the landscape should be untouched by human

[50] R. Nelson, quoted in B. Forse, "The Myth of the Marching Desert," *New Scientist,* Feb. 4, 1989, p. 32.

[51] Ibid.

hands, that is not to insist that nature be kept separate from something unnatural. Rather, it is to insist that one part of nature be kept separate from another.

The problem, notice, is not the relatively trivial definitional one. It is not that we cannot make meaningful distinctions between these two different aspects of nature. We might easily enough distinguish a sense of the term 'nature' according to which it would refer 'only to what takes place without the agency, or without the voluntary and intentional agency, of , 62 man .

The challenge is not to draw some such distinction between the results of human and of non-human (stipulatively 'natural') processes. The challenge is instead to justify attaching any moral importance to the distinction, thus drawn. According to the green theory it is the naturalness of the process that imparts value. But if so, then why is the sort of voluntary, intentional agency associated with *human* nature any less natural - or hence any less valuable - than other aspects of the natural order?

Only those with a very strong sense of humanity's very special place in the order of creation could fail to feel the force of this objection. Yet the objection, if allowed free rein, would threaten to license wanton human destruction of (other parts of) the natural environment, on the grounds that anything that humans do is natural, too. If as Mill says, 'human nature cannot help conforming to Nature', then it follows that 'everything we do is part of nature. ... in that primary sense', as one contemporary philosopher has inferred.[52] The upshot would be to license wanton human destruction of (other parts of) the natural environment, on the grounds that anything that humans do is natural, too. That, clearly, cannot be right. Clearly, I think, we ought be seeking some middle ground in this dispute.

One form this middle ground might take is to say that if we respect and value the products of natural creation, then we ought take steps to protect that natural creation from destruction - even by natural forces. We should, on that account, dam the Colorado River above the Grand Canyon so that it does not undo through future flooding all the wonderful work that it has done through past erosion; or we should artificially reinforce the lip of Niagara Falls so that the Niagara River does not eat away at the perfect horseshoe falls that its cascading water has created through past 64 erosion.

That line is not altogether appealing, though. For one thing, it attaches evaluative significance to a distinction between creation and destruction in a way which seems wholly unwarranted, even within its own theoretical terms.[53] On the green theory of value, what imparts value to an outcome is just the naturalness of the historical process

[52] P. R. Ehrlich, *The Machinery of Nature* (Simon and Schuster, New York, 1986); David Hopcraft, personal communication

[53] Ferguson and Ferguson, *Sacred Cows at the Public Trough.* Overstocking in the U.S. West has no significant human-population component, since the relatively tiny amount of beef produced does not go to hungry people or even allow pressures to be reduced on tropical forests being cleared for pasture. It is mostly a story of greed, stupidity, and the ignorance and incompetence of people ranging from senators to bureaucrats, as this fine book shows.

through which it has come about. On that account, two outcomes that have come about through equally natural processes ought be equally valuable. There seems no room in that model for distinguishing further between outcomes that are constructive or destructive, between ones that result in some object's existing that did not before or ones that result in some object's disappearing or disintegrating or increasing in entropy.

In an unjustifiably neglected essay on 'Nature', John Stuart Mill poses the problem for us in an unusually stark form. Either humans are part of nature, too - in which case the results of human interventions are as natural as the state of things before humans intervened - or else whatever humans do to nature necessarily counts (from the human perspective at least) as an improvement on nature. Mill's own words are worth quoting at length on this point:

If the natural course of things were perfectly right and satisfactory, to act at all [to improve upon nature] would be gratuitous meddling ... If the artificial is not better than the natural, to what end are all the acts of life? To dig, to plough, to build, to wear clothes, are direct infringements of the injunction to follow nature . . . [But] everybody professes to admire many great triumphs of Art over Nature: the junction by bridges of shores which Nature has made separate, the draining of Nature's marshes, the excavation of her wells, the dragging to light of what she has buried at immense depths in the earth; the turning away of her thunderbolts by lightening rods, of her inundations by embankments, of her ocean by breakwaters. But to commend these and similar feats, is to acknowledge that the ways of Nature are to be conquered, not obeyed . . . All praise of Civilization, or Art, or Contrivance, is so much dispraise of Nature; an admission of imperfection, which it is man's business, and merit, to be always - endeavouring to correct or mitigate.[54]

Now. I suspect that the automatic first response, of greens or anyone else, to Mill's dilemma would be to deny its second premise. There is no reason to believe that every human intervention improves the world. Nor is there is any compelling reason - in logic, still less in recent experience - to suppose even that all human interventions taken together make for a better world than would have existed absent such interventions. Nor can we even be confident that any given intervention will have had consequences that are on balance beneficial when all is said and done, in light of the various knock-on effects that any action will inevitably have into the distant future.

Thus, we can easily enough avoid being impaled on the horns of Mill's dilemma by pointing out that there is a third possibility which Mill himself has missed. That amounts to admitting that human interventions are not natural - but then going on to point out that, contrary to Mill's supposition, being non-natural does not necessarily ensure that they will constitute improvements upon nature, either.

That argument is true and important. And it is, in itself, more than enough to defuse Mill's dilemma. But there is another way of evading Mill's dilemma that is even more

[54] Southern African Development Coordination Conference, *SADCC Agriculture: Toward2000*

in keeping with the green theory of value that I have been developing here. Whereas the reply just given basically queries the second of Mill's premises, this alternative reply queries the first.

Greens might say that, yes, humans are part of nature. But greens might go on to say, not everything that human beings do - not all forms of human society, not all forms of human activity - are *equally* natural. Some may be more natural than others. And if so, then some forms of human society and human activity would actually be more valuable than others, purely on the basis of a green theory of value that assigns more value to the natural over the artificial.

That is the version of the argument which I want to explore here at greater length. It is important to recognize that humanity is part of nature and that human interventions are natural, too. But surely it is wrong to leap from that to treating all human interventions as if they were equally natural. We want to make - and, if I am right about it, the green theory of value allows us to make - some important distinctions between different modes of human intervention.

As a start, let us consider the case of the English hedgerows. Groups like the Council for the Protection of Rural England are much exercised to prevent hedgerows from being ploughed under in order to merge small fields and make them more amenable to modern, mechanized farming methods. But those hedgerows, like many of the other aspects of the natural environment that conservationists most cherish, are not in fact purely the work of (non-human) natural forces.

We might, of course, value hedgerows for a variety of instrumental reasons. They provide habitats for a considerable amount of wildlife that would otherwise disappear, and so on. Conservationists would of course make much of those instrumental arguments in framing their case for hedgerow preservation. But over and above those instrumental reasons for preserving hedgerows, they want to claim that we would be destroying something intrinsically valuable about the English countryside by eradicating all the hedgerows.

The thing to notice, in the context of the present argument, is that that 'intrinsically valuable' aspect of the countryside is in no sense a natural part of the countryside. Hedgerows are human artefacts - not just in the weaker sense of being residual by-products of the places where humans choose to plough and where they do not, but also in the stronger sense of being quite deliberate, intentional human creations. Hedgerows and the peculiar habitats associated with them simply did not exist before human cultivation. They were created, intentionally, as part of a deliberate policy of clearing the primordial forests and of carving up and fencing off the commons. So what conservationists today are wanting to preserve as part of the quintessentially English environment is not the product of nature but rather the product of past phases of English society.

The same can obviously be said in trumps for other aspects of English villages - ancient churches, old houses and suchlike - that such conservationist groups would also

want to preserve. They would less often phrase those claims in terms of protecting the environment, perhaps.[55]' But the arguments given for preservation of the surrounding hedgerows are obviously of a cloth with the arguments given for preservation of the village green and surrounding structures.

Ancient monuments of that sort can obviously qualify for protection on account of their *historical* value. They might qualify for protection on account of their *ethnographic* value, as representative of dead or dying cultures. The question before us is to what extent they can qualify for protection on account of value derived from their being part of *nature,* somehow construed.

These things were all shaped by human hands rather than natural forces, to be sure. So they do not, on the face of things, qualify for the strong sort of special status, described by the green theory of value above. People cannot set their lives in the context of something larger than themselves if that context is merely one which they have themselves created.

That argument might move a little too fast, though, in sliding between individual and group levels of analysis. If the issue is merely one of setting your own life in the context of something larger than yourself, then setting it in the context of any history larger than your own personal history can qualify The history of your group - race, club, nation, species - could count as that. Hence, things that have value on account of their (purely human) history might well derive value from a source *akin* to, if not strictly identical to, that imparting value to naturally occurring objects in the non-human world.

There is, then, a case to be made for the conservation of things in general on account of their history, whether human or natural. That provides an argument which is both intellectually important and politically powerful for the preservation of ancient monuments and historical landmarks.[56] I do not want to say anything here to undermine that case. Rather, I want to supplement it with yet another.[57]

The distinction that will prove crucial for this further argument is between forms of human society in which people live broadly in harmony with nature and ones which attempt to impose upon and tyrannize over nature. An example of the former is the small-scale, close-to-the-land culture of the medieval English cultivator, as represented by the traditional English village, its church, houses and hedgerows.[58] An example of the latter is Los Angeles: a megalopolis of several million so inappropriately sited on a semi-arid plain that it can provide its citizens with adequate water only by piping

(FAO, Rome, Italy, 1984).

[55] Godelier, M. *Rationality and Irrationality in Economics.* London: New Left Books, 1972.

[56] The Everglades have been under threat for a long time; see J. Harte and R. Socolow, "The Everglades: Wilderness Versus Rampant Land Development in South Florida," in J. Harte and R. Socolow, eds., *Patient Earth* (Holt, Rinehart and Winston, New York, 1971), pp 181-202.

[57] A distinctive, pure white south-Florida population of the common great blue heron.

[58] G. V. N. Powell, A. H. Powell, and N. K. Paul, "Brother, Can You Spare a Fish?," *Natural History,* February 1988, pp. 34-38.

it in from hundreds of miles away. Or, if that contrast is too stark to grasp firmly, consider the contrast between the English landscape garden and French formal gardens of the same period: although both were intentional human creations, one attempted to harmonize with nature while the other superimposed its own order upon it.

Green commentators are certainly sensitive to such distinctions. 'An ecological policy', according to the 1983 manifesto of the German Greens, 'means understanding ourselves and our environment as part of nature', which would lead, in turn, to 'an all-encompassing rejection of an economy of exploitation and the uncontrolled pillage of natural resources and raw materials, as well as refraining from destructive intervention in the circuits of the natural ecosystem'.[59] Similarly, 'ecological wisdom' according to the North American greens' *Ten Key Values* amounts to appreciating 'that we are *part* of nature, not on top of it'.[60]

The temptation at this point is of course to say that one mode of life is more 'natural' than the other, and on the green theory more valuable in consequence. In attempting to give the flavour of this response to Mill's challenge, I have (as a kind of shorthand, once again) been speaking this way myself. But, in the end, I think a slightly more nuanced response really is going to be required.

Certainly English village life requires less - though, in the end, nonetheless considerable - human intervention into various natural processes in order to sustain it. But if humanity is to be regarded as part of nature, then there can be no grounds for disparaging as 'artificial' the interventions required to sustain civilization (if it can be called that) in Los Angeles. Human interventions are required, to be sure: the natural rainfall and river flow and water table are not adequate to meet the demands of the population now resident there. But, on this analysis, there is nothing artificial about human interventions. They are part of nature, too.

What we can still say, I think, is this. People who live more in harmony with nature - in traditional English villages, rather than postmodern Los Angeles - are living more in a context that is outside of themselves, individually or even collectively. Even those who merely visit those places from time to time are reminded, by the existence of such places, of that larger context in which they might see (if not live) their own lives. Places and peoples embodying such down-to-earth lifestyles are well worth preserving and conserving (or indeed creating or recreating, if they have been lost) as a means of providing everyone, whether directly party to them or not, of this larger perspective on their own lives.

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[59] U.S. Bureau of the Census, *Statistical Abstract of the United States: 1982-83 (103d ed.; Washington, D. C, 1982). The Chinese number is said to have increased to 3.2 million by 1985.*

[60] These estimates are based on 1986 statistics from WRI and IIED, *World Resources, 1988-89* (Basic Books, New York, 1988). Note that the assumptions in the statement include that energy-use differentials will remain the same as the babies grow up, and that technological changes will be parallel in all nations. Statistics are also very rough estimates, especially in the poorer nations, and a disproportionately larger fraction of damage from energy use is likely to come from *non-commercial* energy use (such as agricultural burning and the gathering of fuelwood by individual families). None of this changes the

All that can be claimed without claiming that St Mary Mead is more 'natural' than Los Angeles or hedgerows are more natural than freeways.[61] What is at issue is not the naturalness of its creation, since humanity is part of nature, and its creations are therefore natural too. What is at issue instead, on this account, is the modesty of its creation. It is not that, in the one, nature is 'in better balance'.[62] It is rather that, in the one case, humanity does not ride roughshod over other parts of nature. And that allows humanity to derive satisfaction from reflection upon its larger setting, in a way that it cannot where that larger setting is more exclusively of its own creation.

Saying that the small-scale English village is 'more in harmony with nature' is simply to say that it represents a form of life that is better, from the green perspective, than does a postmodern megalopolis. But 'better' is, of course, very different from 'best'. If our choice is between St Mary Mead or Los Angeles, then the former is clearly the option to be preferred. And that is, indeed, the form in which the choice is typically presented to us. But it should go without saying that there is nothing in this argument to suggest that, if faced with a choice between preserving pristine nature and grubbing it out to build even the most harmonious small-scale village development, we should of course prefer the former to the latter option in *that* pair.

Even with those caveats in place, environmentalists might still be hesitant to retreat quite so far as this. One particularly striking example recalls the great debate in Australia in the early 1980s over the Tasmanian proposal to dam the Franklin River below the Gordon.[63] Environmentalists cherished that part of the Tasmanian rain forest as genuine wilderness - a primordial part of the Australian landscape untouched by human hands. The then-new Hawke government was sympathetic to their cause, but damming rivers was under the constitution strictly a matter for the states. If the Commonwealth wanted to save the rain forest, it would have to find some grounds for claiming jurisdiction in the matter. The most promising turned out to be to appeal to international treaty obligations; the best way to do that turned out to be to get the area listed as a World Heritage site; and that turned out to depend," in large part, upon evidence of early human habitation on the site.

When anthropologists supplied just such evidence, though, their findings were greeted with considerable ambivalence among environmentalists. At one and the same time, environmentalists recognized the pragmatic importance of demonstrating human habitation on the site, but they also deeply wished that that was not so. There was a side of environmentalists that said that, in so far as the site is not really pristine nature after all, it is to that extent not so very much worth preserving after all. And I suspect that there is a similar side to almost every environmentalist. Most, I suspect,

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validity of the basic point.

[61] P. 130.

[62] It may well be more 'natural' for nature to be perpetually out of balance, displaying wild cycles with great regularity.

[63] This is a tale told me by the distinguished Australian prehistorian, John Mulvaney. It is retold in Griffiths (199J) and Mulvaney (1991).

would be tempted to equate 'unspoilt nature' with 'that part of nature that is *literally* untouched by human hands'.

One moral of the Franklin-below-Gordon story would be to say that insisting upon that would be to set the standard too high. There is virtually nowhere of which we can say that with confidence. The more important moral of the story, deriving from my larger theoretical argument, is that that is not an unacceptably bitter moral for environmentalists to swallow. For them to insist upon nature's being 'literally untouched by human hands' would be to set the standard unnecessarily high. If what we value about nature is that it allows us to see our own lives in some larger context, then we need not demand that that nature be *literally* untouched by human hands. We need demand merely that it have been touched only *lightly* - or if you prefer, *lovingly* - by them.

Some cultures, including earlier periods of our own cultures, have managed to live in harmony with nature rather than trying to dominate nature and bend and subordinate it to their will. Those cultures still shaped nature, in various ways, through their interactions with it. But they do so respectfully, and in a way that allowed nature to retain some real independence from humanity. And that, in turn, allows nature to retain its valued role for us.

This conclusion is particularly important in a setting - like Australia, or even Arizona - where so much of the case for environmental preservation is couched in terms of respect for the attitudes towards the land of the aboriginal inhabitants and their contemporary heirs. There is not an inch of the continent that is without meaning to the original Australians - not an inch that has not been incorporated into their legends, and perhaps not an inch that has not been touched by their hands at some point over the course of their long habitation.[64] That fact would come as desperately bad news to environmental purists who infer that there is not an inch of the continent that is pristine nature untouched by human hands. But recalling the attitude that the original inhabitants, both in Australia and the Americas, took towards the land that they knew so well, there is no need to see it as having been somehow contaminated by their touch in the way that it might have been by the the hand of more domineering subsequent settlers.

Green corollaries

I should admit straightaway that the green theory of value described above is my own invention. Anyway, it is *largely* my own invention. Some writers, describing and defending green positions, do sometimes talk in similar - sometimes very similar - ways. Others, however, cast the green case in what would seem to be very different terms indeed. They put what would appear to be very different values at centre stage. They

[64] As Jones (1991) suggests may well be the case

apparently want to relegate what I regard as central to what would seem to be, at most, bit roles.

Now, I cast the green case in the terms I do because I believe - and think I can show, in chapters 3 and 4 below - that that is the strongest way to make the case. A green political programme cast in those terms is the logically most compelling; and (as I shall argue in chapter 5, section 1 below) being logically compelling in these ways might just, for once, translate into its being politically compelling, too. Thus, in so far as my analysis of the core of green political theory is genuinely revisionary, so be it. If what I am proposing is a radical revision rather than a mere restatement of green values, then it is a revision that it would be politically prudent for greens to adopt forthwith.

Having made that plain, though, I now want to go on to show that a great many of the most familiar ways of putting the green case can in fact be accommodated to my own way of talking. The green theory of value I have elaborated above is, in fact, capable of subsuming many of the more standard green themes. Or. where it does not actually subsume them, it isolates the most defensible - and the most distinctively green - core of those more familiar propositions.

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Part 2: Animal rights

Introduction

The above questions were controversial long before the post-1960s era of modern environmentalism; in long-standing debates over issues like animal 'rights'. Regan (Ch. 12) succinctly presents the basic case for such rights. This rests not on contractarian lines (founded on possibly arbitrary, often utilitarian, criteria) where parties to a contract may be selected on the basis of their ability to reciprocate with the other parties. Rather, he uses, like Taylor above, the same Kantian argument as that for human rights: that we all have equal, inherent value, independent of external 'usefulness'. This basis, says Regan, is rationally the most satisfactory.

But despite their forcefulness and erudition, Regan's arguments are problematic for many. Some dissenters argue that animals cannot have rights because they cannot recognise or make claim to them: others that they cannot have rights because they lack interests apart from those defined by humans. (As Thompson (Ch. 6) notes, it might not matter to plants if they flower, or to species if they die out.) Feinberg (Ch. 13) reviews such arguments, reasoning that without awareness, expectation, belief, desire, aim and purpose (or at least, as with young babies and unborn generations, the *potential* to experience these things) individuals cannot be benefited. And it follows that without the capacity to be a beneficiary they cannot have rights.

The animal rights debate typically becomes polarised: with ethical humanists on one side (only humans are rational, have interests, self-awareness, language) and humane moralists (opposing such 'speciesism', arguing that only sentience and capacity for suffering should matter) on the other. But Callicott (Ch. 14) points out, neither side challenges the established and potentially restrictive *humane* ethic of conventional moral philosophy. He, however, prefers to anchor the ethical foundations of animal liberation to Leopold's *land* ethic. This goes beyond sentient animals to include plants, water, soils, etc., and beyond the reductive, atomistic Benthamite foundations of humane ethics to consider the integrity, stability and beauty of the whole biotic community (which therefore does not preclude killing individual animals).

Benton (Ch. 15) is another who wishes to shift the terms of the prevailing moral discourse about animal treatment. He identifies tensions in this discourse, where radical environmentalists (i) reject anthropocentric bases for valuing nature yet argue for animal rights based on their similarities with us, and (ii) reject the liberal-individualist paradigm yet argue for extending that paradigm to animals. This leads him to argue a case based on *social relations* between humans and animals. Because animals are included in human social practices, they are adversely affected by their positions in present, capitalist, socio-economic relations of power and dependency (e.g. through

humans asserting property rights). Like Regan, who demands nothing less than abolition of commercial animal agriculture, Benton regards the system allowing us to view animals as human resources as fundamentally wrong. But, for Benton, protecting animals is not a matter of rights-based strategies but of redistributing land ownership, regulation and management powers - a socialist rather than liberal solution.

Benton is one of several commentators who appreciate how a Marxian perspective can help to deepen understanding of the sources and potential solutions of environmental problems. However Benton (Ch. 15) also poses the question: 'which Marxian perspective?' This paper is valuable for its succinct recapitulation of Marx's description of historical development as a dialectical process involving species-wide, multi-faceted, progressive, augmentation of human transformative powers over nature. Furthermore, it distinguishes between Marx's early and later writings. The latter contains that Cartesian dualism which environmentalists often attack wherever they see it: in 'socialism' or capitalism. In describing the course of human development later Marx distinguishes fundamentally between humans and animals; effectively driving a wedge between the two. Yet, says Benton, if Marxists are going to criticise capitalism for alienating humans from nature they must criticise, too, the alienation which this later Marxian view also creates between the two. Benton finds much more of merit in defending animals in the earlier Marx's work. Here is a naturalism that sees humans as subcategories of animals - therefore resonating with environmentalism, but not in the simplistic, over-reductive ways of some ecocentrics. Rather it allows humans distinctive attributes enabling us to satisfy our needs (e.g. for food, shelter, community, self-realisation) uniquely - but the *needs* are *not* unique, being shared with other animals. Here Benton offers a philosophical basis supporting unity rather than dualism as a basis for animal treatment

12. The Case for Animal Rights

Tom Regan

Source: P. Singer (ed.), *In Defence of Animals.* Oxford: Basil Blackwell, 1985, pp. 13-26.

I regard myself as an advocate of animal rights - as a part of the animal rights movement. That movement, as I conceive it, is committed to a number of goals, including:

- the total abolition of the use of animals in science:
- the total dissolution of commercial animal agriculture;
- the total elimination of commercial and sport hunting and trapping.

There are, I know, people who profess to believe in animal rights but do not avow these goals. Factory farming, they say, is wrong - it violates animals' rights - but traditional animal agriculture is all right. Toxicity tests of cosmetics on animals violates their rights, but important medical research - cancer research, for example - does not. The clubbing of baby seals is abhorrent, but not the harvesting of adult seals. I used to think I understood this reasoning. Not any more. You don't change unjust institutions by tidying them up.

What's wrong - fundamentally wrong - with the way animals are treated isn't the details that vary from case to case. It's the whole system. The forlornness of the veal calf is pathetic, heart wrenching; the pulsing pain of the chimp with electrodes planted deep in her brain is repulsive; the slow, tortuous death of the racoon caught in the leg-hold trap is agonizing. But what is wrong isn't the pain, isn't the suffering, isn't the deprivation. These compound what's wrong. Sometimes - often - they make it much, much worse. But they are not the fundamental wrong.

The fundamental wrong is the system that allows us to view animals as *our resources,* here for *us* - to be eaten, or surgically manipulated, or exploited for sport or money. Once we accept this view of animals - as our resources - the rest is as predictable as it is regrettable. Why worry about their loneliness, their pain, their death? Since animals exist for us, to benefit us in one way or another, what harms them really doesn't matter - or matters only if it starts to bother us, makes us feel a trifle uneasy when we eat our veal escalope, for example. So, yes, let us get veal calves out of solitary confinement, give them more space, a little straw, a few companions. But let us keep our veal escalope.

But a little straw, more space and a few companions won't eliminate - won't even touch - the basic wrong that attaches to our viewing and treating these animals ds our resources. A veal calf killed to be eaten after living in close confinement is viewed and treated in this way: but so, too, is another who is raised (as they say) 'more humanely'. To right the wrong of our treatment of farm animals requires more than making rearing methods 'more humane'; it requires the total dissolution of commercial animal agriculture.

How we do this, whether we do it or, as in the case of animals in science, whether and how we abolish their use - these are to a large extent political questions. People must change their beliefs before they change their habits. Enough people, especially those elected to public office, must believe in change - must want it - before we will have laws that protect the rights of animals. This process of change is very complicated, very demanding, very exhausting, calling for the efforts of many hands in education, publicity, political organization and activity, down to the licking of envelopes and stamps. As a trained and practising philosopher, the sort of contribution I can make is limited but, I like to think, important. The currency of philosophy is ideas - their meaning and rational foundation - not the nuts and bolts of the legislative process, say, or the mechanics of community organization. That's what I have been exploring over the past ten years or so in my essays and talks and, most recently, in my book, *The Case for Animal Rights.* I believe the major conclusions I reach in the book are true because they are supported by the weight of the best arguments. I believe the idea of animal rights has reason, not just emotion, on its side.

In the space I have at my disposal here I can only sketch, in the barest outline, some of the main features of the book. It's main themes - and we should not be surprised by this - involve asking and answering deep, foundational moral questions about what morality is, how it should be understood and what is the best moral theory, all considered. I hope I can convey something of the shape I think this theory takes. The attempt to do this will be (to use a word a friendly critic once used to describe my work) cerebral, perhaps too cerebral. But this is misleading. My feelings about how animals are sometimes treated run just as deep and just as strong as those of my more volatile compatriots. Philosophers do - to use the jargon of the day - have a right side to their brains. If it's the left side we contribute (or mainly should), that's because what talents we have reside there.

How to proceed? We begin by asking how the moral status of animals has been understood by thinkers who deny that animals have rights. Then we test the mettle of their ideas by seeing how well they stand up under the heat of fair criticism. If we start our thinking in this way, we soon find that some people believe that we have no duties directly to animals, that we owe nothing to them, that we can do nothing that wrongs them. Rather, we can do wrong acts that involve animals, and so we have duties regarding them, though none to them. Such views may be called indirect duty views. By way of illustration: suppose your neighbour kicks your dog. Then your neighbour has done something wrong. But not to your dog. The wrong that has been done is

a wrong to you. After all, it is wrong to upset people, and your neighbour's kicking your dog upsets you. So you are the one who is wronged, not your dog. Or again: by kicking your dog your neighbour damages your property. And since it is wrong to damage another person's property, your neighbour has done something wrong - to you, of course, not to your dog. "lour neighbour no more wrongs your dog than your car would be wronged if the windshield were smashed. Your neighbour's duties involving your dog are indirect duties to you. More generally, all of our duties regarding animals are indirect duties to one another - to humanity.

How could someone try to justify such a view? Someone might say that your dog doesn't feel anything and so isn't hurt by your neighbour's kick, doesn't care about the pain since none is felt, is as unaware of anything as is your windshield. Someone might say this, but no rational person will, since, among other considerations, such a view will commit anyone who holds it to the position that no human being feels pain either - that human beings also don't care about what happens to them. A second possibility is that though both humans and your dog are hurt when kicked, it is only human pain that matters. But, again, no rational person can believe this. Pain is pain wherever it occurs. If your neighbour's causing you pain is wrong because of the pain that is caused, we cannot rationally ignore or dismiss the moral relevance of the pain that your dog feels.

Philosophers who hold indirect duty views - and many still do - have come to understand that they must avoid the two defects just noted: that is, both the view that animals don't feel anything as well as the idea that only human pain can be morally relevant. Among such thinkers the sort of view now favoured is one or other form of what is called *contractarianism.*

Here, very crudely, is the root idea: morality consists of a set of rules that individuals voluntarily agree to abide by, as we do when we sign a contract (hence the name contractarianism). Those who understand and accept the terms of the contract are covered directly; they have rights created and recognized by, and protected in, the contract. And these contractors can also have protection spelled out for others who, though they lack the ability to understand morality and so cannot sign the contract themselves, are loved or cherished by those who can. Thus young children, for example, are unable to sign contracts and lack rights. But they are protected by the contract none the less because of the sentimental interests of others, most notably their parents. So we have, then, duties involving these children, duties regarding them, but no duties to them. Qur duties in their case are indirect duties to other human beings, usually their parents.

As for animals, since they cannot understand contracts, they obviously cannot sign; and since they cannot sign, they have no rights. Like children, however, some animals are the objects of the sentimental interest of others. You, for example, love your dog or cat. So those animals that enough people care about (companion animals, whales, baby seals, the American bald eagle), though they lack rights themselves, will be protected because of the sentimental interests of people. I have, then, according to

contractarianism, no duty directly to your dog or any other animal, not even the duty not to cause them pain or suffering; my duty not to hurt them is a duty I have to those people who care about what happens to them. As for other animals, where no or little sentimental interest is present - in the case of farm animals, for example, or laboratory rats - what duties we have grow weaker and weaker, perhaps to vanishing point. The pain and death they endure, though real, are not wrong if no one cares about them.

When it comes to the moral status of animals' contractarianism could be a hard view to refute if it were an adequate theoretical approach to the moral status of human beings. It is not adequate in this latter respect, however, which makes the question of its adequacy in the former case, regarding animals, utterly moot. For consider: morality, according to the (crude) contractarian position before us, consists of rules that people agree to abide by. What people? Well, enough to make a difference - enough, that is, *collectively* to have the power to enforce the rules that are drawn up in the contract. That is very well and good for the signatories but not so good for anyone who is not asked to sign. And there is nothing in contractarianism of the sort we are discussing that guarantees or requires that everyone will have a chance to participate equally in framing the rules of morality. The result is that this approach to ethics could sanction the most blatant forms of social, economic, moral and political injustice, ranging from a repressive caste system to systematic racial or sexual discrimination. Might, according to this theory, does make right. Let those who are the victims of injustice suffer as they will. It matters not so long as no one else - no contractor, or too few of them - cares about it. Such a theory takes one's moral breath away ... as if, for example, there would be nothing wrong with apartheid in South Africa if few white South Africans were upset by it. A theory with so little to recommend it at the level of the ethics of our treatment of our fellow humans cannot have anything more to recommend it when it comes to the ethics of how we treat our fellow animals.

The version of contractarianism just examined is, as I have noted, a crude variety, and in fairness to those of a contractarian persuasion it must be noted that much more refined, subtle and ingenious varieties are possible. For example, John Rawls, in his *A Theory of Justice,* sets forth a version of contractarianism that forces contractors to ignore the accidental features of being a human being - for example, whether one is white or black, male or female, a genius or of modest intellect. Only by ignoring such features, Rawls believes, can we ensure that the principles of justice that contractors would agree upon are not based on bias or prejudice. Despite the improvement a view such as Rawls's represents over the cruder forms of contractarianism, it remains deficient: it systematically denies that we have direct duties to those human beings who do not have a sense of justice - young children, for instance, and many mentally retarded humans. And yet it seems reasonably certain that, were we to torture a young child or a retarded elder, we would be doing something that wronged him or her, not something that would be wrong if (and only if) other humans with a sense of justice were upset. And since this is true in the case of these humans, we cannot rationally deny the same in the case of animals.

Indirect duty views, then, including the best among them, fail to command our rational assent. Whatever ethical theory we should accept rationally, therefore, it must at least recognize that we have some duties directly to animals, just as we have some duties directly to each other. The next two theories I'll sketch attempt to meet this requirement.

The first I call the cruelty-kindness view. Simply stated, this says that we have a direct duty to be kind to animals and a direct duty not to be cruel to them. Despite the familiar, reassuring ring of these ideas, I do not believe that this view offers an adequate theory. To make this clearer, consider kindness. A kind person acts from a certain kind of motive - compassion or concern, for example. And that is a virtue. But there is no guarantee that a kind act is a right act If I am a generous racist, for example, I will be inclined to act kindly towards members of my own race, favouring their interests above those of others. My kindness would be real and, so far as it goes, good. But I trust it is too obvious to require argument that my kind acts may not be above moral reproach - may, in fact, be positively wrong because rooted in injustice. So kindness, notwithstanding its status as a virtue to be encouraged, simply will not carry the weight of a theory of right action.

Cruelty fares no better. People or their acts are cruel if they display either a lack of sympathy for or, worse, the presence of enjoyment in another's suffering. Cruelty in all its guises is a bad thing, a tragic human failing. But just as a person's being motivated by kindness does not guarantee that he or she does what is right, so the absence of cruelty does not ensure that he or she avoids doing what is wrong. Many people who perform abortions, for example, are not cruel, sadistic people. But that fact alone does not settle the terribly difficult question of the morality of abortion. The case is no different when we examine the ethics of our treatment of animals. So, yes, let us be for kindness and against cruelty. But let us not suppose that being for the one and against the other answers questions about moral right and wrong.

Some people think that the theory We are looking for is utilitarianism. A utilitarian accepts two moral principles. The first is that of equality: everyone's interests count, and similar interests must be counted as having similar weight or importance. White or black, American or Iranian, human or animal - everyone's pain or frustration matter, and matter just as much as the equivalent pain or frustration of anyone else. The second principle a utilitarian accepts is that of utility: do the act that will bring about the best balance between satisfaction and frustration for everyone affected by the outcome.

As a utilitarian, then, here is how I am to approach the task of deciding what I morally ought to do: I must ask who will be affected if I choose to do one thing rather than another, how much each individual will be affected, and where the best results are most likely to lie - which option, in other words, is most likely to bring about the best results, the best balance between satisfaction and frustration. That option, whatever it may be, is the one I ought to choose. That is where my moral duty lies.

The great appeal of utilitarianism rests with its uncompromising *egalitarianism'.* everyone's interests count and count as much as the like interests of everyone else.

The kind of odious discrimination that some forms of contractarianism can justify - discrimination based on race or sex, for example - seems disallowed in principle by utilitarianism, as is speciesism, systematic discrimination based on species membership.

The equality we find in utilitarianism, however, is not the sort an advocate of animal or human rights should have in mind. Utilitarianism, has no room for the equal moral rights of different individuals because it has no room for their equal inherent value or worth. What has value for the utilitarian is the satisfaction of an individual's interests, not the individual whose interests they are. A universe in which you satisfy your desire for water, food and warmth is, other things being equal, better than a universe in which these desires are frustrated. And the same is true in the case of an animal with similar desires. But neither you nor the animal have any value in your own right. Only your feelings do.

Here is an analogy to help make the philosophical point clearer: a cup contains different liquids, sometimes sweet, sometimes bitter, sometimes a mix of the two. What has value are the liquids: the sweeter the better, the bitterer the worse. The cup, the container, has no value. It is what goes into it, not what they go into, that has value. For the utilitarian you and I are like the cup; we have no value as individuals and thus no equal value. What has value is what goes into us, what we serve as receptacles for; our feelings of satisfaction have positive value, our feelings of frustration negative value.

Serious problems arise for utilitarianism when we remind ourselves that it enjoins us to bring about the best consequences. What does this mean? It doesn't mean the best consequences for me alone, or for my family or friends, or any other person taken individually. No, what we must do is, roughly, as follows: we must add up (somehow!) the separate satisfactions and frustrations of everyone likely to be affected by our choice, the satisfactions in one column, the frustrations in the other. We must total each column for each ot the options before us. That is what it means to say the theory is aggregative. And then we must choose that option which is most likely to bring about the best balance of totalled satisfactions over totalled frustrations. Whatever act would lead to this outcome is the one we ought morally to perform - it is where our moral duty lies. And that act quite clearly might not be the same one that would bring about the best results for me personally, or for my family or friends, or for a lab animal. The best aggregated consequences for everyone concerned are not necessarily the best for each individual.

That utilitarianism is an aggregative theory - different individuals' satisfactions or frustrations are added, or summed, or totalled - is the key objection to this theory. My Aunt Bea is old, inactive, a cranky, sour person, though not physically ill. She prefers to go on living. She is also rather rich. 1 could make a fortune if I could get my hands on her money, money she intends to give me in any event, after she dies, but which she refuses to give me now. In order to avoid a huge tax bite, I plan to donate a handsome sum of my profits to a local children's hospital. Many, many children will benefit from my generosity, and much joy will be brought to their parents, relatives and friends. If

I don't get the money rather soon, all these ambitions will come to naught. The once-in-a-lifetime opportunity to make a real killing will be gone. Why, then, not kill my Aunt Bea? Oh, of course I *might* get caught. But I'm no fool and, besides, her doctor can be counted on to cooperate (he has an eye for the same investment and I happen to know a good deal about his shady past). The deed can be done . . . professionally, shall we say. There is *very* little chance of getting caught. And as for my conscience being guilt-ridden, I am a resourceful sort of fellow and will take more than sufficient comfort - as I lie on the beach at Acapulco - in contemplating the joy and health I have brought to so many others

Suppose Aunt Bea is killed and the rest of the story comes out as told. Would I have done anything wrong? Anything immoral? One would have thought that I had. Not according to utilitarianism. Since what I have done has brought about the best balance between totalled satisfaction and frustration for all those affected by the outcome, my action is not wrong. Indeed, in killing Aunt Bea the physician and I did what duty required.

This same kind of argument can be repeated in all sorts of cases, illustrating, time after time, how the utilitarian's position leads to results that impartial people find morally callous. It *is* wrong to kill my Aunt Bea in the name of bringing about the best results for others. A good end does not justify an evil means. Any adequate moral theory will have to explain why this is so. Utilitarianism fails in this respect and so cannot be the theory we seek.

What to do? Where to begin anew? The place to begin, I think, is with the utilitarian's view of the value of the individual - or, rather, lack of value. In its place, suppose we consider that you and I, for example, do have value as individuals - what we'll call *inherent value.* To say we have such value is to say that we are something more than, something different from, mere receptacles. Moreover, to ensure that we do not pave the way for such injustices as slavery or sexual discrimination, we must believe that all who have inherent value have it equally, regardless of their sex, race, religion, birthplace and so on. Similarly to be discarded as irrelevant are one's talents or skills, intelligence and wealth, personality or pathology, whether one is loved and admired or despised and loathed. The genius and the retarded child, the prince and the pauper, the brain surgeon and the fruit vendor, Mother Teresa and the most unscrupulous used-car salesman - all have inherent value, all possess it equally, and all have an equal right to be treated with respect, to be treated in ways that do not reduce them to the status of things, as if they existed as resources for others. My value as an individual is independent of my usefulness to you. Yours is not dependent on your usefulness to me. For either of us to treat the other in ways that fail to show respect for the other's independent value is to act immorally, to violate the individual's rights.

Some of the rational virtues of this view - what I call the rights view - should be evident. Unlike (crude) contractarianism, for example, the rights view *in principle* denies the moral tolerability of any and all forms of racial, sexual or social discrimination; and unlike utilitarianism, this view *in principle* denies that we can justify good results

by using evil means that violate an individual's rights - denies, for example, that it could be moral to kill my Aunt Bea to harvest beneficial consequences for others. That would be to sanction the disrespectful treatment of the individual in the name of the social good, something the rights view will not - categorically will not - ever allow.

The rights view, I believe, is rationally the most satisfactory moral theory. It surpasses all other theories in the degree to which it illuminates and explains the foundation of our duties to one another - the domain of human morality. On this score it has the best reasons, the best arguments, on its side. Of course, if it were possible to show that only human beings are included within its scope, then a person like myself, who believes in animal rights, would be obliged to look elsewhere.

But attempts to limit its scope to humans only can be shown to be rationally defective. Animals, it is true, lack many of the abilities humans possess. They can't read, do higher mathematics, build a bookcase or make *baba ghanoush.* Neither can many human beings, however, and yet we don't (and shouldn't) say that they (these humans) therefore have less inherent value, less of a right to be treated with respect, than do others. It is the *similarities* between those human beings who most clearly, most non-controversially have such value (the people reading this, for example), not our differences, that matter most. And the really crucial, the basic similarity is simply this: we are each of us the experiencing subject of a life, a conscious creature having an individual welfare that has importance to us whatever our usefulness to others. We want and prefer things, believe and feel things, recall and expect things. And all these dimensions of our life, including our pleasure and pain, our enjoyment and suffering, our satisfaction and frustration, our continued existence or our untimely death - all make a difference to the quality of our life as lived, as experienced, by us as individuals. As the same is true of those animals that concern us (the ones that are eaten and trapped, for example), they too must be viewed as the experiencing subjects of a life, with inherent value of their own. •

Some there are who resist the idea that animals have inherent value. 'Only humans have such value,' they profess. How might this narrow view be defended? Shall we say that only humans have the requisite intelligence, or autonomy, or reason? But there are many, many humans who fail to meet these standards and yet are reasonably viewed as having value above and beyond their usefulness to others. Shall we claim that only humans belong to the right species, the species *Homo sapiens!* But this is blatant speciesism. Will it be said, then, that all - and only - humans have immortal souls? Then our opponents have their work cut out for them. I am myself not ill-disposed to the proposition that there are immortal souls. Personally, I profoundly hope I have one. But ! would not want to rest my position on a controversial ethical issue on the even more controversial question about who or what has an immortal soul. That is to dig one's hole deeper, not to climb out. Rationally, it is better to resolve moral issues without making more controversial assumptions than are needed. The question of who has inherent value is such a question, one that is resolved more rationally without the introduction of the idea of immortal souls than by its use.

Well, perhaps some will say that animals have some inherent value, only less than we have. Once again, however, attempts to defend this view can be shown to lack rational justification. What could be the basis of our having more inherent value than animals? Their lack of reason, or autonomy, or intellect? Only if we are willing to make the same judgement in the case of humans who are similarly deficient. But it is not true that such humans - the retarded child, for example, or the mentally deranged - have less inherent value than you or 1. Neither, then, can we rationally sustain the view that animals like them in being the experiencing subjects of a life have less inherent value. *All* who have inherent value have it *equally,* whether they be human animals or not.

Inherent value, then, belongs equally to those who are the experiencing subjects of a life. Whether it belongs to others - to rocks and rivers, trees and glaciers, for example - we do not know and may never know. But neither do we need to know, if we are to make the case for animal rights. We do not need to know, for example, how many people are eligible to vote in the next presidential election before we can know whether I am. Similarly, we do not need to know how many individuals have inherent value before we can know that some do. When it comes to the case for animal rights, then, what we need to know is whether the animals that, in our culture, are routinely eaten, hunted and used in our laboratories, for example, are like us in being subjects of a life. And we do know this. We do know that many - literally, billions and billions - of these animals are the subjects of a life in the sense explained and so have inherent value if we do. And since, in order to arrive at the best theory of our duties to one another, we must recognize our equal inherent value as individuals, reason - not sentiment, not emotion - reason compels us to recognize the equal inherent value of these animals and, with this, their equal right to be treated with respect.

That, *very* roughly, is the shape and feel of the case for animal rights. Most of the details of the supporting argument are missing. They are to be found in the book to which I alluded earlier. Here, the details go begging, and I must, in closing, limit myself to four final points.

The first is how the theory that underlies the case for animal rights shows that the animal rights movement is a part of, not antagonistic to, the human rights movement. The theory that rationally grounds the rights of animals also grounds the rights of humans. Thus those involved in the animal rights movement are partners in the struggle to secure respect for human rights - the rights of women, for example, or minorities, or workers. The animal rights movement is cut from the same moral cloth as these.

Second, having set out the broad outlines of the rights view, I can now say why its implications for farming and science, among other fields, are both clear and uncompromising. In the case of the use of animals in science, the rights view is categorically abolitionist. Lab animals are not our tasters; we are not their kings. Because these animals are treated routinely, systematically as if their value were reducible to their usefulness to others, they are routinely, systematically treated with a lack of respect, and thus are their rights routinely, systematically violated. This is just as true when

they are used in trivial, duplicative, unnecessary or unwise research as it is when they are used in studies that hold out real promise of human benefits. We can't justify harming or killing a human being (my Aunt Bea, for example) just for these sorts of reason. Neither can we do so even in the case of so lowly a creature as a laboratory rat. It is not just refinement or reduction that is called for, not just larger, cleaner cages, not just more generous use of anaesthetic or the elimination of multiple surgery, not just tidying up the system. It is complete replacement. The best we can do when it comes to using animals in science is - not to use them. That is where our duty lies, according to the rights view.

As for commercial animal agriculture, the rights view takes a similar abolitionist position. The fundamental moral wrong here is not that animals are kept in stressful close confinement or in isolation, or that their pain and suffering, their needs and preferences are ignored or discounted. All these *are* wrong, of course, but they are not the fundamental wrong. They are symptoms and effects of the deeper, systematic wrong that allows these animals to be viewed and treated as lacking independent value, as resources for us - as, indeed, a renewable resource. Giving farm animals more space, more natural environments, more companions does not right the fundamental wrong, any more than giving lab animals more anaesthesia or bigger, cleaner cages would right the fundamental wrong in their case. Nothing less than the total dissolution of commercial animal agriculture will do this, just as, for similar reasons I won't develop at length here, morality requires nothing less than the total elimination of hunting and trapping for commercial and sporting ends. The rights view's implications, then, as I have said, are clear and uncompromising.

My last two points are about philosophy, my profession. It is, most obviously, no substitute for political action. The words I have written here and in other places by themselves don't change a thing. It is what we do with the thoughts that the words express - our acts, our deeds - that changes things. All that philosophy can do, and all I have attempted, is to offer a vision of what our deeds should aim at. And the why. But not the how.

Finally, I am reminded of my thoughtful critic, the one I mentioned earlier, who chastised me for being too cerebral. Well, cerebral I have been: indirect duty views, utilitarianism, contractarianism - hardly the stuff deep passions are made of. I am also reminded, however, of the image another friend once set before me - the image of the ballerina as expressive of disciplined passion. Long hours of sweat and toil, of loneliness and practice, of doubt and fatigue: those are the discipline of her craft But the passion is there too, the fierce drive to excel, to speak through her body, to do it right, to pierce our minds. That is the image of philosophy I would leave with you, not 'too cerebral' but *disciplined passion.* Of the discipline enough has been seen. As for the passion: there are times, and these not infrequent, when tears come to my eyes when I see, or read, or hear of the wretched plight of animals in the hands of humans. Their pain, their suffering, their loneliness, their innocence, their death. Anger. Rage. Pity. Sorrow. Disgust. The whole creation groans under the weight of the evil we humans

visit upon these mute, powerless creatures. It *is* our hearts, not just our heads, that call for an end to it all, that demand of us that we overcome, for them, the habits and forces behind their systematic oppression. All great movements, it is written, go through three stages: ridicule, discussion, adoption. It is the realization of this third stage, adoption, that requires both our passion and our discipline, our hearts and our heads. The fate of animals is in our hands. God grant we are equal to the task.

13. The Rights of Animals and Unborn Generations

Joel Feinberg

Source- William T. Blackstone (ed.), *Philosophy and Environmental Crisis.* Athens, GA:

University of Georgia Press, 1974, pp. 43-68.

Every philosophical paper must begin with an unproved assumption. Mine is the assumption that there will still be a world five hundred years from now, and that it will contain human beings who are very much like us. We have it within our power now, clearly, to affect the lives of these creatures for better or worse by contributing to the conservation or corruption of the environment in which they must live. I shall assume furthermore that it is psychologically possible for us to care about our remote descendants, that many of us in fact do care, and indeed that we ought to care. My main concern then will be to show that it makes sense to speak of the rights of unborn generations against us, and that given the moral judgment that we ought to conserve our environmental inheritance for them, and its grounds, we might well say that future generations *do* have rights correlative to our present duties toward them. Protecting our environment now is also a matter of elementary prudence, and insofar as we do it for the next generation already here in the persons of our children, it is a matter of love. But from the perspective of our remote descendants it is basically a matter of justice, of respect for their rights. My main concern here will be to examine the concept of a right to better understand how that can be.

The problem

To have a right is to have a claim[1] *to* something and *against* someone, the recognition of which is called for by legal rules or. in the case of moral rights, by the principles of an enlightened conscience. In the familiar cases of rights, the claimant is a competent adult human being, and the claimee is an officeholder in an institution or else a private individual, in either case, another competent adult human being. Normal adult human beings, then, are obviously the sorts of beings of whom rights can meaningfully be predicated. Everyone would agree to that, even extreme misanthropes who deny

[1] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

that anyone in fact has rights. On the other hand, it is absurd to say that rocks can have rights, not because rocks are morally inferior things unworthy of rights (that statement makes no sense either), but because rocks belong to a category of entities of whom rights cannot be meaningfully predicated. That is not to say that there are no circumstances in which we ought to treat rocks carefully, but only that the rocks themselves cannot validly claim good treatment from us. In between the clear cases of rocks and normal human beings, however, is a spectrum of less obvious cases, including some bewildering borderline ones. Is it meaningful or conceptually possible to ascribe rights to our dead ancestors? to individual animals? to whole species of animals? to plants? to idiots and madmen? to fetuses? to generations yet unborn? Until we know how to settle these puzzling cases, we cannot claim fully to grasp the concept of a right, or to know the shape of its logical boundaries.

One way to approach these riddles is to turn one's attention first to the most familiar and unproblematic instances of rights, note their most salient characteristics, and then compare the borderline cases with them, measuring as closely as possible the points of similarity and difference. In the end, the way we classify the borderline cases may depend on whether we are more impressed with the similarities or the differences between them and the cases in which we have the most confidence.

It will be useful to consider the problem of individual animals first because their case is the one that has already been debated with the most thoroughness by philosophers so that the dialectic of claim and rejoinder has now unfolded to the point where disputants can get to the end game quickly and isolate the crucial point at issue. When we understand precisely what *is* at issue in the debate over animal rights, I think we will have the key to the solution of all the other riddles about rights.

Individual animals

Almost all modern writers agree that we ought to be kind to animals, but that is quite another thing from holding that animals can claim kind treatment from us as their due. Statutes making cruelty to animals a crime are now very common, and these, of course, impose legal duties on people not to mistreat animals; but that still leaves open the question whether the animals, as beneficiaries of those duties, posses rights correlative to them. We may very well have duties *regarding* animals that are not at the same time duties *to* animals, just as we may have duties regarding rocks, or buildings, or lawns, that are not duties *to* the rocks, buildings, or lawns. Some legal writers have taken the still more extreme position that animals themselves are not even the directly intended beneficiaries of statutes prohibiting cruelty to animals. During the nineteenth century, for example, it was commonly said that such statutes were designed to protect human beings by preventing the growth of cruel habits that could later threaten human beings with harm too. Prof. Louis B. Schwartz finds the rationale of the cruelty-to-animals prohibition in its protection of animal lovers from

affronts to their sensibilities. "It is not the mistreated dog who is the ultimate object of concern," he writes. "Our concern is for the feelings of other human beings, a large proportion of whom, although accustomed to the slaughter of animals for food, readily identify themselves with a tortured dog or horse and respond with great sensitivity to its sufferings."[2] This seems to me to be factitious. How much more natural it is to say with John Chipman Gray that the true purpose of cruelty-to-animals statutes is "to preserve the dumb brutes from suffering."[3] The very people whose sensibilities are invoked in the alternative explanation, a group that no doubt now includes most of us, are precisely those who would insist that the protection belongs primarily to the animals themselves, not merely to their own tender feelings. Indeed, it would be difficult even to account for the existence of such feelings in the absence of a belief that the animals deserve the protection in their own right and for their own sakes.

Even if we allow, as I think we must, that animals are the intended direct beneficiaries of legislation forbidding cruelty to animals, it does not follow directly that animals have legal rights, and Gray himself, for one,[4] refused to draw this further inference. Animals cannot have rights, he thought, for the same reason they cannot have duties, namely, that they are not genuine "moral agents." Now, it is relatively easy to see why animals cannot have duties, and this matter is largely beyond controversy. Animals cannot be "reasoned with" or instructed in their responsibilities; they are inflexible and unadaptable to future contingencies; they are subject to fits of instinctive passion which they are incapable of repressing or controlling, postponing or sublimating. Hence, they cannot enter into contractual agreements, or make promises; they cannot be trusted; and they cannot (except within very narrow limits and for purposes of conditioning) be blamed for what would be called "moral failures" in a human being. They are therefore incapable of being moral subjects, of acting rightly or wrongly in the moral sense, of having, discharging, or breaching duties and obligations.

But what is there about the intellectual incompetence of animals (which admittedly disqualifies them for duties) that makes them logically unsuitable for rights? The most common reply to this question is that animals are incapable of *claiming* rights on their own. They cannot make motion, on their own, to courts to have their claims recognized or enforced; they cannot initiate, on their own, any kind of legal proceedings; nor are they capable of even understanding when their rights are being violated, of distinguishing harm

 from wrongful injury, and responding with indignation and an outraged sense of justice instead of mere anger or fear.

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[2] Cole, H. S. D., C. Freeman, M. Jahoda, and K. L. R. Pavitt. *Thinking about the Future: A Critique of the Limits to Growth,* London: Chatto and Windus, 1973.

[3] Engels, F. *The Dialectics of Nature.* New York: International Publishers, 1940.

[4] Firey, W. *Man, Mind and the Land.* Glencoe, Illionis: Free Press, 1960.

No one can deny any of these allegations, but to the claim that they are the grounds for disqualification of rights of animals, philosophers on the other side of this controversy have made convincing rejoinders. It is simply not true, says W. D. Lamont,[5] that the ability to understand what a right is and the ability to set legal machinery in motion by one's own initiative are necessary for the possession of rights. If that were the case, then neither human idiots nor wee babies would have any legal rights at all. Yet it is manifest that both of these classes of intellectual incompetents have legal rights recognized and easily enforced by the courts. Children and idiots start legal proceedings, not on their own direct initiative, but rather through the actions of proxies or attorneys who are empowered to speak in their names. If there is no conceptual absurdity in this situation, why should there be in the case where a proxy makes a claim on behalf of an animal? People commonly enough make wills leaving money to trustees for the care of animals. Is it not natural to speak of the animal's right to his inheritance in cases of this kind? If a trustee embezzles money from the animal's account,[6] and a proxy speaking in the dumb brute's behalf presses the animal's claim, can he not be described as asserting the animal's *rights?* More exactly, the animal itself claims its rights through the vicarious actions of a human proxy speaking in its name and in its behalf. There appears to be no reason why we should require the animal to understand what is going on (so the argument concludes) as a condition for regarding it as a possessor of rights.

Some writers protest at this point that the legal relation between a principal and an agent cannot hold between animals and human beings. Between humans, the relation of agency can take two very different forms, depending upon the degree of discretion granted to the agent, and there is a continuum of combinations between the extremes. On the one hand, there is the agent who is the mere "mouthpiece" of his principal. He is a "tool" in much the same sense as is a typewriter or telephone; he simply transmits the instructions of his principal. Human beings could hardly be the agents or representatives of animals in this sense, since the dumb brutes could no more use human "tools" than mechanical ones. On the other hand, an agent may be some sort of expert hired to exercise his professional judgment on behalf of, and in the name of, the principal. He may be given, within some limited area of expertise, complete independence to act as he deems best, binding his principal to all the beneficial or detrimental consequences. This is the role played by trustees, lawyers, and ghost-writers. This type of representation requires that the agent have great skill, but makes little or no demand upon the principal, who may leave everything to the judgment of his agent. Hence, there appears, at first, to be no reason why an animal cannot be a totally passive principal in this second kind of agency relationship.

There are still some important dissimilarities, however. In the typical instance of representation by an agent, even of the second, highly discretionary kind, the agent is

[5] Glacken, C. *Traces on the Rhodian Shore.* Berkeley: University of California Press, 1967.

[6] Godelier, M. *Rationality and Irrationality in Economics.* London: New Left Books, 1972.

hired by a principal who enters into an agreement or contract with him; the principal tells his agent that within certain carefully specified boundaries "You may speak for me," subject always to the principal's approval, his right to give new directions, or to cancel the whole arrangement. No dog or cat could possibly do any of those things. Moreover, if it is the assigned task of the agent to defend the principal's rights, the principal may often decide to release his claimee, or to waive his own rights, and instruct his agent accordingly. Again, no mute cow or horse can do that. But although the possibility of hiring, agreeing, contracting, approving, directing, canceling, releasing, waiving, and instructing is present in the typical (all-human) case of agency representation, there appears to be no reason of a logical or conceptual kind why that *must* be so, and indeed there are some special examples involving human principals where it is not in fact so. I have in mind legal rules, for example, that require that a defendant be represented at his trial by an attorney, and impose a state-appointed attorney upon reluctant defendants, or upon those tried *in absentia,* whether they like it or not. Moreover, small children and mentally deficient and deranged adults are commonly represented by trustees and attorneys, even though they are incapable of granting their own consent to the representation, or of entering into contracts, of giving directions, or waiving their rights. It may be that it is unwise to permit agents to represent principals without the latters' knowledge or consent. If so, then no one should ever be permitted to speak for an animal, at least in a legally binding way. But that is quite another thing than saying that such representation is logically incoherent or conceptually incongruous—the contention that is at issue.

H. J. McCloskey,[7]1 believe, accepts the argument up to this point, but he presents a new and different reason for denying that animals can have legal rights. The ability to make claims, whether directly or through a representative, he implies, is essential to the possession of rights. Animals obviously cannot press their claims on their own, and so if they have rights, these rights must be assertable by agents. Animals, however, cannot be represented, McCloskey contends, and not for any of the reasons already discussed, but rather because representation, in the requisite sense, is always of interests, and animals (he says) are incapable of having interests.

Now, there is a very important insight expressed in the requirement that a being have interests if he is to be a logically proper subject of rights. This can be appreciated if we consider just why it is that mere things cannot have rights. Consider a very precious "mere thing"—a beautiful natural wilderness, or a complex and ornamental artifact, like the Taj Mahal. Such things ought to be cared for, because they would sink into decay if neglected, depriving some human beings, or perhaps even all human beings, of something of great value. Certain persons may even have as their own special job the care and protection of these valuable objects But we are not tempted in these cases to speak of "thing-rights" correlative to custodial duties, because, try as we might, we cannot think of mere things as possessing interests of their own. Some people may

[7] Harvey, D. *Social Justice and the City.* Baltimore: Johns Hopkins Press, 1973.

have a duty to preserve, maintain, or improve the Taj Mahal, but they can hardly have a duty to help or hurt it, benefit or aid it, succor or relieve it. Custodians may protect it for the sake of a nation's pride and art lovers' fancy: but they don't keep it in good repair for "its own sake, or for "its own true welfare,' or "well-being." A mere thing, however valuable to others, has no good of its own. The explanation of that fact, I suspect, consists in the fact that mere things have no conative life: no conscious wishes, desires, and hopes: or urges and impulses; or unconscious drives, aims, and goals; or latent tendencies, direction of growth, and natural fulfillments. Interests must be compounded somehow out of conations; hence mere things have no interests. *A fortiori,* they have no interests to be protected by legal or moral rules. Without interests a creature can have no "good" of its own, the achievement of which can be its due. Mere things are not loci of value in their own right, but rather their value consists entirely in their being objects of other beings' interests.

So far McCloskey is on solid ground, but one can quarrel with his denial that any animals but humans have interests. I should think that the trustee of funds willed to a dog or cat is more than a mere custodian of the animal he protects. Rather his job is to look out for the interests of the animal and make sure no one denies it its due. The animal itself is the beneficiary of his dutiful services. Many of the higher animals at least have appetites, conative urges, and rudimentary purposes, the integrated satisfaction of which constitutes their welfare or good. We can, of course, with consistency treat animals as mere pests and deny that they have any rights; for most animals, especially those of the lower orders, we have no choice but to do so. But it seems to me, nevertheless, that in general, animals *are* among the sorts of beings of whom rights can meaningfully be predicated and denied.

Now, if a person agrees with the conclusion of the argument thus far, that animals are the sorts of beings that *can* have rights, and further, if he accepts the moral judgment that we ought to be kind to animals, only one further premise is needed to yield the conclusion that some animals do in fact have rights. We must now ask ourselves for whose sake ought we to treat (some) animals with consideration and humaneness? If we conceive our duty to be one of obedience to authority, or to one's own conscience merely, or one of consideration for tender human sensibilities only, then we might still deny that animals have rights, even though we admit that they are the kinds of beings that *can* have rights. But if we hold not only that we ought to treat animals humanely but also that we should do so for the animals' own sake, that such treatment is something we owe animals as their due, something that can be claimed for them, something the withholding of which would be an injustice and a wrong, and not merely a harm, then it follows that we do ascribe rights to animals. I suspect that the moral judgments most of us make about animals do pass these phenomenological tests, so that most of us do believe that animals have rights, but are reluctant to say so because of the conceptual confusions about the notion of a right that I have attempted to dispel above.

Now we can extract from our discussion of animal rights a crucial principle for tentative use in the resolution of the other riddles about the applicability of the concept of a right, namely, that the sorts of beings who *can* have rights are precisely those who have (or can have) interests. I have come to this tentative conclusion for two reasons: (1) because a right holder must be capable of being represented and it is impossible to represent a being that has no interests, and (2) because a right holder must be capable of being a beneficiary in his own person, and a being without interests is a being that is incapable of being harmed or benefited, having no good or "sake" of its own. Thus, a being without interests has no "behalf' to act in, and no "sake" to act for. My strategy now will be to apply the "interest principle," as we can call it, to the other puzzles about rights, while being prepared to modify it where necessary (but as little as possible), in the hope of separating in a consistent and intuitively satisfactory fashion the beings who can have rights from those which cannot.

Vegetables

It is clear that we ought not to mistreat certain plants, and indeed there are rules and regulations imposing duties on persons not to misbehave in respect to certain members of the vegetable kingdom. It is forbidden, for example, to pick wildflowers in the mountainous tundra areas of national parks, or to endanger trees by starting fires in dry forest areas. Members of Congress introduce bills designed, as they say, to "protect" rare redwood trees from commercial pillage. Given this background, it is surprising that no one[8] speaks of plants as having rights. Plants, after all, are not "mere things"; they are vital objects with inherited biological propensities determining their natural growth. Moreover, we do say that certain conditions are "good" or "bad" for plants, thereby suggesting that plants, unlike rocks, are capable of having a "good." (This is a case, however, where "what we say" should not be taken seriously: we also say that certain kinds of paint are good or bad for the internal walls of a house, and this does not commit us to a conception of walls as beings possessed of a good or welfare of their own.) Finally, we are capable of feeling a kind of affection for particular plants, though we rarely personalize them, as we do in the case of animals, by giving them proper names.

Still, all are agreed that plants are not the kinds of beings that can have rights. Plants are never plausibly understood to be the direct intended beneficiaries of rules designed to "protect" them. We wish to keep redwood groves in existence for the sake of human beings who can enjoy their serene beauty, and for the sake of generations of human beings yet unborn. Trees are not the sorts of beings who have their "own sakes," despite the fact that they have biological propensities. Having no conscious wants or goals of their own, trees cannot know satisfaction or frustration, pleasure or

[8] Hays, S. *The Conservation Movement and the Gospel of Efficiency.* Cambridge, Massachusetts: Atheneum, 1959.

pain. Hence, there is no possibility of kind or cruel treatment of trees. In these morally crucial respects, trees differ from the higher species of animals.

Yet trees are not mere things like rocks. They grow and develop according to the laws of their own nature. Aristotle and Aquinas both took trees to have their own "natural ends." Why then do I deny them the status of beings with interests of their own? The reason is that an interest, however the concept is finally to be analyzed, presupposes at least rudimentary cognitive equipment. Interests are compounded out of *desires* and *aims,* both of which presuppose something like *belief,* or cognitive awareness. A desiring creature may want X because he seeks anything that is 0, and X appears to be 0 to him; or he may be seeking Y, and he believes, or expects, or hopes that X will be a means to Y. If he desires X in order to get Y, this implies that he believes that X will bring Y about, or at least that he has some sort of brute expectation that is a primitive correlate of belief. But what of the desire for 0 (or for T) itself? Perhaps a creature has such a "desire" as an ultimate set, as if he had come into existence all "wound up" to pursue 0-ness or T-ness, and his not to reason why. Such a propensity, I think, would not qualify as a desire. Mere brute longings unmediated by beliefs—longings for one knows not what—might perhaps be a primitive form of consciousness (I don't want to beg that question) but they are altogether different from the sort of thing we mean by "desire," especially when we speak of human beings.

If some such account as the above is correct, we can never have any grounds for attributing a desire or a want to a creature known to be incapable even of rudimentary beliefs; and if desires or wants are the materials interests are made of, mindless creatures have no interests of their own. The law, therefore, cannot have as its intention the protection of their interests, so that "protective legislation" has to be understood as legislation protecting the interests human beings may have in them.

Plant life might nevertheless be thought at first to constitute a hard case for the interest principle for two reasons. In the first place, plants no less than animals are said to have needs of their own. To be sure, we can speak even of mere things as having needs too, but such talk misleads no one into thinking of the need as belonging, in the final analysis, to the "mere thing" itself. If we were so deceived we would not be thinking of the mere thing as a "mere thing" after all. We say, for example, that John Doe's walls need painting, or that Richard Roe's car needs a washing, but we direct our attitudes of sympathy or reproach (as the case may be) to John and Richard, not to their possessions. It would be otherwise, if we observed that some child is in need of a good meal. Our sympathy and concern in that case would be directed at the child himself as the true possessor of the need in question.

The needs of plants might well seem closer to the needs of animals than to the pseudoneeds of mere things. An owner may need a plant (say, for its commercial value or as a potential meal), but the plant itself, it might appear, needs nutrition or cultivation. Our confusion about this matter may stem from language..It is a commonplace that the word *need* is ambiguous. To say that A needs X may be to say either: (1) X is necessary to the achievement of one of *A's* goals, or to the performance of one of

its functions, or (2) *X* is good for *A;* its lack would harm *A* or be injurious or detrimental to him (or it). The first sort of need-statement is value-neutral, implying no comment on the value of the goal or function in question; whereas the second kind of statement about needs commits its maker to a value judgment about what is good or bad for *A* in the long run, that is, about what is in *A's* interests. A being must have interests, therefore, to have needs in the second sense, but any kind of thing, vegetable or mineral, could have needs in the first sense. An automobile needs gas and oil to function, but it is no tragedy for it if it runs out—an empty tank does not hinder or retard its interests. Similarly, to say that a tree needs sunshine and water is to say that without them it cannot grow and survive; but unless the growth and survival of trees are matters of human concern, affecting human interests, practical or aesthetic, the needs of trees alone will not be the basis of any claim of what is "due" them in their own right. Plants may need things in order to discharge their functions, but their functions are assigned by human interests, not their own.

The second source of confusion derives from the fact that we commonly speak of plants as thriving and flourishing, or withering and languishing. One might be tempted to think of these states either as themselves consequences of the possession of interests so that even creatures without wants or beliefs can be said to have interests, or else as grounds independent of the possession of interests for the making of intelligible claims of rights. In either case, plants would be thought of as conceivable possessors of rights after all.

Consider what it means to speak of something as "flourishing." The verb *to flourish* apparently was applied originally and literally to plants only, and in its original sense it meant simply "to bear flowers: blossom"; but then by analogical extension of sense it came also to mean "to grow luxuriantly: increase, and enlarge," and then to "thrive" (generally), and finally, when extended to human beings, "to be prosperous," or to "increase in wealth, honor, comfort, happiness, or whatever is desirable."[9] Applied to human beings the term is, of course, a fixed metaphor. When a person flourishes, something happens to his interests analogous to what happens to a plant when it flowers, grows, and spreads. A person flourishes when his interests (whatever they may be) are progressing severally and collectively toward their harmonious fulfillment and spawning new interests along the way whose prospects are also good. To flourish is to glory in the advancement of one's interests, in short, to be happy.

Nothing is gained by twisting the botanical metaphor back from humans to plants. To speak of thriving human interests as if they were flowers is to speak naturally and well, and to mislead no one. But then to think of the flowers or plants as if they were interests (or the signs of interests) is to bring the metaphor back full circle for no good reason and in the teeth of our actual beliefs. Some of our talk about flourishing plants reveals quite clearly that the interests that thrive when plants flourish are human not "plant interests.' For example, we sometimes make a flowering bush flourish by

[9] Hudson, W. D. *Modern Moral Philosophy.* London: Macmillan, 1970.

"frustrating" its own primary propensities. We pinch off" dead flowers before seeds have formed, thus "encouraging" the plant to make new flowers in an effort to produce more seeds. It is not the plant's own natural propensity (to produce seeds) that is advanced, but rather the gardener's interest in the production of new flowers and the spectator's pleasure in aesthetic form, color, or scent. What we mean in such cases by saying that the plant flourishes is that our interest in the plant, not its own, is thriving. It is not always so clear that that is what we mean, for on other occasions there is a correspondence between our interests and the plant's natural propensities, a coinciding of what we want from nature and nature's own "intention." But the exceptions to this correspondence provide the clue to our real sense in speaking of a plant's good or welfare.[10] And even when there exists such a correspondence, it is often because we have actually remade the plant's nature so that our interests in it will flourish more "naturally" and effectively.

Whole species

The topic of whole species, whether of plants or animals, can be treated in much the same way as that of individual plants. A whole collection, as such, cannot have beliefs, expectations, wants, or desires, and can flourish or languish only in the human interest-related sense in which individual plants thrive and decay. Individual elephants can have interests, but the species elephant cannot. Even where individual elephants are not granted rights, human beings may have an interest—economic, scientific, or sentimental—in keeping the species from dying out, and *that* interest may be protected in various ways by law. But that is quite another matter from recognizing a right to survival belonging to the species itself. Still, the preservation of a whole species may quite properly seem to be a morally more important matter than the preservation of an individual animal. Individual animals can have rights but it is implausible to ascribe to them a right to life on the human model. Nor do we normally have duties to keep individual animals alive or even to abstain from killing them provided we do it humanely and nonwantonly in the promotion of legitimate human interests. On the other hand, we do have duties to protect threatened species, not duties to the species themselves as such, but rather duties to future human beings, duties derived from our housekeeping role as temporary inhabitants of this planet.

We commonly and very naturally speak of corporate entities, such as institutions, churches, and national states as having rights and duties, and an adequate analysis of the conditions for ownership of rights should account for that fact. A corporate entity, of course, is more than a mere collection of things that have some important traits in common. Unlike a biological species, an institution has a charter, or constitution, or bylaws, with rules defining offices and procedures, and it has human beings whose

[10] Humboldt, A. von. *Essai Politique sur le Royaume de la Nouvelle Espagne.* Paris: F. Schoell, 1811.

function it is to administer the rules and apply the procedures. When the institution has a duty to an outsider, there is always some determinant human being whose duty it is to do something for the outsider, and when the state, for example, has a right to collect taxes, there are always certain definite flesh and blood persons who have rights to demand tax money from other citizens. We have no reluctance to use the language of corporate rights and duties because we know that in the last analysis these are rights or duties of individual persons, acting in their "official capacities." And when individuals act in their official roles in accordance with valid empowering rules, their acts are imputable to the organization itself and become "acts of state." Thus, there is no need to posit any individual superperson named by the expression "the State" (or for that matter, "the company," "the club," or "the church.") Nor is there any reason to take the rights of corporate entities to be exceptions to the interest principle. The United States is not a superperson with wants and beliefs of its own, but it is a corporate entity with corporate interests that are, in turn, analyzable into the interests of its numerous flesh and blood members.

Dead persons

So far we have refined the interest principle but we have not had occasion to modify it. Applied to dead persons, however, it will have to be stretched to near the breaking point if it is to explain how our duty to honor commitments to the dead can be thought to be linked to the rights of the dead against us. The case against ascribing rights to dead men can be made very simply: a dead man is a mere corpse, a piece of decaying organic matter. Mere inanimate things can have no interests, and what is incapable of having interests is incapable of having rights. If, nevertheless, we grant dead men rights against us, we would seem to be treating the interests they had while alive as somehow surviving their deaths. There is the sound of paradox in this way of talking, but it may be the least paradoxical way of describing our moral relations to our predecessors. And if the idea of an interest's surviving its possessor's death is a kind of fiction, it is a fiction that most living men have a real interest in preserving.

Most persons while still alive have certain desires about what is to happen to their bodies, their property, or their reputations after they are dead. For that reason, our legal system has developed procedures to enable persons while still alive to determine whether their bodies will be used for purposes of medical research or organic transplantation, and to whom their wealth (after taxes) is to be transferred. Living men also take out life insurance policies guaranteeing that the accumulated benefits be conferred upon beneficiaries of their own choice. They also make private agreements, both contractual and informal, in which they receive promises that certain things will be done after their deaths in exchange for some present service or consideration. In all these cases promises are made to living persons that their wishes will be honored after

they are dead. Like all other valid promises, they impose duties on the promisor and confer correlative rights on the promisee.

How does the situation change after the promisee has died? Surely the duties of the promisor do not suddenly become null and void. If that were the case, and known to be the case, there could be no confidence in promises regarding posthumous arrangements; no one would bother with wills or life insurance companies to pay benefits to survivors, which are, in a sense, only conditional duties before a man dies. They come into existence as categorical demands for immediate action only upon the promisee's death. So the view that death renders them null and void has the truth exactly upside down.

The survival of the promisor's duty after the promisee's death does not prove that the promisee retains a right even after death, for we might prefer to conclude that there is one class of cases where duties to keep promises are not logically correlated with a promisee's right, namely, cases where the promisee has died. Still, a morally sensitive promisor is likely to think of his promised performance not only as a duty (i.e., a morally required action) but also as something owed to the deceased promisee as his due. Honoring such promises is a way of keeping faith with the dead. To be sure, the promisor will not think of his duty as something to be done for the promisee's "good," since the promisee, being dead, has no "good" of his own. We can think of certain of the deceased's interests, however, (including especially those enshrined in wills and protected by contracts and promises) as surviving their owner's death, and constituting claims against us that persist beyond the life of the claimant. Such claims can be represented by proxies just like the claims of animals. This way of speaking, I believe, reflects more accurately than any other an important fact about the human condition: we have an interest while alive that other interests of ours will continue to be recognized and served after we are dead. The whole practice of honoring wills and testaments, and the like, is thus for the sake of the living, just as a particular instance of it may be thought to be for the sake of one who is dead.

Conceptual sense, then, can be made of talk about dead men's rights; but it is still a wide open moral question whether dead men in fact have rights, and if so, what those rights are. In particular, commentators have disagreed over whether a man's interest in his reputation deserves to be protected from defamation even after his death. With only a few prominent exceptions, legal systems punish a libel on a dead man "only when its publication is in truth an attack upon the interests of living persons."[11] A widow or a son may be wounded, or embarrassed, or even injured economically, by a defamatory attack on the memory of their dead husband or father. In Utah defamation of the dead is a misdemeanor, and in Sweden a cause of action in tort. The law rarely presumes, however, that a dead man himself has any interests, representable by proxy, that can be injured by defamation, apparently because of the maxim that what a dead man doesn't know can't hurt him.

[11] Jacks, G. V. and R. O. Whyte. *Vanishing Lands.* New York: Doubleday, 1939.

This presupposes, however, that the whole point of guarding the reputations even of living men, is to protect them from hurt feelings, or to protect some other interests, for example, economic ones, that do not survive death. A moment's thought, I think, will show that our interests are more complicated than that. If someone spreads a libelous description of me, without my knowledge, among hundreds of persons in a remote part of the country, so that I am, still without my knowledge, an object of general scorn and mockery in that group, I have been injured, even though I never learn what has happened. That is because I have an interest, so I believe, in having a good reputation *simpliciter,* in addition to my interest in avoiding hurt feelings, embarrassment, and economic injury. In the example, I do not know what is being said and believed about me, so my feelings are not hurt; but clearly if I did know, I would be enormously distressed. The distress would be the natural consequence of my belief that an interest other than my interest in avoiding distress had been damaged. How else can I account for the distress? If I had no interest in a good reputation as such, I would respond to news of harm to my reputation with indifference.

While it is true that a dead man cannot have his feelings hurt, it does not follow, therefore, that his claim to be thought of no worse than he deserves cannot survive his death. Almost every living person, I should think, would wish to have this interest protected after his death, at least during the lifetimes of those persons who were his contemporaries. We can hardly expect the law to protect Julius Caesar from defamation in the history books. This might hamper historical research and restrict socially valuable forms of expression. Even interests that survive their owner's death are not immortal. Anyone should be permitted to say anything he wishes about George Washington or Abraham Lincoln, though perhaps not everything is morally permissible. Everyone ought to refrain from malicious lies even about Nero or King Tut, though not so much for those ancients' own sakes as for the sake of those who would now know the truth about the past. We owe it to the brothers Kennedy, however, as their due, not to tell damaging lies about them to those who were once their contemporaries. If the reader would deny that judgment, I can only urge him to ask himself whether he now wishes his own interest in reputation to be respected, along with his interest in determining the distribution of his wealth, after his death.

Human vegetables

Mentally deficient and deranged human beings are hardly ever so handicapped intellectually that they do not compare favorably with even the highest of the lower animals, though they are commonly so incompetent that they cannot be assigned duties or be held responsible for what they do. Since animals can have rights, then, it follows that human idiots and madmen can too. It would make good sense, for example, to ascribe to them a right to be cured whenever effective therapy is available at reasonable

cost, and even those incurables who have been consigned to a sanatorium for permanent "warehousing'[-] can claim (through a proxy) their right to decent treatment.

Human beings suffering extreme cases of mental illness, however, may be so utterly disoriented or insensitive as to compare quite unfavorably with the brightest cats and dogs. Those suffering from catatonic schizophrenia may be barely distinguishable in respect to those traits presupposed by the possession of interests from the lowliest vegetables. So long as we regard these patients as potentially curable, we may think of them as human beings with interests in their own restoration and treat them as possessors of rights. We may think of the patient as a genuine human person inside the vegetable casing struggling to get out, just as in the old fairy tales a pumpkin could be thought of as a beautiful maiden under a magic spell waiting only the proper words to be restored to her true self. Perhaps it is reasonable never to lose hope that a patient can be cured, and therefore to regard him always as a person "under a spell" with a permanent interest in his own recovery that is entitled to recognition and protection.

What if, nevertheless, we think of the catatonic schizophrenic and the vegetating patient with irreversible brain damage as absolutely incurable? Can we think of them at the same time as possessed of interests and rights too, or is this combination of traits a conceptual impossibility? Shocking as it may at first seem, I am driven unavoidably to the latter view. If redwood trees and rosebushes cannot have rights, neither can incorrigible human vegetables.[12] The trustees who are designated to administer funds for the care of these unfortunates are better understood as mere custodians than as representatives of their interests since these patients no longer have interests. It does not follow that they should not be kept alive as long as possible: that is an open moral question not foreclosed by conceptual analysis. Even if we have duties to keep human vegetables alive, however, they cannot be duties *to* them. We may be obliged to keep them alive to protect the sensibilities of others, or to foster humanitarian tendencies in ourselves, but we cannot keep them alive for their own good, for they are no longer capable of having a "good" of their own. Without awareness, expectation, belief, desire, aim, and purpose, a being can have no interests; without interests, he cannot be benefited; without the capacity to be a beneficiary, he can have no rights. But there may nevertheless be a dozen other reasons to treat him as if he did.

Fetuses

9

If the interest principle is to permit us to ascribe rights to infants, fetuses, and generations yet unborn, it can only be on the grounds that interests can exert a claim upon us even before their possessors actually come into being, just the reverse of the situation respecting dead men where interests are respected even after their possessors

[12] Kapp, K. W. *The Social Costs of Private Enterprise.* Cambridge, Massachusetts: Harvard University Press, 1950.

have ceased to be. Newly born infants are surely noisier than mere vegetables, but they are just barely brighter They come into existence, as Aristotle said, with the capacity to acquire concepts and dispositions, but in the beginning we suppose that their consciousness of the world is a "blooming, buzzing confusion." They do have a capacity, no doubt from the very beginning, to feel pain, and this alone may be sufficient ground for ascribing both an interest and a right to them. Apart from that, however, during the first few hours of their lives, at least, they may well lack even the rudimentary intellectual equipment necessary to the possession of interests. Of course, this induces no moral reservations whatever in adults. Children grow and mature almost visibly in the first few months so that those future interests that are so rapidly emerging from the unformed chaos of their earliest days seem unquestionably to be the basis of their present rights. Thus, we say of a newborn infant that he has a right now to live and grow into his adulthood, even though he lacks the conceptual equipment at this very moment to have this or any other desire. A new infant, in short, lacks the traits necessary for the possession of interests, but he has the capacity to acquire those traits, and his inherited potentialities are moving quickly toward actualization even as we watch him. Those proxies who make claims in behalf of infants, then, are more than mere custodians: they are (or can be) genuine representatives of the child's emerging interests, which may need protection even now if they are to be allowed to come into existence at all.

The same principle may be extended to "unborn persons." After all, the situation of fetuses one day before birth is not strikingly different from that a few hours after birth. The rights our law confers on the unborn child, both proprietary and personal, are for the most part, placeholders or reservations for the rights he shall inherit when he becomes a full-fledged interested being. The law protects a potential interest in these cases before it has even grown into actuality, as a garden fence protects newly seeded flower beds long before blooming flowers have emerged from them. The unborn child's present right to property, for example, is a legal protection offered now to his future interest, contingent upon his birth, and instantly voidable if he dies before birth. As Coke put it: 'The law in many cases hath consideration of him in respect of the apparent expectation of his birth";[13] but this is quite another thing than recognizing a right actually to be born. Assuming that the child will be born, the law seems to say, various interests that he will come to have after birth must be protected from damage that they can incur even before birth. Thus prenatal injuries of a negligently inflicted kind can give the newly bom child a right to sue for damages which he can exercise through a proxy-attorney and in his own name any time *after* he is born.

There are numerous other places, however, where our law seems to imply an unconditional right to be born, and surprisingly no one seems ever to have found that idea conceptually absurd. One interesting example comes from an article given the following

[13] Keynes, J. M. *The General Theory of Employment, Interest and Money.* New York: Harcourt Brace, 1936.

headline by the *New York Times:* "Unborn Child's Right Upheld Over Religion."[14] A hospital patient in her eighth month of pregnancy refused to take a blood transfusion even though warned by her physician that "she might die at any minute and take the life of her child as well.' The ground of her refusal was that blood transfusions are repugnant to the principles of her religion (Jehovah's Witnesses). The Supreme Court of New Jersey expressed uncertainty over the constitutional question of whether a non-pregnant adult might refuse on religious grounds a blood transfusion pronounced necessary to her own survival, but the court nevertheless ordered the patient in the present case to receive the transfusion on the grounds that "the unborn child is entitled to the law's protection."

It is important to reemphasize here that the questions of whether fetuses do or ought to have rights are substantive questions of law and morals open to argument and decision. The prior question of whether fetuses are the kind of beings that can have rights, however, is a conceptual, not a moral, question, amenable only to what is called "logical analysis," and irrelevant to moral judgment. The correct answer to the conceptual question, I believe, is that unborn children are among the sorts of beings of whom possession of rights can meaningfully be predicated, even though they are (temporarily) incapable of having interests, because their future interests can be protected now, and it does make sense to protect a potential interest even before it has grown into actuality. The interest principle, however, makes perplexing, at best, talk of a noncontingent fetal right to be born; for fetuses, lacking actual wants and beliefs, have no actual interest in being born, and it is difficult to think of any other reason for ascribing any rights to them other than on the assumption that they will in fact be born.'

Future generations

We have it in our power now to make the world a much less pleasant place for our descendants than the world we inherited from our ancestors. We can continue to proliferate in ever greater numbers, using up fertile soil at an even greater rate, dumping our wastes into rivers, lakes, and oceans, cutting down our forests, and polluting the atmosphere with noxious gases. All thoughtful people agree that we ought not to do these things. Most would say that we have a duty not to do these things, meaning not merely that conservation is morally required (as opposed to merely desirable) but also that it is something due our descendants, something to be done for their sakes. Surely we owe it to future generations to pass on a world that is not a used up garbage heap. Our remote descendants ai;e not yet present to claim a livable world as their right, but there are plenty of proxies to speak now in their behalf. These spokesmen, far from being mere custodians, are genuine representatives of future interests.

[14] Firey, W. *Man, Mind and the Land.* Glencoe, Illionis: Free Press, 1960.

Why then deny that the human beings of the future have rights which can be claimed against us now in their behalf? Some are inclined to deny them present rights out of a fear of falling into obscure metaphysics, by granting rights to remote and unidentifiable beings who are not yet even in existence. Our unborn great-great-grandchildren are in some sense "potential'[15] persons, but they are far more remotely potential, it may seem, than fetuses. This, however, is not the real difficulty. Unborn generations are more remotely potential than fetuses in one sense, but not in another. A much greater period of time with a far greater number of causally necessary and important events must pass before their potentiality can be actualized, it is true; but our collective posterity is just as certain to come into existence "in the normal course of events" as is any given fetus now in its mother's womb. In that sense the existence of the distant human future is no more remotely potential than that of a particular child already on its way.

The real difficulty is not that we doubt whether our descendants will ever be actual, but rather that we don't know who they will be. It is not their temporal remoteness that troubles us so much as their indeterminacy—their present facelessness and namelessness. Five centuries from now men and women will be living where we live now. Any given one of them will have an interest in living space, fertile soil, fresh air, and the like, but that arbitrarily selected one has no other qualities we can presently envision very clearly. We don't even know who his parents, grandparents, or great-grandparents are. or even whether he is related to us. Still, whoever these human beings may turn out to be, and whatever they might reasonably be expected to be like, they will have interests that we can affect, for better or worse, right now. That much we can and do know about them. The identity of the owners of these interests is now necessarily obscure, but the fact of their interest-ownership is crystal clear, and that is all that is necessary to certify the coherence of present talk about their rights. We can tell, sometimes, that shadowy forms in the spatial distance belong to human beings, though we know not who or how many they are; and this imposes a duty on us not to throw bombs, for example, in their direction In like manner, the vagueness of the human future does not weaken its claim on us in light of the nearly certain knowledge that it will, after all, be human.

Doubts about the existence of a right to be bom transfer neatly to the question of a similar right to come into existence ascribed to future generations. The rights that future generations certainly have against us are contingent rights: the interests they are sure to have when they come into being (assuming of course that they will come into being) cry out for protection from invasions that can take place now. Yet there are no actual interests, presently existent, that future generations, presently nonexistent, have now. Hence, there is no actual interest that they have in simply coming into being, and I am at a loss to think of any other reason for claiming that they have a right to come into existence (though there may well be such a reason). Suppose then that

[15] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

all human beings at a given time voluntarily form a compact never again to produce children, thus leading within a few decades to the end of our species. This of course is a wildly improbable hypothetical example but a rather crucial one for the position I have been tentatively considering. And we can imagine, say, that the whole world is converted to a strange ascetic religion which absolutely requires sexual abstinence for everyone. Would this arrangement violate the rights of anyone? No one can complain on behalf of presently nonexistent future generations that their future interests which give them a contingent right of protection have been violated since they will never come into existence to be wronged. My inclination then is to conclude that the suicide of our species would be deplorable, lamentable, and a deeply moving tragedy, but that it would violate no one's rights. Indeed if, contrary to fact, all human beings could ever agree to such a thing, that very agreement would be a symptom of our species' biological unsuitability for survival anyway.

Conclusion

For several centuries now human beings have run roughshod over the lands of our planet, just as if the animals who do live there and the generations of humans who will live there had no claims on them whatever. Philosophers have not helped matters by arguing that animals and future generations are not the kinds of beings who can have rights now, that they don't presently qualify for membership, even "auxiliary membership," in our moral community. I have tried in this essay to dispel the conceptual confusions that make such conclusions possible. To acknowledge their rights is the very least we can do for members of endangered species (including our own). But that is something.

Appendix

The paradoxes of potentiality

Having conceded that rights can belong to beings in virtue of their merely potential interests, we find ourselves on a slippery slope; for it may seem at first sight that anything at all can have potential interests, or much more generally, that anything at all can be potentially almost anything else at all' Dehydrated orange powder is potentially orange juice, since if we add water to it, it will be orange juice. More remotely, however, it is also potentially lemonade, since it will become lemonade if we add a large quantity of lemon juice, sugar, and water. It is also potentially poisonous brew (add water and arsenic), a potential orange cake (add flour, etc., and bake), a potential orange-colored building block (add cement and harden), and so on, *ad infinitum.* Similarly a two-celled embryo, too small to be seen by the unaided eye, is a potential human being; and so is an unfertilized ovum; and so is even an "uncapacitated" spermatozoan. Add the proper nutrition to an implanted embryo (under certain other necessary conditions) and it becomes a fetus and then a child. Looked at another way, however, the implanted embryo has been combined (under the same conditions) with

the nutritive elements, which themselves are converted into a growing fetus and child. Is it then just as proper to say that food is a "potential child" as that an embryo is a potential child? If so, then what isn't a "potential child?" (Organic elements in the air and soil are "potentially food," and hence potentially people!)

Clearly, some sort of line will have to be drawn between direct or proximate potentialities and indirect or remote ones; and however we draw this line, there will be borderline cases whose classification will seem uncertain or even arbitrary. Even though any *X* can become a F provided only that it is combined with the necessary additional elements, *a, b, c, d,* and so forth, we cannot say of any given *X* that it is a "potential F" unless certain further— rather strict—conditions are met. (Otherwise the concept of potentiality, being universally and promiscuously applicable, will have no utility.) A number of possible criteria of proximate potentiality suggest themselves. The first is the criterion of causal importance. Orange powder is not properly called a potential building block because of those elements needed to transform it into a building block, the cement (as opposed to any of the qualities of the orange powder) is the causally crucial one. Similarly, any pauper might (misleadingly) be called a "potential millionaire" in the sense that all that need be added to any man to transform him into a millionaire is a great amount of money. The absolutely crucial element in the change, of course, is no quality of the man himself but rather the million dollars "added" to him.

What is causally "important" depends upon our purposes and interests and is therefore to some degree a relativistic matter. If we seek a standard, in turn, of "importance," we may posit such a criterion, for example, as that of the ease or difficulty (to some persons or other) of providing those missing elements which, when combined with the thing at hand, convert it into something else. It does seem quite natural, for example, to say that the orange powder is potentially orange juice, and that is because the missing element is merely common tap water, a substance conveniently near at hand to everyone; whereas it is less plausible to characterize the powder as potential cake since a variety of further elements, and not just one, are required, and some of these are not conveniently near at hand to many. Moreover, the process of combining the missing elements into a cake is rather more complicated than mere "addition. It is less plausible still to call orange powder a potential curbstone for the same kind of reason. The criterion of ease or difficulty of the acquisition and combination of additional elements explains all these variations.

Still another criterion of proximate potentiality closely related to the others is that of degree of deviation required from "the normal course of events." Given the intentions of its producers, distributors, sellers, and consumers, dehydrated orange juice will, in the normal course of events, become orange juice. Similarly, a human embryo securely imbedded in the wall of its mother's uterus will in the normal course of events become a'human child. That is to say that if no one deliberately intervenes to prevent it happening, it will, in the'vast majority of cases, happen. On the other hand, an unfertilized ovum will not become an embryo unless someone intervenes deliberately

to make it happen. Without such intervention in the "normal" course of events, an ovum is a mere bit of protoplasm of very brief life expectancy. If we lived in a world in which virtually every biologically capable human female became pregnant once a year throughout her entire fertile period of life, then we would regard fertilization as something that happens to every ovum in "the natural course of events." Perhaps we would regard every unfertilized ovum, in such a world, as a potential person even possessed of rights corresponding to its future interests. It would perhaps make conceptual if not moral sense in such a world to regard deliberate nonfertihzation as a kind of homicide.

It is important to notice, in summary, that words like *important, easy,* and *normal* have sense only in relation to human experiences, purposes, and techniques. As the latter change, so will our notions of what is important, difficult, and usual, and so will the concept of potentiality, or our application of it. If our purposes, understanding, and techniques continue to change in indicated directions, we may even one day come to think of inanimate things as possessed of "potential interests." In any case, we can expect the concept of a right to shift its logical boundaries with changes in our practical experience.

14. Animal Liberation; a Triangular Affair

J. Baird Callicott

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The ethical foundations of the "animal liberation" movement are compared with those of Aldo Leopold's "land ethic," which is taken as the paradigm for environmental ethics in general. Notwithstanding certain superficial similarities, more profound practical and theoretical differences are exposed. While only sentient animals are morally considerable according to the humane ethic, the land ethic includes within its purview plants as well as animals and even soils and waters. Nor does the land ethic prohibit the hunting, killing, and eating of certain animal species, in sharp contrast to the humane ethic. The humane ethic rests upon Benthamic foundations: pain is taken to be the ultimate evil and it is reductive or atomistic in its moral focus. The land ethic, on the other hand, is holistic in the sense that the integrity, stability, and beauty of the biotic community is its *summum bonum.* A classical antecedent of some of the formal characteristics of the land ethic is found in Plato's moral philosophy. Special consideration is given to the differing moral status of domestic and wild animals in the humane and land ethics and to the question of moral vegetarianism.

Environmental ethics and animal liberation

Partly because it is so new to Western philosophy (or at least heretofore only scarcely represented) *environmental ethics* has no precisely fixed conventional definition in glossaries of philosophical terminology. Aldo Leopold, however, is universally recognized as the father or founding genius of recent environmental ethics. His "land ethic" has become a modern classic and may be treated as the standard example, the paradigm case, as it were, of what an environmental ethic is. *Environmental ethics* then can be defined ostensively by using Leopold's land ethic as the exemplary type. I do not mean to suggest that all environmental ethics should necessarily conform to Leopold's paradigm, but the extent to which an ethical system resembles Leopold's land ethic might be used, for want of anything better, as a criterion to measure the extent to which it is or is not of the environmental sort.

It is Leopold's opinion, and certainly an overall review of the prevailing traditions of Western ethics, both popular and philosophical, generally confirms it. that traditional

Western systems of ethics have not accorded moral standing to nonhuman beings.[1] Animals and plants, soils and waters, which Leopold includes in his community of ethical beneficiaries, have traditionally enjoyed no moi'al standing, no rights, no respect, in sharp contrast to human persons whose rights and interests ideally must be fairly and equally considered if our actions are to be considered "ethical" or "moral." One fundamental and novel feature of the Leopold land ethic, therefore, is the extension of *direct* ethical considerability from people to nonhuman natural entities.

At first glance, the recent ethical movement usually labeled "animal liberation" or "animal rights" seems to be squarely and centrally a kind of environmental ethics.[2] The more uncompromising among the animal liber- ationists have demanded equal moral consideration on behalf of cows, pigs, chickens, and other apparently enslaved and oppressed nonhuman animals.[3] The theoreticians of this new hyper-egalitarianism have coined such terms as *speciesism* (on analogy with *racism* and *sexism)* and *human chauvinism* (on analogy with *male chauvinism),* and have made animal liberation seem, perhaps not improperly, the next and most daring development of political liberalism.[4] Aldo Leopold also draws upon metaphors of political liberalism when he tells us that his land ethic "changes the role of *Homo sapiens* from conqueror of the land community to plain member and citizen of it."[5] For animal liberationists it is as if the ideological battles for equal rights and equal consideration for women and for racial minorities have been all but won, and the next and greatest challenge is to purchase equality, first theoretically and then practically, for all (actually only *some)* animals, regardless of species. This more rhetorically implied than fully articulated historical progression of moral rights from fewer to greater numbers of "persons" (allowing that animals may also be persons) as advocated by animal liberationists, also parallels Leopold's scenario in "The Land Ethic" of the historical extension of "ethical criteria" to more and more "fields of conduct" and to larger and larger groups of people during the past three thousand or so years." As Leopold develops it, the land ethic is a cultural "evolutionary possibility," the next "step in a sequence." For Leopold, however, the next step is much more sweeping, much more inclusive than the animal liberationists envision, since it "enlarges the boundaries of the [moral] community to include soils, waters, [and] plants ..." as well as animals.[6] Thus, the animal liberation movement *could* be construed as partitioning Leopold's perhaps undigestable and totally inclusive environmental ethic into a series of more assimilable stages: today animal rights, tomorrow equal rights for plants, and after that full moral standing for rocks, soil, and other earthy compounds,

[1] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

[2] Cole, H. S. D., C. Freeman, M. Jahoda, and K. L. R. Pavitt. *Thinking about the Future: A Critique of the Limits to Growth,* London: Chatto and Windus, 1973.

[3] Engels, F. *The Dialectics of Nature.* New York: International Publishers, 1940.

[4] Firey, W. *Man, Mind and the Land.* Glencoe, Illionis: Free Press, 1960.

[5] Glacken, C. *Traces on the Rhodian Shore.* Berkeley: University of California Press, 1967.

[6] Hays, S. *The Conservation Movement and the Gospel of Efficiency.* Cambridge, Massachusetts: Atheneum, 1959.

and perhaps sometime in the still more remote future, liberty and equality for water and other elementary bodies.

Put just this way, however, there is something jarring about such a graduated progression in the exfoliation of a more inclusive environmental ethic, something that seems absurd. A more or less reasonable case might be made for rights for some animals, but when we come to plants, soils, and waters, the frontier between plausibility and absurdity appears to have been crossed. Yet, there is no doubt that Leopold sincerely proposes that *land* (in his inclusive sense) be ethically regarded. The beech and chestnut, for example, have in his view as much "biotic right" to life as the wolf and the deer, and the effects of human actions on mountains and streams for Leopold is an ethical concern as genuine and serious as the comfort and longevity of brood hens.[7] In fact, Leopold to all appearances never considered the treatment of brood hens on a factory farm or steers in a feed lot to be a pressing moral issue. He seems much more concerned about the integrity of the farm *wood lot* and the effects of clear-cutting steep slopes on neighboring *streams.*

Animal liberationists put their ethic into practice (and display their devotion to it) by becoming vegetarians, and the moral complexities of vegetarianism have been thoroughly debated in the recent literature as an adjunct issue to animal rights.[8] (No one however has yet expressed, as among Butler's Erewhonians, qualms about eating plants, though such sentiments might be expected to be latently present, if the rights of plants are next to be defended.) Aldo Leopold, by contrast did not even condemn hunting animals, let alone eating them, nor did he personally abandon hunting, for which he had had an enthusiasm since boyhood, upon becoming convinced that his ethical responsibilities extended beyond the human sphere.[9] There are several interpretations for this behavioral peculiarity. One is that Leopold did not see that his land ethic actually ought to prohibit hunting, cruelly killing, and eating animals. A corollary of this interpretation is that Leopold was so unperspicacious as deservedly to be thought stupid—a conclusion hardly comporting with the intellectual subtlety he usually evinces in most other respects. If not stupid, then perhaps Leopold was hypocritical. But if a hypocrite, we should expect him to conceal his proclivity for blood sports and flesh eating and to treat them as shameful vices to be indulged secretively. As it is, bound together between the same covers with "The Land Ethic" are his unabashed reminiscences of killing and consuming *game)* This term (like *stock)* when used of animals, moreover, appears to be morally equivalent to referring to a sexually appealing young woman as a "piece" or to a strong, young black man as a "buck"—if animal rights, that is, are to be considered as on a par with women's rights and the rights of formerly enslaved races. A third interpretation of Leopold's approbation of regulated and disciplined sport hunting (and *a fortiori* meat eating) is that it is a

[7] Hudson, W. D. *Modern Moral Philosophy.* London: Macmillan, 1970.

[8] Humboldt, A. von. *Essai Politique sur le Royaume de la Nouvelle Espagne.* Paris: F. Schoell, 1811.

[9] Jacks, G. V. and R. O. Whyte. *Vanishing Lands.* New York: Doubleday, 1939.

form of human/animal behavior not inconsistent with the land ethic as he conceived it. A corollary of this interpretation is that Leopold's land ethic and the environmental ethic of the animal Jiberation movement rest upon very different theoretical foundations, and that they are thus two very different forms of environmental ethics. ‘

The urgent concern of animal liberationists for the suffering of *domestic* animals, toward which Leopold manifests an attitude which can only be described as indifference, and the urgent concern of Leopold, on the other hand, for the disappearance of *species* of plants as well as animals and for soil erosion and stream pollution, appear to be symptoms not only of very different ethical perspectives, but profoundly different cosmic visions as well. The neat similarities, noted at the beginning of this discussion, between the environmental ethic of the animal liberation movement and the classical Leopoldian land ethic appear in light of these observations to be rather superficial and to conceal substrata of thought and value which are not at all similar. The theoretical foundations of the animal liberation movement and those of the Leopoldian land ethic may even turn out not to be companionable, complementary, or mutually consistent. The animal liberationists may thus find themselves not only engaged in controversy with the many conservative philosophers upholding *apartheid* between man and "beast," but also faced with an unexpected dissent from another, very different, system of environmental ethics ' ' Animal liberation and animal rights may well prove to be a triangular rather than, as it has so far been represented in the philosophical community, a polar controversy.

Ethical humanism and humane moralism

The orthodox response of "ethical humanism" (as this philosophical perspective may be styled) to the suggestion that nonhuman animals should be accorded moral standing is that such animals are not worthy of this high perquisite. Only human beings are rational, or capable of having interests, or possess se/f-awareness, or have linguistic abilities, or can represent the future, it is variously argued.[10] These essential attributes taken singly or in various combinations make people somehow exclusively deserving of moral consideration. The so-called "lower animals," it is insisted, lack the crucial qualification for ethical considerability and so may be treated (albeit humanely, according to some, so as not to brutalize man) as things or means, not as persons or as ends.[11]

The theoreticians of the animal liberation movement ("humane moralists" as they may be called) typically reply as follows.[12] Not all human beings qualify as worthy of moral regard, according to the various criteria specified. Therefore, by parity of reasoning, human persons who do not so qualify as moral patients may be treated, as animals

[10] Keynes, J. M. *Essays in Biography.* New York' Meridian Books, 1951.
[11] Keynes, J. M. *Essays in Biography.* New York' Meridian Books, 1951.
[12] Kuhn, T. S. *The Structure of Scientific Revolutions.* Chicago: Chicago University Press, 1962.

often are, as mere things or means (e.g., used in vivisection experiments, disposed of if their existence is inconvenient, eaten, hunted, etc., etc.). But the ethical humanists would be morally outraged if irrational and inarticulate infants, for example, were used in painful or lethal medical experiments, or if severely retarded people were hunted for pleasure. Thus, the double-dealing, the hypocrisy, of ethical humanism appears to be exposed.[13] Ethical humanism, though claiming to discriminate between worthy and unworthy ethical patients on the basis of objective criteria impartially applied, turns out after all, it seems, to be *spe- ciesism,* a philosophically indefensible prejudice (analogous to racial prejudice) against animals. The tails side of this argument is that some animals, usually the "higher" lower animals (cetaceans, other primates, etc.), as ethnological studies seem to indicate, may meet the criteria specified for moral worth, although the ethical humanists, even so, are not prepared to grant them full dignity and the rights of persons. In short, the ethical humanists' various criteria for moral standing do not include all or only human beings, humane moralists argue, although in practice ethical humanism wishes to make the class of morally considerable beings coextensive with the class of human beings.

The humane moralists, for their part, insist upon *sentience (sensibility* would have been a more precise word choice) as the only relevant capacity a being need possess to enjoy full moral standing. If animals, they argue, are conscious entities who, though deprived of reason, speech, forethought or even .sr//-awareness (however that may be judged), are capable of suffering, then their suffering should be as much a matter of ethical concern as that of our fellow human beings, or strictly speaking, as our very own. What, after all, has rationality or any of the other allegedly uniquely human capacities to do with ethical standing? Why, in other words, should beings who reason or use speech (etc.) qualify for moral status, and those who do not fail to qualify?' Isn't this just like saying that only persons with white skin should be free, or that only persons who beget and not those who bear should own property? The criterion seems utterly unrelated to the benefit for which it selects. On the other hand, the capacity to suffer is, it seems, a more relevant criterion for moral standing because—as Bentham and Mill, notable among modern philosophers, and Epicurus, among the ancients, aver -pain is evil, and its opposite, pleasure and freedom from pain, good. As moral agents (and this seems axiomatic), we have a duty to behave in such a way that the effect of our actions is to promote and procure good, so far as possible, and to reduce and minimize evil. That would amount to an obligation to produce pleasure and reduce pain. Now pain is pain wherever and by whomever it is suffered. As a *moral* agent, 1 should not consider my pleasure and pain to be of greater consequence in determining a course of action than that of other persons. Thus, by the same token, if animals suffer pain—and among philosophers only strict Cartesians would deny that they do—then we are morally obliged to consider their suffering as much an evil to be minimized by conscientious

[13] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

moral agents as human suffering.[14] Certainly actions of ours which contribute to the suffering of animals, such as hunting them, butchering and eating them, experimenting on them, etc., are on these assumptions morally reprehensible. Hence, a person'who regards himself or herself as not aiming in life to live most selfishly, conveniently, or profitably, but rightly and in accord with practical principle, if convinced by these arguments, should, among other things, cease to eat the flesh of animals, to hunt them, to wear fur and leather clothing and bone ornaments and other articles made from the bodies of animals, to eat eggs and drink milk, if the animal producers of these commodities are retained under inhumane circumstances, and to patronize zoos (as sources of psychological if not physical torment of animals). On the other hand, since certain very simple animals are almost certainly insensible to pleasure and pain, they may and indeed should be treated as morally inconsequential. Nor is there any *moral* reason why trees should be respected or rivers or mountains or anything which is, though living or tributary to life processes, unconscious. The humane moralists, like the moral humanists, draw a firm distinction between those beings worthy of moral consideration and those not. They simply insist upon a different but quite definite cut-off point on the spectrum of natural entities, and accompany their criterion with arguments to show that it is more ethically defensible (granting certain assumptions) and more consistently applicable than that of the moral humanists/[0]

The first principle of the land ethic

The fundamental principle of humane moralism, as we see, is Benthamic. Good is equivalent to pleasure and, more pertinently, evil is equivalent to pain. The presently booming controversy between moral humanists and humane moralists appears, when all the learned dust has settled, to be essentially internecine; at least, the lines of battle are drawn along familiar watersheds of the conceptual terrain/[15] A classical ethical theory, Bentham's, has been refitted and pressed into service to meet relatively new and unprecedented ethically relevant situations—the problems raised especially by factory farming and ever more exotic and frequently ill-conceived scientific research employing animal subjects. Then, those with Thomist, Kantian, Lockean, Moorean (etc.) ethical affiliation have heard the bugle and have risen to arms. It is no wonder that so many academic philosophers have been drawn into the fray. The issues have an apparent newness about them; moreover, they are socially and politically *avant garde.* But there is no serious challenge to cherished first principles.[16] Hence, without having to undertake any creative ethical reflection or exploration, or any reexamination of

[14] Malthus, T. R. *An Essay on the Principle of Population and a Summary View of the Principle of Population.* Harmondsworth, Middlesex: Penguin Books, 1970.

[15] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

[16] Marx, K. *The Economic and Philosophic Manuscripts of 1844.* New York: International Publishers, 1964.

historical ethical theory, a fresh debate has been stirred up. The familiar historical positions have simply been retrenched, applied, and exercised.

But what about the third (and certainly minority) party to the animal liberation debate? What sort of reasonable and coherent moral theory would at once urge that animals (and plants and soils and waters) be included in the same class with people as beings to whom ethical consideration is owed and yet not object to some of them being slaughtered (whether painlessly or not) and eaten, others hunted, trapped, and in various other ways seemingly cruelly used? Aldo Leopold provides a concise statement of what might be called the categorical imperative or principal precept of the land ethic: "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise."' What is especially noteworthy, and that to which attention should be directed in this proposition, is the idea that the good of the biotic *community* is the ultimate measure of the moral value, the rightness or wrongness, of actions. Thus, to hunt and kill a white-tailed deer in certain districts may not only be ethically permissible,' it might actually be a moral requirement, necessary to protect the local environment, taken as a whole, from the disintegrating effects of a cervid population explosion. On the other hand, rare and endangered animals like the lynx should be especially nurtured and preserved. The lynx, cougar, and other wild feline predators, from the neo-Benthamite perspective (if consistently and evenhandedly applied) should be regarded as merciless, wanton, and incorrigible murderers of their fellow creatures, who not only kill, it should be added, but cruelly toy with their victims, thus increasing the measure of pain in the world. From the perspective of the land ethic, predators generally should be nurtured and preserved as critically important members of the biotic communities to which they are native. Certain plants, similarly, may be overwhelmingly important to the stability, integrity, and beauty of biotic communities, while some animals, such as domestic sheep (allowed perhaps by egalitarian and humane herdspersons to graze freely and to reproduce themselves without being harvested for lamb and mutton) could be a pestilential threat to the natural floral community of a given locale. Thus, the land ethic is logically coherent in demanding at once that moral consideration be given to plants as well as to animals and yet in permitting animals to be killed, trees felled, and so on. In every case the effect upon ecological systems is the decisive factor in the determination of the ethical quality of actions. Well-meaning actions from the point of view of neo-Benthamite ethics may be regarded as morally wanton from the point of view of land ethics, and *vice versa.* An example of the former, in addition to those already mentioned, is turning dairy cows out to pasture in a wood lot situated on a steep slope overlooking a trout stream (for the sake of the shady comfort and dietary variety of the cattle) with ruinous impact upon the floral and wildlife community native to the woods, the fish and benthic organisms of the stream, and the microbic life and the physiochemical structure of the soil itself. An example of the latter is trapping or otherwise removing beaver (to all appearances very sensitive and intelligent animals) and their dams to eliminate siltation in an otherwise free-flowing

and clearrunning stream (for the sake of the complex community of insects, native fish, heron, osprey, and other avian predators of aquatic life which on the anthropocentric scale of consciousness are "lower" life forms than beaver).

The land ethic and the ecological point of view

The philosophical context of the land ethic and its conceptual foundation is clearly the body of empirical experience and theory which is summed up in the term *ecology.* The specter of the naturalistic fallacy hovers around any claim to discover values in facts (and/or, probably, in scientific theories as well), but notwithstanding the naturalistic fallacy (or the fact/value lacuna), which is essentially a logical problem for formal ethics, there appears very often to be at least a strongly compelling psychological connection between the way the world is imagined or conceived and what state of things is held to be good or bad, what ways of behaving are right or wrong, and what responsibilities and obligations we, as moral agents, acknowledge."

Since ecology focuses upon the relationships between and among things, it inclines its students toward a more holistic vision of the world. Before the rather recent emergence of ecology as a science the landscape appeared to be, one might say, a collection of objects, some of them alive, some conscious, but all the same, an aggregate, a plurality of separate individuals. With this "atomistic" representation of things it is no wonder that moral issues might be understood as competing and mutually contradictory clashes of the "rights" of separate individuals, each separately pursuing its "interests." Ecology has made it possible to apprehend the same landscape as an arti- culte unity (without the least hint of mysticism or ineffability). Ordinary organic bodies have articulated and discernible parts (limbs, various organs, myriad cells); yet, because of the character of the network of relations among those parts, they form in a perfectly familiar sense a second-order whole. Ecology makes it possible to see land, similarly, as a unified system of integrally related parts, as, so to speak, a third-order organic whole.[17]

Another analogy that has helped ecologists to convey the particular holism which their science brings to reflective attention is that land is integrated as a human community is integrated. The various parts of the "biotic community" (individual animals and plants) depend upon one another *economically* so that the system as such acquires distinct characteristics of its own. Just as it is possible to characterize and define collectively peasant societies, agrarian communities, industrial complexes, capitalist, communist, and socialist economic systems, and so on, ecology characterizes and defines various biomes as desert, savanna, wetland, tundra, wood land, etc., communities, each with its particular "professions," "roles," or "niches."

[17] Marx, K. *Theories of Surplus Value.* Part 3, Moscow: Progress Publishers, 1972.

Now we may think that among the duties we as moral agents have toward ourselves is the duty of self-preservation, which may be interpreted as a duty to maintain our own organic integrity. It is not uncommon in historical moral theory, further, to find that in addition to those peculiar responsibilities we have in relation both to ourselves and to other persons severally, we also have a duty to behave in ways that do not harm the fabric of society *per se.* The land ethic, in similar fashion, calls our attention to the recently discovered integrity—in other words, the unity—of the biota and posits duties binding upon moral agents in relation to that whole. Whatever the strictly formal logical connections between the concept of a social community and moral responsibility, there appears to be a strong psychological bond between that idea and conscience. Hence, the representation of the natural environment as, in Leopold's terms, "one humming community" (or, less consistently in his discussion, a third-order organic being) brings into play, whether rationally or not, those stirrings of conscience which we feel in relation to delicately complex, functioning social and organic systems/[18]

The neo-Benthamite humane moralists have, to be sure, digested one of the metaphysical implications of modem biology. They insist that human beings must be understood continuously with the rest of organic nature. People are (and are only) animals, and much of the rhetorical energy of the animal liberation movement is spent in fighting a rear guard action for this aspect of Darwinism against those philosophers who still cling to the dream of a special metaphysical status for people in the order of "creation." To this extent the animal liberation movement is biologically enlightened and argues from the taxonomical and evolutionary continuity of man and beast to moral standing for some nonhuman animals. Indeed, pain, in their view the very substance of evil, is something that is conspicuously common to people and other sensitive animals, something that we as people experience not in virtue of our metasimian cerebral capabilities, but because of our participation in a more generally animal, limbic-based consciousness. 7/ it is pain and suffering that is the ultimate evil besetting human life, and this not in virtue of our humanity but in virtue of our animality, then it seems only fair to promote freedom from pain for those animals who share with us in this mode of experience and to grant them rights similar to ours as a means to this end.

Recent ethnological studies of other primates, cetaceans, and so on, are not infrequently cited to drive the point home, but the biological information of the animal liberation movement seems to extend no further than this—the continuity of human with other animal life forms. The more recent ecological perspective especially seems to be ignored by humane moralists. The holistic outlook of ecology and the associated value premium conferred upon the biotic community, its beauty, integrity, and stability may simply not have penetrated the thinking of the animal liberationists, or it could be that to include it would involve an intolerable contradiction with the Benthamite foundations of their ethical theory. Bentham's view of the "interests of the community" was bluntly reductive. With his characteristic bluster, Bentham wrote, "The community is

[18] Godelier, M. *Rationality and Irrationality in Economics.* London: New Left Books, 1972.

a fictitious *body* composed of the individual persons who are considered as constituting as it were its *members.* The interest of the community then is, what?—the sum of the interests of the several members who compose it."[19] Bentham's very simile—the community is like a body composed of members—gives the lie to his reduction of its interests to the sum of its parts taken severally. The'interests of a person are not those of his or her cells summed up and averaged out. Our organic health and wellbeing, for example, requires vigorous exercise and metabolic stimulation which cause stress and often pain to various parts of the body and a more rapid turnover in the life cycle of our individual cells. For the sake of the person taken as whole, some parts may be, as it were, unfairly sacrificed. On the level of social organization, the interests of society may not always coincide with the sum of the interests of its parts. Discipline, sacrifice, and individual restraint are often necessary in the social sphere to maintain social integrity as within the bodily organism. A society, indeed, is particularly vulnerable to disintegration when its members become preoccupied totally with their own particular interest, and ignore those distinct and independent interests of the community as a whole. One example, unfortunately, our own society, is altogether too close at hand to be examined with strict academic detachment. The United States seems to pursue uncritically a social policy of reductive utilitarianism, aimed at promoting the happiness of all its members severally. Each special interest accordingly clamors more loudly to be satisfied while the community as a whole becomes noticeably more and more infirm economically, environmentally, and politically.

The humane moralists, whether or not they are consciously and deliberately following Bentham on this particular, nevertheless, in point of fact, are committed to the welfare of certain kinds of animals distributively or reductively in applying their moral concern for nonhuman beings.[20] They lament the treatment of animals, most frequently farm and laboratory animals, and plead the special interests of these beings. We might ask, from the perspective of the land ethic, what the effect upon the natural environment taken as whole would be if domestic animals were actually liberated? There is, almost certainly, very little real danger that this might actually happen, but it would be instructive to speculate on the ecological consequences.

Ethical holism

Before we take up this question, however, some points of interest remain to be considered on the matter of a holistic versus a reductive environmental ethic. To pit the one against the other as I have done without further qualification would be mistaken. A society is constituted by its members, an organic body by its cells, and the ecosystem by the plants, animals, minerals, fluids, and gases which compose it. One

[19] Cole, H. S. D., C. Freeman, M. Jahoda, and K. L. R. Pavitt. *Thinking about the Future: A Critique of the Limits to Growth,* London: Chatto and Windus, 1973.

[20] Mill, J. S. *Principles of Political Economy.* Toronto: University of Toronto Press, 1965. «

cannot affect a system as a whole without affecting at least some of its components. An environmental ethic which takes as its *summum bonum* the integrity, stability, and beauty of the biotic community is not conferring moral standing on something *else* besides plants, animals, soils, and waters. Rather, the former, the good of the community as a whole, serves as a standard for the assessment of the relative value and relative ordering of its constitutive parts and therefore provides a means of adjudicating the often mutually contradictory demands of the parts considered separately for *equal* consideration. If diversity does indeed contribute to stability (a classical "law" of ecology), then *specimens* of rare and endangered species, tor example, have a *prima facie* claim to preferential consideration from the perspective of the land ethic. Animals of those species, which, like the honey bee, function in ways critically important to the economy of nature, moreover, would be granted a greater claim to moral attention than psychologically more complex and sensitive ones, say, rabbits and moles, which seem to be plentiful, globally distributed, ^productively efficient, and only routinely integrated into the natural economy. Animals and plants, mountains, rivers, seas, the atmosphere are the *immediate* practical beneficiaries of the land ethic. The well-being of the biotic community, the biosphere as a whole, cannot be logically separated from their survival and welfare.

Some suspicion may arise at this point that the land ethic is ultimately grounded in *human* interests, not in those of nonhuman natural entities. Just as we might prefer a sound and attractive house to one in the opposite condition so the "goodness" of a whole, stable, and beautiful environment seems rather to be of the instrumental, not the autochthonous, variety. The question of ultimate value is a very sticky one for environmental as well as for all ethics and cannot be fully addressed here. It is my view that there can be no value apart from an evaluator, that all value is as it were in the eye of the beholder. The value that is attributed to the ecosystem, therefore, is humanly dependent or (allowing that other living things may take a certain delight in the well-being of the whole of things, or that the gods may) at least dependent upon some variety of morally and aesthetically sensitive consciousness. Granting this, however, there is a further, very crucial distinction to be drawn. It is possible that while things may only have value because we (or someone) values them, they may nonetheless be valued for themselves as well as for the contribution they might make to the realization of our (or someone's) interests. Children are valued for themselves by most parents. Money, on the other hand, has only an instrumental or indirect value. Which sort of value has the health of the biotic community and its members severally for Leopold and the land ethic? It is especially difficult to separate these two general sorts of value, the one of moral significance, the other merely selfish, when something that may be valued in *both ways at once* is the subject of consideration. Are pets, for example, well-treated, like children, for the sake of themselves, or, like mechanical appliances, because of the sort of services they provide their owners? Is a healthy biotic community something we value because we are so utterly and (to the biologically well-informed) so obviously dependent upon it not only for our happiness but for our very

survival, or may we also perceive it disinterestedly as having an independent worth? Leopold insists upon a noninstrumental value for the biotic community and *mutatis mutandis* for its constituents. According to Leopold, collective enlightened self-interest on the part of human beings does not go far enough; the land ethic in his opinion (and no doubt this reflects his own moral intuitions) requires "love, respect, and admiration for land, and a high regard for its value." The land ethic, in Leopold's view, creates "obligations over and above self-interest." And, "obligations have no meaning without conscience, and the problem we face is the extension of the social conscience from people to land."[21] If, in other words, any genuine ethic is possible, if it is possible to value *people* for the sake of themselves, then it is equally possible to value *land* in the same way.

Some indication of the genuinely biocentric value orientation of ethical environmentalism is indicated in what otherwise might appear to be gratuitous misanthropy. The biospheric perspective does not exempt *Homo sapiens* from moral evaluation in relation to the well-being of the community of nature taken as a whole. The preciousness of individual deer, as of any other specimen, is inversely proportional to the population of the species. Environmentalists, however reluctantly and painfully, do not omit to apply the same logic to their own kind. As omnivores, the population of human beings should, perhaps, be roughly twice that of bears, allowing for differences of size. A global population of more than four billion persons and showing no signs of an orderly decline presents an alarming prospect to humanists, but it is at present a global disaster (the more *per capita* prosperity, indeed, the more disastrous it appears) for the biotic community. If the land ethic were only a means of managing nature for the sake of man, misleadingly phrased in moral terminology, then man would be considered as having an ultimate value essentially different from that of his "resources." The extent of misanthropy in modern environmentalism thus may be taken as a measure of the degree to which it is biocentric. Edward Abbey in his enormously popular *Desert Solitaire* bluntly states that he would sooner shoot a man than a snake.[22] Abbey may not be simply depraved; this is perhaps only his way of dramatically making the point 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 a rare even if unattractive species, the choice would be moot. Among academicians, Garret Hardin, a human ecologist by discipline who has written extensively on ethics, environmental and otherwise, has shocked philosophers schooled in the preciousness of human life with his "lifeboat" and "survival" ethics and his "wilderness economics." In context of the latter, Hardin recommends limiting access to wilderness by criteria of hardiness and woodcraft and would permit no emergency roads or airborne rescue vehicles to violate the pristine purity of wilderness areas. If a wilderness adventurer

[21] Oilman, B. *Alienation: Marx's Conception of Man in Capitalist Society.* London: Cambridge University Press, 1971.

[22] Oilman, B. "Marxism and Political Science: Prolegomenon to a Debate on Marx's Method," *Politics and Society,* 3 (1973), pp. 491-510.

should have a serious accident, Hardin recommends that he or she get out on his or her own or die in the attempt. Danger, from the strictly human-centered, psychological perspective, is part of the wilderness experience, Hardin argues, but in all probability his more important concern is to protect from mechanization the remnants of wild country that remain even if the price paid is the incidental loss of human life which, from the perspective once more of the biologist, is a commodity altogether too common in relation to wildlife and to wild landscapes.[23] Hardin's recommendation of harsh policies in relation to desperate, starving nations is based strictly upon a utilitarian calculus, but reading between the lines, one can also detect the biologist's chagrin concerning the ecological dislocations which a human population explosion have already created and which if permitted to continue unchecked could permanently impoverish (if not altogether extinguish) an already stressed and overburdened economy of nature.[24]

Finally, it may be wondered if anything ought properly be denominated an "ethic" which on the basis of an impersonal, not to say abstract, good, "the integrity, stability, and beauty of the biotic community," permits and even requires *preferential* consideration. A "decision procedure," to give it for the moment a neutral rubric, which lavishes loving and expensive care on whooping cranes and (from the Benthamite point of view, villainous) timber wolves while simultaneously calculating the correct quotas for "harvesting" mallards and ruffed grouse should hardly be dignified, it might be argued, by the term *ethic.* Modem systems of ethics have, it must be admitted, considered the principle of the equality of persons to be inviolable. This is true, for example, of both major schools of modern ethics, the utilitarian school going back to Bentham and Mill, and the deontological, originating with Kant. The land ethic manifestly does not accord equal moral worth to each and every member of the biotic community; the moral worth of individuals (including, n.b., human individuals) is relative, to be assessed in accordance with the particular relation of each to the collective entity which Leopold called "land."

There is, however, a classical Western ethic, with the best philosophical credentials, which assumes a similar holistic posture (with respect to the social moral sphere). I have in mind Plato's moral and social philosophy. Indeed, two of the same analogies figuring in the conceptual foundations of the Leopold land ethic appear in Plato's value theory.[25]' From the ecological perspective, according to Leopold as I have pointed out, land is like an organic body or like a human society. According to Plato, body, soul, and society have similar structures and corresponding virtues.[26] The goodness of each is a function of its structure or organization and the relative value of the parts or constituents of each is calculated according to the contribution made to the integrity,

[23] Orans, M. "Surplus," *Human Organization,* 25 (1966), pp. 24—32.

[24] Pearson, H. "The Economy Has No Surplus: A Critique of a Theory of Development," in K. Polanyi, C. M. Arensberg, and H. W. Pearson. *Trade and Market in Early Empires.* Glencoe, Illinois: Free Press, 1957.

[25] Engels, F. *The Dialectics of Nature.* New York: International Publishers, 1940.

[26] Piaget, J. *The Principles of Genetic Epistemology.* London: Routledge and Kegan Paul, 1972.

stability, and beauty of each whole.[27] In the *Republic,* Plato, in the very name of virtue and justice, is notorious for, among other things, requiring infanticide for a child whose only offense was being born without the sanction of the state, making presents to the enemy of guardians who allow themselves to be captured alive in combat, and radically restricting the practice of medicine to the dressing of wounds and the curing of seasonal maladies on the principle that the infirm and chronically ill not only lead miserable lives but contribute nothing to the good of the polity/[28] Plato, indeed, seems to regard individual human life and certainly human pain and suffering with complete indifference. On the other hand, he shrinks from nothing so long as it seems to him to be in the interest of the community. Among the apparently inhuman recommendations that he makes to better the community are a program of eugenics involving a phony lottery (so that those whose natural desires are frustrated, while breeding proceeds from the best stock as in a kennel or stable, will blame chance, not the design of the rulers), the destruction of the pair bond and nuclear family (in the interests of greater military and bureaucratic efficiency and group solidarity), and the utter abolition of private property?[29]

When challenged with the complaint that he is ignoring individual human happiness (and the happiness of those belonging to the most privileged class at that), he replies that it is the well-being of the community as a whole, not that of any person or special class at which his legislation aims.[30] This principle is readily accepted, first of all, in our attitude toward the body, he reminds us—the separate interests of the parts of which we acknowledge to be subordinate to the health and well-being of the whole—and secondly, assuming that we accept his faculty psychology, in our attitude toward the soul—whose multitude of desires must be disciplined, restrained, and, in the case of some, altogether repressed in the interest of personal virtue and a well-ordered and morally responsible life.

Given these formal similarities to Plato's moral philosophy, we may conclude that the land ethic—with its holistic good and its assignment of differential values to the several parts of the environment irrespective of their intelligence, sensibility, degree of complexity, or any other characteristic discernible in the parts considered separately—is somewhat foreign to modern systems of ethical philosophy, but perfectly familiar in the broader context of classical Western ethical philosophy. If, therefore, Plato's system of public and private justice is properly an "ethical" system, then so is the land ethic in relation to environmental virtue and excellence.[31]

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[27] Ricardo, D. *Principles of Political Economy.* London: Cambridge University Press, 1951.

[28] Godelier, M. *Rationality and Irrationality in Economics.* London: New Left Books, 1972.

[29] Harvey, D. *Social Justice and the City.* Baltimore: Johns Hopkins Press, 1973.

[30] Schmidt, A. *The Concept of Nature in Marx.* London: New Left Books, 1971.

[31] Oilman, B. "Marxism and Political Science: Prolegomenon to a Debate on Marx's Method," *Politics and Society,* 3 (1973), pp. 491-510.

Reappraising domesticity

Among the last philosophical remarks penned by Aldo Leopold before his untimely death in 1948 is the following: "Perhaps such a shift of values [as implied by the attempt to weld together the concepts of ethics and ecology] can be achieved by reappraising things unnatural, tame, and confined in terms of things natural, wild, and free."[32] John Muir, in a similar spirit of reappraisal, had noted earlier the difference between the wild mountain sheep of the Sierra and the ubiquitous domestic variety. The latter, which Muir described as "hooved locusts," were only, in his estimation, "half alive" in comparison with their natural and autonomous counterparts.[33] One of the more distressing aspects of the animal liberation movement is the failure of almost all its exponents to draw a sharp distinction between the very different plights (and rights) of wild and domestic animals.[34] But this distinction lies at the very center of the land ethic. Domestic animals are creations of man. They are living artifacts, but artifacts nevertheless, and they constitute yet another mode of extension of the works of man into the ecosystem. From the perspective of the land ethic a herd of cattle, sheep, or pigs is as much or more a ruinous blight on the landscape as a fleet of four-wheel drive off-road vehicles. There is thus something profoundly incoherent (and insensitive as well) in the complaint of some animal liberatiortists that the " natural behavior' of chickens and bobby calves is cruelly frustrated on factory farms. It would make almost as much sense to speak of the natural behavior of tables and chairs.

Here a serious disanalogy (which no one to my knowledge has yet pointed out) becomes clearly evident between the liberation of blacks from slavery (and more recently, from civil inequality) and the liberation of animals from a similar sort of subordination and servitude. Black slaves remained, as it were, metaphysically autonomous: they were by nature if not by convention free beings quite capable of living on their own. They could not be enslaved for more than a historical interlude, for the strength of the force of their freedom was too great. They could, in other words, be retained only by a continuous counterforce, and only temporarily. This is equally true of caged wild animals. African cheetas in American and European zoos are captive, not indentured, beings. But this is not true of cows, pigs, sheep, and chickens. They have been bred to docility, tractability, stupidity, and dependency. It is literally meaningless to suggest that they be liberated. It is, to speak in hyperbole, a logical impossibility.

Certainly it is a practical impossibility. Imagine what would happen if the people of the world became morally persuaded that domestic animals were to be regarded as oppressed and enslaved persons and accordingly *set free.* In one scenario we might imagine that like former American black slaves they would receive the equivalent of forty acres and a mule and be turned out to survive on their own. Feral cattle and

[32] Tarascio, V. J. *Pareto's Methodological Approach to Economics.* Chapel Hill, North Carolina: University of North Carolina Press, 1966.

[33] Vogt, W. *The Road to Survival,* New York: W. Sloane Associates, 1948.

[34] Firey, W. *Man, Mind and the Land.* Glencoe, Illionis: Free Press, 1960.

sheep would hang around farm outbuildings waiting forlornly to be sheltered and fed, or would graze aimlessly through their abandoned and deteriorating pastures. Most would starve or freeze as soon as winter settled in. Reproduction which had been assisted over many countless generations by their former owners might be altogether impossible in the feral state for some varieties, and the care of infants would be an art not so much lost as never acquired. And so in a very short time, after much suffering and agony, these species would become abruptly extinct. Or, in another scenario beginning with the same simple emancipation from human association, survivors of the first massive die-off of untended livestock might begin to recover some of their remote wild ancentral genetic traits and become smaller, leaner, heartier, and smarter versions of their former selves. An actual contemporary example is afforded by the feral mustangs ranging over parts of the American West. In time such animals as these would become (just as the mustangs are now) competitors both with their former human masters and (with perhaps more tragic consequences) indigenous wildlife for food and living space.

Foreseeing these and other untoward consequences of immediate and unplanned liberation of livestock, a human population grown morally more perfect than at present might decide that they had a duty, accumulated over thousands of years, to continue to house and feed as before their former animal slaves (whom they had rendered genetically unfit to care for themselves), but not to butcher them or make other ill use of them, including frustrating their "natural" behavior, their right to copulate freely, reproduce, and enjoy the delights of being parents. People, no longer having meat to eat, would require more vegetables, cereals, and other plant foods, but the institutionalized animal incompetents would still consume all the hay and grains (and more since they would no longer be slaughtered) than they did formerly. This would require clearing more land and bringing it into agricultural production with further loss of wildlife habitat and ecological destruction. Another possible scenario might be a decision on the part of people not literally to liberate domestic animals but simply to cease to breed and raise them. When the last livestock have been killed and eaten (or permitted to die "natural" deaths), people would become vegetarians and domestic livestock species would thus be rendered deliberately extinct (just as they had been deliberately created). But there is surely some irony in an outcome in which the beneficiaries of a humane extension of conscience are destroyed in the process of being saved.[35]

The land ethic, it should be emphasized, as Leopold has sketched it, provides for the *rights* of nonhuman natural beings to a share in the life processes of the biotic community. The conceptual foundation of such rights, however, is less conventional than natural, based upon, as one might say, evolutionary and ecological entitlement. Wild animals and native plants have a particular place in nature, according to the land ethic, which domestic animals (because they are products of human art and represent an extended presence of human beings in the natural world) do not have. The land

[35] Zinke, G. W. *The Problem of Malthus: Must Progress End in Overpopulation.* University of Colorado Studies, Series in Economics, No. 5, Boulder, Colorado, 1967.

ethic, in sum, is as much opposed, though on different grounds, to commercial traffic in wildlife, zoos, the slaughter of whales and other marine mammals, etc., as is the humane ethic. Concern for animal (and plant) rights and wellbeing is as fundamental to the land ethic as to the humane ethic, but the difference between naturally evolved and humanly bred species is an essential consideration for the one, though not for the other.

The "shift of values" which results from our "reappraising things unnatural, tame, and confined in terms of things natural, wild, and free" is especially dramatic when we reflect upon the definitions of *good* and *evil* espoused by Bentham and Mill and uncritically accepted by their contemporary followers. Pain and pleasure seem to have nothing at all to do with good and evil if our appraisal is taken from the vantage point of ecological biology. Pain in particular is primarily information. In animals, it informs the central nervous system of stress, irritation, or trauma in outlying regions of the organism. A certain level of pain under optimal organic circumstances is indeed desirable as an indicator of exertion—of the degree of exertion needed to maintain fitness, to stay "in shape." and of a level of exertion beyond which it would be dangerous to go. An arctic wolf in pursuit of a caribou may experience pain in her feet or chest because of the rigors of the chase. There is nothing bad or wrong in that. Or, consider a case of injury. Suppose that a person in the course of a wilderness excursion sprains an ankle. Pain informs him or her of the injury and by its intensity the amount of further stress the ankle may endure in the course of getting to safety. Would it be better if pain were not experienced upon injury or, taking advantage of recent technology, anaesthetized? Pleasure appears to be, for the most part (unfortunately it is not always so) a reward accompanying those activities which contribute to organic maintenance, such as the pleasures associated with eating, drinking, grooming, and so on, or those which contribute to social solidarity like the pleasures of dancing, conversation, teasing, etc., or those which contribute to the continuation of the species, such as the pleasures of sexual activity and of being parents. The doctrine that life is the happier the freer it is from pain and that the happiest life conceivable is one in which there is continuous pleasure uninterrupted by pain is biologically preposterous. A living mammal which experienced no pain would be one which had a lethal dysfunction of the nervous system. The idea that pain is evil and ought to be minimized or eliminated is as primitive a notion as that of a tyrant who puts to death messengers bearing bad news on the supposition that thus his well-being and security is improved?[36]

More seriously still, the value commitments of the humane movement seem at bottom to betray a world-denying or rather a life-loathing philosophy. The natural world as actually constituted is one in which one being lives at the expense of others?[37] Each organism, in Darwin's metaphor, struggles to maintain its own organic integrity. The more complex animals seem to experience (judging from our own case, and reasoning

[36] Firey, W. *Man, Mind and the Land.* Glencoe, Illionis: Free Press, 1960.

[37] Glacken, C. *Traces on the Rhodian Shore.* Berkeley: University of California Press, 1967.

from analogy) appropriate and adaptive psychological accompaniments to organic existence. There is a palpable passion for self-preservation. There are desire, pleasure in the satisfaction of desires, acute agony attending injury, frustration, and chronic dread of death. But these experiences are the psychological substance of living. To live *is* to be anxious about life, to feel pain and pleasure in a fitting mixture, and sooner or later to die. That is the way the system works. If nature as a whole is good, then pain and death are also good. Environmental ethics in general require people to play fair in the natural system. The neo-Benthamites have in a sense taken the uncourageous approach. People have attempted to exempt themselves from the life/death reciprocities of natural processes and from ecological limitations in the name of a prophylactic ethic of maximizing rewards (pleasure) and minimizing unwelcome information (pain). To be fair, the humane moralists seem to suggest that we should attempt, to project the same values into the nonhuman animal world and to widen the charmed circle—no matter that it would be biologically unrealistic to do so or biologically ruinous if, per impossible, such an environmental ethic were implemented.

There is another approach. Rather than imposing our alienation from nature and natural processes and cycles of life on other animals, we human beings could reaffirm our participation in nature by accepting life as it is given without a sugar coating. Instead of imposing artificial legalities, rights, and so on on nature, we might take the opposite course and accept and affirm natural biological laws, principles, and limitations in the human personal and social spheres. Such appears to have been the posture toward life of tribal peoples in the past. The chase was relished with its dangers, rigors, and hardships as well as its rewards: animal flesh was respectfully consumed; a tolerance for pain was cultivated; virtue and magnanimity were prized; lithic, floral, and faunal spirits were worshipped; population was routinely optimized by sexual continency, abortion, infanticide, and stylized warfare; and other life forms, although certainly appropriated, were respected as fellow players in a magnificent and awesome, if not altogether idyllic, drama of life. It is impossible today to return to the symbiotic relationship of Stone Age man to the natural environment, but the ethos of this by far the longest era of human existence could be abstracted and integrated with a future human culture seeking a viable and mutually beneficial relationship with nature. Personal, social, and environmental *health* would, accordingly, receive a premium value rather than comfort, self-indulgent pleasure, and anaesthetic insulation from pain. Sickness would be regarded as a worse evil than death. The pursuit of health or wellness at the personal, social, and environmental levels would require self-discipline in the form of simple diet, vigorous exercise, conservation, and social responsibility.

Leopold's prescription for the realization and implementation of the land ethic—the reappraisal of things unnatural, tame, and confined in terms of things natural, wild, and free—does not stop, in other words, with a reappraisal of nonhuman domestic animals in terms of their wild (or willed) counterparts; the human ones should be similarly reappraised. This means, among other things, the reappraisal of the comparatively recent values and concerns of "civilized" *Homo sapiens* in terms of those of our "savage"

ancestors.[38] Civilization has insulated and alienated us from the rigors and challenges of the natural environment. The hidden agenda of the humane ethic is the imposition of the anti-natural prophylactic ethos of comfort and soft pleasure on an even wider scale. The land ethic, on the other hand, requires a shrinkage, if at all possible, of the domestic sphere; it rejoices in a recrudescence of wilderness and a renaissance of tribal cultural experience.

The converse of those goods and evils, axiomatic to the humane ethic, may be illustrated and focused by the consideration of a single issue raised by the humane morality: a vegetarian diet. Savage people seem to have had, if the attitudes and values of surviving tribal cultures are representative, something like an intuitive grasp of ecological relationships and certainly a morally charged appreciation of eating. There is nothing more intimate than eating, more symbolic of the connectedness of life, and more mysterious. What we eat and how we eat is by no means an insignificant ethical concern.

From the ecological point of view, for human beings universally to become vegetarians is tantamount to a shift of trophic niche from omnivore with carnivorous preferences to herbivore. The shift is a downward one on the trophic pyramid, which in effect shortens those food chains terminating with man. It represents an increase in the efficiency of the conversion of solar energy from plant to human biomass, and thus, by bypassing animal intermediates, increases available food resources for human beings. The human population would probably, as past trends overwhelmingly suggest, expand in accordance with the potential thus afforded. The net result would be fewer nonhuman beings and more human beings, who, of course, have requirements of life far more elaborate than even those of domestic animals, requirements which would tax other "natural resources" (trees for shelter, minerals mined at the expense of topsoil and its vegetation, etc.) more than under present circumstances. A vegetarian human population is therefore *probably* ecologically catastrophic.

Meat eating as implied by the foregoing remarks may be more *ecologically* responsible than a wholly vegetable diet. Meat, however, purchased at the supermarket, externally packaged and internally laced with petrochemicals, fattened in feed lots, slaughtered impersonally, and, in general, mechanically processed from artificial insemination to microwave roaster, is an affront not only to physical metabolism and bodily health but to conscience as well. From the perspective of the land ethic, the immoral aspect of the factory farm has to do far less with the suffering and killing of nonhuman animals than with the monstrous transformation of living things from an organic to a mechanical mode of being. Animals, beginning with the Neolithic Revolution, have been debased through selective breeding, but they have nevertheless remained animals. With the Industrial Revolution an even more profound and terrifying transformation has overwhelmed them. They have become, in Ruth Harrison's most apt description,

[38] *CDC Development Report May 1993* (London: The Commonwealth Development Corporation 1993).

"animal machines." The very' presence of animals, so emblematic of delicate, complex organic tissue, surrounded by machines, connected to machines, penetrated by machines in research laboratories or crowded together in space-age "production facilities" is surely the more real and visceral source of our outrage at vivisection and factory farming than the contemplation of the quantity of pain that these unfortunate beings experience. I wish to denounce as loudly as the neoBenthamites this ghastly abuse of animal life, but also to stress that the pain and suffering of research and agribusiness animals is not greater than that endured by free-living wildlife as a consequence of predation, disease, starvation, and cold—indicating that there is something immoral about vivisection and factory farming which is not an ingredient in the natural lives and deaths of wild beings. That immoral something is the transmogrification of organic to mechanical processes.

Ethical vegetarianism to all appearances insists upon the human consumption of plants (in a paradoxical moral gesture toward those animals whose very existence is dependent upon human carnivorousness), even when the tomatoes are grown hydroponically, the lettuce generously coated with chlorinated hydrocarbons, the potatoes pumped up with chemical fertilizers, and the cereals stored with the help of chemical preservatives. The land ethic takes as much exception the transmogrification of plants by mechanicochemical means as to that of animals. The important thing, I would think, is not to eat vegetables as opposed io animal flesh, but to resist factory farming in all its manifestations, including especially its liberal application of pesticides, herbicides, and chemical fertilizers to maximize the production of *vegetable* crops.

The land ethic, with its ecological perspective, helps us to recognize and affirm the organic integrity of self and the untenability of a firm distinction between self and environment. On the ethical question of what to eat, it answers, not vegetables instead of animals, but organically as opposed to mechanicochemically produced food. Purists like Leopold prefer, in his expression, to get their "meat from God," i.e., to hunt and consume wildlife and to gather wild plant foods, and thus to live within the parameters of the aboriginal human ecological niche.[39] Second best is eating from one's own orchard, garden, henhouse, pigpen, and barnyard. Third best is buying or bartering organic foods from one's neighbors and friends.

Conclusion

Philosophical controversy concerning animal liberation/rights has been most frequently represented as a polar dispute between traditional moral humanists and seemingly *avant garde* humane moralists. Further, animal liberation has been assumed to be closely allied with environmental ethics, possibly because in Leopold's classical formulation moral standing and indeed rights (of some unspecified sort) is accorded

[39] Harrison, P. *The Third Revolution* p. 124.

nonhuman beings, among them animals. The purpose of this discussion has been to distinguish sharply environmental ethics from the animal liberation/rights movement both in theory and practical application and to suggest, thereupon, that there is an underrepresented, but very important, point of view respecting the problem of the moral status of nonhuman animals. The debate over animal liberation, in short, should be conceived as triangular, not polar, with land ethics or environmental ethics, the third and, in my judgment, the most creative, interesting, and practicable alternative. Indeed, from this third point of view moral humanism and humane moralism appear to have much more in common with one another than either have with environmental or land ethics. On reflection one might even be led to suspect that the noisy debate between these parties has served to drown out the much deeper challenge to "business-as-usual" ethical philosophy represented by Leopold and his exponents, and to keep ethical philosophy firmly anchored to familiar modern paradigms.

Moral humanism and humane moralism, to restate succinctly the most salient conclusions of this essay, are *atomistic* or distributive in their theory of moral value, while environmental ethics (again, at least, as set out in Leopold's outline) is *holistic* or collective. Modern ethical theory, in other words, has consistently located moral value in individuals and set out certain metaphysical reasons for including some individuals and excluding others. Humane moralism remains firmly within this modern convention and centers its attention on the competing criteria for moral standing and rights holding, while environmental ethics locates ultimate value in the "biotic community" and assigns differential moral value to the constitutive individuals relatively to that standard. This is perhaps the most fundamental theoretical difference between environmental ethics and the ethics of animal liberation.

Allied to this difference are many others. One of the more conspicuous is that in environmental ethics, plants are included within the parameters of the ethical theory as well as animals. Indeed, inanimate entities such as oceans and lakes, mountains, forests, and wetlands are assigned a greater value than individual animals and in a way quite different from systems which accord them moral considerability through a further multiplication of competing individual loci of value and holders of rights.

There are intractable practical differences between environmental ethics and the animal liberation movement. Very different moral obligations follow in respect, most importantly, to domestic animals, the principal beneficiaries of the humane ethic. Environmental ethics sets a very low priority on domestic animals as they very frequently contribute to the erosion of the integrity, stability, and beauty of the biotic communities into which they have been insinuated. On the other hand, animal liberation, if pursued at the practical as well as rhetorical level, would have ruinous consequences on plants, soils, and waters, consequences which could not be directly reckoned according to humane moral theory. As this last remark suggests, the animal liberation/animal rights movement is in the final analysis utterly unpractica- ble. An imagined society in which all animals capable of sensibility received equal consideration or held rights to equal consideration would be so ludicrous that it might be more appropriately and

effectively treated in satire than in philosophical discussion. The land ethic, by contrast, even though its ethical purview is very much wider, is nevertheless eminently practicable, since, by reference to a single good, competing individual claims may be adjudicated and relative values and priorities assigned to the myriad components of the biotic community. This is not to suggest that the implementation of environmental ethics as social policy would be easy. Implementation of the land ethic would require discipline, sacrifice, retrenchment, and massive economic reform, tantamount to a virtual revolution in prevailing attitudes and life styles. Nevertheless, it provides a unified and coherent practical principle and thus a decision procedure at the practical level which a distributive or atomistic ethic may achieve only artificially and so imprecisely as to be practically indeterminate.

15. Animal Rights and Social Relations

Ted Benton

Source: A. Dobson and P. Lucardie (eds), *The Politics of Nature.* London: Routledge, 1993 pp 161-176

Introduction

Alongside, and to some extent intertwined with, the rise of environmental politics has emerged a new and increasingly politicized concern about human mistreatment of other animals. In both cases there is an evident concern to extend - or, properly, restore - the scope of moral responsibility to include the non-human world. However, there are also interesting points of tension between the moral discourses of environmental concern and the most influential voices in the debate about the moral status of (non-human) animals. For example, radical environmentalism ('deep ecology') claims to reject anthropocentric approaches to morality, whilst the advocates of animal rights argue for an extension of moral concepts to non-human animals only on the basis, and to the extent that, the latter share certain favoured psychological abilities with humans. Also, the discourse of animal rights preserves the abstract individualism of liberal moral thinking, in sharp contrast to the 'holistic' thinking of deep ecology. In general, radical environmentalists have seen a need for profound changes in human ways of social living and have tended therefore to be sceptical about the prevailing (liberalist-individualist) moral vocabulary. By contrast, the most influential advocates of an improved moral status for animals have taken their stand *with* the prevailing moral discourses, and attempted to show that they cannot consistently be confined within the species boundary.

This strategy has been relatively effective in getting the moral status of animals onto the agenda of'established' moral philosophy, but it has had the consequence of detaching animal rights advocacy from potential allies among the radical critics of the established moral discourses and practices.

This chapter is small part of the wide-ranging investigation of the issue of the moral status of animals from just such a radical, or oppositional moral standpoint (Benton 1993). Where the leading champions of the moral status of animals have tried to show that we should consider them as holders of rights, they seek to confer on animals the

benefits already accruing to humans from the current popularity of the idea of '*human* rights'. But there are, of course, .several long traditions of radical scepticism about the epistemological basis, political desirability and practical effectiveness of the discourse of rights even in its paradigm application to the human case. If rights advocacy is 'nonsense upon stilts' when applied to humans, why should we suppose it makes any better sense when applied to animals? And, if some other moral discourse - for example, a socialist, needs-based morality - might be held to offer better prospects for humans, how does *it* fare across the species boundary?

Animal rights: the objections

The standard objections to animal rights do not call into question the status of *human* rights. They are aimed either at exhibiting morally significant differences between humans, and all non-human animals, or at demonstrating the paradoxical or counter-intuitive consequences of extending rights beyond the species boundary. First, animals may be held to lack the crucial psychological powers to be bona fide rights-holders. Can they be said to have intentions, beliefs, desires, autonomous will, a sense of past and future, and of their own identity? It is easier, of course, to get consensus around the claim that animals can experience pleasure and pain. A utilitarian defence of the moral status of animals, whatever its disadvantages in other aspects, faces less resistance from those who hold a dim view of the mental life of animals. However, animal rights advocates are able to call in animal ethologists and psychologists, proud pet owners, and the principles of evolutionary biology as witnesses in support of their claim that *at least some* non-human animals have the necessary psychological complexity to count as what Tom Regan calls 'subjects-of-a-life' (Regan 1988: 243).

But is subject-of-a-life status sufficient to qualify as a bearer of rights? Some opponents of animal rights argue that only beings who can comprehend the force of moral requirements, and choose to act in conformity to or deviance of them - 'moral agents' - can so qualify. No (non-human) animal is a moral agent in the appropriate sense. Against this, animal rights advocates argue that some groups of humans (young infants and the severely mentally handicapped are standard examples which, of course, raise rather different issues) are not moral agents either. Yet, it is precisely such vulnerable individuals who are most in need of the protections afforded by rights. If one accepts that such *human* 'moral patients' have rights, then it is inconsistent to deny rights to non-human animals which, whilst lacking moral

 agency, are certainly vulnerable to suffering harms in broadly comparable ways to human moral patients. Here, the dispute opens out into a more detailed discussion of how and in what respects the various categories of 'moral patient differ from one another, and what moral significance should attach to such differences as there are.

Yet another common line of attack on the idea of animal rights is closely linked to the point about moral agency. Lacking full linguistic capacity and, connectedly, lacking moral agency, animals are intrinsically incapable of claiming rights on their own behalf. There is an inescapably paternalistic or vicarious eJement in the ascription of rights to animals. This is a powerful argument against those advocates of animal rights who argue from parallels between the demands for women's liberation, black people's rights and so on, and their moral claims on behalf of animals. Acquiring the power to make and enforce rights claims on one's own behalf is a crucial part of the content of such human emancipatory movements, yet it can be given no sense at all in the case of non-human animals. More generally, the argument is effective against the animal rights case because of the clear affinities between that discourse and liberal-individualist moral perspectives in which personal autonomy and self-avowal have a canonical status.

There are, further, two difficulties having to do with the scope of the rights discourse if we seek to extend it beyond the boundaries of the human species. Both of these difficulties are especially pressing when viewed from the standpoint of a broader environmental concern. The first of these difficulties derives, again, from the individualism of the rights-perspective. Though, on the rights view, it is prima facie wrong to harm any individual subject of life, it would also be wrong to discriminate between such individuals on the basis of their belonging to rare or endangered species. No moral significance attaches to the extinction of species over and above that of the deaths of the individuals concerned. The denial of this is even denounced as environmental Fascism! (Regan 1988: 361-2). The second difficulty has to do with the moral status of those animals which fail to satisfy the subject-of-a-life criterion. For Tom Regan satisfaction of this criterion is a sufficient, not a necessary, condition for having 'inherent value' and therefore rights, but it is hard to see what kind of case could be made out for attributing rights to beings which failed his criterion. Unless this were done, the rights view gives, or purports to give, the full protection of rights to subjects of a life (mammalian individuals, and, possibly, some birds), whilst apparently withholding any direct moral status at all from the immense majority of animals (amphibians, reptiles, fish, insects, crustaceans, and so on) which unambiguously fail the subject-of-a-life test

The difficulty of squaring this last consequence with any moderately environmentalist 'reflective intuition' is intensified by the resolute crossspecies egalitarianism *(within* the class of subjects of a life) which goes along with animal rights advocacy. Rats must be accorded rights on equal terms with humans, whilst frogs, bees and butterflies are a moral free-fire zone in which 'anything goes'. It is, indeed, cross-species egalitarianism which draws most resistance to the animal rights cause. Most opponents of animal rights take it to be absurd to require that the same consideration should be given to the interests of a human being, and, say, a dog, or a rat. One strategy for softening this line of resistance is to point out that 'equality of consideration' does not imply 'sameness of treatment'. Where beings differ, then equality of consideration will positively require appropriate differences of treatment. This defence of egalitarianism, is, indeed, quite adequate when it is applied to individuals which differ only in a small number of

respects (for example, across human differences of gender, race, or ability/disability). However, where beings differ so radically in their nature and modes of life as, say, mice, seals, orang-utans and humans, the question must arise as to whether any determinate sense can be given to the requirement to treat them with equal consideration.

Short of a solution to that problem, we are returned to the favoured ground of animal-rights opponents - stark choices between saving a child or a dog from drowning, and the like, where few have any doubts which way their 'choice' would go. A common stand taken by many opponents of animal rights at this point is to abandon the appeal to abstract and formal moral reasoning of the kind favoured by animal rights advocacy, and to acknowledge, instead, the powerful sentiments that lead us to favour our own kind in such situations: 'species loyalty' as one such opponent of animal rights calls them (Rose 1991: 21). But there is a ready response to this from the side of animal rights. Such spontaneous sentiments in favour of one's own kind can be, and often are, used to justify, or otherwise give legitimacy to racist and patriarchal practices, *within* the human species. How can we accept the one, but reject the others?

Humans, animals and social relations

An ambitious response to this question was attempted by Leslie Pickering Francis and Richard Norman (1978). Ultimately, their response was not, I think, successful, but it did take the argument about animal rights onto a new terrain, and I propose to follow them. Their main argument is that humans may justifiably give more weight to the interests of other humans than they give to those of other animals, not because of characteristics possessed uniquely by humans, but because of the relations in which humans stand to one another. Though human social relations are by no means *always* characterized by reciprocity, mutual understanding, and self-conscious intentionality, our capacity for such relationships in activities such as communication, economic life, the family and politics, enable and dispose us to identify more strongly with other humans than with non-human animals with which, in general, we do not have such relationships.

Francis and Norman (1978) do, indeed, offer a plausible account of how it comes about that humans generally are disposed to give greater weight to the interests of other humans, but they do not show why this is morally justifiable. A closely similar argument could be advanced to show how it comes about that people give greater weight to the interests of members of their own gender, racial or ethnic group. It would not show that such preferential treatment is just. However, though it does not succeed in its own terms, Francis and Norman's argument has the merit of bringing into the debate about the moral status of animals the key feature which is excluded by the rights view: namely, social relationships. By this means, a long tradition of politically radical (mainly socialist, but also feminist) criticism of the discourse and

practice of rights in the human case can be brought into dialogue with advocacy of a new moral status for animals.

However, a further step beyond Francis and Norman's position has to be taken. For them, moral commitments and responsibilities arise in the contexts of human relatedness in social life. A moral view (such as the rights view) which abstracts from social belonging as a dimension of well-being, and considers the moral standing of individuals independently of their positioning in social practices and structures will have little or no purchase on the actual conditions of life in which morally significant decisions have to be taken. So far, so good. Where I part company with Francis and Norman is in their exclusion of animals from the domain of human social life. They achieve this exclusion by assigning a distinctive (exclusive?) moral significance to certain kinds of social relation as against others. Special moral value attaches to autonomous, self-conscious, reciprocal recognitionaccording relationships, and so special moral condemnation is reserved for those human social relations in which these aspects are withheld or suppressed.

Since these are precisely the kinds of social relations we cannot have with individuals of other species, it is left unclear in Francis and Norman's account what positive moral value can be given to those social relations we *are* capable of having with other animals, and, indeed, what moral grounds there would be for objecting to the various ways in which those relations might go wrong. We cannot be criticized for deceiving, cheating, or even exploiting an animal, since fair trading and honest discourse do not carry across the species divide. But surely both humans and animals can be tortured, treated cruelly, deprived of their freedom, neglected and abused in a whole panoply of ways which *do* depend on social relations and which also may span the species-boundary. From the practice of maintaining nature reserves, through zoos and circuses, to pet keeping, animal experimentation and intensive stock-rearing, humans are bound to non-human animals by a great diversity of patterns of social relationships. Just as the basic interests of individual humans may be affected in morally significant ways by the place they occupy in society, so may the basic interests of animals be affected by their mode of inclusion in such human social practices. A moral view which seeks to offer effective prptection from harm would need to be conceptually sensitive to such social-relational conditions of harm and wellbeing, and context-specific enough to provide moral regulation across a wide range of very diverse social situations. Prima facie the liberal-individualist discourse of universal rights is not well suited to this task in the human case. What I have just suggested about the social placing of non-human animals indicates some cause for scepticism about the likely effectiveness of the extension of that same discourse to protect them.

Animals in society: against rights?

In what follows I'll explore some of the further implications of this thought, whilst holding in mind one 'core' argument in the radical case against (human) rights: in societies governed by deep inequalities of political power, economic wealth, social standing and cultural accomplishment the promise of *equal* rights is delusory, with the consequence that for the majority, rights are merely abstract, formal entitlements with little or no *de facto* purchase on the realities of social life. In so far as social life is regulated by these abstract principles, and in so far as the promise is mistaken for its fulfillment, then the discourse of rights and justice is an ideology, a form of mystification which plays a real causal role in binding individuals to the very conditions of dependence and impoverishment from which it purports to offer emancipation.

How much of this line of criticism of the discourse of rights applies to the liberal-individualist argument for the recognition of rights in the case of (non-human) animals? First, we can dispense rather quickly with the contention attributed to the early Marx that all (bourgeois) rights amount, in effect, to property rights. Except in rather special legal contexts (which do not, anyway, affect my argument) non-human animals cannot be property owners. This is not a merely contingent, historical-cultural fact, but is rooted in a recognition of real differences of psychological constitution and moral attributes as between (most) humans and individuals of all currently known non-human animal species. The capacities to exercise ownership rights are, if not identical with, then closely allied with those that constitute moral agency.

If the claim that animals have rights amounts to the claim that they have a right to acquire property, then it directly falls. But, clearly, the *interests* of animals which advocates of animal rights seek to protect remain unaffected by this argument. Whatever force the argument for animal rights has, it cannot derive from any claim that animals have a basic interest in the protection of their property! If there is moral force in that argument, it must derive from an acknowledgement that non-human animals have basic interests, other than property ownership, which ought to be protected. If this is so in the case of animals, then it is reasonable to consider whether humans, too, may have such right-grounding basic interests, irreducible to property. This consideration tells against any Marxian temptation to reduce liberalindividualist rights to property rights. However, the serious point of Marx's association of rights with property is still sustainable. For some categories of property - most obviously property in means of production - ownership rights are simultaneously powers to affect the basic interests of non-owners: to give or withhold the means of livelihood, health, safety, and personal liberty.

Just as economically dependent, or relatively powerless humans are at risk of harms from the exercise of property rights by other humans, so, too, may be non-human animals which are caught up within human social relations and practices which involve the exercise of property rights - intensive livestock farming, for example. Here, an analysis could be given of the distortion and fragmentation of the mode of life of animals

in such regimes which parallels that given by the young Marx of the consequences for wage labourers of capitalist private property (Benton 1988). Also, however, animals may suffer harm as a result of the exercise of property rights in land, as when land-use changes result in habitat destruction. Again, there are parallels with the effects on human rural society wrought by the extension of commercial agriculture, enclosure of common land, and the destruction of natural and semi-natural biotopes used as traditional sources of food and fuel resources. In each of these cases, animals suffer harms as a result of the exercise by humans of property rights in ways which parallel (and, indeed, are often intertwined with) the effects on relatively powerless humans; but, of course, animals are significantly less well-placed than even the most disadvantaged humans.

Animals in society: for rights?

However, there are also situations in which the discourse of rights appears, at first sight, to offer a good chance of substantive protection to animals. One implication of the radical criticism of rights is that we should expect the liberal discourse of rights to work best in protecting individuals from basic harms in real circumstances which approximate to what we might call the presumed social ontology of the rights discourse: that of autonomous individuals, contingently related, each resisting encroachment/ interference on the part of the other, and seeking authoritative arbitration. For reasons which I cannot explore here, these conditions are never satisfied in the case of competing rights claims across the species divide. However, some moral controversies affecting animals are analogous in certain respects. In the case of blood sports, for example, where the quarry is a wild animal, there is a (highly qualified) sense in which the hunters and the hunted are autonomous, contingently related beings: they are not bound together, as in the case of farmers and stock animals, for example, in socio-economic relations of power and dependency. Moreover, the right of the quarry animal (asserted on its behalf by human allies) is a claim not to be interfered with in its own, non-right-infringing activity. This is a right closely assimilable to the liberal paradigm of negative liberty, and the situation is, *ex hypo the si,* one in which it does make sense to think of the wild animal's enjoyment of its freedom as something which can be taken for granted, so long as restraint is imposed upon the hunters.

Of course, the situation is not an exact parallel. Most obviously, the rights attributed to quarry animals conflict with those claimed by hunters to enjoy traditional rural sports which do not infringe the rights of other humans. These rights are aggressively asserted when they are threatened, either by the direct action of 'hunt saboteurs' or by attempts at legislation. The disanalogy with the human case is, of course, that the countervailing rights of animals not to be hunted cannot be claimed by the animals themselves. The outcome then depends on the retrospective powers of advocacy and access to political and legal institutions of rival human social groups. Notwithstanding

this disanalogy, however, this is one type of situation in which an extension of the liberal-individualist notion of rights to non-human animals could have some hope not only of carrying rational conviction, but also of being practically efficacious in protecting some categories of animals from substantive harms to which they would otherwise be vulnerable.

Another sort of case in which practical efficacy on the part of the liberalrights discourse might be hoped for is that of acts of cruelty committed by human individuals against animals kept in confinement. The deliberate infliction of unnecessary pain on domestic pets will serve as an example here. Although differentials of power and dependency are intrinsic to the relation between a pet owner and pet, this situation is unlike the employer/employee one with respect to, for example, freedom of speech in that the right to inflict unnecessary pain cannot reasonably be claimed as a part of what it is to be a pet owner. Cruel practices are a contingent, and not an essential feature of the relationship. On the contrary, the widely shared cultural norms which prescribe and regulate pet-keeping include a strong presumption *against* cruelty. In such a case, where a powerful consensus favours a presumption against causing unnecessary pain, where causal and moral responsibility for causing pain can be readily placed at the door of an identifiable (human) moral agent, and where there are no powerful countervailing socio-economic interests, the prospects for an effective defence of the rights of the animals concerned against the rival claims of pet-owners to privacy and rights of property in their pets are relatively good.

But even in these two kinds of case, there is a point to the radical critique. First, in the case of blood sports, the sense in which the quarry are 'wild' animals will generally need to be highly qualified. Commonly, game animals are deliberately hand reared, or, in some cases, allowed to breed under highly protected 'semi-wild' conditions for sporting purposes. Even where this is not done, links between landowners and blood-sports interests are generally crucial in sustaining conditions for the practice. Only if sufficient areas of suitable habitat are left free of incompatible commercial management or development will enough game animals survive to make the sport worth while. The relation between hunters and quarry, in this perspective, looks less like a 'contingent' relation between autonomous beings, and more like a systemically structured relation of differential socio-economic power and dependency, albeit an ecologically mediated one. To the extent that this is true, the practical effectiveness of the rights strategy in getting the sport abolished could well have the self-defeating effect of undermining the conditions under which it was reasonable to take as 'given' the ability of the animals concerned to enjoy their freedom once protected from the depredations of the hunters. These conditions are, precisely, the preservation of the general ecological conditions for the living of the life appropriate to that species over a sufficiently large geographical extent to sustain its population. The often quite cynical use of this argument to give

a 'conservationist' cover to blood-sports interests does not affect its validity, so far as it goes![1]

Application of the radical critique to this kind of case, at first sight one very amenable to the 'rights' approach, suggests that *under prevailing patterns of social and economic relationship* the objectives of protecting the basic interests of the animals concerned are more likely to be achieved by complementing - or even replacing - a rights-based strategy with a broader strategy for large-scale shifts in patterns of land ownership, and redistributed powers and altered criteria for regulating land use and land management. This strategy would, in turn, presuppose integrated socio-economic and ecological analysis, and involve animal rights and welfare campaigners entering into coalitions with other social groups which might favour such changes on other grounds: amenity access, nature conservation, aesthetics, social justice, and so on. More specifically, the strategy would be one of integrating concern for the well-being of animals into a broader political programme.

The second kind of case - that of cruelty to animals kept in confinement by humans - is also to a degree vulnerable to considerations of a socialist or radical kind. For one thing, notwithstanding the power of the cultural consensus against cruelty, it would be a mistake to underestimate the rival cultural power of the appeal to privacy and property rights. The privacy of the pet owner is not only the ground for powerful 'non-interference' rights but is also a major barrier against both detection of abuses and collection of reliable evidence. In this respect there are strong parallels between the situation of 'privately' abused non-human animals, and humans - usually children and women - abused in domestic contexts. To the extent that property rights may be adduced to defend cruelty to animals, the advocates of the ascription of rights to animals have two options. One would be to argue for a limitation of property rights in this case on grounds of the nature of the property: as the subject of a life the pet animal has a right to respectful treatment. But it is difficult to see how this line of argument could stop short of (the second option) calling into question the institution of private property itself in relation to this class of being. From a 'fully fledged' animal-rights perspective the keeping of pets - even at its most benign - would be seen as a form of slavery.

Again, however, we might reasonably ask whether the rights perspective, if it has these implications, offers the best strategy for achieving its own objectives: protecting the individual animals concerned from harms to I heir basic interests. In this case, as often elsewhere, the rhetoric of rights (of the pet owner) is implicated as both a substantive condition (privacy) of abuse and its legitimation (private property). The extension of rights to those vulnerable to abuse, though prima facie an attractive option, is liable to be limited in its practical effectiveness. What the radical line of argument suggests in this kind of case, too, is that a transformation of the social relations of power and dependency which characterize the private, domestic sphere would be likely

[1] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

both to be effective on its own account, and also to provide conditions under which the extension of moral concern could begin to offer effective rather than merely formal 'protections'.

Animal rights and human interests: in the lab and on the farm

Other cases which give rise to moral concern over the treatment of animals in captivity include the use of captive animals in medical experimentation or in safety testing of new commodities, and also modem regimes of intensive rearing of livestock in meat production. Here, the liberal-individualist moral framework of rights and justice can be shown to be still more directly vulnerable to criticisms which foreground the social relational and economic conditions under which such rights are conceptualized and are to be recognized.

Animal experimentation

The use of animals as experimental subjects is in some respects analogous to the case of cruelty to pet animals. In both cases the animal is kept in confinement, and in both cases the concept of ownership may play a part in the moral justification of the disposal over the conditions of life of the animal by some individual or group of humans. However, there are also significant disanalogies. The keeping of animals as pets has as its central point the intrinsic value of the relationship itself. The relation is asymmetrical in terms of the social powers and communicative competences of the human individuals and animals involved, but it is, nonetheless, a 'quasi-personal' relationship in which each takes pleasure in the company of the other and has regard to the other's desires as well as needs. If these features are not present, the relation is not one of pet owner to pet, but, perhaps, more closely assimilable to a utilitarian one, in which the animal is kept as an extra protection for the household from burglary, to keep vermin at bay, or for some other purpose *extrinsic* to the social relation involved. By contrast, keeping animals for use as experimental subjects involves humans and animals in just such external, utilitarian social relations with one another, and this is, moreover, the point of keeping the animals in confinement.

This is not, of course, to overlook the fact that moral and/or legal regulation is typically present in these situations. For one thing, many experiments on animals make sense only if there are believed to be good' reasons for thinking that human/animal comparisons are valid with respect to the characteristics dr responses under test. Depending on what those are, some degree or other of practical recognition of their conditions of well-being will have to be accorded in the way the test-animals are kept and treated. Also, there is often a tendency for those human individuals whose work tasks include caring for the animals to spontaneously develop affective ties and a sense of moral responsibility for the well-being of the animals for which

they are responsible. Finally, the whole situation will be bounded by broader cultural predispositions against maltreatment of captive animals, and a juridical framework which, to varying degrees, sets conditions and limits on the range of legally tolerable treatments and interventions.

However, these limitations are themselves an implicit acknowledgement that the point of the practice of animal experimentation is that human experimenters intervene in the lives of the animals under their control in ways which are liable to cause them harm. This is a morally significant difference between the practice of animal experimentation and the keeping of pets. Standards of care which would be acknowledged and routinely maintained in the one sphere, are deliberately, but conditionally and within limits, suspended in the other. So, for example, the deliberate causing of unnecessary pain, from which animal rights advocates would seek to protect the pet animal, becomes a problematic concept in the case of animal experimentation. Difficulty focuses on both the terms 'deliberate' and 'unnecessary'. Let us suppose that a specific intervention be deemed necessary to achieve the purpose of an experiment, but that it is incidental to the experiment whether the intervention causes suffering to the animal. We could say in this sort of case that the *intervention* is deliberate, but not under the description 'causing suffering'. Here it would be morally relevant to ask whether the experiment would retain its epistemic value if some available anaesthetic were used to spare the animal's suffering, and, if so, whether care had been taken to administer it. Where suffering really is, and is known by the experiments to be, an unavoidable concomitant of the experiment they wish to carry out, then the moral focus is on the term 'unnecessary': if the suffering is necessary to the experiment, is the experiment itself necessary?

In the terms available to the liberal-individualist rights discourse, it is of course possible to hold that individuals, including individual (non-human) animals have absolute rights. This position does, however, have implications which are difficult to square with the reflective moral intuitions of most supporters of the idea of individual rights, who tend to regard rights rather as prima facie morally valid claims. From this standpoint, an experiment which caused suffering to an animal (or person) might in some circumstances be justified, despite involving an infringement of its (prima facie) rights. If the moral grounds (for example, competing rights of other individuals) are strong enough, then rights *may* be overridden. On the rights perspective, a utilitarian calculation of possible benefits to humans (or, indeed, other animals) in the form of cures to major diseases or the like cannot justify an infringement of basic rights. However, competing rights *could,* do so.

Steven Rose, for example, advocates a high priority for research to replace animals in safely testing, and in medical research. But. he argues, there will always be some areas where the use of animals is unavoidable:

There is no way, for instance, that the biochemical causes of the lethal disease diabetes, or its treatment with insulin, could have been discovered, without experiments

on mammals. And we can't use tissue-cultures, or bacteria, or plants, to develop and test the treatments needed to alleviate epilepsy, Parkinsonism or manic depression

(Rose 1991:21)

This sort of argument, on the face of it, is flatly opposed to the rights perspective in its preparedness to license basic harms to members of other species for the benefit of members of our own.

However, it is quite possible to cast such arguments in the language of countervailing rights - those of human sufferers from terminal or chronically disabling diseases to some hope of alleviation, or of research scientists to intellectual liberty. For example, a recent newspaper article on the case for animal research combined both. Focusing on a sufferer from an inherited disabling disease called Friedreich's ataxia, the article went on:

In the years that he has left, he hopes to further the chances of a cure for his and other disabling conditions by campaigning for the right of doctors and scientists to use animals in scientific research. ... He has founded Seriously Ill for Medical Research, an organisation which places the human right to health above any claim animals may have on our consciences.

(Stepney 1991: 34)

Animal experimentation is a kind of case, then, where the rights perspective is limited in its power to protect animals at risk by several prevailing features of the social-relational conditions under which such experimentation is

 conducted. First, the rights of the experimental subjects have to be balanced against countervailing 'basic' rights of experimenters *and* against powerful popular moral sentiments which differentiate in ways not available to the rights perspective between a range of different benefits which may or may not result from experimentation (between, say, attempts to find a cure for cancer, and testing of novelty cosmetics). Both these countervailing social forces have access to political representation and therefore to legislative influence.

Second, the character of the practice is one within which such rights as are ascribed to experimental subjects are liable to be overridden or abused in pursuit of the intrinsic purposes of the practice. This contrasts with pet keeping, in which the power and opportunity to abuse are structurally present, but in which the practice of abuse runs counter to the intrinsic normative order and 'spirit' of the practice. Third, the institutional framework - whether public institution research science, or private corporation research and development - within which animal experimentation takes place, is one which resembles the domestic sphere in its relative imperviousness to external monitoring and, in the event of suspicion of abuse, to the gathering of reliable evidence leading to successful prosecution. Though the rights perspective is not consensual among animal welfare pressure groups, it is none the less true that widespread popular opposition to animal abuse in experimental laboratories has not yet been effective in preventing extreme suffering, often with quite trivial justification (Ryder 1985; Sperlinger 1981; Rollin 1989; Fox 1986). The socialist argument's emphasis on

the social relational conditions and contexts under which formal rights may or may not be substantively enjoyed is, I claim, a persuasive diagnosis of this state of affairs.

But. more than this, it places on the agenda alternative strategies for, first, changing the social and economic relations which enable and favour abuse, and, second, developing moral perspectives on the status of animals which may have more purchase on the complex social realities of animal research than does the rights view on its own. Recent feminist work points in a promising direction here, linking laboratory abuse of animals with a broader critique of the culture and institutions of contemporary science. Lynda Birke, for example, is both critical of the abuse of animals in the name of science *and* sceptical of the value of the attribution of rights. Desensitization to animal suffering, she points out, is an established part of science education, a condition of the appropriate attitude of dispassionate 'objectivity' required to become a 'real' scientist. She continues:

In our critiques, we have stressed the social context of contemporary science. Within that context of capitalism and patriarchy, specific forms of science have developed and with them, specific ways of conceptualizing animals and using them in science. But those forms are not inevitable. At present, our biological knowledge is grounded

in a material base that includes the bodies of experimental animals. A science that did not see animals as expendable (if sometimes expensive) bits of apparatus might, then, have a somewhat different understanding of the material world

(Birke 1991: 456-7)

A more humane and egalitarian society would be one in which many current laboratory uses of animals would no longer have any point, but 'even if that more humane society still sanctioned the use of some animals in research in specified conditions, it would see the ethical issues as centrally important' (Birke 1991:457).

The costs of food

In many cases of animal abuse in experimental situations, many of the above social-relational obstacles to the substantive enjoyment of formal rights (even where they are juridically acknowledged) are complemented by yet another obstacle: an economic or commercial dynamic and its effects on the priorities and intentional attitudes of the human agents bound up in it.

This applies even more forcefully to yet another class of case - modem intensive stock-rearing, or 'factory farming'. The development of commercial, and then fully capitalist agriculture exerts contradictory pressures with respect to the treatment of stock animals. For any specific technical organization of agricultural labour processes there are pressures towards an instrumental treatment of animals as mere 'things' whose output is to be maximized by whatever technical means are available; but there are also countervailing obstacles and restraints on the full realization of these pressures, which derive from the organic, psychological and social requirements of the stock animals themselves. These restraints are not, or are not necessarily, of a normative kind, but are ontological. If the social needs of captive animals are not met, they cease to breed, they show developmental anomalies, become ill, behave aggressively or self-

destructively, and so on. In his description of the early stages of intensive rearing in the poultry industry, for example, Jim Mason notes:

Large-scale indoor production caught on fast around the urban market centres, but the new methods created a host of problems. Nightmarish scenes began to occur in the crowded sheds. Birds pecked others to death and ate their remains. In the poorly ventilated poultry sheds contagious diseases were rampant and losses multiplied ...

(Mason 1985: 90)

Of course, as Mason also points out, research science was able to come up with technical responses to many of these problems - for example, automatic 'debeaking' machines for reducing the damage birds could do to one another, antibiotics and other drugs to reduce disease losses. However, none of these responses was free either of costs, or of undesirable unintended consequences. Obstacles and constraints deriving from the biological nature and psychological and social requirements of confined animals remain as limits to 'reifying' commercial pressures whatever technical reorganization of animal 'husbandry' is adopted.

However, there are clear qualitative differences both in the extent to which needs are acknowledged and the ways in which they are met as between different production regimes. Traditional, non-commercial pastoralism requires human/animal communicative interaction, extensive sharing by humans of the conditions of life of herd animals, and human adaptation to those conditions. There are generally deeply held affective dispositions and culturally authoritative moral regulations at work in these practices, notwithstanding the fact that animals are commonly being reared to be killed as food. Commercial agriculture, with the 'formal' subsumption of ecological conditions, animals and human labour, retains many of these features, though the element of a requirement for humans to adapt to the conditions of life of stock animals is reduced or eliminated with physical confinement and eco-regulation.

A sharp differentiation in the affective and normative content of human/ animal relations comes with intensive rearing. The fragmentation, distortion and partial suppression of the mode of life of the stock animal is paralleled by an elimination of 'quasi-personal' elements in the relation between humans and animals in the labour process. The human-social division of labour and specialization of tasks imposed by the overriding intentionality of value-maximization, de-skills, fragments, and 'operationalizes' necessary human/animal contacts in ways which give them the character of episodic interventions and routines as distinct from long-run relationships, as in other husbandry modes.

Conclusion

The paradox for the 'rights' perspective is that it is just this animal 'husbandry' regime whose predominance in modern agriculture has led to the most intense moral outrage. Yet, at the same time, the forms of human/ animal interaction at the core of

these practices are precisely the ones which are least likely to be responsive to moral appeals. There are several reasons why this is likely to be so. First, the appeal to the rights of the animals involved can be effective only if the moral agents to whom it is addressed are already able to recognize or acknowledge these animals as subjects of a life, or as bearers of inherent value. The mode of involvement of human agents in these labour processes is one which, as we have seen, obstructs the formation of long-run, 'quasi-personal', communicative relations between humans and animals. In this respect, intensive rearing of livestock is quite unlike traditional animal husbandry, pet-keeping and other such social practices which combine humans and animals. To the extent that intensive stockrearing regimes do 'acknowledge' or 'recognize' the subject-of-a-life status of the animals involved (and I have suggested that they necessarily do so to some extent) they do so in a sense not reducible to the forms of calculation employed by individual human actors in the process. Such 'recognitions' are, rather, built into the design of the overall structure of the labour process, for which no single individual is likely to be wholly responsible:

'I am just a small cog in a big industry', Mr Turton said. 'Today poultry management is dictated by the company accountant rather than the stockman, but the big companies are not so much villains, as victims of a system that dictates that only the economically ruthless shall survive.'

(Erlichman 1991:4)

A second reason why the appeal to rights in the case of intensive stockrearing regimes is unlikely to be effective is closely related to the first. Even if an argument in favour of the rights of animals subjected to these regimes could be made rationally convincing to the human moral agents involved, the *affective* conditions under which such a conviction might issue in relevantly altered conduct are liable to be missing. In the absence of long-run, quasipersonal, communicative relations between humans and animals, the affective ties of trust, loyalty, compassion and responsibility cannot develop either. This is still more significant if we take into account the powerful socioeconomic interests of the workers in these regimes which run strongly counter to their giving subjective recognition to any feelings of repugnance or moral disquiet they may have about the nature of their work.

Finally, the human-social structure of these regimes is one in which a division of labour and hierarchy of authority diffuses both the causal and moral responsibility of the individual human agents involved. Electrical maintenance workers at intensive plants may well strongly disapprove of the regime, but quite sensibly take the view that there is very little they can do to alter it. They have no access to top management, withdrawal of their labour would make the situation of the animals even worse, whilst giving up the job would deprive them of income without helping the animals at all: other electricians with less of a conscience will be employed to replace them. I am not, of course, here arguing that where individual causal responsibility is diffused by the structure of an oppressive practice there is no moral responsibility on individuals. The point is, rather, that in such a case, the bare moral appeal is liable to be ineffective.

It needs to be complemented by a critique of the social-relational structure of the practice and a strategy for transforming it. This is precisely what is obstructed by the abstract-individualist social ontology which underpins the most influential animal rights arguments.

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16. Humanism = Speciesism; Marx on Humans and Animals

Ted Benton
Source: *Radical Philosophy* 50 (1988): 4-18.

Introduction

This paper[1] is intended to form part of a more extended exploration of some key texts of Marx from the standpoint of the so-called 'new' social movements (though some of these pre-date the Marxist tradition itself!). Here, I shall be focussing on the early work of Marx - especially the *Economic and Philosophical Manuscripts* of 1844 - and with the concerns of two closely related recent radical movements in mind.

These movements are modern environmentalism and a spectrum of groupings which share concern about human mistreatment of (other) animals - animal welfare, rights and liberation groups, as well as the more specialist campaigns against vivisection, factory farming, the fur trade and so on. The value-orientation which underlies both movements, and which informs their critique of modern industrial societies, is radically at odds with a merely utilitarian, or instrumental relation to the rest of nature. Other animals may be sufficiently like human beings to be properly considered as moral subjects, and as the bearers of biographies. Ethical considerations must therefore enter into our dealings with them. It is evil to continue to treat them merely as instruments or resources to be exploited for specifically human purposes.

In the perspective of 'deep' ecology,[2] this argument can be extended to the whole of nature, which is regarded as having an intrinsic value, independent of human purposes and requirements. Concern for the environment, on this view, is properly rooted not in a 'speciesist' enlightened self-interest (i.e. the recognition that short-term benefits from ruthless exploitation of the environment will be paid for in the longer term by the destruction of our own 'life-support systems') but rather in a respect for the independent value of the other species with which we share our planet, and, indeed, for the whole complex of physical and chemical conditions for their existence and well-being.

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[1] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

[2] Cole, H. S. D., C. Freeman, M. Jahoda, and K. L. R. Pavitt. *Thinking about the Future: A Critique of the Limits to Growth,* London: Chatto and Windus, 1973.

At first thought, it seems that there is much in common between this view of our relationship to the rest of nature and that of the early Marx. Both perspectives share a vision of humans as *part* of nature, and as dependent for their well-being on unceasing interaction with nature. Consider, for example, Marx's striking metaphor for nature as man's 'inorganic body':

Nature is man's *inorganic body* - nature, that is in so far as it is not itself human body. Man *lives* on nature - means that nature is his *body,* with which he must remain in continuous interchange if he is not to die. That man's physical and spiritual life is linked to nature means simply that nature is linked to itself, for man is a part of nature.

And Marx is by no means stating merely a shallow-ecological, enlightened self-interest of the species. The view of communism which structures the whole of the *Manuscripts* gives a central place to a proper ethical, aesthetic and cognitive relationship to nature as inseparable from true human fulfilment.

In his later works it sometimes seems as if Marx has retreated into a view of the overcoming of the opposition between humanity and nature as merely the main historical *means* by which humans are enabled to achieve fulfilment. This is very much the kind of picture of Marx's argument presented in Gerry Cohen's very influential defence of Marx's theory of history.[3] But the Marx of the *Manuscripts* is by contrast clear in his recognition that a transformation of our relation to nature is a key *aspect* and *content* of the process of human emancipation itself.

This indeed is something I would like to hold onto as a fundamental insight which Marx reached in the *Manuscripts.* But - and this is the topic of the rest of this paper - it also seems to me that there are fundamental ambiguities and conceptual tensions in the overall philosophical position adopted by the early Marx as it bears on this range of problems. These ambiguities and tensions threaten to undermine what is of value in Marx's achievement and have sustained readings of Marx which have been deeply inimical to environmental values. A serious effort of critical restructuring and revaluation of the most basic philosophical ideas and arguments of the early Marx is necessary if their 'rational kernel' is to be extracted. At best, I can accomplish only a tiny fragment of that task in this paper, but, as I shall try to show, this tiny fragment does have very far-reaching implications.

There are two elements in the argument of the *Manuscripts* which seem to me to sit very uncomfortably alongside the naturalism of the above-quoted passage and its possible 'deepecological' reading. These elements are, first, the use of the human/animal contrast as Marx's central device in the ethical critique of the estrangement of labour under regimes of private property, and, second, the specific content Marx gives to his vision of human emancipation as involving the 'humanisation of nature'. I shall say most about the first of these elements, leaving what I have to say about the second rather underdeveloped.

[3] Firey, W. *Man, Mind and the Land.* Glencoe, Illionis: Free Press, 1960.

With regard to the human/animal opposition the argument is, very roughly, as follows. The estrangement of labour is supposed by Marx to have disastrous effects on human beings, their relations to one another, and their relationships to their external, material world. These disastrous effects can be summed up by saying that the estrangement of labour reduces human life to the condition appropriate to that of animals, and, within human life, inverts the relation between the human and the animal. The overcoming of estrangement means restoring to human beings their properly human status, and relationships to one another and to the rest of nature. But what *is* the rest of nature? Does it include other animals? Marx's use of the metaphor 'inorganic body' suggests not. On the other hand, nothing Marx says in connection with that metaphor can be sustained unless animals *are* included. A human life dependent upon the forces and mechanisms of inorganic nature, unmediated by other forms of life, is impossible. There is no reason to think Marx actually thought it possible. And. notwithstanding the arguments of some that the *possibility* now exists of a satisfactory human life which does not rely on the consumption or exploitation of other animals, the phrase 'man lives on Nature', written in 1844, must have included within its reference a whole range of uses of animals as a source of energy in agricultural and industrial labour processes, as well as for food, entertainment and companionship.

Now, if, for Marx, human emancipation involves a qualitative transformation of our relationship with the rest of nature, a 'humanisation" of nature, and if nature includes other species of animals, then human emancipation must involve a transformation in our relations to other animals. But what could this transformation be? A literal 'humanisation' of them in the sense of 'rendering them human' by selective breeding (or, for us, genetic engineering?)? Or, as with the rest of nature, a deliberate alteration of their character so that they better fulfil human purposes (i.e. a continuation of those breeding and 'husbandry' practices whereby farm animals have been rendered more productive and docile, pets more 'domesticated', companionable, childlike in appearance, and so on)? If either of these were intended by Marx, his critique of the estrangement of humanity from nature would lose all its force: the 'humanisation' of animals (as part of nature) in either of these senses would be a continuation and augmentation, not a transcendence of the treatment of animals under capitalism, and indeed, in pre-capitalist societies too. Moreover, Marx draws on an absolute and universal, not a provisional and historically transcendable opposition between the human and the animal in grounding his ethical critique of the capitalist mode of life. If what is wrong with these societies is that humans are reduced to the condition of animals, then the transcendence of capitalism, in restoring humanity to the human, simultaneously restores the differentiation between the human and the animal. If what is wrong with capitalism is, essentially, that it does not differentiate the human and the animal, then the antidote to capitalism must offer to restore the proper differential. But this is precisely what the notion of 'humanisation' seems to deny. The ontological basis of the ethical critique of capitalism (embedded in the notion of estrangement) appears to be inconsistent with the coherent formulation of its transcendence (in particular, the

notion of'humanisation' in relation to animals as part of nature). As I shall suggest later, this dilemma can be resolved by a revision of the ontology of the *Manuscripts* which nevertheless leaves intact a good deal of the ethical critique of capitalist society. However, before I move on to that task it is worth spending some time investigating in rather more depth the sources of the dilemma, and, in particular, looking at some of the implications of the way Marx draws Iris contrasts between the human and the animal.

Humanity as 'species being'

Central to Marx's account of human nature is the claim that man is a 'species being'. The term is derived from Feuerbach, but Marx gives it a new and richer philosophical meaning:

Man is a species-being, not only because in practice and in theory he adopts the species (his own as well as those of other things) as his object, but - and this is only another way of expressing it - also because he treats himself as the actual, living species; because he treats himself as a *universal* and therefore a free being.[4]

This 'universality' of human theoretical and practical activity distinguishes humans from (other) animals. The sensory, cognitive and transformative powers of other animals are exercised 'under the dominion of immediate physical need'. They produce 'in accordance with the standard and the need' of their species. Humans, by contrast, who know how to produce in accordance with the standard of *every* species, only *truly* produce in freedom from immediate physical need, and take the *whole* world of nature as the object of their practical, aesthetic and cognitive powers.

Whereas animals produce to meet the needs of themselves, or their young, the activity of individual human beings is, at least potentially, a part of the activity of the species as a whole. Not only, then, is human activity 'universal' in the sense that it takes the whole world of nature as its object, but it is also universal in the sense that it is a species-wide activity. The activity of each individual is not a mere *instance* of its type, but, rather, a living *part* of an interconnected whole - the activity, or life of the species. •

In his exposition of the concept of the estrangement of labour, Marx lays great emphasis on this aspect:

In estranging from man (1) nature, and (2) himself, his own active functions,-his life activity, estranged labour estranges the *species* from man. It changes for him the *life of the species* into a means of individual life. First, it estranges the life of the species and individual life, and secondly it makes individual life in its abstract form the purpose of the life of the species, likewise in its abstract and estranged form.[5]

[4] Glacken, C. *Traces on the Rhodian Shore.* Berkeley: University of California Press, 1967.
[5] Godelier, M. *Rationality and Irrationality in Economics.* London: New Left Books, 1972.

In separating individual life from the life of the species, and inverting their proper relationship to one another, the estrangement of labour imposes upon humanity a mode of existence in which its distinctive species attributes cannot be manifested. Human potential remains unactualised, development is stunted, powers are exercised in a distorted or inverted way.

The character of 'man' as a species-being, then, is not a manifest, empirically detectable feature in contemporary societies. It is, rather, an as yet unachieved potential. The achievement of this potential is the work of the human historical process. So, implicit in the idea of humanity as a 'species being' is also the idea of humanity as a *historical* being. And by this is meant, not simply a being whose activities and forms of association change through time. In addition, these changes of manifest activity and forms of association have a cumulative and directional character, an overlying pattern in terms of which we can make sense of each successive phase or period. To say that the human species is historical in this sense is to say that the species as a whole undergoes, in the historical process, something analogous to the development undergone by both individual human beings and other animals in their transition from embryo through infancy to childhood. Only in the adult are the potentials of the infant fully actualised. The development of the individual is the process of its self-realisation. So, in the case of the human species, communist society is the form under which what was merely potential in earlier historical phases becomes actual. The historical process is the 'developmental' process of humankind, through which its species-powers are fully developed, its distinctive species-character is realised.

The analysis of the estrangement of labour shows that there is no necessary or universal connection between the 'developmental' process of the species and the developmental process of the individual. Where labour is estranged, the 'development' of the species occurs at the cost of individual development:

It is true that labour produces wonderful things for the rich - but for the worker it produces privation. It produces palaces - but for the worker, hovels. It produces beauty - but for the worker, deformity...

It produces intelligence - but for the worker, stupidity, cretinism.

On the other hand, the historical 'development' of the species is a precondition for the development of the distinctively human powers of individuals:

Only through the objectively unfolded richness of man's essential being is the richness of subjective *human* sensibility (a musical ear, an eye for beauty of form - in short, *senses* capable of human gratification, senses affirming themselves as essential powers of *man)* either cultivated or brought into being. The *forming* of the five senses is the labour of the entire history of the World down to the present.[6]

Humans are different from other animals, then, in that they undergo 'development' at the level of the species *(historical* development) as well as at the level of the indi-

[6] Hays, S. *The Conservation Movement and the Gospel of Efficiency.* Cambridge, Massachusetts: Atheneum, 1959.

vidual. In the human species, the 'development' of the species may take place at the cost of stunting or distorting the development of individuals, but, in the long run, full development of the individual with respect to the most distinctively human characteristics is only possible on the basis of a high level of 'development' of the species. None of these considerations apply to other animals, which, for Marx, have a fixed, species-characteristic relationship between need, instinct and transformative powers, each producing 'in accordance with the standard and need of the species to which it belongs'.[7]

What makes possible this supra-individual 'development' in the human case is the distinctive character of human activity as 'free, conscious activity':

Yet the productive life is the life of the species. It is life-engendering life. The whole character of a species - its species-character - is contained in the character of its life activity; and free, conscious activity is man's species-character.[8]

A being who freely and consciously engages in a practice is able to reflect critically upon that practice, to change it in line with its existing, or newly formulated purposes. Free, self-conscious transformative practice, then, has within it a potential for change and development which the direct and instinctual need-meeting activity of (other) animals does not have. And since this 'productive life' is the life of the species, to characterise its 'development' - the development of human productive powers - is to characterise what is essential to the formative process of humanity itself:

It is just in his work upon the objective world, therefore, that man really proves himself to be a *species-being.* This production is his active species-life. Through this production, nature appears as *his* work and his reality. The object of labour is, therefore, the *objectification of man 's species-life?* for he duplicates himself not only, as in consciousness, intellectually, but also actively, in reality, and therefore he sees himself in a world that he has created.

And, again:

But since for the socialist man the *entire so-called history of the world* is nothing but the creation of man through human labour, nothing but the emergence of nature for man, so he has the visible, irrefutable proof of his *birth* through himself, of his *genesis)*

Of course, this self-creation through labour, through the augmentation of human transformative powers, should not be confused with self-creation through mere economic, or industrial activity — an 'economistic' view of history. Certainly Marx recognises in industrial production 'the *exoteric* revelation of man's *essential powers',*[9] but full human historical 'development' will involve a transcendence of the prevailing fragmentation of human activities-

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[7] Hudson, W. D. *Modern Moral Philosophy.* London: Macmillan, 1970.

[8] Humboldt, A. von. *Essai Politique sur le Royaume de la Nouvelle Espagne.* Paris: F. Schoell, 1811.

[9] Keynes, J. M. *The General Theory of Employment, Interest and Money.* New York: Harcourt Brace, 1936.

The positive transcendence of *private property,* as the appropriation of *human* life, is therefore the positive transcendence of all estrangement - that is to say, the return of man from religion, family, state, etc., to his *human,* i.e. *social,* existence.'[10]

The historical 'developmental' process, then, is to be understood as a multifaceted and progressive augmentation of human transformative powers visa-vis nature. This process can be understood as one of human se//-creation, or ^//'-realisation, in that the *bearer* of these powers is transformed along with the object of their exercise (nature). In particular, human cognitive powers ('science') underly the development of productive powers, and are themselves developed through reflection upon the outcomes of productive activity. Human sensory powers are likewise (see above quotation) developed along with the transformation of the *objects* of human perception: the power to create beautiful objects and the growth of aesthetic sensibility in the human subject are internally related to one another And, finally, the *purpose* of transformative activity is itself historically transformed as humans acquire new needs in the course of their historical self-development:

We have seen what significance, given socialism, the *wealth* of human needs acquires, and what significance, therefore, both a *new mode of production* and a new *object* of production obtain: a new manifestation of the forces of *human* nature and a new enrichment of *human* nature.[11]

Central to Marx's notion of this historical transformation of need is the idea that self-realisation comes *itself* to be the object of need:

It will be seen how in place of the *wealth* and *property* of political economy come the *rich human being* and the rich *human* need. The *rich* human being is simultaneously the human being *in need of* a totality of human manifestations of life - the man in whom his own realisation exists as an inner necessity, as *need.*[12]

The historical self-creation of humanity, then, is a process in which human transformative, sensory, aesthetic and cognitive powers and liabilities are transformed and augmented, along with a transformation of the structure of human need itself. But this process is not one which takes place 'in vacuo', so to speak. It would make no sense to speak of these powers, liabilities and needs without some notion of their object: 'nature' (including human nature).

History and the 'humanisation of nature'

The species-wide and communal project through which humanity creates itself is summed up by Marx as the 'humanisation of nature'. Nature as an external, threatening and constraining power is to be overcome in the course of a long-drawn-out

[10] Firey, W. *Man, Mind and the Land.* Glencoe, Illionis: Free Press, 1960.

[11] Kneese, A. V., R. U. Ayres, and R. C. D'Arge. *Economics and the Environment.* Washington, D.C.: Resources for the Future. 1970.

[12] Kuhn, T. S. *The Structure of Scientific Revolutions.* Chicago: Chicago University Press, 1962.

historical process of collective transformation. The world thoroughly transformed by human activity will be a world upon which human identity itself has been impressed, and so no longer a world which is experienced as external or estranged:

On the one hand, therefore, it is only when the objective world becomes everywhere for man in society the world of man's essential powers - human reality and for that reason the reality of his *own* essential powers - that all *objects* become for him the *objectification* of himself, become objects which confirm and realise his individuality, become *his* objects

And this applies not merely to the objects of human practical, transformative powers, but also to the world as object of human sensory and cognitive powers:

The *manner* in which they become *his* depends on the *nature of the objects* and on the nature of the essential power corresponding to *if,* for it is precisely the *determinate nature* of this relationship which shapes the particular, *real* mode of affirmation. To the *eye* an object comes to be other than it is to the *ear,* and the object of the eye *is* another object than the object of the *ear . ..* Thus man is affirmed in the objective world not only in the act of thinking, but with *all* his senses. '

These quotations, and others like them, suggest a certain view of the transformation wrought by human history in the relationship between human beings and their natural environment. An external, limiting, conditioned relation between the two is transformed in favour of an internal, unlimited, unconditioned (i.e. 'universal') relation which amounts to a fusion of identities. The 'conflict' between humans and nature is overcome in favour of an incorporation of the natural into the domain of the human without residue. Only when the *whole* world is appropriated cognitively, aesthetically and practically can humanity itself be fully realised:

This communism, as fully developed naturalism, equals humanism, and as fully developed humanism equals naturalism; it is the *genuine* resolution of the conflict between man and nature and between man and man - the true resolution of the strife between existence and essence, between objectification and self-confirmation, between freedom and necessity, between the individual and the species. Communism is the riddle of history solved, and it knows itself to be the solution.[13]

This historical vision is clearly incompatible with the content of Marx's metaphor, elsewhere in the same text, of nature as 'man's inorganic body', the insistence upon the *permanent* necessity of the 'metabolism' between humans and their natural environment as a condition of survival. The reality of nature as a complex causal order, independent of human activity, forever sets the conditions and limits within which human beings, as natural beings, may shape and direct their activities. These materialist theses about the relationship of humanity to nature, which are elsewhere, and more especially in later works, also assented to by Marx, are absent from this utopian and idealist vision of human emancipation.

[13] Humboldt, A. von. *Essai Politique sur le Royaume de la Nouvelle Espagne.* Paris: F. Schoell, 1811.

The important value-content of this early view of history is also put at risk by its residual idealism. Marx insists that the proper relation between the human species and its natural environment is not reducible to instrumental, need-meeting activity (important though this of course is). A properly human relationship with nature is a many-faceted relationship in which aesthetic, cognitive, practical and identity-forming aspects are communally realised. This multi-faceted, properly human relationship to nature is one which not only meets need, but has itself *become* the prime human need.

These ideas are powerful, persuasive, and very much in line with modem environmentalism. But when we turn to Marx's specification of the *kind* of relationship to nature which would realise these values their critical potential is vitiated. If we can be at home in the world, be properly, humanly, connected with the world only on the basis of a thorough-going transformation of it in line with our intentions, then what space is left for a valuing of nature in virtue of its *intrinsic* qualities? If we can 'see ourselves' in, or identify only with a world which *we* have created, then what is left of our status as *part* of nature? Nature, it seems, is an acceptable partner for humanity only insofar as it has been divested of all that constitutes its otherness, insofar, in other words, as it has become, itself, human. This view of a properly human relationship to nature is certainly far removed from a utilitarian, instrumental one, but its value-content is no less anthropocentric. It is, indeed, a quite fantastic species-narcissism.

The opposition between the human and the animal

I shall here leave aside the question of how far what is acceptable in the value-content of Marx's view of a fully human relationship to nature as a whole can be supported on the basis of a critical revision of his ontology. Instead, I shall return to the rather narrower question of the human/animal contrast. We have seen that for Marx, (other) animals are characterised by a certain standardised fixity in their mode of life. In so far as they are able to act transformatively upon external nature they do so in accordance with a definite 'standard', characteristic of their species, and their activity is oriented to the meeting of their individual needs (also fixed, and characteristic for each species) and those of their offspring. By contrast, human beings act upon the external world in a way which is free, self-conscious, and socially coordinated. Because of these distinctive features of human lifeactivity, their forms of association and modes of practical engagement with the world are subject to directional historical transformations. Only an account of the human mode of life which took into account the place of any specific phase of activity in the overall historical 'development' would be capable of adequately specifying what was, in the full sense, 'human'. What distinguishes humans from animals, in other words, is something which only becomes manifest in the course of human history itself. As we saw, this historical-developmental process, peculiar to the human species, consists in an augmentation of our transformative powers *vis-a-vis* nature, amounting to a residueless 'humanisation' of nature; an associated augmenta-

tion of our knowledge both of ourselves and of nature (towards a synthesis of the two); a transformation of our sensory powers, equivalent to the 'humanisation of the senses'; and a transformation in the structure of need.

The contrast between the human and the animal is then, a contrast both between humans and other animals, and between fully developed humanity and undeveloped humanity:

History itself is a *real* part of *natural history* - of nature developing into man.

The process of historical development is a movement from animal-like origins to a fully human realisation, and this is so with respect not only to our powers and liabilities, but also with respect to need. Even when human transformative powers are well-developed but the estrangement of labour has not been overcome, truly human needs are not manifested. The worker experiences need, and is constrained to meet need in a manner which belies his true human potential, resembling, rather, the animal mode of experiencing and satisfying need.

Underlying both Marx's concept of historical development and his critique of estrangement, then, is a contrast between what he variously calls 'crude', 'physical' or 'animal' need, on the one hand, and 'human' need, on the other:

It (the animal) produces only under the dominion of immediate physical need, whilst man produces even when he is free from physical need and only truly produces in freedom therefrom.[14]

And again:

The *sense* caught up in crude practical need has only a *restricted* sense. For the starving man. it is not the human form of food that exists, but only its abstract existence as food. It could just as well be there in its crudest form, and it would be impossible to say wherein this feeding activity differs from that of animals.[15]*

Speaking of estranged labour, Marx says:

It is therefore not the satisfaction of a need; it is merely a *means* to satisfy needs external to it.

Needs, in this sense, determine the worker's share of the product of labour.

... as much, only, as is necessary for his existence, not as a human being, but as a worker, and for the propagation, not of humanity, but of a slave class of workers[16]

Marx's attempt, in passages such as these, to provide an account of human nature in terms of a thorough-going opposition between the human and the animal is very much in line with the mainstream of modern Western philosophy and such more recent disciplines as cultural anthropology and sociology. The conceptual oppositions nature/culture; animal/human; body/ mind play a foundational, structuring role in the theoretical edifices which dominate these disciplines.

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[14] Marx, K. *The Poverty of Philosophy.* New York: International Publishers, 1963.

[15] Cole, H. S. D., C. Freeman, M. Jahoda, and K. L. R. Pavitt. *Thinking about the Future: A Critique of the Limits to Growth,* London: Chatto and Windus, 1973.

[16] Marx, K. *The Grundrisse.* London: Macmillan, 1971.

For each of these disciplinary matrices, an opposition between the animal and the human implies also an opposition *within* the human between what is animal(-like) and what is 'truly' human. In the paradigm dualist philosophy of Descartes, for example, the contrast between persons and animals implies a contrast within the person between a spatially extended bodily mechanism and a self-conscious 'thinking' substance. What is distinctive and valued in human nature is emphasised and its unsullied autonomy preserved, but at the cost of rendering unintelligible the *connections* between humans and the rest of nature and, within persons, between those aspects Which are and those which are not distinctively human.

Now, Marx's utopian vision of an eventual reunification of humanity with itself and with nature seems, at first encounter, to promise a way out of the dilemmas posed by such dualist ways of thinking. However, the systematic use of human/animal contrasts in his early work tells against this. These contrasts are not presented as historically transcendable. On the contrary, the human potential for historical transcendence is precisely what *differentiates* us from animals. Whatever changes take place in our human relationship to nature, animals are, and will remain, mere animals.

Many of my readers, of course, will be now saying 'well, so much the better for Marx'. The main historical alternatives to philosophical dualism - materialist and idealist 'monisms' are the object of well-rehearsed and seemingly decisive objections. Idealisms have great difficulty in sustaining plausible or even coherent accounts of those aspects of our experience in which the mind-independent reality of our world is manifested. Materialisms have a symmetrical difficulty in accounting coherently or plausibly for the existence and nature of human consciousness and experience itself. Materialism have, more often than not, begun with the aim of explaining some supposedly distinctive and highly valued human characteristic or potential, and ended with explaining it away. In our day, biological reductionist accounts of human nature are the best known culprits.

If these were, indeed, the only available options, then the case for dualism could be made to appear relatively strong. But they are *not* the only available options. The philosophical and ethical difficulties of the dualist aspects of Marx's early writings are quite formidable, not only in their own right, but also in terms of other aspects of Marx's overall intellectual and practical project

Against Marx's human/animal dualism

Consider, first. Marx's 'external' dualism of the animal and the human. I'll deal, in turn, with each of the characteristics through which Marx elaborates the opposition:

1. Animals are mere 'instances' of their species, whereas humans relate also as 'part to whole' to theirs. This is Marx's reference to the open-ended capacity of humans for social cooperation. For Marx this is potentially, though not yet actually, a species-wide cooperation in a common speciesspecific project. But the very cultural diversity which Marx's notion of 'free creativity' also recognises must render implausible his historical

projection. What grounds are there for expecting a spontaneous merging of geographically discrete and culturally diverse lines of historical 'development' and visions of the future? What reasons are there for supposing that humans have the potential to evolve noncoercive forms of social coordination on the gigantic scale required?

On the animal side of Marx's contrast, subsequent ethological study has revealed a wealth and complexity of social life in other species. In the case of such animals as dogs, cats, and herd-animals such as sheep and cattle, their very sociability was a necessary initial requirement for their distinctive human uses. So also was a degree of malleability, and 'openness' in their forms of sociability. If we leave aside, then, what is merely speculative in Marx's contrast - his as yet unfulfilled historical projection - the picture is one of highly differentiated and species-specific capacities for and forms of sociability as between animal species. The extent and form of human sociability is, indeed, distinctive, but this is no less true of any other social species. The capacity for and disposition to social coordination of activity *as such* is not a distinctive feature of our species.

2. Humans take the whole world as the object of their activity, whereas animals appropriate the world only partially, and according to the fixed standard of their species. Again, the human side of this opposition is misleading. Certainly it is a plausible extrapolation from the past expansion of the geographical scope of human activity to suppose that one day the whole surface of the globe may bear the imprint of human intentional activity - the last of the rainforests and wildwoods destroyed or cultivated, the poles populated and industrialised, the oceans farmed or rendered sterile by accumulation of toxic wastes, and so on. But what is now supposed to be true of the large-scale, immensely complex and interacting mechanisms of chemical and physical cycling and energy transfer in the biosphere suggests that our species would destroy itself (and many others) by the unintended consequences of its own activity long before such a 'utopian' possibility were actualised. All transformative activity presupposes a distinction between those attributes of its objects which undergo alteration and other attributes of the objects, conditions and agents of the activity whose persistence, unaltered throughout the process, is indispensable to it. Because of this, even if we suppose a limitless increase in human technical powers in any imaginable direction, the notion of a residueless subordination of the world intensively or extensively to human purposes is incoherent.

On the animal side of this contrast, again, ethological studies reveal great diversity among other animal species with respect to the extent, nature and intra-species variability of their interaction with their environments. As Marx notes, birds build nests which are to a considerable extent speciesspecific in the materials used, site chosen, and 'design'. Nevertheless many species show considerable adaptability in all respects, especially if confronted with non-standard environmental conditions. Inventing, making, using, and inter-generational teaching of the use of tools are now well recognised

as powers of non-human primates, notably chimpanzees.[17] That there are profound *differences* in these capacities between humans and other species is clear, but it remains true that such profound differences also separate non-human animal species from one another. For his intellectual purposes, Marx exaggerates both the fixity and limitedness of scope in the activity of other animals, and the flexibility and universality of scope of human activity upon the environment. At the same time he abstracts from diversity among non-human animal species, and obscures human ecological diversity by way of a global historical extrapolation. Each of these 'intellectual tactics' contributes to the formation of a dualistic categorial opposition instead of a recognition of complex patterns of species-specific diversity.

3. Humans possess historical potential, whereas animals exhibit fixed standardised modes of activity, from generation to generation. This contrast presupposes the first two, but goes beyond them in important respects. To get clear about how the contrast works, and to see the difficulties in the way of sustaining it in this form it is first necessary to 'unpack' the notion of 'historical potential' and that of 'historical development' with which it is closely connected in Marx. First, it is important to distinguish between powers, or capacities, on the one hand, and potentials on the other. To attribute a power of a capacity to, say, an organism, is to say that it is *able* to do something (even though it may not be in *fact* doing it - it may never have done it). To attribute a *potential* is to say that it has the capacity to acquire some future capacity or power which it presently does not have. We may distinguish different kinds of potential on the basis of the natures of the processes in virtue of which they are progressively acquired, on the basis of the natures of the external conditions which enable their acquisition, and on the basis of the natures of the bearers of the capacities concerned.

In its infancy an animal, human or non-human, can be said to have capacities, or powers, specific to its stage of development. A child of one year old may be able to crawl but not stand, a little later to stand but not walk, and so on. The infants of most mammal species are less helpless when born than the human infant, and they tend to acquire the species-specific capacities of adults more quickly, but basically the same considerations apply. If we know what capacities are characteristic of adults of the species then we can say of normal infants which have not yet developed these capacities that they have the potential to do so. The nature of the organism is such that given satisfaction of minimal external conditions it will undergo development resulting in the acquisition of the characteristic capacities of adults of its species. Such potentials of infants may be termed 'developmental potentials'.

Again, at any stage in its development, an organism may be said to lack certain capacities - 'skills' are the paradigm here - not because it lacks the necessary organic constitution, nor because it is insufficiently mature, but because it has lacked appro-

[17] Meadows, D. H,, D. L. Meadows, J. Randers, and W. W. Behrens, *The Limits to Growth.* New York: Universe Books, 1972.

priate learning experience. Of such an organism we can say it lacks the capacity (to, for example, catch its own prey, fly long distances, understand long words, do simple arithmetic, depending on the species) concerned, but has the *potential* to acquire it. Such a potential might be termed a 'learning potential'.

Both developmental and learning potentials are potentials of individual organisms. Within the whole range of potentials of individuals we may distinguish between those potentials the fulfilment of which constitutes a species-wide characteristic, and those potentials which are fulfilled only in virtue of the exposure of (a sub-population of) the organisms to a distinctive set of environmental conditions. The former I shall call 'individual speciespotentials', the latter 'individual context-potentials'. In the human case, the potential (in small infants) for language-acquisition is an individual species-potential, whereas the potential to acquire the French language would be an individual context-potential for infants reared in French- speaking cultural environments. Pet dogs can learn to respond to human commands; captive chimps can acquire a degree of competence at learning sign-language.[18] The potentials to do this in the animals acquired for the appropriate training are, in my sense, individual context-potentials.

But Marx's notion of an historical potential includes at least the idea of potentials as possessed by associated groups of individual organisms. Humans characteristically produce means of subsistence, for example, through some form of more-or-less stable pattern of combination of the activities of more-or-less numerous individuals. The productive powers of the group are certainly different in degree, and might indeed be argued to be different in kind from those possessed by individuals. This distinction between individual and group-capacities can also be sustained for other social species of animals. Social bees and wasps, beavers, predators such as lions, hyaenas and others are all species in which sub-populations form more-or-less stable groupings which possess capacities not possessed by individuals independently of their grouping

But can we speak of *group-potentials* as distinct from mere group- *capacitiesl* Are there, for groups, analogues of the processes of development and learning at the level of individuals which might serve as the foundation for a cumulative acquisition of powers through time? Do groups augment their powers of coordination of their own activity, or of transforming their environments? To the extent to which they do we may speak of 'collective potentials'. In fact, collective potentials are probably possessed in any significant degree only in some mammalian social animals, and to a high degree only in the human case.

Where the acquired capacities (the fulfilled potentials) of groups can be transmitted from generation to generation in such a way as to enable a continued augmentation of powers of the associated group which is independent of preservation of the identities of the *members* of the group I shall speak of collective historical potentials. The acquisition of a written language, for example, can retrospectively be recognised to have been a collective historical potential of some pre-literate civilizations. Literacy, like

[18] Schmidt, A. *The Concept of Nature in Marx.* London: New Left Books, 1971.

the wheel, does not have to be re-invented in each generation, but, unlike spoken language, it is not a collective possession in all cultures, or in all historical periods. I think that the notion of collective historical potentials is required if we are to adequately understand historical processes, but I also recognise that there are serious difficulties in the way of coherently specifying the concept. Not the least of these is the problem of securing identity of reference to the 'bearers' or possessors of such potentials. In the case of simple collective potentials this is relatively unproblematic. As long as the group stays together, and continues to interact, it can be identified and re-identified as 'the same' group. Identifying and re-identifying 'the same' collectivity of human beings through prolonged expanses of historical time is another matter.

However, for (the early) Marx, the problem is compounded, since he attributes to the human species alone yet another type of collective potential: the potential for species-wide coordination of activity. The potential is not, here, attributable to any empirically delimitable socially combined *population* of human beings, but to the species as a whole. For Marx, then, over and above simple collective potentials, and collective historical potentials, there are also what we might call 'species historical potentials'.

Finally, for any species capable of historical potentials of either of the two kinds so far distinguished ('collective' or 'species') the conditions exist for a further kind of *individual* potential to be distinguished. To the extent that *collective* (or species) historical potentials are fulfilled, the environmental contexts in which individuals realise their individual developmental and or learning potentials are transformed. In other words, for species susceptible of collective historical 'development' (cumulative acquisition of collective powers across generations) we can distinguish *within* the category of individual context-potentials a sub-class of individual *historical* potentials. Individual historical potentials are capacities which individuals are able to acquire in virtue of their membership of a collective in which cognate *collective* historical potentials have been fulfilled. The individual potential for reading or writing, for example, is an individual historical potential in this sense. It is a potential which can be realised only by individuals who belong to a culture which possesses the institution of a written language The importance of the idea of collective historical potentials is that it is necessary if we are to understand the extent to which the possibilities for *individual* development and fulfilment are dependent upon the historical achievements of the culture in which they find themselves.

Clearly, a good deal needs to Be said by way of elaborating and defending these distinctions. But enough has been said to enable me to at least state my case against Marx's use of the concept of historical potential in sustaining his opposition between humans and animals. On the human side of the opposition, it seems to me that the attribution of *species* historical potentials to humans is, to' say the least, highly speculative. Certainly this is so if we try to follow Marx in saying which potentials these are (humanisation of nature, and so on). Further, the normative connotation which the notion of potential generally carried in Marx does not seem obviously to carry over into historical potentials, whether individual or collective. The individual histor-

ical potential to deliver 'megadeaths' at the press of a button is dependent upon the realisation of the collective historical potential to construct hitech weaponry. But how do we value this historical achievement? Do we recognise in it just one aspect of the historical unfolding of human nature, a dimension of human fulfilment, along with our increased capacities for curing the sick, making the deserts bloom and so on? If we take this option, then it entails recognising that humans have, as part of their nature, a potential for destructiveness, for evil. In this event, human well-being, the pursuit of happiness may require us to find ways of suppressing, or blocking off some of our potentials. Well-being, the 'good life' cannot be identified straightforwardly with the fulfilment of our human potential.

The alternative option would be to keep the positive normative connotations of the notion of 'potential', refusing to recognise *as* potentials those historical possibilities whose realisation would be undesirable - evil, destructive, and, ultimately, self-destructive. This option strikes me as a particularly indefensible form of 'speciesist' special-pleading. The temptation towards utopian blindness to the causal importance of those individual and collective historical possibilities denied the status of 'potentials' is both strong and dangerous. As Mary Midgley has eloquently shown, the human/animal opposition has served as a convenient symbolic device whereby we have attributed to animals the dispositions we have not been able to contemplate in ourselves.[19] The point of these considerations is to suggest that if Marx turns out to have been right in supposing that only humans have historical potentials, it does not follow directly from this that any great gulf stands between the animal and the human with respect to their *moral* status.

The significance of this point becomes clearer if we look at Marx's contrast from the animal side of the divide. As we have seen, many animal species display a complexity, diversity and adaptability in their behaviour which is denied in Marx's view of them as rigidly stereotypical in their species-characteristic modes of life. For many non-human animal species it is possible to speak defensibly of developmental and learning potentials, of simple collective powers, and even to a limited extent of collective potentials.

Some evidence exists of cultural transmission of learned skills in the cases of some species of primates but not (as yet, at least) of any generation-by- generation cumulative direction in these collective skills.[20] This *does* seem to be a distinctive feature of humans by contrast with all other animal species currently inhabiting the earth. It is, however, worth noting that this is a purely contingent matter. There is no *a priori* reason for supposing that some other species might not evolve these potentials in the future, and there are good empirical grounds for thinking that our planet has *previously* been inhabited by other primate species which *did* have historical potentials.

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[19] Marx, K. *Theories of Surplus Value.* Part 3, Moscow: Progress Publishers, 1972.

[20] Meadows, D. H,, D. L. Meadows, J. Randers, and W. W. Behrens, *The Limits to Growth.* New York: Universe Books, 1972.

Now, the *moral* contrast which Marx draws between the *historical potential* of humanity and its estranged, distorted, stunted, *merely animal* mode of existence under the dominion of estranged labour is only effective on two conditions. First, it is necessary to equate the fulfilment of human historical potential with the well-being, the flourishing, of humans in their forms of association with one another and their material environment. I have just suggested that this equation is not justified.[21] Second, it is necessary to attribute to human beings the capacity to exist in two contrasting states: as merely existing, or surviving, as beings whose 'crude, physical', or 'merely animal' needs are met (as mere bearers of the capacity to work, and to physically reproduce that capacity), or, by contrast, as flourishing, as fulfilled, as 'fully human'.

But the place of the reference to 'animal needs', here, and the associated use of the human/animal contrast to sustain the ethical critique of human estrangement requires a *denial* of this capacity in the animal case. Animals, we must suppose, merely exist. As animals they have merely animal needs and the satisfaction of these needs is both necessary and sufficient for the existence and reproduction of the life of the individual and its species. But if, as we have seen, (some) animals, too, have developmental, learning, species, context, and collective capacities and potentials then here, also, it must be possible to distinguish between mere existence, on the one hand, and flourishing. well-being, and the fulfilment of diverse potentials, on the other. The mere fact of distinctively human *historical* potentials does not obliterate *either* the ethical distinction between flourishing and merely existing for other animals, or its ontological presupposition.

The point here is not just that Marx was simply wrong about animals.[22] It is rather that he was wrong in ways which undermine his own view of the desirability of a changed relationship between humanity and nature in the future communist society. Connectedly, he is also wrong about animals in ways which cut him off from a powerful extension and deepening of his own ethical critique of prevailing (capitalist) modes of appropriation of nature.

Let us adopt a 'weak' interpretation of'humanisation of nature' and allow that it may include, not the literal 'humanisation' of animals, but, rather, an alteration of our relationship to animals - perhaps a rendering of that relationship more consistent with our 'humanity', a more *humane* relationship.

This is the very least that would be required to make Marx's notion consistent with his own professed naturalism. Now, whatever content is given to 'a more humane relationship', it presupposes that 'crude, physical need' and the needs of animals are not equivalent. Only if there is a difference between mere existence of animals at a level which minimally satisfies *human* utility, on the one hand, and thriving or well-being, on the other, can we distinguish between 'inhumane' and 'humane' ways of treating those animals whose conditions of life are dependent upon the exercise of our powers.

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[21] Mesjaros, I. "Ideology and Social Science," *Socialist Register,* 1972.

[22] Cole, H. S. D., C. Freeman, M. Jahoda, and K. L. R. Pavitt. *Thinking about the Future: A*

Moreover, the pathological distortions from the properly human mode of life which Marx attempts to capture in his concept of 'estrangement', or 'alienation', are in important respects paralleled in the modes of life imposed upon animals by precisely the same structures of social action. The treatment of animals as mere means to external purposes, the forcible fragmentation of their life-activity, and the dissolution of their social bonds with one another are, for example, features of commercial agriculture which have become progressively intensified since Marx's day with each technical reorganisation of agricultural production. The ethical critique of such practices should not be seen as an *alternative* to a Marxian critique of modem capitalist forms of labour-discipline, but, rather, an extension and a deepening of it. But Marx's contrast between the human and the animal cuts away the ontological basis for such a critical analysis of forms of suffering shared by both animals and humans who are caught up in a common causal network.

4. Marx's attribution to animals of a fixed and standardised mode of activity in relation to nature, and his apparent failure to recognise in any significant way the social life of non-human animals are both at work in his use of the phrases 'physical need' and 'animal need' as if they were equivalent. This suggests a denial of the complexity and diversity of the emotional, psychological and social lives of other animals. Such a denial renders merely rhetorical Marx's characterisation of history as 'nature developing into man', and cuts off two significant sources of insight into human nature and history. The first, which would require giving serious theoretical content to the idea of 'nature developing into man', would be an inquiry into the prehistorical origins of the human species, and the processes of our differentiation from other primate lineages. The second, in part dependent for its rational justification on the first (i.e. a recognition of the *kinship* of humans and other animals), would be a comparative psychology and ethology in which what is genuinely distinctive about human beings could be viewed in the light of what is shared between human and non-human animals. That these lines of enquiry have a long post-Darwinian history of political tendentious and methodologically suspect misuses[23] is not a sufficient reason for a wholesale abandonment of the enterprise. Whilst there is certainly plenty of room for legitimate controversy within modem evolutionary theory it is no longer reasonable to deny the main claims of the evolutionary perspectives in relation to human ancestry in some primate stock, and our kinship with contemporary primates. Unless social scientists wish to stand with the flat earthers, the Inquisitors and the bible-belt creationists they have no choice but to engage with the questions posed by our animal origins and nature. Marx and Engels themselves enthusiastically embraced this perspective after 1859.[24]

Critique of the Limits to Growth, London: Chatto and Windus, 1973.

[23] Oilman, B. "Marxism and Political Science: Prolegomenon to a Debate on Marx's Method," *Politics and Society,* 3 (1973), pp. 491-510.

[24] Orans, M. "Surplus," *Human Organization,* 25 (1966), pp. 24—32.

Against Marx's dualist view of human nature

Perhaps, however, the most telling arguments against the dualist aspects of Marx's early work relate to the dualism *within* human nature which follows from the external dualism of the animal and the human. It is characteristic of dualistic approaches, baulking at the prospect of a comprehensively idealist view of our nature, to recognise an animal component, layer, or aspect, within the human. The human *is* an animal, but an animal with a special 'something' extra which makes all the difference - soul, mind, will, self, reason. and so on. Marx's early writings, as we have seen, still fall within this tradition.

In so far as humans work only to meet their subsistence needs, and do not experience their work as a need in itself, their activity is mere animal activity. In so far as their leisure activities, their eating and drinking, their 'dressing up' and so on are ends in themselves, segregated from the wider speciesproject, they are mere 'animal functions'. When the starving man is fed 'it would be impossible to say wherein this feeding activity differs from that of animals'.[25] This reproduction of the animal/human opposition within the domain of the human involves a sequestering of certain of our needs, powers, functions and activities as animal, or animal-like, from others (generally more highly valued and assigned a more fundamental ontological status) which are designated 'human'.

The main objections to this broad strategy for understanding what humans are can be usefully placed into three groups.

1. Those powers, needs, activities, functions (etc.) which fall on the human side of the divide, are represented as a self-sufficient, *sui generis,* autonomous complex which is thus rendered unintelligible in relation to the rest (the animal side) of human life. But what sense could be made of, for example, human powers of reasoning in abstraction from the bodily needs and activities in which they are exercised? In Marx's own case, the ethical ideal for humanity is a mode of being which integrates the diverse activities of persons within a coherent communal project. This notion of integral self-realisation remains incompatible w'ith the residual dualism of the *Manuscripts.*

2. Those powers, activities, needs, functions (etc.) which fall on the 'animal' side of the division are correspondingly profaned as, perhaps, rather shameful residual features. Their - continued, uncomfortably insistent presence, eruptions and interruptions are demeaning and rob us of the full sense of self-respect to which we feel entitled. A combined dread and contempt for bodily existence and function is barely disguised in much philosophical dualism. It provides grounding

[25] Pearson, H. "The Economy Has No Surplus: A Critique of a Theory of Development," in K. Polanyi, C. M. Arensberg, and H. W. Pearson. *Trade and Market in Early Empires.* Glencoe, Illinois: Free Press, 1957.

and sustenance for the valuation of mental over manual labour, of masculinity ('cultured') over femininity ('natural'), or reason over sentiment, of 'mind over matter', and of the '-civilized' over the 'savage'. It makes for a culture that is guilt- ridden, fearful and confused over such fundamental features of the shared human and animal condition as sexuality and death.

3. The dualist philosophical heritage is at work in many of our most problematic contemporary institutional forms and practices. The development of modem 'health-care' as a form of organised, hi-tech 'body mechanicsV (at its best) detecting, diagnosing and correcting defects in the bodily machine, has an unmistakable Cartesian legacy about it. The pertinence of the psychological, emotional, cultural and socio-economic aspects and contexts of the person to both the causation of and recovery from disease has been widely understood only in recent years.[26] It has yet to gain the central place it deserves in policy disputes and health-care reform. In other areas of public policy, too, a segregation of 'basic' (= physical) needs from 'higher' (emotional, cultural, self-realising) needs underlies priorities of welfare state provision in such areas as housing, the setting of nutritional standards and even in education.[27] A great deal of overseas aid policy, too, neglects the cultural, socio-economic, and environmental contexts within which such 'basic' needs as food and shelter are met. The sequestering of classes of need from one another, often well-motivated, equally often is disastrous in its consequences. Needs which are inseparably interconnected both in the way they are experienced and in the interweaving of their causal conditions of satisfaction are all too often abstractly^targeted' in single-priority interventions which bring extended chains of unintended consequences in their wake. The environmental and social cost of the export of 'green revolution' technologies to large parts of Asia and Latin America is a case in point.[28]

I have tried to show that much of Marx's thinking in the early *Manuscripts* is governed by two closely related dualistic oppositions: between humans and animals, and between the human and the animal *within* the human. I have advanced some considerations which I believe tell against these dualisms, both as they appear in Marx, and as they are present more widely as a constitutive dimension of Western cultures. I have also suggested that human/animal dualisms are incompatible also with key features of Marx's own intellectual and practical project. But if this is so, then it follows that there are other elements or aspects of Marx's thinking, even in his pre-Darwinian days, which cut against the dualist aspects upon which my proffered reading has so far been based.

[26] Piaget, J. *Structuralism.* New York: Harper, 1970.
[27] Piaget, J. *The Principles of Genetic Epistemology.* London: Routledge and Kegan Paul, 1972.
[28] Ricardo, D. *Principles of Political Economy.* London: Cambridge University Press, 1951.

Naturalism without reductionism or 'speciesism'?

In what remains of this paper. I shall offer a sketch for an alternative reading and reconstruction of Marx's early *Manuscripts,* centred on those elements which tell against both philosophical dualism and idealism, and which favour, rather, a naturalistic, but still not reductionist view of human nature. A view, that is, which gives due place to the specificity and distinctiveness of the human-species, but does so without compromising what remains defensible in Marx's assertion that 'man is part of nature'.

Some of the most promising textual materials for his alternative approach are to be found, not surprisingly, perhaps, in the manuscript entitled 'Critique of the Hegelian Dialectic and Philosophy as a Whole'.

Man is directly a *natural being.* As a natural being and as a living natural being he is on the one hand endowed with *natural powers, vital powers* - he is an *active* natural being. These forces exist in him as tendencies and abilities - as *instincts.* On the other hand, as a natural, corporeal, sensuous, objective being he is a *suffering,* conditioned and limited creature, like animals and plants. That is to say, the *objects* of his instincts exist outside him, *objects* independent of him; yet these objects are *objects* that he *needs* - essential *objects,* indispensable to the manifestation and confirmation of his essential powers . . . *Hunger* is a natural *need',* it therefore needs a *nature* outside itself, an *object* outside itself, in order to satisfy itself, to be stilled.

In this passage, Marx is asserting the status of humans as 'natural beings', a status they share with (other) animals and with plants. As natural beings there are three interconnected features which humans share with other living beings. First, they have natural needs whose objects lie outside themselves, independent of them. All living things, for example, have nutritional needs. The objects of these needs - foodstuffs - exist independently of them. Second, all living beings have natural powers which *enable* them to satisfy these needs, and natural tendencies ('instincts') to exercise them. Third, this need-satisfying activity in relation to external objects is essential to the 'confirmation' or 'manifestation' of the essential powers of the species.

In other words, interaction with external nature is necessary for the survival of all natural beings. Each *species* of natural being has its own distinctive mode or pattern of interaction with nature - its own 'species-life'. And finally, (a member of) each species only fully manifests its essential nature - only becomes what it has the potential to be - in virtue of its participation in this distinctive species-life.

'But,' Marx goes on to say, 'Man is not merely natural being: he is a *human* natural being. That is to say, he is a being for himself.'[29] Having begun to speak of human nature in a thoroughly naturalistic way, Marx appears, again, to pull back and re-establish a dualistic opposition, this time between the 'human' and the 'natural'. However, there is no necessity for such a reading. The 'human' here can be understood as a qualification, a specification, or subdivision *within* the natural, rather than its

[29] Sauer, C. *Agricultural Origins and Dispersals.* New York: American Geographical Society. 1952.

opposite. This remains a form of naturalism, in that what humans share with other 'natural beings' is regarded as ontologically fundamental, and is accordingly given priority for purposes of understanding and explaining what humans are and how they act. But it is not a reductionist naturalism in the sense that it allows for a full recognition of the specificity and distinctiveness of humans, their forms of sociability and their potentials within the order of nature. Whereas dualist and idealist accounts of human nature fix upon features which are held to distinguish us from (other) animals and elaborate their views of human nature upon that basis, a naturalistic approach begins with the common predicament of natural beings and moves from that basis to render intelligible their specific differences in constitution, structure and modes of life.

In Marx's account all living beings have needs whose objects are external and independent. The satisfaction of need, therefore, requires interaction with and appropriation of the environment of the organism. The particular content of need, the mechanisms which mediate between needs and forms of activity, and the nature of need-meeting activities themselves are, of course, almost unimaginably diverse - from the chemistry of photosynthesis through the hunting of the tiger to the 'biting' of the mosquito. The point, however, is that the common framework of analysis enables us to recognise the *significance* of all these detailed specificities of biochemical, neurophysiological, anatomical, ethological and ecological facts and processes within the overall 'mode of life' of the species concerned.

Each species has its own characteristic species-life. Organisms can 'confirm' or 'manifest' their essential powers only within the context of their species-life, and so can be said to flourish only when the conditions for the living of the mode of life characteristic of their species are met. For each species, then, we can distinguish conditions for mere organic survival - the meeting of minimal nutritional requirements, protection from predators, and so on - from conditions for flourishing, for the living of the species-life. But *how* this distinction is made, the specific survival-conditions and flourishingconditions which are identified, will vary from species to species. The empirical determination of such conditions is at least part of the content of the sciences of ethology and ecology.

So far, then, my alternative, non-dualistic reading of Marx's early *Manuscripts* has yielded a significant shift in the conceptual means for dealing with Marx's central theme in this text: the estrangement of labour. Under regimes of private property, conditions which enable the survival of workers are provided but the conditions for them to confirm their powers and potentials in the living of their characteristic 'species-life' are denied to them. A distorted and pathological mode of life is the consequence. This theme can be further specified and elaborated with little if any loss of the ethical power of Marx's critique, but with the double gain that precisely the same framework of analysis can be applied in the critique of the mode of life imposed upon many of the other living species caught up in this distorted mode of human life, and that Marx's highly speculative notion of a distinctively human 'species historical' potential is rendered redundant.

I will conclude with some brief indications as to how the form of naturalism I am advocating might offer a preferable way of understanding the relation between the 'human' and the 'animal' *within* the human, how it might, in other words, displace dualism without falling into reductionism.

A naturalistic specification of 'human nature', 1 have suggested, would be a matter of differentiating out and then elaborating our specific features from an initial recognition of the common core of'natural beinghood' which we share with other living creatures. But this process of differentiation, of saying what is specifically human, can all too easily fall into a dualistic mode. If it becomes centred on a specification of those powers, potentials, requirements etc. Possessed by humans 'over and above' those they share with animals. the approach falls short of naturalism. This is not to deny that there *are* things (reading, writing, talking,[30] composing symphonies, inventing weapons of mass destruction and so on) which humans and only humans can do. Rather, it is to say that those things which only humans can do are generally to be understood as rooted in the specifically human *ways* of doing things which other animals also do. It is this feature that I want to emphasise as the hallmark of a naturalistic approach.

What this approach might mean in practice can, perhaps, be illustrated by way of a study of Marx's treatment of the concept of 'need' in the *Manuscripts.* As we have seen, Marx speaks variously of 'crude', 'physical' or 'animal' needs, contrasting them with 'human needs'. In some passages it seems as though human needs constitute a separate, *sui generis* class of needs, set over and above our 'animal', subsistence needs, and peculiar to us as humans. We may distinguish two broad types of human need in this sense. First, what might be called 'self-realisation' needs:

The *rich* human being is simultaneously the human being in need of a totality of human manifestations of life - a man in whom his own realisation exists as an inner necessity, as *need.*

Marx seems to suggest that such inner needs for self-realisation, for the fulfilment of potential, are possible only for self-conscious beings, and even then are only fully acquired on the basis of an extended process of historical 'development'.

The second class of distinctively human needs is similarly linked with our status as self-conscious beings, but not necessarily with our historicity. Marx speaks of the elements of our external environment ('plants, animals, stones, air, light, etc.')[31] as constituting 'spiritual nourishment' in so far as they are objects of human science and art. Over and above the need (which they share with other animals) to physically appropriate nature, humans have spiritual needs to aesthetically and cognitively appropriate nature. This reading is strongly suggested by such passages as this:

[30] Schmidt, A. *The Concept of Nature in Marx.* London: New Left Books, 1971.

[31] Tarascio, V. J. *Pareto's Methodological Approach to Economics.* Chapel Hill, North Carolina: University of North Carolina Press, 1966.

It (the animal) produces only under the dominion of immediate physical need, whilst man produces even when he is free from physical need and only truly produces in freedom therefrom.[32]

There are, it seems, two possible kinds of human practice in relation to nature: one^physical-need satisfaction, which we share with animals, the other, spiritual (aesthetic, cognitive) need-satisfaction, which is special to us, and constitutes production in the 'true' sense. This distinction reappears in the later works as a distinction between the realms of 'necessity' and of 'freedom'.

However, an alternative, naturalistic reading of the passage is also possible. To qualify as properly human, it is necessary not that production have no relation to the satisfaction of physical need, but rather that it should not be performed under the *dominion* of *immediate* physical need. Leaving aside Marx's apparent equation of the animal with the 'not-properly-human', Marx can plausibly be read as making a distinction not so much between practices which satisfy different needs, as between different modes of satisfaction of common needs. The satisfaction of aesthetic and cognitive needs does not *require* the performance of further practice, over and above the practices through which physical needs are met. In a fully human, or 'true' practice of production, physical needs would be met in a *way* that was aesthetically and cognitively satisfying. For at least this sub-class of 'human' needs, then, we can say that they are not a *sui-generis* complex of requirements, over and above the physical needs, but that they are, rather, requirements which bear on the manner of *experiencing, identifying and satisfying* the physical needs. Let's take the physical need for nutrition as an example.[33] This need is common to both humans and other animals. Some non-human animals, but not all, have sufficient psychological and behavioural similarity to ourselves for us to speak non-metaphorically and unequivocally of them as experiencing hunger, searching for, and consuming food. For all such animals the objects and substances which can count as 'food' are a sub-set only of the total range of objects and substances which would satisfy their nutritional requirements. Moreover, only some modes of acquiring and consuming these objects and substances are characteristic of the 'mode of life' of the species concerned, or are activities in which their specific powers and potentials are exercised or fulfilled. The feeding activities actually engaged in by such animals are the overdetermined outcome of inherited predispositions, learning and environmental opportunity-structures.

All this is true of humans and many other species of animals, especially mammals and birds. So, in the passage quoted above Marx's parallel between the feeding activity of the 'starving man' and that of animals is undermined. Neither for humans nor for other species can we simply equate the mere satisfaction of nutritional requirements with the feeding activity characteristic of the species. The distorted, or pathological relation to food induced by starvation in humans is not an animal or animal-like

[32] Vogt, W. *The Road to Survival,* New York: W. Sloane Associates, 1948.

[33] Wittgenstein, L. *Philosophical Investigations.* Oxford: Oxford University Press, 1958.

relation to food, but a specific distortion or pathology of *human* feeding-activity. But, this mistaken equation of the pathologically human with the animal aside, Marx's comment is susceptible of an illuminating and naturalistic interpretation. What makes the relation of the starving man to food a pathological one is that the object of hunger exists *merely* as food, its sole significance is that its consumption will satisfy the hunger. Such feeding activity is performed under the 'domination' of 'immediate' need, to quote what Marx says elsewhere. This feeding activity is means/ends activity, not activity with its own intrinsic satisfaction. It is also activity in which the aesthetic, cognitive, and 'spiritual' dimensions of human activity are missing.

On this naturalistic reading, then, what makes the difference between a 'fully', or 'properly' human way of satisfying hunger, and a less than human, or pathological way of satisfying the same need, is the presence or absence of intrinsic cognitive and aesthetic satisfactions in the activity through which the need is satisfied. We can now get closer to answering the question, what are the enabling conditions for the satisfaction of hunger to take a properly human form? In addition to the availability of nutritional items in the environment and the technical powers on the part of persons to appropriate them, these enabling conditions must also include appropriate aesthetic and cognitive rules and resources.

But if we ask the further question, under what conditions can these aesthetic and cognitive rules and resources exist?, then the short answer is: Within the context of a human culture. That this reading is in line with Marx's thinking is indicated also by his use of the word 'immediate' to specify the non-human relation to physical need satisfaction. Properly human feeding-activity is symbolically, culturally *mediated* need satisfaction. All cultures contain classifications which define (well within the range of all possible means of meeting nutritional requirements) what are and what are not to be counted as food, often with severely sanctioned taboos against the consumption of some items. Similarly normative regulations govern the mode of appropriation of culturally recognised foodstuffs, their preparation for consumption, their distribution within the community, the order in which they are consumed and so on.[34]

To say that there is an aesthetic, cognitive, normative, 'spiritual' - in other words 'cultural' - dimension to the way in which humans meet their physical needs, and that this is indispensable to their meeting of these needs in a 'properly' human way might look like a covert return to dualism. But this is not so. The key point, here, is that the starting point for the analysis is the recognition of a need which is common to both humans and non-human animals. The specification of the distinctively human then proceeds not by identifying a further, supervenient class of needs possessed only by humans, but rather by identifying the species-specific way *in which* humans meet the needs they share with other species. This leaves open the door to making further illuminating contrasts and comparisons between humans and other species, and it

[34] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

avoids the effacement of the manifold differences *among* non-human animals in their ways of satisfying their physical needs.

But if this strategy can be defended from the charge of 'dualism at once remove', is it not susceptible to the contrary charge of reductionism? Surely not *all* of human cognitive and aesthetic activity is displayed in the practices through which physical needs are met, not yet even in those practices through which we meet the whole range of needs which we share with (some) other animal species? What of those needs - self-realisation needs - which appear to be peculiar to self-conscious and historical beings? Again, it is not required by the form of naturalism I want to advocate that the reality of such needs should be denied. Rather, the commitment is to viewing them as *in some sense* consequential upon those needs which are common to natural beings, or upon the species-specific ways in which those common needs are met. Explanatory strategies in relation to such supervenient needs would be to make them intelligible in terms of the (ontologically) more fundamental common needs.

It is beyond the scope of this paper to provide the further elaboration and defence that these remarks clearly require. Suffice it, for the moment, to say that the broad naturalistic but non-reductionist approach advocated above would provide the beginnings of a methodological defence for some already- existing explanatory strategies *(not,* of course, grounds for accepting as *true* any *specific* social-scientific explanation). Marx's attempt to explain the fragmentations and distortions of human personal and social life under capitalism as consequences of a pathological relationship to nature is clearly one such strategy that would be defended. An interesting and provocative comparison here would be with the genre of explicitly ethologically rooted social pathologies, of which Desmond Morris (1969) is perhaps the best-known example.

Such sociological/anthropological strategies might usefully be compared and complemented by psychoanalytical approaches which operate at the level of the human individual. What Freud does with the concept of 'sublimation' is a clear case of an attempt to explain in a non-reductionist way the rootedness of some distinctively human activities (aesthetic and scientific, for example) in needs and propensities (sexuality and affectivity) which we share with other species. Finally, at the level of phylogenetic explanations, S. J. Gould (1980) and others have shown how the concept of natural selection can be used in the explanation of human origins (as with other species) without in any way denying the specificity and distinctiveness of human powers and potentials. The notion that biological modifications which *are* adaptive may bring in their wake a train of consequences which are *non-* adaptive in evolutionary terms is an important concept for this strategy.

These considerations show that the concepts of human potential and species being are by themselves insufficient to establish a defensible view of human wellbeing. A good society would encourage the actualisation of some potentials and discourage others. Its institutional framework would include enabling conditions for the fulfilment of a diverse range of potentials amongst its citizens, but it would also set limits to this

range and establish constraints on the actualisation of undesirable potentials. Further ethical principles and reasoning is required to establish and defend the outlines of such a society. A theory of human nature is an essential part of the rational grounding of any view of human well-being, but it cannot be *substituted* for an adequate moral theory.

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Part 3: Malthusianism, overpopulation and limits to growth

Introduction

Another controversy which preceded, then became assimilated by, early (1960s) environmentalism was that of human population growth and resources consumption and 'overpopulation'. As much as animal rights, this issue was thought to call into fundamental question the relationship between society (especially Western) and nature. A clear neo-Malthusian 'limits to growth' school emerged, with the work of Meadows et al. (1972), Hardin (Ch. 59, Vol. Ill) and Ehrlich (1969) being particularly prominent. Despite the failure of their doomsday scenarios to come about - at least when predicted - Meadows et al. (1992) and Ehrlich and Ehrlich (Ch. 17) reiterated their undiminished views two decades later. The latter set out the neo- Malthusian's basic case, expressed in terms of global modelling. This makes a direct, proportional, correlation between population size and demands on ecosystem services, although acknowledging that levels of technology and affluence are also implicated. However, 'everything else being equal', they say, 'if there was only half as many people in the rich world, they would be responsible for only half as much tropical deforestation'. Largely ignoring the 'everything else', they focus instead on making (or assuming) correlations between population size and growth rates, and supply of food and other resources. The overall conclusion is that 'unprecedented overpopulation and continuing population growth are making substantial contributions to the destruction of earth's life-support systems'. The remedy is a well informed citizenry, who will write letters to influential people.

North (Ch. 18) offsets such pessimism with his confident assertion that even a doubling of the global human population need not produce the starvation which neo-Malthusians widely forecast. This case is based substantially on an attempt to dispel the prevailing technological pessimism about the capacities and performance of modern agriculture, in terms of both productivity and environmental impact. And potential and actual problems in food supply to underfed populations stem from human and institutional obstacles, not ecological ones of carrying capacity. The answer for third world countries lies not in any dreams of rural self sufficiency, but through increased marketisation of agriculture at appropriate scales, as part of a more general modernisation process. Green revolution and biotechnology techniques will feature centrally, and North is confident that in time they can be controlled with increasing 'sensitivity and alertness'.

As with animal rights, this ongoing environmental debate has generally polarised around the positions presented here. However the other two papers in this section take us beyond the confines of a pessimism-optimism spectrum to view the issue of'overpopulation' in broader context. Eberstadt (Ch 19) reminds us of how swiftly

changeable can be the premises on which are based major environmental debates. Thus, long-term global warming is now accepted by most commentators and politicians as a fact, and the premise on which future policy must be based. But some sceptics insist on reminding us that thirty or more years ago, mainstream climatologists were convinced that global cooling was the secular trend. Similarly, neo-Malthusianists based their gloomy prognostications on presumptions of exponential population growth: however, Eberstadt presents us with the real possibility that the world's population might peak around ad 2040, and then go into an indefinite decline. He discusses some of the possible ramifications of this scenario, including 'gerontological drift' (increasingly large proportions of old people) and threats to average levels of health and economic performance - and therefore to state welfare provision - together with fundamental changes in family composition. Clearly the environmental implications of such a scenario might differ greatly from those of a neo-Malthusian one.

Harvey (Ch. 20), too, starts from the premises on which different population-resource scenarios are based. He examines the methodologies of Malthus, Ricardo and Marx, showing how their different approaches would inevitably lead towards very different conclusions about 'overpopulation'. For seemingly neutral, objective and value free 'scientific' methodologies are in fact ideologically non-neutral and value laden. The important thing is to make overt the premises that precede the theory. Harvey then applies aspects of Marx's method - dialectical reasoning, socioanalysis (examining the social relations behind ideas and practices), historical materialism - to the population-resource issue. The result is to demolish neo-Malthusianism. and expose the ideologically-ridden nature of the idea of 'overpopulation'. For no matter what the actual level of a country's population might be, under capitalist relations of production there is always an inherent tendency for a proportion of that population to be unemployed, and therefore unable to access sufficient food and other resources to meet their subsistence 'needs'. Indeed, an 'industrial reserve army' is essential to capitalism's efficient functioning, although its members *appear* surplus to requirements. However, we could, if we lived under different, non-capitalist, modes and relations of production, adjust our perceptions of what constitute resources, subsistence needs and scarcity'. This would leave us no longer appearing to be in the inexorable grip of the same ecological laws that apply to other animal populations. Instead it would free us to change our social organisation, our aims, our technical and cultural appraisal of nature's resources and our views on what constitutes needs, in order to free all the people from scarcity. The implication is that in socialist society there would be no such thing as 'overpopulation'.

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Meadows, D.H.. Meadows, D.L., Randers, J. and Behrens, W. (1972) *Limits to Growth.* London: Earth Island.

17. Global Ecosystem Health

Paul and Anne Ehrlich *

Source: P. and A. Ehrlich, *The Population Explosion.* London: Hutchinson, 1990. pp. 110-135 280-286.

Population size influences our health, and thus our life expectancy, in two different ways. One is indirect, through its impact on "ecosystem health"— the integrity of Earth's life-support systems. The human population is supported by services received from Earth's natural ecosystems, which, among other things, control the mix of gases in the atmosphere, supply fresh water, control floods, supply food from the sea and products from forests, create soils, dispose of wastes, recycle essential nutrients, pollinate crops, and control the vast majority of pests that might attack them.[1] If those ecosystems collapse, the human economy will collapse as well, and *Homo sapiens* will undergo an unprecedented population crash. The larger our population, the more ecosystem services it demands. So it's therefore ironic that one of the greatest threats to the health of natural ecosystems is itself the growing number of human beings.

The other way population size influences health is direct, affecting what is classically known as "public health"—the health of the community one lives in as controlled by sanitation, preventive medicine, and social services.

Food is intimately involved in both kinds of health. Human attempts to produce more food more often than not reduce ecosystem health, which in turn undermines the ability of terrestrial and aquatic ecosystems to supply humanity with sustenance. Undernourished people are more susceptible to diseases and more likely to die from them. We have already discussed many of the local and regional impacts of people on ecosystems and the resultant loss of ecosystem services; in this chapter, we examine the health of ecosystems on a global scale. The population connection to global environmental problems is usually major and often obvious. In the next chapter, we look at public health, where the population connection is present, but often subordinate to other factors and sometimes difficult to demonstrate.

Greenhouse warming •

One of the most important ecosystem services, maintaining the appropriate mix of trace gases in the atmosphere, is also among those most tightly connected to population

[1] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

growth. The connection is two-way. The growing human population is a major factor in the disruption of this service, and that disruption may well have exceedingly dire consequences for humanity. These connections are most evident in the case of global warming.

Our planet is kept habitable by the presence in the atmosphere of tiny amounts of "greenhouse gases" that, in essence, trap heat close to the surface.[2] The best known of these heatholding gases are water vapor and carbon dioxide (CO_2), but there are more than twenty others, including methane, nitrous oxide, and ozone. Were there too little of these, Earth would be a frozen sphere rather like Mars. With too much, Earth, like Venus, would be too hot to support life. In short, we benefit from just the right level of "greenhouse effect."

Since the start of the Industrial Revolution, however, humanity has been adding CO_2 to the atmosphere, primarily by burning fossil fuels and secondarily by cutting down and burning forests. Carbon dioxide is released when anything organic (containing carbon) is burned; and CO_2 is removed from the atmosphere by plants in the process of photosynthesis on land and in the sea. It is also removed by a number of chemical and nonphotosynthetic biological processes, mainly in the oceans. Cutting and burning forests thus adds CO_2 to the atmosphere, unless the forest is replanted and can reabsorb carbon from the air, sequestering it in leaves, branches, trunks, and roots. As Peter Raven, director of the Missouri Botanical Garden and home secretary of the U.S. National Academy of Sciences, recently pointed out, the fires in the Brazilian Amazon in 1987 (which covered 77,000 square miles) contributed about a fifth of all the CO_2 that flowed into the atmosphere that year.[3]

All this CO_2 flowing into the atmosphere, in combination with increasing releases of other greenhouse gases, is gradually warming the entire planet, turning up the heat on the atmospheric system. It now appears that the heating may be detectable in climatic records; one of the most compelling bits of evidence is that, globally, the six hottest years of this century were in the 1980s. Furthermore, scientists examining satellite data have recently concluded that the oceans have been heating up by nearly 0.2 degrees Fahrenheit per year,[4] and at the same time evidence of an annual one-twelfth-inch rise in sea level as a result of warming has been reported by other scientists.[5]

Whether or not the warming has yet had a detectable influence on the weather is hotly debated. Detecting a subtle warming trend is one thing; identifying its effects on weather is another. For example, the 1988 drought was precisely the sort of event that computer models predict will become *more frequent* as the warming continues. So were the near-record-size hurricanes in the Gulf of Mexico the same year and the West Indies and South Carolina in 1989. In October 1989, the Philippines were struck

[2] Cole, H. S. D., C. Freeman, M. Jahoda, and K. L. R. Pavitt. *Thinking about the Future: A Critique of the Limits to Growth,* London: Chatto and Windus, 1973.

[3] Engels, F. *The Dialectics of Nature.* New York: International Publishers, 1940.

[4] Firey, W. *Man, Mind and the Land.* Glencoe, Illionis: Free Press, 1960.

[5] Glacken, C. *Traces on the Rhodian Shore.* Berkeley: University of California Press, 1967.

by *three* powerful typhoons. Hurricanes can be thought of as devices for transferring enormous amounts of heat and moisture from equatorial regions toward the poles.

Still, observation of events of a sort predicted to become more frequent with global warming does not demonstrate that they were caused by a warming. We may never know whether the drought or the hurricanes were a result of the buildup of greenhouse gases or merely events that are part of normal climatic variability. Unless the climate slips over an unpredicted threshold, it will be extremely difficult to identify the start of climatic change due to the warming. If that change has started, it could be a decade or so before scientists have the data to be certain they have detected it. Several years of cool, wet summers and bumper grain crops in the United States could easily occur, even if the computer models of the impacts of global warming are correct. Such a stretch of favorable *weather* would very likely cause a relaxation of concern about the possibility of catastrophic change in *climate.* But the longterm environmental trends matter more than the transient events to which we more often pay attention[6]

The role of population size and growth in generating the excess greenhouse gases can be seen with a few simple calculations. It is widely recognized that industrialized countries, with less than a quarter of the world's population, are responsible for roughly three quarters of the CO_2 released by burning fossil fuels—in automobiles, power plants, and other industrial apparatus used mainly by the rich. Coal is the worst offender among fossil fuels in terms of carbon dioxide per unit of energy generated; natural gas releases only a little more than half as much as coal, and petroleum is in between.

Suppose the United States decided to take the dramatic step of cutting its contribution to the CO_2 component of the global warming by terminating all burning of coal. That would necessitate substantial readjustments in our economy, since coal now supplies almost a quarter of U.S. annual energy consumption. Replacing coal with energy sources that don't release CO_2 (conservation, wind power, solar-voltaic panels, passive solar, hydroelectric, geothermal, nuclear fission) would require considerable effort and would carry other environmental costs.[7]

Suppose also that China's population remained at 1.1 billion—a very optimistic assumption, since demographers project it to rise at least to 1.4 or 1.5 billion, and some Chinese experts claim it has already exceeded 1.2 billion.[8] Suppose further that China scaled back its development plans so that it only doubled its per-capita consumption of commercial energy (it presently plans to *more than double* its use of coal by 2000).[9] That would raise Chinese per-capita energy use to some 14 percent of the U.S. level, about on a par with Algeria. Assume further that China produced that energy by using its vast stocks of coal. This modest development advance by China, certainly a

[6] Godelier, M. *Rationality and Irrationality in Economics.* London: New Left Books, 1972.

[7] Harvey, D. *Social Justice and the City.* Baltimore: Johns Hopkins Press, 1973.

[8] Hays, S. *The Conservation Movement and the Gospel of Efficiency.* Cambridge, Massachusetts: Atheneum, 1959.

[9] Hudson, W. D. *Modern Moral Philosophy.* London: Macmillan, 1970.

 legitimate goal by any standard, would more than offset the reduction of CO_2 emissions achieved by America's abandonment of coal.

Even without considering the *growth* of populations of either rich or poor countries, the huge populations we *already* have can magnify small and reasonable per-person changes into gigantic impacts. Small per-person changes can have very large effects when multiplied by enormous numbers of persons![10] The P factor in the I = PAT equation is critical here.

Accounting for projected population growth makes the situation look even bleaker. What if, in the course of development, India's per-capita energy consumption rose only to about the level of China's today—about 7 percent of U.S. percapita consumption? That, combined with India's projected population growth, by the end of the next century would inject as much additional CO_2 into the atmosphere as would result from doubling China's per-capita energy use with no increase in China's population. That calculation is based on the projection we made earlier that India's population will reach two billion near the end of the next century, assuming success in family planning.[11] The dilemmas of both China and India underline the latent problems the world must face because of previous uncurbed population growth and demographic momentum.

Poor nations are now relatively minor contributors to the CO_2 load generated by burning fossil fuels, but a significant realization of their legitimate aspirations to develop, multiplied by their population growth, will change that very quickly. While the United States might manage its energy use in a way that would compensate for the per-capita increases just discussed for either China or India, it certainly would be hard pressed to compensate for both without dramatic changes in lifestyle. Western Europe and Japan use their energy much more efficiently than we do and so have considerably less potential for energy conservation. Likelier sources of compensation through conservation are the Soviet Union and Eastern Europe, whose per-capita level of fossil-fuel use is high, but whose energy technology is very inefficient. The USSR uses roughly two thirds as much energy as the United States does with a modestly larger population, and has a standard of living less than half of ours. Poland's energy use is equivalent to Sweden's and higher than that of Switzerland or France; but since it's much less efficient, the standard of living is much lower.

It is clear that significant changes in energy patterns will be required in all rich countries in order to slow the injection of CO_2 into the atmosphere if poor nations are to enjoy even moderate levels of development. But the changes are technically feasible, and fast becoming more so. The political determination to make the changes has yet to become widespread, however.

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[10] Humboldt, A. von. *Essai Politique sur le Royaume de la Nouvelle Espagne.* Paris: F. Schoell, 1811.

[11] Jacks, G. V. and R. O. Whyte. *Vanishing Lands.* New York: Doubleday, 1939.

Other contributions of population growth to the CO, problem are also very substantial, but more difficult to measure. Plants take up carbon dioxide in the process of photosynthesis; when they die and decay or are burned, they release it again. When trees are cut, carbon stored over decades or centuries is released. In the tropics, much clearing of forests is for agriculture (often unsustainable) to meet the food needs of increasing populations. The amount of carbon dioxide being added to the atmosphere in this way is uncertain—on the order of a fifth to a half as much as that contributed by fossil fuels.[12]"

One obvious long-term measure that would help mitigate the greenhouse problem, therefore, is to regenerate forests.[13] For this purpose, trees whose wood would be preserved even after cutting rather than burned should be favored as much as possible—ideally, high-quality hardwoods in the tropics. These woods are preferred for construction and furniture.

But, unfortunately, it is precisely in the tropics that expanding human populations are contributing most heavily to the destruction of forests. The relationship is complex. As described earlier, industrialization of agriculture in southern Brazil has created an army of landless people whom the government funnels toward the "frontier" of the Amazon. The government also has tried to encourage migration into the Amazon from the desperately poor, famine-afflicted northeast.[14] Once in Amazonia, the migrants clear and burn the forests in an attempt, usually unsuccessful,[15] to make a living by farming.

Brazil's high rate of population growth is an important factor in the destruction of its rainforest riches, stimulating the government's promotion of migration to the Amazon. But projects sponsored by various international "aid" agencies, which have facilitated the destruction by financing roads and dams to support settlement, have been at least as important.

On the Indian subcontinent, the destruction of forests is even more directly tied to overpopulation, as timber-cutters respond to the needs of cities for firewood and lumber. In the foothills of the Himalayas, nocturnal treecutters, called "owl men," sneak out to harvest the last of a dwindling lumber supply.[16] A countervailing force in India and Nepal is the Chipko movement—"tree huggers." These are men and women who understand the critical role trees play in the local economy and attempt to save trees by education and, if necessary, blocking axmen with their bodies.[17]

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[12] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

[13] Keynes, J. M. *The General Theory of Employment, Interest and Money.* New York: Harcourt Brace, 1936.

[14] Keynes, J. M. *Essays in Biography.* New York' Meridian Books, 1951.

[15] Kneese, A. V., R. U. Ayres, and R. C. D'Arge. *Economics and the Environment.* Washington, D.C.: Resources for the Future. 1970.

[16] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

[17] Levi-Strauss, C. *Tristes Tropiques.* New York: Atheneum, 1973.

Similarly, in China, the original destruction of the forest cover also had close connections with that nation's enormous population growth.[18] And, in spite of much propaganda about reforestation, the loss of China's forests continues. One of China's leading environmentalists, He Bochuan, estimates that since the Communists took over in 1949, forest cover has *declined* from 12 percent to less than 11 percent, despite massive attempts at reforestation, and that it will fall to 8.3 percent by 2000.[19] In a quarter of a century, forest fires have consumed the equivalent of a third of all the surviving saplings from China's reforestation programs. Exact figures are difficult to determine, since it seems that about half of the trees planted in official statistics are in fact imaginary, and only 40 percent of those actually planted survive. The Chinese forestry situation is obviously rather grim. *The People's Daily* reported that annual consumption of wood for building, paper, and fuel was 50 percent higher than regrowth, and that if this overdraft on the forests continued, "state timber enterprises would have nothing to log by the end of the century."[20]

China is only one developing nation facing this problem. A major source of the assault on forests and woodlots, especially in the arid and semiarid subtropics, is the dependence of more than 2 billion people on firewood for fuel.[21] As Peter Raven put it, "The basic reason this [assault] is happening is population growth, brought into intense focus in the warmer parts of the world by extreme poverty.""

Overconsumption and overpopulation in rich nations are also responsible for deforestation in the tropics. Demand for cheap beef in fast-food outlets has created the "hamburger connection." In much of Central America and Amazonia, forests have been cut down to provide temporary pasture for cattle raising—at least 10,000 square miles annually.[22] For a few years, those pastures can produce cattle destined to be devoured by citizens of developed nations. Then the pastures are abandoned as wasteland, and other pieces of forest are cut down to replace them. The immediate economic yield from destroying the forests is greater than it would be from using them in any sustainable way, and immediate yield is the main goal of the present economic system.*[23]

Similar stories could be told about Japanese woodchipping of forests in Papua New Guinea, Thailand, Malaysia, Colombia, and Cameroon and elsewhere,[24] grinding them up to make cardboard for packing around new electronic equipment, or about the destruction caused by demand in rich nations for tropical hardwoods. In each case, the consumption and technological parts of the I = PAT equation are important, but so is the population factor. Everything else being equal, if there were only half as many

[18] Losch, A. *The Economics of Location.* New Haven: Yale University Press, 1954.

[19] Malthus, T. R. *An Essay on the Principle of Population and a Summary View of the Principle of Population.* Harmondsworth, Middlesex: Penguin Books, 1970.

[20] Malthus, T. R. *Principles of Political Economy.* New York: Augustus Kelley, 1968.

[21] Marx, K. *The Poverty of Philosophy.* New York: International Publishers, 1963.

[22] Marx, K. *Capital.* 3 volumes, New York: International Publishers, 1967.

[23] Engels, F. *The Dialectics of Nature.* New York: International Publishers, 1940.

[24] Marx, K. *Theories of Surplus Value.* Part 3, Moscow: Progress Publishers, 1972.

people in the rich world, they would be responsible for only half as much tropical deforestation.

Some rich countries are destroying their own forests as well. In Australia, some of the most interesting of all tropical forests, those in the politically backward northern state of Queensland,[25] are being destroyed simply because the timber industry wants to prove it can do it—regardless of what the rest of the world thinks.[26] In British Columbia, the Ministry of Forestry is cooperating in the unsustainable destruction of that province's precious virgin forests. The rape of U.S. forests, especially old-growth forests, in Alaska and the Pacific North-west (largely at taxpayers' expense) is a continuing disgrace—one only partially hidden from the public by the practice of leaving a narrow band of trees lining mam highways. The forests of those areas are being destroyed by large corporations which care nothing about either the environment or long-term employment for local people in the timber industry.[27]

Again, this destruction, all of which contributes to global warming, can be partly assigned to faulty harvesting and inadequate reforestation, as well as to overconsumption of paper and other forest products. But population plays its inevitable multiplicative role: large (and still growing) numbers of Americans, Canadians, Europeans, and Japanese want homes, furniture, paper, and other products in which w[r]ood is used."

In the next few decades, methane could almost equal CO_2 in importance as a trace gas in causing greenhouse warming. A molecule of methane traps roughly twenty-five times as much of the sun's heat as a molecule of carbon dioxide, and the concentrations are rising in the atmosphere twice as fast. The population connection with methane emissions Is very clear, because the principal known sources of methane include rice paddies,[28] the flatus of cattle, and soils of forests and fields that are cleared and burned by farmers. Another major source of methane appears to be the putrefying contents of garbage dumps, and it has been suggested that sun-baked asphalt is yet another.[29]' All of these sources are intimately tied to the size of the burgeoning human population, so substantial reductions in methane emissions will not be easily achieved without substantial success at population control.

If the climatologists are correct, and the vast weight of the evidence indicates they are, global warming means much more than simply a few degrees Fahrenheit increase in average temperature between now and the middle of the next century.[30] The need for more air-conditioning to deal with more and hotter heat waves, some rise in sea

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[25] Meadows, D. H,, D. L. Meadows, J. Randers, and W. W. Behrens, *The Limits to Growth.* New York: Universe Books, 1972.

[26] Cole, H. S. D., C. Freeman, M. Jahoda, and K. L. R. Pavitt. *Thinking about the Future: A Critique of the Limits to Growth,* London: Chatto and Windus, 1973.

[27] Mill, J. S. *Principles of Political Economy.* Toronto: University of Toronto Press, 1965. «

[28] Oilman, B. "Marxism and Political Science: Prolegomenon to a Debate on Marx's Method," *Politics and Society,* 3 (1973), pp. 491-510.

[29] Engels, F. *The Dialectics of Nature.* New York: International Publishers, 1940.

[30] Piaget, J. *Structuralism.* New York: Harper, 1970.

level, and more frequent and destructive hurricanes could be the least of our problems. The worst consequence of global warming is likely to be alterations of climatic patterns caused by the rising temperatures, changes that will occur at a rate unprecedented in history.

Climate change and food security

While the causes of global warming can be traced through various paths to the activities of a growing human population, the climatic effects of global warming on producing food for that population cannot be predicted with certainty. Computer models, however, suggest that climatic change from greenhouse warming will be rapid—possibly ten to sixty times faster than the average natural rates of change since the last ice age. Those models also suggest that one of the more likely results will be a decrease in water availability in the world's principal grain belts.[31] This pace and kind of change will inevitably cause large-scale disruptions in world agriculture. As climate belts shift rapidly, major adjustments in irrigation and drainage systems will be required at a cost that could be as high as $200 billion worldwide.[32] Farmers in many areas will have to switch to drought-resistant crops, and will be forced to accept the lower yields that such crops produce. Drought-reduced harvests, like those of 1988, can be expected to occur with increasing frequency and severity.

A northward migration of climatic belts favorable to grain production might at first glance appear beneficial to agriculture in regions like Canada and much of the Soviet Union, where low temperatures and growing-season frosts are limiting factors. But if grain production is shifted to those areas, their often thin, infertile soils will limit yields.

Because CO_2 is an essential raw material for photosynthesis, it has been speculated that an increase in CO_2 concentration would enhance productivity. In our view, it is doubtful that this will yield a net benefit in the face of so many other limitations. Higher temperatures and increased CO_2 may unfavorably change relationships between crops and their pollinators, competitors, or pests.[33] For instance, crop plants might grow larger, but supply proportionately less nutritive value per unit of produce, as the ratio of carbon to nitrogen in the tissues increases. Moreover, insect pests may well eat more of the crop to compensate/ No one has any idea what shifts might occur in which pest attacks what crop. At the very least, depending on beneficial effects on crops from higher concentrations of CO_2 to compensate for the climatic impacts of warming would be an extremely dangerous gamble.

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[31] Ricardo, D. *Principles of Political Economy.* London: Cambridge University Press, 1951.

[32] Ricardo, D. *The Works and Correspondence of David Ricardo.* Volume 2. London: Cambridge University Press, 1951.

[33] Sauer, C. *Agricultural Origins and Dispersals.* New York: American Geographical Society. 1952.

Finally, the conservatism of governments will result in considerable delay and exacerbate the problems involved in making adjustments. For instance, the United States Congress had only begun to discuss taking steps to prepare for or to delay the possible effects of global warming a year after the magnitude of the 1988 harvest disaster was apparent. The administrative branch had not taken any initiatives by mid-1989. Even though it was not certain that the drought was caused by the warming, the hot, dry summer did elicit more than enough scientific testimony to make a prudent government take out some "insurance."[34]

Food security will be influenced by global warming in ways other than through change of climate. The rise in sea level will cause losses in food production through flooding of coastal agricultural land and damage to fisheries by inundating coastal wetlands that support them.[35] Low-lying, fertile, and heavily populated deltas such as those of the Nile and the Brahmaputra/ Ganges (Bangladesh) will be submerged first. Developed countries, though more capable of resisting the rising seas, will not be immune. Holland may have to flood some of its reclaimed agricultural land with Rhine River water to prevent saltwater intrusion into groundwater supplies.[36] Florida and its citrus industry may eventually disappear.

Modeling global change and food security

To examine the possible effects of climate change on food production, our group at Stanford constructed a simple global model that simulated population growth, annual agricultural output, annual food consumption, and the effects of unfavorable weather patterns such as those that occurred in 1988.[37] The model determines the amount of food available for consumption (production plus carryover stocks) in each year over a twenty-year period. For all runs of the model, it was assumed that average increases in grain production in years with favorable weather would keep up with population growth (1.7 percent annually). In those years, a surplus of 50 million metric tons of grain was stored. The model then was used to examine the effects of different frequencies and severities of widespread unfavorable weather patterns.

Under the most "optimistic" scenario, unfavorable climatic events occurred on average once every five years and caused a 5 percent reduction in global grain harvest, roughly the size of the drought-caused drop in 1988. Under the most "pessimistic" scenario, the average time between unfavorable climatic events was set at 3.3 years, and

[34] Spoehr, A. "Cultural Differences in the Interpretation of Natural Resources," in W. L. Thomas (ed.), *Man's Role in Changing the Face of the Earth.* Chicago: Chicago University Press, 1956.

[35] Tarascio, V. J. *Pareto's Methodological Approach to Economics.* Chapel Hill, North Carolina: University of North Carolina Press, 1966.

[36] Vogt, W. *The Road to Survival,* New York: W. Sloane Associates, 1948.

[37] Wittgenstein, L. *Philosophical Investigations.* Oxford: Oxford University Press, 1958.

each event was assumed to cause a 10 percent drop in grain production below the trend.

In order to simulate the feedback between availability of food and population size, it was assumed that a food deficit of one ton of grain resulted in two deaths. Roughly three people are supported by each ton of grain produced now, but about one third of all grain is fed to animals; so theoretically some of the shortfall could be made up by feeding people the grain directly. Even so, actual death rates from starvation might be raised further than the model indicates. Undemutrition occurs mainly among the poorest people, say the bottom quarter or fifth of the population. This group bears the brunt of any deficits, while the rest usually maintain adequate diets, albeit at higher prices. Because of the disproportionate burden on the poor, diseases and hunger may take a heavier toll on them than our all-or-nothing simplification 43 suggests.

Results of the model suggest that the optimistic scenario (a 5 percent reduction in grain harvest on average twice per decade) would not lead to complete depletion of world grain stocks, although world food security (adequate carryover supplies to compensate for unexpected crop failures) would be threatened. These reductions would have little effect on overall population growth. Under the pessimistic scenario (10 percent reductions on average three times per decade), however, severe deficits in gram stocks occur about twice per decade, each causing the deaths of between 50 and 400 million people.

Weather patterns that might cause such drops include, for instance, repeats of the 1988 North American/Chinese/Soviet drought, equally or more severe, and totally different weather patterns involving other areas. In short, the model ignored the question of the *pattern* of crop failures that would lead to large declines in grain production. It also did not consider compensatory actions such as bringing set-aside land in the United States back into production, conversion from animal feed to food crops, or the general intensification of agricultural activity that would result from increased demand for food, except to the degree they are included in our "constant average increase" assumption. The model may also have been pessimistic in not

 incorporating increases in production that might result from technical innovations stimulated by famines. «

On the other hand, some of the assumptions about carrying capacity were optimistic. It did not, for example, incorporate additional drops in harvest due to social breakdown related to famines, the spread of disease through malnourished populations, or inappropriate aid programs that damage the agricultural sectors of recipient nations. Indeed, the basic assumption of food production keeping pace with population growth in the absence of unfavorable climatic events should be considered *very* optimistic, since this is no longer the case in Africa or Latin America, and it is almost twice the rate of production increase projected as the maximum by Lester Brown.

Such a model, of course, is simply an aid to thinking about the possible consequences if short-term climatic change were to cause drops in grain production roughly comparable to those known to have occurred before, and considering the rest of the system to be essentially "surprise free." The results were not predictions, simply indications of the nature of problems that may occur if the global warming leads to more frequent and more severe climatic events that are deleterious to agriculture. They show that, if global warming progresses as many climatic models suggest it might, there is a risk of serious famines, each of which could kill more people than any war in human history. The results also indicate that climate change at the very least would reduce the margin of safety in the global food system.

The population-food system has no "fail-safe" backup mechanisms designed into it, even if climates should remain favorable to food production. The world depends upon the statistical "cushion" that adverse weather and unusual pest outbreaks do not occur everywhere at once.[38] To the degree that global food production becomes more concentrated (as in North America), humanity becomes more vulnerable.

Add rain

Whereas the greenhouse warming represents an impending catastrophe, serious damage from acid rain[39] is already upon us. Across North America and Europe, loss of life in lakes, streams, and forests—and of the services of those ecosystems—originates in the sulfur and nitrogen oxides that emanate from smokestacks and vehicle exhaust pipes.[40] Too many automobiles, too many industrial products, and too much energy use per person inflate the consumption factor of the Impact = Population x Affluence x Technology (I = PAT) equation. Failure to invest in smaller, more energy-efficient cars and a refusal to pay for adequate pollution controls in factory and powerplant stacks make the ecologically damaging technology (T) factor substantial as well. But the P factor is important here, too. If there were only half as many Americans driving cars, using manufactured devices, and consuming electric power, acid-rain problems would be comparatively negligible, even if levels of per-capita consumption and pollution control were identical?

The problem is becoming truly global. Vast areas of the world have precipitation substantially more acidic than preindustrial natural levels, including nonindustrial regions. Very acid precipitation has been recorded in remote, nonindustrial parts of China, due to coal burning for heating, cooking, and water purification.[41] Recent reports of acid precipitation have come from tropical Africa, produced there by agricultural burning

[38] Overseas Development Administration briefing.

[39] 'Less pesticides do not mean less rice' FAO press release, 11 May 1992.

[40] *CDC Development Report May 1993* (London: The Commonwealth Development Corporation 1993).

[41] Firey, W. *Man, Mind and the Land.* Glencoe, Illionis: Free Press, 1960.

to clear shrubland and encourage the growth of grass.[42] One does not have to await more detailed studies of the impact of increased acidity on living systems to be very apprehensive about this. Biologists know from first principles that rapidly changing the acidity of an ecosystem is a good way to disrupt its functioning. [0]

In the African case, the population element of the I = PAT equation obviously dominates. As atmospheric scientist Paul Crutzen pointed out, there will be increased air pollution from the tropics as the population grows and more forests and savannas are turned into fields and grasslands that are burned more frequently.[43] It is not yet known how sensitive the African rain forest will prove to be to acid deposition, which in this case is combined with an assault from toxic ozone, also generated by the fires.

The prospects of nearly worldwide damage to vulnerable forests and tree crops in the future is not a cheering one in a world in which both forest and agricultural ecosystems are likely to be badly stressed from climate change— and many forests will be under a multitude of other population-related assaults. Furthermore, forest damage may itself contribute to climate change by putting still more CO_2 into the atmosphere, reducing the amount of moisture recycled through vegetation, and changing the reflectivity of the land surface.[44]

Depletion of the ozone layer

The global environmental problem that has the loosest population connection is depletion of the ozone layer in the upper atmosphere which shields people, other animals, and plants from dangerous ultraviolet-B (UV-B) radiation. Without the ozone layer, life on land would be transformed into something like life under an ultraviolet sterilizer on an old-time roadhouse toilet seat—it would essentially be impossible. Depletion of the ozone layer threatens the flow of services from terrestrial ecosystems by damaging or destroying the ecosystems themselves.

For every 5 percent decrease in the ozone layer, there is a 10 percent increase in the UV-B reaching Earth's surface. That increment of radiation would produce roughly twenty thousand additional skin cancers per year in the United States, of which about one thousand would be fatal. So far the ozone layer over the United States has thinned 2 to 3 percem.

Everyone by now is aware of the danger of increased skin cancers from exposure to UV-B, and most know that it increases the chances of cataracts. But the public is less aware that the impacts of increased UV-B are far broader than these risks suggest; we hear about them because scientists know more about them. But UV-B is widely

[42] Macer, R. and Bartie, L, *Crop Biology in the Developing World* (ICI Seeds, 1990). ~[50] Macer, R. and Bartie, L, *A World Perspective on Population, Agriculture and Food* (ICI Seeds, 1989).

[43] Straughan, R., *Ethics, Morality and Crop Biotechnology* (ICI Seeds, 1992).

[44] The Royal Commission on Environmental Pollution, *The Release of Genetically Engineered Organisms to the Environment,* Report 13 (London: HMSO, July 1989) p. 36.

injurious to virtually all forms of life. It damages DNA (the genetic material), impairs the immune systems of human beings,.and inhibits photosynthesis. Algae, the base of marine food chains, are extremely sensitive to UV-B, and their populations in surface waters (which are penetrated by UV-B) could be reduced, with deleterious effects on fisheries dependent on them. More UV-B exposure also could make human populations more susceptible to disease and have damaging effects on fisheries, natural ecosystems, and crops. Broad-leaved crops such as soybeans appear especially susceptible. Exactly what the total biological impacts will be at various levels of exposure are unknown; all we can say is that as the ozone shield thins, life on Earth's land surfaces will become more difficult, and more skin cancers could be the least of our problems.

The threat to the ozone layer comes largely from the synthetic compounds known as chlorofluorocarbons (CFCs), which are used as refrigerants, foaming agents in plastics, and aerosol propellants—and are potent greenhouse gases to boot. CFCs in aerosol spray cans have been banned for most uses in the United States since 1977, but are still widely used elsewhere.

Substitutes can be found for CFCs in all these uses; some may cost more to produce or will require changes in refrigerator design that will make them more expensive. Some substitutes will cause refrigerators to be less efficient.

The CFC threat to the ozone layer can be abated by operating only on the affluence and technology factors of the I - PAT equation. But even here the job would be eased if there were fewer people—especially in poor countries such as China. That nation has the goal of providing refrigeration for its entire population. China had planned to use CFCs rather than more expensive substitutes, since it must strive to minimize the costs of development, which are already enormous because of its huge population.

Nonetheless, the ozone situation is a bellwether, because eliminating the threat to the ozone shield is simple compared to the efforts that will be required to slow the global warming, abate acid precipitation, arrest the general toxification of the planet, or save a substantial portion of biodiversity. A first international protocol on reducing CFC production was reached in Montreal in 1987. Then it was found that ozone depletion was occurring faster than thought earlier. Negotiations for a necessary strengthening of that protocol with the goal of ending all production and use by 2000 have proceeded rapidly. An agreement to that end was signed in Helsinki in May 1989 by eighty nations, including the U.S.A., China, and India. The nations also agreed to establish a fund to help poor nations to develop alternates.[45] We hope that complete elimination of these compounds will occur, and that the rich will honor their commitments to help the poor with the inevitable costs. Most of all, we hope that the ozone protocols will serve as a model for dealing with other global environmental problems.

[45] *Development Forum,* May-June 1989.

Desertification

One of the most widespread population-related environmental problems is the ecological degradation of Earth's land surface in a process called "desertification Desertification is caused by destruction of vegetation by woodcutting, burning, and overgrazing, by erosion by water and wind as a result of poor land-management, by salinization and waterlogging of irrigated fields, and by soil compaction (by cattle hoofs, tractors, drying, and the impact of raindrops on denuded soil surfaces).' Its terminal stage is easily recognizable—a barren w asteland, virtually devoid of vegetation, familiar to those who have seen TV stories of famine in the Sahel. A functional ecosystem is degraded to the point where it can provide few, if any, services to humanity.

But in its earlier stages, desertification can go unrecognized by most people. For instance, overgrazing has ruined much of the grasslands of the western United States. Nonetheless the average citizen of, say, Albuquerque, New Mexico, does not realize that he or she lives in an area desertified by human action—that the upper Rio Grande Valley was once a rich grassland.

The United Nations has estimated that globally about 13 million square miles (almost four times the area of the fifty United States) of arid and semiarid land have lost about a quarter of their potential productivity due to desertification classified as "moderate." Almost 6 million square miles have lost over half of their potential productivity, and are severely desertified. Over 80,000 square miles have been reduced to zero economic productivity annually The areas most affected include the margins of the Sahara, eastern and southern Africa, much of south-central Asia, Australia, the western United States, and southern South America. Desertification even threatens relatively humid tropical areas where deforestation can change local climates and turn an area previously rich with life into a wasteland. Approximately 230 million people, mostly in poor nations, are said Io be directly and dele- teriously affected by desertification.

Unfortunately, these numbers are but rough estimates, and present a picture of "deserts on the march" that greatly understates the complexity of the situation. For instance, the image of the Sahara moving inexorably southward may well be inaccurate. Satellite studies in the 1980s show "a generally southward retreating vegetation front in the Sahel in 1982 to 1984 and a generally northward advancing vegetation front in 1985, 1986, and 1987."[46] It is probably more accurate to view desertification as a process of repeated pulses of land deterioration "from centres of excessive population pressure"[47] than as a process originating from edges of established deserts.

While understanding the precise pattern of land deterioration is necessary to reversing that deterioration, we must not let disagreements over that pattern or over estimates of the amount of desertification obscure the basics of the situation. It is a huge global problem; too many people is one of its major causes; and population

[46] R. Nelson, quoted in B. Forse, "The Myth of the Marching Desert," *New Scientist,* Feb. 4, 1989, p. 32.

[47] Ibid.

growth interacts with bad land-use policies and changing socioeconomic conditions to produce it.

It is no accident that the most serious desertification is found in areas where burgeoning human populations are contributing to rapidly changing land-use patterns. For instance, the 1950s and 1960s were a period of unusually favorable rainfall in the Sahel. As a result, cash-crop agriculture expanded along with the human population. Specifically, the population of Niger increased from 2.5 to 3.8 million from 1954 to 1968, and peanut farming expanded from just over 500 square miles to some 1700 square miles. Nomadic herders of the Sahel, who previously grazed animals on land that had disappeared under cash crops, were displaced to the north. They stocked new lands (which tribal traditions taught were undependable for the long term), and their herds increased during the moist phase. Then, as tradition predicted, the climate turned dry again. The vegetation was completely removed by cattle, camels, and goats, and millions of animals died. An unknown number of people, probably around 100,000, perished in the resulting famine.[48]

Overpopulation of grazing animals and the people who depend on them in the Sahel often resulted from the drilling of tube wells. The wells allowed herds to build up beyond the long-term carrying capacity of an area. Cattle must trek daily to water in order to survive, and their movements destroy vegetation and compact the soil. They concentrate around the well sites, eating and trampling vegetation, and degrading the soil of an ever-increasing area. Even the droppings of cattle add to the process. "Cowpats" dry rapidly in the sun, heating up and killing the bacteria and fungi that otherwise would speed their decomposition. The dried cowpats form a "fecal pavement" that discourages the sprouting of fresh grass.[49] The drilling of even more wells is often seen as the solution to this problem, but clearly it is much more likely simply to exacerbate it.[50]

The Sahel tragedy is just an extreme example of a general trend on Earth's grasslands. As human populations expand, so do those of the livestock that supply food, draft power, and dung used as fertilizer or (in extremis) fuel. Not only in the developing world but in much of the intermountain United States,[6-] herds now exceed the carrying capacity of the land. The animals eat the grass faster than it can grow. In each of nine nations in southern Africa, cattle exceed the carrying capacity of the range by 50 to 100 percent.[6b] In desertified Indian states such as Karnataka and Rajasthan, the range can carry only 50 to 80 percent of the cattle herds now on them. Many of the animals are emaciated, and droughts kill hundreds of thousands.[51]

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[48] N. Myers, *Gaia: An Atlas of Planet Management;* P. R. Ehrlich, A. H. Ehrlich, and J. P. Holdren, *Ecoscience: Population, Resources, Environment* (Freeman, San Francisco, 1977), p. 628.

[49] P. R. Ehrlich, *The Machinery of Nature* (Simon and Schuster, New York, 1986); David Hopcraft, personal communication

[50] R. Baker, "Famine: The Cost of Development," *Ecologist,* vol. 4, pp. 170-75 (June 1974).

[51] L. R. Brown, and C. Flavin, "The Earth's Vital Signs," in Brown et al., *State of the World 1988* (Norton, New York, 1988), p. 9.

In China, between 1949, when the Communist government took over, and 2000, it is estimated that the total area of desert will have doubled. At the moment, about one sixth of the nation is desert. In Inner Mongolia, some 33,000 square miles are threatened with desertification, and in northern China 15.000 square miles of farmland and 20.000 square miles of grasslands are also threatened. Between 1983 and 2000, an increase of almost 30,000 square miles of desert is expected in northern semiarid and arid 68 areas.

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Environmental disaster in the United States: an example

If one wants to see blatant evidence of the squandering of the human inheritance in the United States, perhaps the best way to do so is to travel to one of our most grossly overpopulated areas: south Florida. South Florida is an ideal real-life laboratory in which to observe the impacts of overpopulation on the quality of life in general and on ecosystem services in particular. If Florida were an independent nation, it would be one of the fastest growing in the world. Its population growth rate is about that of Bangladesh, 2.8 percent per year, which if continued unchanged would increase its 1987 population of 12 million to 17.5 million by 2010. A major difference, however, is that Florida's growth is not the result of a high birthrate but of immigration, about a quarter of which is of elderly people choosing to retire in a benign climate.

The signs of explosive growth are everywhere evident in south Florida. Lake Okeechobee is heavily polluted, and groundwater tables are dropping. Suburban developments are marching steadily into the once-wildlife-rich Everglades,[52]> their invasion made possible by the draining of the marshes and the termination of the ecosystem services they once provided. Over this scene looms the highest point in south Florida, majestic "Mount Garbage," the Miami sanitary landfill. Mount Garbage doesn't get the job done, though. Informal dumps line the area's back roads. Plastic garbage bags and derelict refrigerators decorate those roads and complement the plastic- bottle-festooned shorelines of the Florida Keys, accented by old fishing nets and floats, six-pack wrappers, and other colorful debris made from processed petroleum. Mixed in with this are the globs, cakes, and stains of unprocessed petroleum, washed from the holds of passing tankers. All this and the generally sleazy development are the most obvious symptoms of a population already too large, growing too fast, and overconsuming nonrenewable resources.

Those superficial symptoms tend to distract attention from much more fundamental problems, most of which are connected to the freshwater flows through the marshes of the southern peninsula. Before European settlement, water drained southward along a gentle gradient from the northern part of the state into Lake Okeechobee. From there

[52] Godelier, M. *Rationality and Irrationality in Economics.* London: New Left Books, 1972.

it flowed as a sheet, many miles wide and a few inches deep, to Florida Bay, the body of water between the Keys and the mainland. That sheet flow is the famous "river of grass' the central part of the Everglades. The rich estuarine waters of Florida Bay and the vast Everglades marshes supported a diverse flora and fauna, including deer, cougars, and millions of nesting wading birds. The influx of people and their agriculture and industry has put heavy demands upon this water supply, in terms of both its use and the course of its flow. The result has been a disaster for the area's wildlife. Only remnants of the previous bird populations—about 10 percent—now occupy the Everglades. As they so often do, the bird populations signal difficulties within the ecosystem.

The most poignant indicators of distress are the "panhandling great white herons.[53] Many of these 3-feet-tall, long-legged birds now patrol regular territories on docks and in the backyards of local human residences, begging for fish. The birds nest on mangrove islets in Florida Bay, where they are secure from raccoons and other mammalian nest-robbers. Once the herons supported themselves and raised their young on the fish of Florida Bay. But, as Audubon Society biologist George Powell and his colleagues have shown, the herons can no longer find enough of their natural food to raise enough young to maintain their populations. Only the panhandlers are sufficiently successful reproductively to fledge enough young to replace themselves.[54] They are dependent on the kindly retirees of the Keys.

The human-population-related changes in the Everglades wetlands apparently have reduced the productivity of Florida Bay, something that bodes ill for the commercial and sport fisheries that are critical to the economy of the Florida Keys. In addition, subtle changes in coastal waters are suspected of causing a decline in the coral reefs, a major tourist attraction in the area. And, unless effective steps are taken to restore the wetlands ecosystem, Everglades National Park, a major tourist attraction important to the local economy, may close its doors in a decade or so.

Florida not only has serious difficulties created by human intervention in its fresh-water flows, but also is the state most at risk from a sea-level rise resulting from global warming. The state is low and flat; the bottom of Lake Okeechobee is at sea level. The 2- or 3-foot rise in sea level that may occur in the next half century would flood a substantial portion of the state. A big chunk of the southwestern Everglades will disappear as salt water intrudes at rates that neither mangroves nor marsh grasses can adjust to. More serious, the porous limestone shelf on which most of the state rests will permit salt to penetrate aquifers far inland as sea level rises. It has been estimated that for every foot of rise in sea level, there will be about a 40-foot reduction in the depth of fresh water in Florida aquifers.[55] Indeed, the threat of salinization of aquifers

[53] A distinctive, pure white south-Florida population of the common great blue heron.

[54] G. V. N. Powell, A. H. Powell, and N. K. Paul, "Brother, Can You Spare a Fish?," *Natural History,* February 1988, pp. 34-38.

[55] John Harte, personal communication. Fresh water, of course, floats on salt water, so the saltwater intrusion amounts to making the underground reservoir shallower.

is already present because of human manipulation of surface water flows even without rising seas.[56]

Most frightening of all, however, is the prospect of a higher sea level combined with the predicted increase in both the frequency and intensity of hurricanes. Storm surges will be carried far inland. It is likely, if the greenhouse warming continues as projected, that many acres of Florida now seemingly remote from the sea will, in the next century, find themselves swept by a fathom or two of fast-moving salt water.

Florida, even more than California, appears to be at the "edge of history." Grow th is rampant, and human and natural values are being lost in a development mania in many areas. Environmental groups are working hard to prevent development in critical parts of the Everglades ecosystem and pushing attempts to restore something resembling the original hydrologic regime. But, as in much of the rest of the world, their chances of success depend on curing both local and global problems.

Population growth and "development" in Florida must be halted, and the lifestyles and attitudes of Floridians changed. But that won't save the state if the world doesn't solve its global problems. Ozone depletion could make sunbathing lethal and help kill the state's agriculture (both directly and by contributing to climate change). Climate change due to greenhouse warming also could greatly exacerbate Florida's fresh-water-supply problems. If that warming continues unabated, most of the state may disappear beneath the sea in a few centuries or less.

Comparative impacts

Overpopulation in rich nations obviously represents a much greater threat to the health of Earth's ecosystems than does population growth in poor nations. The rich contribute disproportionately to the problem of global warming, being responsible today for about 80 percent of the injection of carbon dioxide into the atmosphere from burning fossil fuels, and sharing responsibility for tropical deforestation, which also adds to the CO_2 load. The developed nations probably also contribute more than their share of methane emissions, the second-most-important greenhouse gas. Similarly, most of the responsibility for ozone depletion, acid precipitation, and oceanic pollution can be laid at the doorstep of the rich. So can the local and regional environmental consequences of much of the cash-crop agriculture, tropical deforestation, and mining operations carried out worldwide.

Unfortunately, nations do not even attempt to keep statistics on average per-capita environmental impact of their citizens—which, of course, is simply the combined A and T factors of the I = PAT equation. So, in order to make reasonable comparisons, we must use a surrogate statistic for A x T: per-capita use of commercial energy. Much environmental damage is done in the mobilization of energy, and even more is done

[56] Harte and Socolow, "The Everglades."

by its use. Energy use is central to many things we consider affluence (A), and lack of energy efficiency in the devices that provide affluence is a major cause of environmental damage (T).

Hundreds of thousands of fishes, sea birds, and mammals killed at Prince William Sound in Alaska, the .death of lakes in the Northeast from acid precipitation, originating largely in midwestern power plants, and a contribution to global warming and acidification of ecosystems (CO_2 and nitrogen oxides from vehicles and hundreds of power plants) all follow from mobilization of energy to power American society.

Energy is also used to pave over natural ecosystems to create airports and parking lots; energy is required to produce the plastic and paper and aluminum cans that clog our landfills and decorate our highways and seashores; energy powers the boats that slaughter the manatees in Florida lakes; energy was used to produce the pesticides and to mobilize the selenium from soils that kills buds in California's Kesterson National Wildlife Refuge; energy cools the offices of Arizona developers as they plan the further unsustainable suburbanization of the American southwestern deserts; energy warms the offices of oil-company officials in Anchorage as they plan the exploitation of the Alaskan National Wildlife Refuge.

Energy is being used to pump the Ogallala aquifer dry, and energy lets us fly in jet airplanes 30,000 feet above the circular irrigation patterns created by the pumping—energy that did environmental damage when oil was pumped out of the ground and now is causing environmental damage as jet exhausts are spewed into the atmosphere. And. of course, energy damages when it is used to mine ores, win metals from those ores, and use those metals and other energy-intensive materials to manufacture automobiles, airplanes, TVs, refrigerators, and all the other paraphernalia of our civilization.

Poor people don't use much energy, so they don't contribute much to the damage caused by mobilizing it. The average Bangladeshi is not surrounded by plastic gadgets, the average Colombian does not fly in jet airplanes, the average Kenyan farmer does not have a tractor or a pickup, and the average Chinese does not have air-conditioning or central heating in his apartment. In 1980, of some 400 million motor vehicles in the world, 150 million were in the United States, 36 million in Japan, 24 million in West Germany, 1.7 million each in India and China, and 181,000 in Nigeria.[57]

So statistics on per-capita commercial energy use are a reasonable index of AT—of the responsibility for damage to the environment and consumption of resources of an average citizen of a nation. According to that index of AT, a baby born in the United States represents twice the destructive impact on Earth's ecosystems and the services they provide as one born in Sweden, 3 times one born in Italy, 13 times one born in Brazil, 35 times one in India, 140 times one in Bangladesh or Kenya, and 280 times one in Chad, Rwanda, Haiti, or Nepal.[58]

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[57] U.S. Bureau of the Census, *Statistical Abstract of the United States: 1982-83 (103d ed.; Washington, D. C, 1982). The Chinese number is said to have increased to 3.2 million by 1985.*

[58] These estimates are based on 1986 statistics from WRI and IIED, *World Resources, 1988-89* (Basic Books, New York, 1988). Note that the assumptions in the statement include that energy-use differ-

These statistics should lay to rest the myth that population problems arise primarily from rapid growth in poor nations—although their impact is nontrivial and increasing very rapidly. They remind us that population shrinkage is essential among the rich, since each birth forgone relieves on average much more of the pressure on Earth's resources and environment than a birth forgone in a poor nation.

Conclusion

In summary, overpopulation is rapidly degrading Earth's ecosystems in both rich and poor nations. The future of humanity probably depends much more heavily on the health of global ecosystems than on public health in the classic sense. Civilization can't persist without ecosystem services, and these are threatened in innumerable ways by the expanding scale of human activities. Curing cancer, for example, would increase the life expectancy of Americans by only a year or so; a collapse of ecosystem services will lower life expectancy by decades.

Perhaps the best way to end this discussion of the human environment is with a quote from *The Population Bomb:*

How well are we treating these symptoms of the Earth's disease of overpopulation? Are hc *getting ahead of the filth, corruption, and noise? Are we guarding the natural cycles on which our lives depend? Are* wc *protecting ourselves from subtle and chronic poisoning? The answer is obvious—the palliatives are too few and too weak. The patient continues to get sicker.*[59]

entials will remain the same as the babies grow up, and that technological changes will be parallel in all nations. Statistics are also very rough estimates, especially in the poorer nations, and a disproportionately larger fraction of damage from energy use is likely to come from *non-commercial* energy use (such as agricultural burning and the gathering of fuelwood by individual families). None of this changes the validity of the basic point.

[59] P. 130.

18. Feeding the Future Billions

Some clues

Richard North

Source: R. North, *Life on a Modern Planet.* Manchester: Manchester University Press, 1995, pp. 35-62.

Driving along the red-brown tracks of the lush hill country near Arusha in Tanzania, a small-scale farmer turned to me and asked, as though I might know the answer better than he: 'Why is it that this continent still has the sort of farming which would have been recognisable by Christ? Why can't we change?'

Homo sapiens has used farming to feed huge numbers of people. This chapter looks at the evidence which suggests that even a doubling of human population need not produce the starvation which is widely forecast.

Humankind the farmer

Humankind has become a chemist and an electrician, and before that human civilisation has been defined by its ability to mine and smelt, and to make steam work. In the future, human beings are almost certain to become strongly identified with the culture of bugs and the manipulation of genes. But these industrial activities disguise a fundamental truth: human beings are farmers.

There has been something resembling a human on the planet for about 4 million years. Hominids have existed for about one thousandth of the earth's history. A million years ago there is something more obviously human, and it becomes more and more obviously so about 100,000 years ago. The last 10,000 have been the farming years, and they have mattered to us partly for the odd reason that they seem to us like the years in which ever larger

J 9 numbers of people ceased to be preoccupied with getting food.

What made human beings develop, in the latest tenth of their history, the techniques of farming? Little is known about why humans slipped out of previous habits and into cultivation. But the process was quick, according to Sir John Burnett, executive secretary of the World Council for the Biosphere:

Clearly the boundaries between foraging and farming, especially if the former is associated with storage of seeds or fruits, and that between hunting and herding, are exceedingly narrow and must have been so for many millenia. It is, therefore, a quite remarkable fact that the change to early pastoral or farming communities was a rel-

atively rapid process; moreover it was very recent, commencing perhaps not more than 20,000 years ago, becoming detectable some 10,000 years ago and being almost universal adopted as the dominant pattern for the future from about 6,000 bc.[j]

Was the farming revolution and the steady, fast increase in human numbers technology-driven, or did the technology derive from the desperate need to feed the large numbers of people that pressed on the earth? Did humans become farmers because they were so numerous that no other course but a development of high productivity was open to them? Or did they become numerous because high agricultural productivity allowed it? Did human beings become more prone to famine in farming years, or less? Some of these questions are unanswerable because the evidence is so scanty. Still, they are important to us, so we have always attempted answers to them.

It is fashionable now to say that early on and ever since, humankind the farmer has failed. The despairists like to point out that entire farming civilisations have collapsed in hot countries. In this view, deforestation and over- grazing denuded the Mediterranean basin. They led to soil erosion in what are now Iran and Iraq which were then further damaged by the salts which uncontrollably built-up in badly-managed irrigation schemes. It is less often said of these disasters that the climate seems to have been turning against agriculture in those regions at about the same time, and that while there is almost always a risk of erosion following deforestation and of salivation following irrigation, they need not be crippling.

The idea that early societies were uniquely rich and environmentally friendly is as wrong as the suggestion that Stone Age life had nothing to offer except brutality. There are interesting modern cases of famine striking at African farming regions while hunter-gatherers nearby went unscathed.[1] But mankind has often called a famine what is really only a matter of food shortages. This is pointed out forcibly by Peter Garnish,[2] who also found that despite much discussion about famines and ecological degradation during the classical period, the Mediterranean remained a breadbasket capable of feeding large numbers of non-farmers. This was in spite of a local climate which varies greatly in space and time.

Regional trade and local government action often ensured that shortages did not become famines. That general picture has been true in quite recent history. In nineteenth-century Britain - especially the Hungry Forties - many people experienced food shortages. But this was more because rapid industrialisation had created distortions and strains in the market, than that the fields were failing to produce.[3] Farm productivity soon continued to rise handsomely to meet the case.

Monoculture is often criticised, and it is true that sometimes farmers have concentrated on too few crops. The Irish potato famine was an obvious example of over-dependence on a single harvest. Even so, it was the failure of the trading system

[1] Firey, W. *Man, Mind and the Land.* Glencoe, Illionis: Free Press, 1960.

[2] Glacken, C. *Traces on the Rhodian Shore.* Berkeley: University of California Press, 1967.

[3] Godelier, M. *Rationality and Irrationality in Economics.* London: New Left Books, 1972.

and of government to bolster demand in a period of local shortage which produced the hunger in Ireland. In Scotland, there was the same dependence on the potato crop, and the same catastrophe threatened when it failed. But landowners and the government combined to make supplies of food available.[4]

The past cannot have been as awful as the despair industry has it. We know perfectly well that the farming and trading system fed fast-rising human numbers, and whatever its periodic failings these were not for long sufficient to dent the onward march of the number of humans on the earth which its general success allowed. We do not know the whole reason why people using Stone Age technologies managed and manage to feed about a tenth of a person per square kilometre while even primitive agriculture manages to feed ten or twenty times that number. But we do know that in the modem world, we can support over 300 people on that area of land.[5] Doubtless, such productivity is a mixed blessing, but it is clearly a considerable technical and probably a social triumph too.

Constraints all around the world

While it is likely that the planet can support as many people as it has to (as we shall see later), we are not in a particularly good position to know to what degree the poor of the Third World will be able to grow the food with which to feed themselves. If they cannot grow enough, or earn enough to buy in food, then the rich world will have to do something about the situation. The difficulties will be more political and economic than ecological. They will also be technical, and we will look at aspects of that soon.

Bodies such as the Food and Agriculture Organisation of the United Nations (FAO)[6] are struggling to adjust to new demands and put these alongside their historic core goal of a vast increase in production. The new demands are being made by the alert consciences of the westei n governments and the prickly sensitivities of governments in the ex-colonies. International aid agencies now need to show they care about ecological concerns. They must not be thought patronising to governments in the Third World. They must be highly sensitive to the needs of peasants. This is asking of the farming revolution something very new: that it be conducted without social and environmental trauma.

There has never been an increase in agricultural production which did not involve the use of less labour pgr hectare of land. The agricultural revolutions we have seen have all led to fewer people being needed on the land, and therefore all raise the problem of what happens to surplus labour.

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[4] Harvey, D. *Social Justice and the City.* Baltimore: Johns Hopkins Press, 1973.

[5] Hays, S. *The Conservation Movement and the Gospel of Efficiency.* Cambridge, Massachusetts: Atheneum, 1959.

[6] Hudson, W. D. *Modern Moral Philosophy.* London: Macmillan, 1970.

Almost all agricultural improvement has grown out of increased specialisation within individual farms and usually within whole districts of the countryside. The history of agriculture has been the history of farms getting bigger, employing fewer people, and being part of an efficient market. Farming has gone from the variety subsistence requires to the specialisation which increases yields. It has done what the market required.

But it is by no means clear that the competing need both for more food production and more jobs in the Third World countryside can be reconciled. Everyone now seems to agree that the Third World is looking for some brilliant new accommodation between the old and the new. This is the way FAO expresses it:

To meet the declared objectives of SARD [Sustainable Agriculture and Rural Development] most developing countries will have no choice but to intensify agriculture. Experience in developed countries shows that intensification can lead to pollution and problems of waste disposal. Moreover it can encourage consumption patterns that are ecologically and economically unsustainable. Other forms of agriculture and rural development are therefore needed, requiring an appropriate balance between both intensification and diversification in the choice of production systems, technologies and practices.[7]

When FAO's advisers look at different regions, they see different problems, naturally. In Africa they note that there are large areas of land which hold untapped agricultural potential, and that:

There is more scope m sub-Saharan Africa than in any other region of the world for increasing input use to achieve sustainable agriculture with higher production. However, inputs such as fertilisers and pesticides should be used wisely, by integrated plant nutrient management [which uses as much on-farm nutrient and humus as possible] with emphasis on local inputs, and by integrated pest management with emphasis on biological and agronomic methods.[8]

By comparison with this sense that Africa was waiting for big increases in production, the Asian and Pacific region was already in many places facing difficulties from the overuse of chemicals, and suffering very unequal distribution of the benefits of modem agriculture.

FAO sees the Asian and Pacific region as having experienced a massive increase in cropped land alongside a massive increase in the numbers of landless peasants. It sees little chance of industry employing these millions of people. It sees people pushed onto steep or otherwise unsuitable land, and much farmland undernourished:

Appropriate technologies do not exist to sustain present and future populations for many resource-poor areas, and even some resourcerich areas are reaching their maximum output. The systems used by many producers are unsustainable, due either to commercial over- exploitation or an attempt to meet survival needs, and are induced by

[7] Humboldt, A. von. *Essai Politique sur le Royaume de la Nouvelle Espagne.* Paris: F. Schoell, 1811.
[8] Jacks, G. V. and R. O. Whyte. *Vanishing Lands.* New York: Doubleday, 1939.

inadequate or inappropriate public or private incentives. Strategies to achieve sustainable crop, livestock forestry and fishery production systems, and combinations of them, will fail unless they are complemented by policies to slow down population growth and enhance alternative employment opportunities.[9]

In the case of Latin America and the Caribbean region, FAO suggests that while there are areas of poverty on the Asian scale, there are also generally wider opportunities for growth. There is land which is barely exploited at all, there are some chronically discouraging government policies and there are the usual egregious examples of skewed land ownership. The picture may look bleak, but it is not - generally speaking - as ecologically bleak as all that.

Almost all informed views suggest that if economic policies in poor countries were rewritten to favour agriculture there would be big increases in food production. That sounds reasonable. But even if land reform could give more peasants more land; even if capitalists could be attracted to put in big effective plantations where appropriate; even if unadventurous farmers could be encouraged to be as good as their best neighbours; even if there is a considerable following wind, there is a general assumption that with present technologies, present aid flows, present trading circumstance and present Third World politics there will be many people very hungry in the Third World.[10] Even so, it is important not to overstate the difficulties we face.

Destructive myths: the anti-farming propaganda

There is a potent myth that the further back in history one goes, the better the farming practices one finds. Yet research constantly turns up intriguing data to confound this anecdotal gloom. A recent contribution to *Nature* pointed out:

Although it is widely believed that the Spanish encountered an almost pristine landscape in ad 1521, some archival and palaeolim- nological studies have suggested that extensive land clearance began before European contact... We identify three periods of accelerated erosion and conclude that erosion rates [before the advent of the Europeans] were at least as high as those after the Spanish conquest. One implication of these results is that soil erosion caused by the Spanish introduction of plough agriculture was apparently no more severe than that associated with traditional methods; it is therefore questionable whether a return to traditional methods would have significant environmental benefits,[11]

Seeing a patchy record in modern farming, too many commentators pile on the misery. The World Resources Institute in Washington each year publishes *World Re-*

[9] Kapp, K. W. *The Social Costs of Private Enterprise.* Cambridge, Massachusetts: Harvard University Press, 1950.

[10] Keynes, J. M. *The General Theory of Employment, Interest and Money.* New York: Harcourt Brace, 1936.

[11] Keynes, J. M. *Essays in Biography.* New York' Meridian Books, 1951.

sources. It is an excellent source of information. Yet people who know anything about Britain will be surprised to find in the 1992-3 edition a soil erosion map of the world which shows about a third of the country as one of many 'Areas of Serious Concern'. It is shaded in the same colour that, more plausibly, covers parts of Africa and India. Intrigued as to how anyone could seriously suggest that Britain is at risk of becoming a dustbowl, I contacted the leading British soil research institution, the Silsoe campus of the Cranfield Institute of Technology. The staff there kindly sent an overview paper by one of their experts, Professor R. P. C. Morgan, who was - hardly surprisingly - the source from which a Dutch institution[12] had put together data which underpinned WRI's map.[13] What faraway Washington did not see as the most obvious nonsense, one would have thought a nearby Dutchman might have.

The paper I was sent of course did not say anything very alarming about Britain's soils,[14] because their structure and fertility are by and large in good health. However, Britain's fields are required to be very productive indeed and are kept in good health only by expert farming skills and by inputs of synthetic or mined chemicals. Nonetheless, soil is being lost to runoff quicker than it is being replaced, and, says the paper: 'Soil erosion could threaten crop yields in the first quarter of the next century if allowed to continue at present rates.' In that sense it is at risk. But there is no reason to suppose that the skills or the chemicals are going to dry up; nor that any additional materials the soil might need cannot be found and applied. The problem is more in semantics than in soils. The paper said clearly enough that there is more soil erosion in Britain than people think and that about a third of the country's arable land has highly erodible soils. The author describes his work as an assessment of areas with erosion risk and areas of actual erosion. Where land is under dense vegetation cover or where soil conservation measures are practised, such as use of shelter-belts or plough-press tillage to control wind erosion, there may be little or no erosion. But this, however, does not detract from the risk of erosion in such areas if conservation measures are not employed and so it is appropriate to class these areas as having an erosion risk.

This sounds sensible, and strikes a useful cautionary note. But it is not very different to the statement that a man walking in London's streets is at severe risk of death from passing cars unless he takes sensible self-preservation measures such as staying on the pavement.

One can go round the developed world like this. In the United States, the *Global2000 Report* to the President, *Entering the Twenty-First Century,* stated:

Although soil loss and deterioration are especially serious in many LDCs (Less Developed Countries), they are also affecting agricultural prospects in industrialised nations. Present rates of soil loss in many industrialised countries cannot be sustained

[12] Kneese, A. V., R. U. Ayres, and R. C. D'Arge. *Economics and the Environment.* Washington, D.C.: Resources for the Future. 1970.

[13] Kuhn, T. S. *The Structure of Scientific Revolutions.* Chicago: Chicago University Press, 1962.

[14] Levi-Strauss, C. *Tristes Tropiques.* New York: Atheneum, 1973.

without serious implications for crop production. In the United States, for example, the Soil Conservation Service, looking at wind and water erosion of US soils, has concluded that to sustain crop production indefinitely at even present levels, soil losses must be cut in half.

The outlook for making such gains in the United States and elsewhere is not good. The food and forestry projections imply increasing pressure on soils throughout the world.[15]

This was just the kind of thing to give the troops. It called to mind images of the horrible scenes familiar to readers of John Steinbeck and American history: the Dustbowl years. These and much less respectable predictions were very dire and made routinely. And yet the crisis has passed, even before it began to be economically significant. By 1995 various programmes in the United States are likely to have succeeded in 'reducing soil erosion in the USA by two thirds', says Lester Brown, of the World Watch Institute in Washington. The reversion of inappropriate arable land to pasture or woodland is one of the main chosen techniques for combating soil erosion, as Brown points out,[16] but he makes of this an argument that soil erosion has indicated the final ecological limits which farmers are constantly trying to cross. It is just as reasonable to suggest that land which was turned to heavily-subsidised inappropriate grain-growing (much of it for consumption by animals) can be returned to much less damaging direct production of animal protein on the hoof.

Many North American environmentalists now stress that North American farming may yet die of thirst. The western states are accused of mining the underground water supplies of aquifers and overstretching the amount of water abstracted from rivers.[17]' Yet what seems to be happening is much more an extravagant squandering of water because of its artificial cheapness than an absolute shortage.[18] Lawns right across the western states remain verdant, and farmers pay small fractions of the cost of the water they use in irrigation. Long before the United States runs out of water a new balance of interests should emerge. Water will achieve its proper price and demand fall into step with supply. It is not necessary and frugal use of water which has caused a problem in the United States, but profligacy.

Almost all green writers - including many of the moderates as well as all the purists - seem in thrall to the difficulties posed by the physical constraints to world food production. Even some of the most intelligent and informed of the green commentators, including Lester Brown of the Worldwatch Institute,[19] Fred Pearce, a regular contrib-

[15] Malthus, T. R. *An Essay on the Principle of Population and a Summary View of the Principle of Population.* Harmondsworth, Middlesex: Penguin Books, 1970.

[16] Malthus, T. R. *Principles of Political Economy.* New York: Augustus Kelley, 1968.

[17] Cole, H. S. D., C. Freeman, M. Jahoda, and K. L. R. Pavitt. *Thinking about the Future: A Critique of the Limits to Growth,* London: Chatto and Windus, 1973.

[18] Marx, K. *The Economic and Philosophic Manuscripts of 1844.* New York: International Publishers, 1964.

[19] Marx, K. *Capital.* 3 volumes, New York: International Publishers, 1967.

utor to *New Scientist* and author,' and Paul Harrison,[20] often stress the gloominess of the picture.

Characteristically, the gloomy view notes that historically irrigation schemes were often poorly-planned. It also notes that such schemes have often brought an increased risk of water-borne disease and soil wastage.

A rounder picture comes from Ian Carruthers, Professor of Agrarian Development, Wye College, University of London. He believes that the idea of 'poorly performing irrigation' has become entrenched in spite of evidence that productivity of irrigated land is, clearly, often high. Besides, he says, the failure of irrigation to perform as well as it might often flows from projects which ignore the knowledge of local farmers and from schemes whose financing did not include a proper commitment to long-term - very necessary - management. He suggests:

There is another puzzle concerning irrigation performance which most evaluations show to be sub-standard. There is a hard to prove but often claimed statistic that 35-50 per cent of the world's food now comes from such 'poorly performing' irrigation (mostly of rice - the first line of defence against Malthus). More importantly 50-60 per cent of the vital increments to developing world food supply between 1960 and 1980 came from irrigated land (mostly wheat - the second line of defence - and rice). In principle, this high marginal return to irrigated agriculture can be expected to continue because only when water supply is assured will farmers invest in the costly seeds and fertilizer and other yield increasing and quality enhancing innovations that are still emerging, albeit perhaps more slowly, from the agronomists' high-tech pipeline.

This 'poorly performing' irrigated agriculture has been the major confounder of the expert opinion in the 1970s which predicted a doubling of world food prices in real terms by the 1990s. Prices are presently at historically very low levels and look set to stay there so long as irrigation continues to improve (and the industrial world continues to subsidize its own agriculture through production enhancement techniques). Perhaps the troubles of irrigation are more apparent than real and it is the high visibility of the infrastructure that creates the problem.[21]

The gloomy, general view notes the shortage of good new land to exploit and the presence of much land which is already over-exploited. It creates the impression that hunter-gatherers were the wisest of humans, and that nowadays only tribal people or poor peasants are worth listening to. It always celebrates the successes of peasant agriculture (where they can be found) and seldom notes the success of larger-scale farmers.

The pervasive gloom has created potent myths. For instance, everyone knows by now that overpopulation and modern farming techniques are producing desertification. 'The Sahara Desert is expanding southwards, engulfing degraded grasslands, at a rate

[20] Marx, K. *Theories of Surplus Value.* Part 3, Moscow: Progress Publishers, 1972.

[21] Meadows, D. H,, D. L. Meadows, J. Randers, and W. W. Behrens, *The Limits to Growth.* New York: Universe Books, 1972.

of 590 kilometres (300 miles) every year,' says Jonathon Porritt's *Save the Earth?*[22] And yet, in *Wasting the Rain,* Bill Adams, a Cambridge University geographer, puts quite a different case:

Overviews of the droughts and famines in Africa in the 1970s and 1980s have tended to focus on the problems of'desertification'. The word was coined by the French ecologist Aubreville in 1949 to mean the process by which desert-like conditions (arid areas with few plants) develop. In the 1970s use of the word expanded enormously, and desertification became a central element in debates about Africa's 'crisis'. By the late 1980s it was clear that there were significant problems emerging in the use of the term. It was ambiguous and had suffered what one analysis [by the British geographer, Andrew Warren] wryly described as an 'erosion of meaning'. It was widely taken to mean any loss of biological productivity which might lead to desert-like conditions. Thus this 'desertification' included waterlogging and salimsation of irrigated land as well as loss of biomass, loss of vegetation cover or soil erosion.

Part of this verbal inflation can be traced back to the United Nations Conference on Desertification which was organised by the United Nations Environment Programme in Nairobi in 1976. Worthy though this effort was, it made 'desertification' a highly politicised concept. Aid agencies wanted to be seen to put money into stopping it.

Any agricultural project could get itself a better name by being relabelled, 'desertification control'. In the sudden alarm, some projects were instigated which had scant chance of success. But it is surprising how little we really know about how much damage is being done or what needs doing. The harder people look, the more confusing an honest assessment becomes. As Bill Adams says:

It is now clear that simple and rather sweeping ideas about desertification are unhelpful, and can be seriously misleading. For example, there is remarkably little good evidence to support the widely-held view that the Sahara is advancing southwards year by year.

These words are echoed in detail by the International Union for the Conservation of Nature and Natural Resources (IUCN) in its report on a very big study on the Sahel, published in 1989.[23] Its brief popular summary of the 1989 Sahel studies carries a simple headline on its front cover: *The Sahel - Out of the Myths?'*

Yet there can be few people who take even a passing interest in Africa who do not believe that deserts are spreading everywhere in the continent. Worse, the view the despair industry promotes is that deserts grow solely because people are pressing too many domesticated animals and too many ploughs into the fragile terrain which they are forced to colonise as population densities increase. Peasant as well as capitalist culpability satisfies some Greens because messages of human failure reinforce the campaigners' distaste for growing populations. They bolster the argument that

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[22] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

[23] Oilman, B. "Marxism and Political Science: Prolegomenon to a Debate on Marx's Method," *Politics and Society,* 3 (1973), pp. 491-510.

human beings are already reaping a harvest not of food but of crisis as they push the planet beyond its supportive limits. This view leaves out of the picture the confusing evidence that in some places in Saharan Africa productivity is rising, agricultural areas expanding, and cattle numbers rising.

All these need underpinning by better resources if they are to be sustainable, as Bill Adams points out. Yet they indicate that Africa is nowhere near its productive limits. There is a good deal of evidence that soil degradation may in part be the result of one of Africa's periodic, normal and regular dry spells. Not a drought, the knowledgeable people are careful to point out, but a desiccation.[24] Droughts are short and fairly rare; desiccations can be very long and common. Africa has seen a period of about thirty dry years during which it would have been very remarkable if farmers had found life easy. The difficulty for everyone trying to think about the problem is that it looks as though Africa has to assume such things will happen periodically for ever.

Africa is a dry place. But modem agriculturalists were surprised by the continent's recent arid conditions because of a relatively wet recent period, during the 1950s and early 1960s.[25] Drought or desiccation, famine or food shortages, had often disturbed European observers of Africa in the middle of the last century,[26] but that was at levels of population well below those that modern medicine and hygiene now allow, and before the advent of widespread agriculture. Moreover, Europeans first saw Africa after a period when widespread disease had wiped out many people and animals.

So Africa of course faces enormous difficulties to do with large numbers of people and animals trying to make a living in a continent whose present and future may well be drier than we have grown to expect. But there will probably be better years too. Knowledgeable commentators on Africa note that even in very dry places, it is amazing what can happen when the weather is wet at the right times of year. Land which had been given up for dead is suddenly verdant. Land which was assumed to have become irreversibly degraded by human activities is found not to be so; grass swards which look as though they have been overgrazed turn out to be in surprisingly good health and perhaps to be working at their optimum productivity.

There are elements of the standard, sad view of Africa, and other arid and semi-arid areas such as Mexico, which hold up. There are plenty of places in which more and more people are pressing onto inherently unproductive land. Often they are pressing onto the sides of hills which were once grassed and wooded, and turning seasonal streams into deep gullies. There are places where soils develop a hard surface, through which neither shoots can grow upward nor rain soak downward. Quite often, cattle herders have become very rich in cattle at the same time as the amount of grazing land for animals has shrunk because of population pressures. The result is a risk of erosion. We know that there is overgrazing and there are inappropriate agricultural

[24] Piaget, J. *Structuralism.* New York: Harper, 1970.
[25] Piaget, J. *The Principles of Genetic Epistemology.* London: Routledge and Kegan Paul, 1972.
[26] Ricardo, D. *Principles of Political Economy.* London: Cambridge University Press, 1951.

practices. We know that in many places land should either be rested or better fertilised and nourished with water-retaining organic matter. We know there are traditional and modern techniques which could be introduced (we know this last especially because of excellent work by Paul Harrison).'[27] We also know that in many countries marketing methods and infrastructure are so primitive that it is barely surprising that farmers are poor. We know that in many places, cattle herders need to have fewer, better animals which go to market at a useful age? In some cases, grazing clubs can make an enormous difference to the productivity and impact of herds. In others quite a small effort would usefully plant quick-growing grasses and stabilise river banks.

That progress is being made and that the issues are very old can be seen very clearly in Machakos in Kenya. In the 1930s the British district authorities were concerned that the area was heavily over-exploited by humans and animals. They took pictures to show the case, and the place looks barren indeed. As the World Bank's *Environment Bulletin* said, in reporting some work it had funded the British Overseas Development Institute to lead:

In the late 1930s, the District was considered by the Colonial administration to be degrading alarmingly and to be rapidly approaching, if not exceeding, its capacity to support inhabitants and their livestock. Today, the area has a population five times as great and the value of agricultural output per head (at constant prices) is estimated to be three times larger than it was then.

Cultivation has expanded by four times and there has been a corresponding reduction in the area of general grazing, bush and scrub. Much of the land used is now under continuous cultivation, and almost 100 per cent of the area is cultivated in some form of terracing.

The rate of erosion has been sharply reduced, although it still does occur, and there is no evidence that the quality of soils is declining under current practices.[28]

The reforms which produced this turnaround look like a textbook case for much of the rest of this chapter. The farmers of the area were helped to find useful markets, have sold produce for cash, took advantage of handy advice. Two of the researchers for the study believe that this Kenyan area goes a long way to disprove Malthusian gloom:

Machakos illustrates that land use and carrying capacity are not fixed. The land resource can be improved by investment in new technologies, knowledge and improved management techniques. These factors are assisted by a rise in population densities from very low levels. A recent cross-country study found that growth in rural non-farm incomes and in population density were both strongly related to higher agricultural income of the agricultural population. These relationships showed up much more clearly

[27] Godelier, M. *Rationality and Irrationality in Economics.* London: New Left Books, 1972.

[28] Tarascio, V. J. *Pareto's Methodological Approach to Economics.* Chapel Hill, North Carolina: University of North Carolina Press, 1966.

in Asia than in Africa, where most rural population densities are below 80/km[29], but were evident in a densely populated area of Southeastern Nigeria/[30]

The real agenda

When we look closely at agricultural issues, which often seem ecological, we find that in important ways they are not. They are overwhelmingly human and institutional. When you ask experienced people about why Africa looks as though it is going to be hungry, they often paint a picture which seems much more real, much more densely complicated, much more fully human, than the picture which the Greens have mostly given us. A catalogue of difficulties includes:

- too little technical education;
- too few sources of advice;
- too few local markets for trading inputs or produce;
- too few fair sources of very small loans;
- too little good land for small fanners;
- too few opportunities for very small farmers to become small farmers;
- too few opportunities for small farmers to become medium-scale farmers;
- too few western capitalists prepared to invest in large plantation schemes;
- too few non-government organisations of every sort to ginger and encourage;
- too much late payment of fixed and low state prices for produce;
- too many village elders and witchdoctors who hate to see young people get ahead;
- too few energetic and public-spirited public servants at any level;

The answers to some of these problems fly in the face of Green convention.

Many people have a strong intuitive sense that poor farmers should grow and eat their own food. Peasant subsistence has a powerful pull on western imaginations. However, it must be asked why very few well-off farmers in the rich world bother with any subsistence farming. How different should the picture be in the Third World?

[29] Cole, H. S. D., C. Freeman, M. Jahoda, and K. L. R. Pavitt. *Thinking about the Future: A Critique of the Limits to Growth,* London: Chatto and Windus, 1973.

[30] Buchanan, K. *The Transformation of the Chinese Earth.* New York: Praeger, 1970.

The romance of self-sufficiency springs partly from a belief that subsistence farming is somehow more secure than dependence on markets. Clearly, people in cities need the market to bring them secure food supplies. But even people in the countryside may find that both cheapness and security in food supplies are more easily had from the market than their own fields. This is likely to be a part of their calculations even when they are quite or very poor. The essence of this new security is that cash - even in small quantities - is a virtual guarantee of food, even if one's own land has seen a reverse in productivity, perhaps because of the weather. The creation in Africa of a vigorous trading sector is seen by some knowledgeable white Africans as the rebirth of what was quite a strong tradition of rural markets which colonialists stamped out the better to ensure that they had labour for white-owned farms.

Not that cash is always king. Many modern urbanite Third Worlders - especially men - live in cities in the hopes of getting work and money. They do so while depending on their wives to keep a village plot ticking over, available as a last resort larder. Besides, as one experienced agricultural adviser pointed out to me on reading a draft of this chapter, cash can corrupt. He said that, too often, cash is squandered on beer and prostitutes: subsistence crops might have helped the family rather more.

So the picture is complicated. Yet, it seems fair to suggest that modern country people do not want the promise of a very slightly improved version of a primordial way of life which they left or want to leave because it did not pay and did not attract. Even poor people eschew backbreaking work in a claustrophobic family or village environment. These aspects of peasant life only satisfy those who have never known anything different or have never known it at all.

The rural dream of rich world romantics can no more be expected to survive in Africa or other Third World places than it has anywhere else. Yet young disaffected, talented and useful men and women may come back from the cities into the countryside. The present best-hope youngsters who are already there may be enticed to stay.

Modem Third World country people want the chance of a decent living gained by the nifty deployment of very small amounts of skill and capital. They want a scale of technology which is cheap but saves sweat. They may well become beneficiaries of the small-engine and hydraulic revolution which has yet to come to much of tfie Third World. Technology is decried by romantics because it so often seen in its nineteenth-century guise. This was the version of machine and technique which gave us factories and other forces of centralised enterprise gathered round monolithic machinery. The nineteenth-century anarchist and geographer Prince Kropotkin may, however, be proved to have been merely a little early in predicting the arrival of decentralised, often hand-held, machinery everywhere in the world. This is the power-tool scale of technology which was celebrated by Ivan Illich half a century after Kropotkin. Interestingly, labour-saving devices may not create unemployment. Many useful soil- and water-conserving jobs are now left undone because they are uncongenial and unprofitable. Quite small changes in markets and machinery may change that dramatically.

There has for years been a fierce debate about economic measures to increase food production, and the latest intelligent fashion is to argue that, amongst much else, the agriculture sector is an engine for economic growth. This might seem obvious, but it is not self-evident. For several decades, it has been assumed that even poor countries should concentrate on developing an industrial economy and that doing so would put money into the hands of farmers, and they would produce food as a consequence. Now, increasingly, it is argued that it is worthwhile concentrating policy directly on improving the means farmers have of getting a living.

The economic and social reforms that will bring about successful, small and medium-scale farming are emerging. They flow from the defeat, partly as a result of sustained bullying from western governments, of Third World command and control economic policies, and also from the gradual, forced, erosion of Third World elites, and perhaps especially in land reform. The changes will make sure the grower, and not a bureaucrat, gets the profit from his or her crop.

There has been a good deal of discussion about how poor countries should put agriculture higher than industrialisation on their agenda of development goals. Actually, it seems they need to progress together. Without paying customers, farmers starve. As Professor A. H. Bunting of Reading University, a very experienced agronomist, points out, few countries have ever grown rich by growing food. Rather, a healthy agricultural sector followed wealth. On the other hand, without benign government help - and aid - it is unlikely that farmers will have an effective infrastructure through which to supply their customers.[31]

No reforms will produce a limitless supply of food. But they will make it increasingly likely that it will be small- and medium-scale farmers in lucky parts of the world's continent who get nicely affluent by supplying food to the unlucky parts. This will be a marked improvement on the situation whereby North American and European farmers are heavily subsidised to do so.

At present, many farmers cannot afford labour and chemicals because their produce does not find a market. Much of the ecological damage done by farmers stems from the lack of profit they find in the enterprise. Soils are left undernourished, wells and terraces unmended, irrigation works poorly managed, not because the fields were asked to do too much work, but because too little cash came in for the produce they grew.

Breaking through the barriers

The Green Revolution has lifted much of Asia and Latin America out of famine in the past two or three decades. This is a matter of applying plantbreeding techniques - the core of the revolution - to create plant strains which could be heavily fertilised without falling over on their stalks. But agricultural experts do not expect the Asian

[31] Wittgenstein, L. *Philosophical Investigations.* Oxford: Oxford University Press, 1958.

and Latin American Green Revolution miracles to be repeated on the same scale in Africa or indeed in any area with very poor soils, adverse terrain or climates.

Equally, though, environmentalists do not do well when they snipe at the Green Revolution. It was more helpful to Asia and Latin America than it is fashionable to admit. In future a revised version of it will be helpful to Africa. Certainly, the Green Revolution involved social upheaval because it required and rewarded farmers who had access to skills and capital rather than the very small-scale farmer. Consequently, it was the large farmer rather than the small who benefited from it most. But the fact remains that in the huge areas where the Green Revolution took off, there had been a high expectation of famine as populations increased, and those famines did not happen. Instead of importing food or being dependent on food aid, these regions were - against all expectations - growing their own food.

In areas where the revolution took off. people lost their jobs, and that is a pity. But plenty of them found the means of making enough money to buy the cheap produce the revolution brought to the market. Without the revolution it is likely there would have been neither the produce nor the farmwork. Social and ecological problems went along with the Green Revolution, and it is tempting to see them as making the case against technological innovation.[32] But they do not. Technological revolutions can be very brutal - as can economic transformations if they are not cushioned by alert and conscientious social action. That makes a better case for a better politics than it does for abandoning technological change.

It is said that the Green Revolution was an ecological disaster. But at least one British aid official believes that such impoverishment of the soils as has been caused by the revolution's methods could be fairly easily cured by a little education and investment: 'Nothing has been irrevocably lost,' he says.[33] Indeed, it is often for the absence of a few easily-delivered minerals, rather than for the lack of major inputs, that the soils of, say. the Punjab are impoverished.

It is also true that the Green Revolution involves many farmers in a vicious cycle of pesticide application. They are obtaining very high yields with new strains which are vulnerable to pests which the old strains had evolved alongside and with which they could co-exist. But after a spate of bad-news stories, we are beginning to hear that the Green Revolution is starting quite successfully to combine high yields with freedom from the need to use high doses of pesticides. Integrated Pest Management (IPM) - which uses a wide range of ecological insights to reduce dependence on chemicals - has, for instance, proven very successful in protecting some of Indonesia s hugely-expanded rice crop. IPM will save countries millions of dollars of pesticide subsidies for their farmers. When more farmers pay the full cost of their pesticide-use IPM will take off dramatically.[34]

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[32] Zinke, G. W. *The Problem of Malthus: Must Progress End in Overpopulation.* University of Colorado Studies, Series in Economics, No. 5, Boulder, Colorado, 1967.

[33] Overseas Development Administration briefing.

[34] Firey, W. *Man, Mind and the Land.* Glencoe, Illionis: Free Press, 1960.

It has become fashionable to celebrate only the small farmer. This is a big mistake. We cannot afford to forget how successful plantations can be. At Mpongwe, in Zambia, to take just one example, the British Commonwealth Development Corporation has a big scheme which produces rainfed maize and soya, and irrigated coffee and winter wheat. Alongside a Zambian firm, the British development agency has become a 50 per cent shareholder in the enterprise, which CDC manages. With 4000 hectares in production and a further 8000 hectares to come, this is just the sort of large-scale operation which seems inappropriate to the romantics who think that only peasant agriculture is right for poor countries, and that it must be wrong for partly foreign-owned farms to be able to export some of their profits out of Africa. And yet on these thousands of hectares, 1000 fulltime employees have livings, and in good years 2500 seasonal employees get part of theirs. New and improved housing, a primary school for 700 pupils, a clinic, shops and a bank have all been created as part of the scheme.[35]

The land CDC and its Zambian partner uses was underemployed before they came along. It now produces foreign exchange and food for a country in bad need of both. It is also producing an important intangible: a success story in a country which needs them. Beyond the general lesson that Africa's soils and water supplies are not all as hopeless as they look, and Zambia's happen to be very good, CDC's scheme will also be helping to answer questions about what works and where. It is far better that this sort of experiment at least in part happens with foreign capital, especially if - sadly - it turns out not to work for long. If one such scheme does not work, then the next is more likely to because o(the lessons learned.

Presuming that CDC's scheme flourishes, then perhaps some of Africa's rich people will follow where British enterprise helped lead. The capacity to take big risks, teach big lessons, and produce big quantities of food and foreign exchange is what the British brought to the scheme: that is surely a large series of pluses. It is CDC's purpose to invest money and management precisely in schemes and countries perceived as being too risky for most western firms.

There is a growing awareness that plantation schemes have often proven that — contrary to myth - even tropical land can remain in good heart for many years under intensive production. Moreover, there is a growing awareness amongst some academics that they have generated a new and not altogether accurate myth about the virtue of small-scale production. Professor Tim Harding, director of the International Centre for Plantation Studies at the Silsoe campus of the Cranfield Institute of Technology, puts it this way:

I've be.en involved with tropical agriculture for twenty years and especially with small-scale farming. More recently, with this new Institute, I've become very much involved with large scale operations and have witnessed the extraordinary contribution they have made. You have to see the infrastructural developments which have gone

[35] *CDC Development Report May 1993* (London: The Commonwealth Development Corporation 1993).

along, which they have paid for: schools, hospitals, roads. I tended to view plantations as everyone else views them. You hear that they're exploitative, paying appalling wages to the labour force; devastating the environment, tearing out national forest, that their profits are repatriated to the United Kingdom and the Netherlands. In short that they are run by exploitative capitalists. Then there is the question of corruption.

You'd have to say that some of the multinationals can be accused of these things. There are some that I wouldn't work with. You worry about them all to some extent; they're in business and they have a labour force which is comparatively underpaid. But you see their conditions tend to be better than those of their neighbours; that people are keen to work for them. After all, their employees get education, health, welfare and that is all held in high regard. Indeed, the multinational corporations are under pressure to maintain high labour forces, while most of them would be more profitable if they were allowed to mechanise.

Tea companies, for instance, wouldn't mind having fewer, better paid workers. In principle they're interested in developing labour productivity, say by the use of shears in tea plucking.

Plantation companies like foreign exchange crops: they like longterm tree crops, such as tea, coffee, cocoa, palm oil, sugar cane. And then you see that most of these big companies acquired concessions maybe a hundred year ago, and many have worked the same land for many years.

Tim Harding is sure that plantations have a role, but of course does not dismiss the received wisdom that smaller-scale farming also has one, especially in producing very high grades of some crops, though in small quantities. Acre for acre, small-scale farming can produce very high yields. But it

 is extraordinarily difficult to get really large volumes of crops from small-scale farming, if you look at the problem from the point of view of production from a region rather than from an individual plot. And it is very hard, too, to match small-scale farmers with the scale of food storage and processing which is the key to modern cheapness of production.

The CDC scheme affronts romantic ideals of several kinds. It produces cash crops, and at a plantation scale. It uses African land to produce crops which are not for local consumption. It has been a familiar Green argument for many years that poor people should work toward self-sufficiency and subsistence, and that any other route to growth is exploitative.

Overstated, as it often is, this view is nonsensical. Like Paul Harrison,[36]1 have met farmers in Kenya and Tanzania whose handful of acres produce a wide range of crops, some of them for sale to Europeans. Two of the liveliest Africans I have met were engaged in producing carnations and would not have been without the crop. As we have already seen, cash is an important key to security in poor as well as in rich

[36] Harrison, P. *The Third Revolution* p. 124.

countries. And variety of crop can powerfully help farmers insure cheaply against the diseases which may strike at any time.

It will not be by peasants alone or plantations alone that the Third World produces food and a living for its people. It will not be by relying on exclusively modern or exclusively traditional techniques. And it will not be by notions of self-sufficiency, either. It will be an amalgam of farming and trading techniques which will, with luck, help the poor countries of the world to discover their agricultural potential. It will also be by the application of techniques which have hardly been invented yet.

The bio-industrial revolution

We know that about 90 per cent of the increase in food production in recent decades has come from increases in yield of food per acre of land, and only 10 per cent or less from increases in land under production.[37] It is clear that in many places, perhaps most places, the new lands which might become arable or more intensively pastoral are less and less likely to be highly productive.

For at least one industry the constraints facing farmers seem almost like good news. Biotechnology offers a route out of some of the difficulties which afflict conventional agriculture. To take one major United Kingdom example, ICI Seeds (now known as Zeneca) has made a big effort to explain its potential role to anyone who will listen. This is only appropriate for a business which the public believes is more likely to make a Frankenstein than a new version of the miracle with fishes and loaves.

Under the general banner 'Growing for a Better Future', ICI Seeds (as it then was) produced several accounts of the new opportunities and some of the attached dilemmas.[38]'[50,51]'[39] One of these, *Crop Protection In the*

Developing World, readily accepts many of the conventional limitations which block big new productivity increases. If there are limits to new land, to new supplies of water, and to new increases in the uses of pesticides and fertilisers - and there clearly are - then it makes sense, in the biotechnological view, to optimise their use.

Most of the major crops of the world - including rice, wheat, and soya - are drawn from a very broad genetic base, cross-bred, and have been shifted out of their region of origin by pioneer agriculturists, hundreds or even thousands of years ago. They have become prone to disease as they have become more productive, but they have also been developed to grow in areas where they could not have managed hundreds or thousands of years ago.

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[37] *World Bank World Development Report 1992* p. 135.

[38] Macer, R. and Bartie, L, *Crop Biology in the Developing World* (ICI Seeds, 1990). ~[50] Macer, R. and Bartie, L, *A World Perspective on Population, Agriculture and Food* (ICI Seeds, 1989).

[39] The Royal Commission on Environmental Pollution, *The Release of Genetically Engineered Organisms to the Environment,* Report 13 (London: HMSO, July 1989) p. 36.

Zeneca maps out three stages in the likely future development of these ancient techniques, all of which will produce plants which deliver more and more of what humankind desires with less and less dependence on resources in short supply. In the short term, until the mid-1990s, the main developments will be in techniques which make hunting through existing plant gene types quicker and more efficient. Increasingly, in the mid-term, by the late 1990s, technology will allow the transformation of plant types by the addition of particular genes conferring particular new advantages. In the longer term, technologists expect to be able to make what Zeneca calls 'more fundamental changes', which will take the manipulation to the point of creating new species.

The promise and threat of biotechnology flow from the skill mankind has developed in getting into the engine room of life; into, that is, the cells and genes which are life's building blocks. This new technology seems to many people to be an offence against nature. Biotechnology is viewed with the same suspicion that was once reserved for nuclear power. It is only forty years and less since nuclear power was touted as the source which would produce electricity 'too cheap to meter'. The risks and costs have emerged later (and been exaggerated, as we discuss in Chapter 4).

Biotechnological development faces the obvious problem that we might create a monster - a virus against which we have no defence, a new superweed, a new agricultural pest capable of wiping out entire crops. The industry and its regulators insist that biotechnology is doing little that nature could not do for itself. The regulators and the semi-official bodies which advise them clearly believe that we can proceed slowly, testing our confidence at every point.[40] But will the cautious optimism of industry and regulator still quiet anxiety?

Nuclear power and biotechnology share qualities of fearfulness and incomprehensibility. Confidence about technologies such as these will not come because Joe Public understands them. The non-technicians amongst us will far more likely come to trust biotechnology, or nuclear power, because we learn to trust the institutional process by which technologies and processes are judged on our behalf. The penultimate chapter of this book looks at some institution-building which may help this process. Familiarity helps. Every year that passes without a major western nuclear accident helps that industry, and with luck biotechnology will have an even better record.

The debate surrounding biotechnology has so far made one feel mildly confident that the progress of this development will be like most others: noisy, controversial, occasionally surprising in its capacity to go wrong, but controlled with, increasing sensitivity and alertness as the years roll on.

But how much will gene manipulation help feed the world? The developments which we see so far are in products from which industry can predict high profits. So we find ourselves reading about the engineered tomato rather than the engineered rice plant.

[40] 54 Brown, M. and Goldin, L, *The Future of Agriculture, Developing Country Implications* (Paris: Organisation for Economic Co-Operation and Development, Development Centre, 1992).

This is the way capitalism often works with the technologies it pays for, and the result is blind but often benign. The market funds marketable research into high-price product. But discoveries soon find their more general, and more generally useful, low-price outlets. It will not be at all surprising if insights which Zeneca or any other firm gains in tomatoes will soon be used in more nutritious plants, or that processes explored initially for private profit and for use in the rich world will be found to work well and cheaply in the Third World. Doubtless, we will have to explore ways for governments, foundations and charities to fund private firms to develop seeds and techniques for their dissemination in poor countries.[41]

Third World researchers worry that genetically engineered substitutes for pyrethrum, cocoa, vanilla and gum arabic could soon be produced in laboratories and factories in the west rather than in the tropical countries in which they are valuable cash crops.[42] One simply has to hope that cases of loss will be matched by examples of other crops made to grow with less water, or less chemical inputs, than are presently needed and that these benefits help the poorer countries.

In any case, the general lesson of the past is that these sorts of concerns evaporate. In the instance of computing, there were fears that IBM would somehow monopolise hardware and software. What has happened, instead, is an explosion of variety of suppliers. Indeed, biotechnology is more like computing than it is like nuclear power in this sense: it will often be cheap, simple, easily dispersed into the market, and profitable to use.

The global good news

The Third World will be very unlucky indeed if it does not grow very much more food than it now does, and with less ecological damage. But there is no certainty that it will be self-sufficient in food. Professor Ian Carruthers of Wye College, London University, wrote recently, after six months travelling in the Third World:

In thirty years' time four out of five of the world's urban people will live in the developing world. I cannot see the bulk of food supplies for these cities of the developing world coming from their hinterland but only from overseas. In 20 to 30 years' time the cities of the developing world will be fed from Chicago and possibly Kiev.[43]

This may not matter.

Martin Brown and Ian Goldin[44] have pulled together many of the teasing paradoxes of world farming and food supply. Their message, drawing on a wide range of studies,

[41] *Development Forum,* May-June 1989.

[42] *The Sunday Times,* Nairobi, November 20 1988.

[43] Ian Carruthers, 'Going, going, gone; tropical agriculture as we knew it', *CDC Magazine* no. 12, 1993; Bunting, A. H. 'What is this thing called development?' *CDC Magazine,* no. 3, 1991.

[44] Brown M. and Goldin, I., *The Future of Agriculture, Developing Country Implications (Paris-.* OECD, 1992).

is that the world as a whole can grow and trade quite enormous quantities of food. This food is likely to get cheaper in almost all cases (with, rice as a possible exception) as technologies increasingly bite. Much of this bulk and cheapness can probably be achieved within tighter ecological controls. The most obvious and predictable source of the bulk and cheapness of food is the rich world. There will perhaps be the same number of very poor hungry people in the world in the next century as there are now: maybe a few more, maybe a few less. The proportion of the world's population which cannot feed itself by its own efforts will fall somewhat, but the absolute numbers of hungry will rise somewhat.

Mssrs Brown and Goldin's arguments imply that the world is nowhere near exhausting its capacity to feed humans. The food can be there when there are ten billion people to eat it. What is much less clear is how the very poor of the world will lay their hands on it.

The authors provide some ways of thinking about this problem. No one knows what the Third World will be growing in the future. It would not, for instance, make sense for the poor of the world to be told to try to buy expensive local produce as opposed to cheap foreign produce merely on the grounds that it was produced by people of the same nationality as themselves. On the other hand, buying foreign food, however cheap, involves economies in getting hold of foreign exchange, and that may not be as easy as all that. The balance between earning the foreign exchange by exporting industrial or farm products and growing the food for oneself is a fine one and there are no clear answers as to where the line should be drawn.

But Brown and Goldin offer quite firm guidance on a related topic. They stress that if one is trying to get a rural economy going then the cheapness of the produce which farmers grow will help a great deal. Modern analysis suggests that if a farmer can reduce costs, and sell food into markets cheaply, that will do the farmer and the economy and the customers far more good than rigging things so that the consumer pays, and farmer is paid, falsely high prices.

These are arguments of immense hopefulness. They suggest there will be an abundance of cheap food available in international trade during the next century. The proportion of this tradeable food which would be required to feed those who are predicted to have difficulty feeding themselves in the market is very small. In other words: the food needs of the poor of the world are likely to add up to a very small percentage of the total food which the world will be growing very cheaply by then.

It is surely likely to be possible to make the next little leap. If we have, say, half a billion hungry people and lots of food around, we will work out a way of getting the food to the people if we want to.

19. Research

Too few people

Nicholas Eberstadt

Source: *Prospect* 25 (1997): 50-55.

Over the past few years, some of the world's best demographers have begun a dramatic reassessment of the world's future. They are now seriously proposing that the world's population, rather than continuing to increase, might peak in our lifetimes and then go into an indefinite decline in the generations immediately ahead. This scenario is reflected in, among other studies, the UN Population Division's biennial compendium, *World Population Prospects*—the oldest and largest contemporary attempt to outline future demographic trends. The current 7996 *Revision* includes "low variant" projections which anticipate zero population growth for the world as a whole by the year 2040 and negative growth—that is to say, depopulation—thereafter.

Like the two alternative projections ("medium" and "high") also offered, this low variant is "thought to provide reasonable and plausible future trends." The eventual global depopulation visualised in this variant, it must be emphasised, is not calamitous—it does not result from Malthusian, environmental or any other variety of disaster. On the contrary: the possible stabilisation and ultimate decline of world population—within the lifetime of most of the earth's current inhabitants—are assumed to occur in what *World Popidation Prospects* terms "conditions of orderly progress."

Of course, the UN's new low variant projections do not provide a sure vision of the future. But they do offer a glimpse of one particular, and by no means fantastic, version of it—a version whose outlines have rarely been described and whose ramifications have scarcely been pondered. At a time when all manner of potential "population problems" are regularly accorded official attention by national and international authorities, such neglect is striking.

This is not the first time that population specialists (or others) have raised the prospect of long-term population decline. About 60 years ago, expectations of imminent depopulation were widespread in the western world. We now know that thosQ predictions were wide of the mark. Indeed, at the very time when we were supposed to be entering into permanent negative growth as a result of sub-replacement fertility—in the 1950s and 1960s— western countries were actually in the middle of a demographic surge driven by a postwar baby boom.

The paradox of long-term demographic forecasting is that its methods combine superb technique with an almost complete lack of predictive theory. Mathematical demography is an elegant and sophisticated construct; supplied with the necessary

assumptions, it can generate detailed and internally consistent population projections. Those assumptions, unfortunately, are precisely the sticking point.

The defining characteristic of population change in the modem era has been the emergence and spread of sustained fertility decline. Yet this phenomenon has always posed unanswerable questions. The first country in the world to embark upon long-term fertility decline did so in the late 18th century. That country was not industrialising England, as modernisation theories would lead us to expect, but France—then impoverished, overwhelmingly agrarian, predominantly illiterate and devoutly catholic.

More recent fertility trends have proved no less nettlesome. Despite the wealth of information on social and economic conditions in contemporary industrial societies, demographers were unable to predict either the transnational postwar baby boom or the subsequent shift to a sub-replacement fertility level in every country of the Organisation for Economic Cooperation and Development (OECD). As for developing countries, demographers have been unable to forecast either the onset of fertility decline or the trajectory it follows, once it begins.

For better or worse, our only recourse in addressing these issues is to consult the empirical record. From this we know that the fertility level of a fairly large population under conditions of orderly progress can be very low indeed. Eastern Germany's post-unification fertility level, if continued, would be less than one birth per woman per lifetime. We also know that a country's fertility level can drop dramatically once the process of secular fertility decline begins. Between the early 1960s and the early 1990s Thailand's estimated total fertility rate (TFR) plunged from more than six births per woman per lifetime to fewer than two. We know, further, that subreplacement fertility can characterise fairly poor contemporary societies— China, Cuba and possibly Sri Lanka, among others. Moreover, fertility levels can remain below replacement for prolonged periods. Japan entered into sub-replacement fertility over 40 years ago and has been moving further away from net replacement for the past quarter century. But all these particulars offer little guidance for long-range forecasts of a country's population total—much less for the world as a whole.

Explaining the UN low variant

The UN low variant model uses estimates of the world's current population composition (by country, age and sex) and calculates future populations based on three sets of assumptions: migration, mortality and fertility. For the period 1995 to 2000, the model envisions a net migration of about 1.6m people a year to the more developed regions (the OECD countries of the early 1990s, eastern Europe and the European parts of the former Soviet Union) from the less developed regions (everywhere else). This stream gradually diminishes, ceasing in 2025. These assumptions are clearly arbitrary; there is no particular reason to think they will be correct. But, given their magnitude, they

exert only a slight influence on population trends in the more developed regions—and, of course, none at all on global trends.

On mortality, the UN model assumes that life expectancy at birth will rise from roughly 75 years today to 81 years in 2050 in the more developed regions. For the less developed regions, life expectancy is assumed to increase from the current estimate of 64 to 76 years by 2050; in the least developed countries (mainly in sub-Saharan Africa), it is seen as rising from 52 to 72 years. By the benchmarks of the immediate past, such improvements in longevity seem feasible—between 1950 and 1995, global life expectancy is thought to have risen by 20 years (from about 45 to about 65 years).

The model's most important assumptions concern future fertility trends. By the UN's estimate, total fertility rates (TFRs) m the more developed regions averaged about 1.7 births per woman per lifetime in the early 1990s; the low variant assumes that these will stabilise in another decade at about 1.4 (about the EU's level today). In the less developed regions. TFRs averaged 3.3 in the early 1990s; they are now estimated at just below three, declining further to about two in 2020 and to 1.6 in 2050. For the least developed countries, where the average number of births per woman per lifetime in the 1990s is estimated to have exceeded five. TFRs are posited to drop below four by 2010. below three by 2020 and below two by 2035.

Another way to look at fertility assumptions is from the viewpoint of net replacement. In the more developed regions, the net reproduction rate (NRR) is already down to about 0.7—the next generation, following present patterns of childbearing, will be about 30 per cent smaller than the current one. The UN low variant assumes that the NRR will stay close to its present level for the next half century, registering just under 0.7 in 2050. In this picture the less developed regions drop below replacement by about 2010, the least developed regions fall below replacement by about 2030. For the world as a whole, the NRR today is placed at over 1.2; global sub-replacement begins in about 2010 and it is stipulated at 0.74 by 2050—about the same as in today's industrial democracies.

The arithmetical consequence of this bundle of assumptions—none of them outlandish—is a world in which population peaks and then declines forever. On these computations, the human population would reach its apogee in about the year 2040, at pver 7.7 billion—about one third more than the 5.8 billion thought to be alive today. Between 2040 and 2050, the world's population would fall by about 85m. Thereafter, world population would shrink by roughly 25 per cent with each successive generation.

The trends which would result in an ultimate global population decline would also bring about a significant redistribution of world population. In 1995, the ratio of population between less developed and more developed regions stood at about four to one; in 2050, by these projections, it would be seven to one. The balance of population would shift dramatically—not only between countries but between entire continents. In 1995, for example, the estimated populations of Europe (including Russian and Africa (including Egypt and the Maghreb states) were almost exactly equal. In 2050, by these projections, Africans would outnumber Europeans by over three to one.

In a world of negative population growth, the rankings of the 12 most populous countries would also look rather different from those with which we have become familiar. Only half the largest countries of 1950 would remain on the list for the year 2050. Nigeria—which did not even make the list for 1950—will be the world's fourth largest country in 2050, just edging out the US. New additions to the big 12 between now and the year 2050 would include Ethiopia, Zaire and Iran. Whereas six of the 12 largest countries in 1950, and four in 1995, come from the more developed regions, only one—the US—would remain in 2050. Just how demographically negligible today's industrial democracies would be in this vision of the year 2050 may be illustrated with one comparison: not a single European state—including Russia—would match the Philippines in total population. Other things being equal (admittedly, in world politics they seldom are) these trends presage a tremendous shift in the balance of global power.

These projected demographic forces of longer lives and falling fertility would inexorably pave the way for a radical ageing of the human population—a shift whose magnitude would be without historical precedent. In 1900 or so, the median age of the world's population was about 20 years—not far from what it had been in all earlier eras. By 1995, it had reached about 25 years. By 2050, in this low variant world, the median age would be over 42.

The gerontological drift

In the less developed regions, the median age would almost double between 1995 and 2050, jumping from 23 to 41 years. To put this in perspective, the average population from these regions would be more aged than the "greyest" populations in the world today. (In Germany and Japan median age is now just under 40 years.) But people in the more developed regions of 2050 would be older still. By then, the median age in these regions would exceed 51. Japan's median age would be 53; Germany's, 55; Italy's 58.

In the UN low variant, the number of children would sharply decline in all regions, while there would be a population boom among the elderly (or groups currently considered elderly). In 1950, children under the age of five were just under one seventh of the global population. Today, they are about one ninth of the total. In 2050, they would account for less than one twentieth. Conversely, persons aged 65 and over made up about 5 per cent of the world's population in 1950, 6.5 per cent in 1995; they would account for over 18 per cent, of the total in 2050. Where there were 2.5 young children for every elderly person in the world in 1950, by 2050 there would be almost four elderly persons for every child. In these projections Italy serves as the extreme instance of demographic ageing: scarcely 2 per cent of the population in 2050 would be under the age of five—but 40 per cent would be 65 or older.

This dramatic worldwide ageing would especially affect the female population. For the first time in the modem era, possibly the first time in human experience, "women of reproductive age" would no longer constitute the norm for humanity. In 1995, an estimated 51 per cent of the world's women were between 15 and 49 years old. Under low variant assumptions, however, by 2050 over *55* per cent of all women will be outside their childbearing years. In the more developed regions, nearly two thirds of all women would not be of reproductive age.

Now consider people between the ages of 15 and 24—the vigorous and exuberant young adults who influence fashion and style, exemplify physical beauty and do most of the fighting in times of war. In the low variant version of the future, the size of this youthful group shrinks significantly in both relative and absolute terms. In the world as a whole, there would be 100m fewer youths in 2050 than in 1995. Comprising 18 per cent of the world's population in 1995, they would account for less than 12 per cent by 2050. More developed regions would especially lack young people: less than 9 per cent of their population would be 15 to 24 years of age. In fact, barely half as many young people would be living in these countries as live there now.

Such a gerontological drift raises questions about the health of the societies in this projected future. Would a depopulating planet be a planet of wheelchairs—of increasingly infirm senior citizens whose escalating demands for medical services and care burden the rest of society? Or would the revolution in longevity be accompanied by a revolution in health, extending the boundaries of middle age—and thereby the scope for active, vigorous and productive existence?

The available literature on research into health and ageing, as it happens, is inconclusive—it points in opposite, mutually exclusive, directions. According to one school of thought, the risk of illness and mortality changes are inversely related: longer lives mean worse health for the survivors. The other school holds that improvements in life expectancy translate into greater life expectancy free from disability, aven for persons in their 70s and early 80s.

Reviewing the points of controversy in these studies, the ambiguity of the term "healthy life" is striking. Mortality is easy to define and thus (in theory) to measure. Health is subjective and has many gradations. It is possible, indeed likely, that data on self-perceived health status are confounded by the higher expectations of those who are better off. In the US and elsewhere, despite physical evidence to the contrary, affluent people seem more inclined than the less well off to rate their own health as unsatisfactory.

But the international data seem to support the argument that improvements in "disability-free" life expectancy occur nearly as rapidly as improvements in life expectancy itself—at least for people under 85 years of age and so long as "disability" is carefully and objectively defined. Proper health habits and appropriate medical help can already offer most people an active and independent life well into their 80s. To this extent, anxieties about a coming era of dependent invalids would appear to be misplaced.

Yet we should remember that at times the quality of life for older persons may hinge on discrete but expensive medical treatments. Such services would be more available in rich countries than in poor ones, even in the year 2050. and differences in the health status of the elderly might in the future replace the summary index of "development" that the infant mortality rate provides today.

The economics of ageing

In the 1930s, when the spectre of depopulation haunted western intellectuals, many of the most eminent economists of the day, including John Maynard Keynes, Gunnar Myrdal and Joan Robinson, argued that low fertility and stagnant or declining population could compromise economic performance. By stifling demand, sluggish or negative population growth could exacerbate or even precipitate "under-consumption" and a crisis of unemployment. At the very least, low fertility would press down the investment rate or slow the allocation of new labour into promising and productive areas.

With the benefit of hindsight, most of these arguments now look surprisingly weak. Depression era economists were too ready to explain the great international slump of the 1930s—which was essentially non-demographic in nature—in terms of the fertility patterns and population trends of the day. (Ironically, scarcely a generation later, eminent economists were attributing the same ills to overly *rapid* rates of population growth.)

Careful review of the empirical record suggests that demographic forces, of whatever kind, need be no more than a secondary factor in overall economic performance. This empirical record also suggests that well thought out public policies, in tandem with suitable private arrangements, can capitalise on the opportunities inherent in a country's population trends. In fact, during the modern era nations have prospered even in the wake of seemingly calamitous "population problems." West Germany, Taiwan and South Korea each flourished after their sudden, forced and tumultuous absorption of millions of refugees; Japan enjoyed rapid development after the second world war, even though its male life expectancy had dropped to Neolithic levels as a result of the war.

By comparison with such trials, the demographic challenges posed by gradual population ageing and eventual population decline seem decidedly modest. Indeed, there are reasons to be guardedly optimistic about the macroeconomic consequences of these trends. Surveying demographic prospects in the US. Harvard economist David M Cutler and his colleagues have made the point that prolonged sub-replacement fertility would actually lower that country's investment needs and increase its living standards (consump- tion levels), because less capital would be required by new entrants into the labour force. Although expenditures on the care and support of the elderly would rise, these costs would be substantially offset, Cutler and his colleagues reckon, by a

reduced need for spending on the young. In all, they conclude, the optimal savings rate in 2050 would probably be slightly lower than the optimal savings rate today.

However, the demographics of depopulation might pose one important and so far novel problem for the education and training of the workforce. In a world where nearly half the population lives to the age of 80 or beyond, the ordinary person's "economically active life expectancy" could quite conceivably be as long as 50 working years—or longer. Given the arithmetic of sustained below-replacement fertility, it is not difficult to imagine circumstances half a century from now in which the majority of a country's workers were over the age of 50.

If future education systems operated on today's principles, most people at work would have received their final formal training over a generation earlier; they would be functioning with the knowledge and techniques of an increasingly distant past. We should not overstate the problem: on-the-job training, refresher courses and the like are already familiar in the modem workplace. But the age structure changes which negative population growth would bring would considerably intensify the mismatch between an education system designed to train people when they are young, and their desire to enjoy a long and worthwhile career in an increasingly complex economy. The institutions and routines of higher education would have to be fundamentally re-examined and recast.

The possible cessation and decline of population growth in coming decades may pose no insuperable macroeconomic problems for future generations, but it stands to make enormous difficulties for the state. In a world like the one suggested in the UN's low variant projections, governments would be subject to intense budgetary and political pressure to overhaul their welfare systems. Negative population growth would especially threaten the central feature of the modem welfare state—the nation-wide, tax-financed, pay-as-you-go pension programme. Weighed down by unalleviable demographic burdens, it is hard to see how these programmes could remain viable.

The government-run social security and pension programmes in almost all of today's industrial democracies finance these operations by taxing today's workers in order to fund today's retirees. Because these systems were established in periods of relatively high fertility and relatively rapid population growth, pay-as-you-go pension systems had the political allure of promising generous benefits on the cheap. In an unguarded moment 30 years ago, the economist Paul Samuelson captured the reasoning which underpinned this approach to public finance: "The beauty about social insurance is that it is actuarially unsound. Everyone who reaches retirement age is given benefit privileges that far exceed anything he has paid in . . . social security is squarely based on what has been called the eighth wonder of the world— compound interest."

With below-replacement fertility and increasing longevity, however, the arithmetic of pay-as-you-go retirement programmes changes unforgivingly. As the ratio of employees to retirees falls, a universal pay-as-you-go retirement system has only three options for preventing bankruptcy: reduce pension benefits; raise taxes; restrict eligibility. There are no alternatives.

Although populations in the less developed regions would not, in these projections, be so very "grey," those countries would probably be less capable of maintaining state-based pay-as-you-go retirement systems in the year 2050 than OECD countries are today. First, the dependency ratio of elderly to working age population would be higher in the less developed regions, on average, than it is in any OECD country today. Second, the less developed regions half a century from now may not, on average, be nearly as affluent as OECD countries today. The calculations of the economic historian Angus Maddison suggest that (adjusting for international differences in purchasing power of local currencies) GDP per capita for what the UN describes as less developed regions was about one fifth of the more developed countries' per capita GDP in the early 1990s—and less than one sixth of the OECD countries. If these regions enjoy long-term per capita growth rates of 3 per cent a year for the next half century, their average output level would still be nearly 40 per cent lower than the OECD's today. (To get a sense of what this would mean, imagine financing western Europe's pension burden in the coming decade with western European incomes of the late 1960s.)

Already the actuarial status of state-run retirement systems in most OECD countries looks unsustainable. In the US, according to economists at the OECD, the net present value of the unfunded deficit in the social security system amounts to only 23 per cent of GDP. I say "only"—because the unweighted average of that deficit for the 20 OECD countries examined came to 95 per cent of GDP. Even if the implicit social contract underlying these systems were gutted—by restricting pension eligibility to cover less than a third of the retirement age population, for instance—over half of these pension systems would still remain underfunded for the foreseeable future.

One reform to deal with the problem is likely to be later retirement ages, as populations make greater productive use of their extended active life spans. More fundamentally, pay-as-you-go financing will probably be replaced by self-financed retirement benefits. Although such a change could involve a full privatisation of social insurance, it is also possible to imagine the reformed pension systems operating under the aegis of‘ government. Even under government supervision, however, it is hard to see how selffinanced pensions (which explicitly acknowledge the beneficiary's creation of his or her retirement account) could lend themselves as readily to redistributive or other non-market objectives as pay-as-you-go arrangements have done. Thus declining population growth might not suppress the appetite of the state, but it might well check the voting public's willingness to feed it.

A world without siblings

Nearly 40 years ago, Jean Fourastie, the French sociologist, wrote a vivid and penetrating essay on how family and social life change under the influence of the modern decline in mortality. The revolution in survival chances, he asserted, had transformed marriage from a binding but temporary contract to a much lengthier, possibly more

tenuous, commitment; it had reduced old age from an almost mystical status to a common and often pitiable physical condition; and it had all but banished the procession of death and suffering which had previously conditioned family life. Fourastie also noted that the modern revolution in mortality schedules had entirely altered the ordinary person's chances of participating in "intellectual life" (which he took to begin at age 12) and "independent life" (which began, in his view, at about age 20). The scope for "creative intellectual life," he observed, had been hugely expanded by improvements in survival chances. By Fourastie's calculations, modern man could expect to experience between three and six times as many years of life in his 40s and 50s (which Fourastie designated the peak period of creativity) as the "traditional man" of the 17th century. (This great extension of "creative intellectual life," I would add, may have contributed to modern economic growth, which has been so strongly driven by applied advances in knowledge.)

If a revolution in mortality has already recast social rhythms and relations within the family, a revolution in fertility may have a similar impact in the future. More particularly, the fertility decline envisioned in the UN's low variant projections would set the stage for a world never before experienced: a world in which the only biological relatives for many people—perhaps most people—will be their ancestors.

Paradoxically, the great reduction in fertility witnessed in western societies over the past two centuries has l?een accompanied by a parallel reduction in childlessness. In the modern world, as the demographer Laurent Toulemon has observed, "very few couples remain childless voluntarily." Under the modern regimen of sub-replacement fertility, it seems, very few parents seek a third child, but almost everyone chooses to have that first baby if they can.

In such circumstances, prolonged bouts of fertility far below the replacement level would profoundly alter the composition of the typical family. Consider the possibilities for Italy, currently the country with the world's lowest fertility level. At present, Italy's TFR is estimated at less than 1.2; the UN's low variant projections anticipate the continuation of this pattern to the year 2050. If Italy's current fertility regimen is extended for two generations, the Italian family will be completely redefined. For in that future world, under reasonable assumptions about the incidence of childlessness and larger families, almost three fifths of Italy's children will have no siblings, cousins, aunts or uncles. They will have only parents, grandparents and perhaps great-grandparents.

Italy's position today is at an extreme within the fertility continuum among contemporary nations. But projecting the fertility rates for the entire EU forward over two generations only slightly alters the Italian scenario: about 40 per cent of European children would have no collateral blood relatives; less than one sixth would have a brother or a sister and a cousin.

While it is possible to describe this new kind of family, we can hardly imagine what it would portend. Throughout the memory of human experience, the family has been the primary and indispensable instrument for socialising a people. Within the family the individual found extended bonds of obligation and reciprocal resources—including

emotional resources—to draw upon. Under the demographic projections considered here, this would change momentously. For many people, "family" would come to be understood as a unit without biological contemporaries or peers.

How will each person's little tribe be formed in such a future? Who will we play with, learn from, love unthinkingly and fight with ferociously, knowing all the while that we can do these things because we are linked by an indissoluble common tie? To paraphrase the poet Robert Frost: if "family," means "the people who must take you when no one else will," and blood relatives our own age are no longer the norm, who then will take us in?

The nuclear family may have marked a radical departure from previous kinds of family arrangement. But as we have seen, the nuclear family does not begin to approach the limits of social atomisation which may await us in a depopulating world. Difficult as the implications of these changes may be to comprehend today, we may yet manage to assess them very carefully. It is not impossible that we will eventually experience them firsthand.

20. Population, Resources and the Ideology of Science

David Harvey
Source: *Economic Geography* 50 (1974): 256-277

It would be convenient indeed if such a contentious issue as the relationship between population and resources could be discussed in some ethically neutral manner. In recent years scientific investigations into this relationship have multiplied greatly in number and sophistication. But the plethora of scientific investigation has not reduced contentiousness; rather, it has increased it. We can venture three possible explanations for this state of affairs: (1) science is not ethically neutral; (2) there are serious defects in the scientific methods used to consider the population-resources problem; or (3) some people are irrational and fail to understand and accept scientifically established results. All of these explanations may turn out to be true, but we can afford to proffer none of them without substantial qualification. The last explanation would require, for example, a careful analysis of the concept of *rationality* before it could be sustained[1]. The second explanation would require a careful investigation of the capacities and limitations of a whole battery of scientific methods, techniques, and tools, together with careful evaluation of available data, before it could be judged correct or incorrect. In this paper, however, I shall focus on the first explanation and seek to show that the lack of ethical neutrality in science affects each and every attempt at "rational" scientific discussion of the population-resources relationship. I shall further endeavor to show how the adoption of certain kinds of scientific methods inevitably leads to certain kinds of substantive conclusions which, in turn, can have profound political implications.

The ethical neutrality assumption

Scientists frequently appear to claim that scientific conclusions are immune from ideological assault. Scientific method, it is often argued, guarantees the objectivity and ethical neutrality of "factual" statements as well as the conclusions drawn therefrom. Thisi view is common in the so-called natural sciences; it is also widespread in disciplines such as economics and sociology. The peculiarity of this view is that the claim

[1] Godelier, M. *Rationality and Irrationality in Economics.* London: New Left Books, 1972.

to be ethically neutral and ideology free is itself an ideological claim. The principles of scientific method (whatever they may be) are normative and not factual statements. The principles cannot, therefore, be justified and validated by appeal to science's own methods. The principles have to be validated by appeal to something external to science itself. Presumably this "something" lies in the realms of metaphysics, religion, morality, ethics, convention, or human practice. Whatever its source, it lies in realms that even scientists agree are freely penetrated by ideological considerations. I am not arguing that facts and conclusions reached by means of a particular scientific method are false, irrelevant, immoral, unjustifiable, purely subjective, or non-replicable. But I am arguing that the use of a particular scientific method is of *necessity* founded in ideology, and that any claim to be ideology free is of *necessity* an ideological claim. The results of any enquiry based on a particular version of scientific method cannot consequently claim to be immune from ideological assault, nor can they automatically be regarded as inherently different from or superior to results arrived at by other methods.

The ideological foundation of the ethical neutrality assumption can be demonstrated by a careful examination of the paradigmatic basis of enquiry throughout the history of science (both natural and social) [7; *16\ 27],* as well as by examining the history of the ethical neutrality assumption itself [27; *40].* The ideological foundation can also be revealed by a consideration of those theories of meaning in which it is accepted that there cannot be an ethically neutral language because meaning in language cannot be divorced from the human practices through which specific meanings are learned and communicated [9; *42],* It is not, however, the purpose of this paper to document the problems and defects of the ethical neutrality assumption, critical though these are. I shall, rather, start from the position that scientific enquiry cannot proceed in an ethically neutral manner, and seek to show how the inability to sustain a position of ethical neutrality inevitably implies some sort of an ideological position in any attempt to examine something as complex as a population-resources system.

Lack of ethical neutrality does not in itself prove very much. It does serve, of course, to get us beyond the rather trivial view that there is one version of some problem that is scientific and a variety of versions which are purely ideological. For example, the Malthusian terms "overpopulation" and "pressure of population on the means of subsistence" are inherently no more or less scientific than Marx's terms "industrial reserve army" and "relative surplus population," even though there is a predilection among unsophisticated analysts to regard the former phrases as adequately scientific and the latter as purely ideological. Unfortunately, it is not very informative to aver also that *all* versions of a problem are ideological, and it is downright misleading to suggest that our views on the population-resources problem depend merely upon whether we are optimists or pessimists, socialists or conservatives, determinists or possibilists, and the like. To contend the latter is not to give sufficient credit to that spirit of scientific endeavor that seeks to establish ' truth" without invoking subjective

personal preferences; to say that there is no such thing as ethical neutrality is not to say that we are reduced to mere personal opinion.

We are, however, forced to concede that "scientific" enquiry takes place in a social setting, expresses social ideas, and conveys social meanings. If we care to probe more deeply into these social meanings, we may observe that particular kinds of scientific method express certain kinds of ethical or ideological positions. In something as controversial as the population-resources debate an understanding of this issue is crucial; yet it is all too frequently ignored. If, as 1 subsequently hope to show, the dominant method of logical empiricism inevitably produces Malthusian or neo-Malthusian results, then we can more easily understand how it is that scientists raised in the tradition of logical empiricism have, when they have turned to the populationresources question, inevitably attributed a certain veracity to the Malthusian and neo-Malthusian view. When they have found such a view distasteful such scientists have rarely challenged it on "scientific" grounds; they have, rather, resorted to some version of subjective optimism as a basis for refutation. This kind of refutation has not been helpful, of course, for it has perpetuated the illusion that science and ideology (understood as personal preference) are independent of each other when the real problem lies in the ideology of scientific method itself.

It is easiest to grapple with the connections between method, ideology, and substantive conclusions by examining the works of Malthus, Ricardo, and Marx, for it is relatively easy to grasp the connections in these works and thereby to discern some important and often obscured questions that lie at the heart of any analysis of the population-resources relation.

Malthus

It is sometimes forgotten that Malthus wrote his first *Essay on the Principle of Population* in 1798 as a political tract against the utopian socialistanarchism of Godwin and Condorcet and as an antidote to the hopes for social progress aroused by the French Revolution. In his introduction, however, Malthus lays down certain principles of method which ought, he argues, to govern discourse concerning such an ambitious subject as the perfectibility of man;

A writer may tell me that he thinks a man will ultimately become an ostrich. I cannot properly contradict him. But before he can expect to bring any reasonable person over to his opinion, he ought to show that the necks of mankind have been gradually elongating, that the lips have grown harder and more prominent, that the legs and feet are daily altering their shape, and that the hair is beginning to change into stubs of feathers. And till the probability of so wonderful a conversion can be shown, it is surely lost time and lost eloquence to expatiate on the happiness of man in such a state: to describe his powers, both of running and flying, to paint him in a condition where all narrow luxuries would be contemned, where he would be employed

only in collecting the necessaries of life, and where, consequently, each man's share of labour would be light, and his portion of leisure ample *[19,* p. 70].

The method which Malthus advocates is empiricism. It is through the application of this empiricist method that the competing theories of the utopian socialists, the proponents of liberal advancement and the rights of man, and the advocates of "the existing order of things" can be tested against the realities of the world. Yet, the first edition of the *Essay* is strongly colored by a priori deduction as well as by polemics and empiricism. Malthus sets up two postulates—that food is necessary to the existence of man and that the passion between the sexes is necessary and constant. He places these two postulates in the context of certain conditions; deduces certain consequences (including the famous law through which population inevitably places pressure on the means of subsistence); and then uses the empiricist method of verify his deductions. Thus Malthus arrives at a conception of method which we may call "logical empiricism." This method broadly assumes that there are two kinds of truths which we may call "logical truths" (they are correct deductions from certain initial statements) and "empirical truths" (they are correct and verifiable factual statements which reflect observation and experiment). Logical truths may be related to empirical truths by uniting the two kinds of statements into a hypothetico-deductive system. If empirical observation indicates that certain of the derived statements are "factually true," then this is taken to mean that the system of statements as a whole is true, and we then have a "theory" of, for example, the population-resources relationship. Malthus constructs a crude version of such a theory.

Another feature of empiricism is worthy of note. Empiricism assumes that objects can be understood independently of observing subjects. Truth is therefore assumed to lie in a world external to the observer whose job is to record and faithfully reflect the attributes of objects. This logical empiricism is a pragmatic version of that scientific method which goes under the name of "logical positivism," and is founded in a particular and very strict view of language and meaning.

By the use of the logical empiricist method Malthus arrives at certain conclusions supportive of those advanced by the advocates of "the existing order of things.' rejects the utopianism of Godwin and Condorcet, and rebuffs the hopes for political change. The diminution in polemics and the greater reliance on empiricism in the subsequent editions of the *Essay* may in part be regarded as a consequence of Malthus' basic discovery that scientific method of a certain sort could accomplish, with much greater credibility and power than straight polemics, a definite social purpose. The resort to empiricism was facilitated in turn by the growing body of information concerning the growth and condition of the world's population— a prime source, for example, was the work of the geographer Alexander von Humboldt [Jd].

Having shown that the "power of population is indefinitely greater than the power of the earth to produce subsistence," and that it is a "natural law" that population will inevitably press against the means of subsistence, Malthus then goes on to discuss the positive and preventive checks through which population is kept in balance with

the means of subsistence. The subsequent evolution in Malthus' ideas on the subject are too well-known to warrant repetition here. What is often forgotten, however, is the class character with which he invests it. Glacken, for example, who treats Malthus in the penultimate chapter of his monumental study, *Traces on the Rhodian Shore*[2], ignores this aspect to Malthus entirely.

Malthus recognizes that "misery" has to fall somewhere" and maintains that the positive checks will necessarily be the lot of the lower classes *[19,* p. 82]. Malthus thereby explains the misery of the lower classes as the result of a natural law which functions "absolutely independent of all human regulation." The distress among the lowest classes has, therefore, to be interpreted as "an evil so deeply seated that no human ingenuity can reach it" *[19,* p. 101]. On this basis Malthus arrives, "reluctantly," at a set of policy recommendations with respect to the poor laws. By providing welfare to the lowest classes in society, aggregate human misery is only increased; freeing the lowest classes in society from positive checks only results in an expansion of their numbers, a gradual reduction in the standards of living of all members of society, and a decline in the incentive to work on which the mobilization of labor through the wage system depends. He also argues that increasing subsistence levels to "a part of society that cannot in general be considered as the most valuable part diminishes the shares that would otherwise belong to more industrious and worthy members, and thus forces more to become dependent" *[19,* p 97],

From this Malthus draws a moral:

Hard as it may appear in individual instances, dependent poverty ought to be held disgraceful. Such a stimulus seems to be absolutely necessary to promote the happiness of the great mass of mankind, and every general attempt to weaken this stimulus, however benevolent its apparent intention will always defeat its own purpose ...

I feel no doubt whatever that the parish laws of England have contributed to raise the price of provisions and to lower the real price of labour. They have therefore contributed to impoverish that class of people whose only possession is their labour. It is also difficult to suppose that they have not powerfully contributed to generate that carelessness and want of frugality observable among the poor, so contrary to the disposition to be remarked among petty tradesmen and small farmers. The labouring poor, to use a vulgar expression, seem always to live from hand to mouth. Their present wants employ their whole attention, and they seldom think of the future. Even when they have an opportunity of saving, they seldom exercise it, but all that is beyond their present necessities goes, generally speaking, to the ale-house. The poor laws of England may therefore be said to diminish both the power and the will to save among the common people, and thus to weaken one of the strongest incentives to sobriety and industry, and consequently to happiness *[19,* p. 98],

Thus, Malthus arrives at what we have now come to know as the "counterintuitive solution"—namely, that the best thing to do about misery and poverty is to do nothing

[2] Glacken, C. *Traces on the Rhodian Shore.* Berkeley: University of California Press, 1967.

for anything that is done will only exacerbate the problem. The only valid policy with respect to the lowest classes in society is one of "benign neglect." This policy is further supported by a certain characterization of "typical" behaviors exhibited among the lower classes. Arguments such as these are still with us. They appear in the policy statements by Jay Forrester, Edward Banfield, Patrick Moynihan and others. In fact, welfare policy in the United States at the present time is dominated by such thinking.

Malthus' approach to the lower classes has, if it is to be judged correctly, to be set against his view of the roles of the other classes in society— principally those of the industrial and landed interests. These roles are discussed more analytically in *The Principles of Political Economy.* Here he recognizes that there is a problem to be solved in accounting for the accumulation of capital in society. The capitalist saves, invests in productive activity, sells the product at a profit, ploughs the profit back in as new investment, and commences the cycle of accumulation once more. There is a serious dilemma here, for the capitalist has to sell the product to someone if a profit is to be achieved, and the capitalist is saving rather than consuming. If the capitalist saves too much and the rate of capital accumulation increases too rapidly, then long before subsistence problems are encountered, the capitalists will find expansion checked by the lack of effective demand for the increased output. Consequently, "both capital and population may be at the same time, and for a period of great length, redundant, compared to the effective demand for produce" *[20.* p 402].

Malthus placed great emphasis upon the effective demand problem and sought to convince his contemporary Ricardo that in practice: "the actual check to production and population arises more from want of stimulant than want of power to produce *[14,* p. 117], Ricardo was not persuaded, and the idea of effective demand in relationship to capital accumulation and wage rates remained dormant until Keynes resurrected it in his *General Theory of Employment, Interest and Money.*

Malthus solution to the problem of effective demand is to rely upon the proper exercise of the power to consume on the part of those unproductive classes—the landlords, state functionaries, etc.—who were outside of the production process. Malthus took pains to dissociate himself from any direct apologetics for conspicuous consumption on the part of the landed gentry. He was merely saying that if the capitalist, who was not giving in to what Adam Smith calls "mankind's insatiable appetite for trinkets and baubles," was to succeed in the task of capital accumulation, then someone, somewhere, had to generate an effective demand:

It is unquestionably true that wealth produces wants; but it is a still more important truth that wants produce wealth. Each cause acts and reacts upon the other, but the order, both of precedence and importance, is with the wants which stimulate industry ... The greatest of all difficulties in converting uncivilized and thinly peopled countries into civilized and populous ones, is to inspire them with the wants best calculated to excite their exertions in the production of wealth. One of the greatest benefits which foreign commerce confers, and the reason why it has always appeared an almost necessary ingredient in the progress of wealth, is its tendency to inspire new wants, to

form new tastes, and to furnish fresh motives for industry. Even civilized and improved countries cannot afford to lose any of these motives *[20,* p. 403].

Effective demand, located in the unproductive classes of society and stimulated by need creation and foreign trade, was an important and vital force in stimulating both the accumulation of capital and the expansion of employment. Labor might be unemployed, consequently, simply because of the failure of the upper classes to consume. This theory of effective demand does not sit easily with the theory of population. For one thing, it appears contradictory to assert via the theory of population that the power to consume be withheld from the lowest classes in society while asserting, through the theory of effective demand, that the upper classes should consume as much as possible. Malthus attempts to resolve this contradiction by arguing that the upper classes do not increase their numbers according to the principle of population—they consume conspicuously and regulate their numbers by prudent habits generated out of a fear of a decline in their station in life. The lowest classes imprudently breed. The law of population is consequently disaggregated into one law for the poor and another law for the rich. But Malthus also has to explain why an effective demand cannot be generated by an increasing power to consume on the part of the laboring classes. Such a possibility Malthus quickly dismisses as illogical for: "no one will ever employ capital merely for the sake of the demand occasioned by those who work for him" *[20,* p. 404],

He adds that the only case in which this could occur would be if the laborers "produce an excess of value above what they consume." He dismisses this possibility entirely. But even Ricardo, in annotating this passage, asks quite simply "why not?" and writes out a simple case to prove his point *[36,* p. 429], And, of course, it is this idea, which Malthus rejects out of hand, that forms the foundation of Marx's theory of surplus value, out of which the Marxist theory of relative surplus population stems.

Internal to Malthus' own work there is a central contradiction. On the one hand, the "natural law" of population asserts a doctrine of inevitable misery for the mass of mankind, while the theory of effective demand points to social controls to the employment of both capital and labor. Zinke suggests that Malthus did not need to reconcile these conflicting positions, for the principle of population applies in the long run, while the theory of effective demand is an explanation for short run cyclical swings [3]. Malthus does not appear to have thought this way about it. In the *Summary View of the Principle of Population,* published in 1830, Malthus attempts to reconcile these divergent views. Here he admits that "the laws of private property, which are the grand stimulants to production, do themselves so limit it as always to make the actual produce of the earth fall very considerably short of the power of production" *[19,* p. 245].

He then goes on to point out that under a system of private property "the only effectual demand for produce must come from the owners of property," and that the control of effective demand so intervenes with respect to the principle of population that it

[3] Zinke, G. W. *The Problem of Malthus: Must Progress End in Overpopulation.* University of Colorado Studies, Series in Economics, No. 5, Boulder, Colorado, 1967.

prevents the visitation of misery on all sectors of mankind and "secures to a portion of society the leisure necessary for the progress of the arts and sciences"—a phenomena that "confers on society a most signal benefit." Claims for social reform, and particularly any challenges to the principle of private property, are misplaced. To do away with a society based on competitive individualism regulated through the institutions of private property is to permit the principle of population to operate unchecked—an eventuality that will plunge all of mankind into a state of misery. The laws of private property, insofar as they have restricted the opportunities for the laboring classes, have artificially checked the operation of the principle of population and thereby reduced the aggregate misery of mankind. Malthus thus reconciles the principle of population with the theory of effective demand:

It makes little difference in the actual rate of increase of population, or the necessary existence of checks to it, whether the state of demand and supply which occasions an insufficiency of wages to the whole of the labouring classes be produced prematurely by a bad structure of society, and an unfavourable distribution of wealth, or necessarily by the comparative exhaustion of the soil. The labourer feels the difficulty in the same degree and it must have nearly the same results, from whatever cause it arises *[19,* p. 247].

Malthus was, in principle, a defender of private property arrangements, and it is this ideology that underlies his formulation of the principle of population as well as the theory of effective demand. Private property arrangements inevitably mean an uneven distribution of income, wealth, and the means of production in society. Malthus accepts some such distributional arrangement and accepts its class character. Specific distributional arrangement may be judged good or bad, but there was no way in which a rational society could be ordered which did not incorporate necessary class distinctions. Malthus bolstered his arguments with analysis and materials blended together, particularly with respect to the theory of population, by appeal to a method of logical empiricism. In his writings on political economy, however, Malthus frequently made use of a method more characteristic of Ricardo. In part the contradictory character of much of Malthus' writings on population and effective demand stems from the disjunction of method used to examine the two phenomena. At this point, therefore, we must turn to that method of investigation most clearly exhibited in the cleanly spelled-out analytics of Ricardo.

Ricardo

Ricardo accepted Malthus' principle of population without any reservations and, it must be added, quite uncritically. But the population principle plays a quite different role and is also treated according to a quite different methodology in Ricardo's work. Ricardo's method was to abstract a few basic elements and relationships out of a complex reality and to analyze and manipulate these idealized elements and rela-

tionships in order to discern the structure of the system under consideration. In this manner Ricardo built an abstract model of economic allocation through the market mechanism—a working model of capitalist society—that had little need for an empirical base. The function of such a model was to provide a tool for analysis which would both explain and predict change. Ricardo was not an empiricist in the sense that Malthus was in the *Essay on Population,* and he used facts sparingly, largely by way of illustration rather than with the intent to verify theory. The success and legitimacy of such a method depends, of course, entirely upon the reasonableness of the abstractions made. It is important to look, therefore, at the nature of the abstractions and idealizations built into Ricardo's model in order to understand both his substantive conclusions and his treatment of the population-resources problem.

At the heart of Ricardo's system we find a basic assumption concerning the nature of economic rationality: "economic man" is the model of rationality to which all human beings ought to aspire. Ricardo was, consequently, a normative rather than an empirical (positive) thinker. More deeply buried in Ricardo's work, however, is a doctrine of social harmony achieved through economically rational behavior in the market place. This doctrine of social harmony is frequently found in the political economy of the period, and its appearance in Ricardo's work is not unconnected with the use of an analytic, model-building methodology. A set of elements and relationships linked into a logical structure is bound to be internally consistent and to be internally harmonious. The model also generates equilibrium-type solutions to problems when it is subjected to manipulation and analysis. It is with respect to the social harmony concept that Ricardo's work contrasts most markedly with that of Malthus and Marx. The latter's work is expressive of the theme of class conflict throughout, whereas in Malthus' work the sense of class conflict is confused with social harmony (particularly in *The Principles of Political Economy)* as Malthus seeks to combine results arrived at by means of logical empiricism with those arrived at by means of an abstract model of the economy. Class conflict can scarcely be found in the harmonious analytics of Ricardo's market system, although the analytical results are used for class purposes, namely, the defeat of the landed interest and the subservience of wage labor to the interests of the industrial entrepreneur.

Under these conditions it is surprising to find that Ricardo so easily accepted Malthus' principle of population. In part, the simplicity of Malthus' deductive argument must have appealed to him, but there is a much more significant reason for Ricardo's wholehearted endorsement of the principle. Only by means of it could Ricardo keep his system harmonious and in equilibrium. The analytic problem for Ricardo was to explain the equilibrium wage rate. Wages, he argued, were basically determined by two factors: scarcity and the costs of subsistence. In Ricardo's system labor was regarded abstractly as a commodity like any other, and a growing demand for it ought to elicit a supply so that wages would, in the long-run, tend to the level of a "natural wage" set by the costs of subsistence. The mechanism that Ricardo appropriated from Malthus to achieve the balance between the supply and demand for labor was,

of course, the principle of population, through which the laboring population would automatically increase their numbers:

When, however, by the encouragement which high wages give to the increase of population, the number of labourers is increased, wages again fall to their natural price, and indeed from a re-action sometimes fall below it [55, p. 94].

In the short run and under favorable circumstances, the rate of accumulation of capital could exceed that of the power of population to reproduce, and during such periods wages would be well above their "natural" price [55, p. 98]. But such periods are bound to be short-lived. Also, when a population presses against the means of subsistence, "the only remedies are either a reduction of people or a more rapid, accumulation of capital." Consequently, the laws determining wages and "the happiness of far the greatest part of every community" were dependent upon a balanced, relationship between the supply of labor, via the principle of population, and the accumulation of capital. Population, Ricardo argued, "regulates itself by the funds which are to employ it, and therefore always increases or diminishes with the increase or diminution of capital" [55, p. 78], Even Malthus, however, objected to this use of his population principle, observing that it took at least sixteen years to produce a laborer, and that the population principle was far more than just an equilibriating mechanism *[20,* pp. 319-20].

Ricardo accepted that:

the pernicious tendency of the poor laws is no longer a mystery since it has been fully developed by the able hand of Mr. Malthus and every friend of the poor must adamantly wish for their abolition [55, p. 106].

Like Malthus he argues that:

The principle of gravitation is not more certain than the tendency of such laws to change wealth and power into misery and weakness; to call away the exertions of labour from every object, except that of providing mere subsistence; to confound all intellectual distinction; to busy the mind in supplying the body's wants; until at last all classes should be infected with the plague of universal poverty [55, p. 108],

Further, he warns that:

if we should attain the stationary state, from which I trust we are yet far distant, then the pernicious nature of these laws become more manifest and alarming [55, p. 109].

Ricardo's evocation here of an ultimate stationary state is of interest. The analytic model-building methodology that he employed naturally suggests, as we have seen, harmony and equilibrium, and it is understandable that Ricardo should infer from his model that there must inevitably be some kind of equilibrium or stationary state. (J. S. Mill came to the same sort of conclusion using a similar methodological framework *[28,* pp. 752-7].) Ricardo

MALTHUSIANISM, OVERPOPULATION & LIMITS TO GROWTH is here arguing also that under such an equilibrium condition, in which the demand and supply of labor are‘equated and the prospects for further capital accumulation eliminated,

there would appear to be a choice between conditions of universal poverty (everybody receiving a mere subsistence wage) or conditions in which rational thought and civilization itself could survive, at least among an elite. Ricardo is also suggesting that social welfare provision will become particularly pernicious in non-growth situations. Again, this argument is still with us and we will return to it later.

Ricardo found Malthus' arguments with respect to effective demand "quite astonishing" however, and commented that: "A body of unproductive labourers are just as necessary and useful with a view to future production as a fire which should consume in the manufacturer's warehouse, the goods which those unproductive labourers would otherwise consume" *[36,* p. 421].

Ricardo would have no truck with Malthus' defense of the landed interest and it is clear from his remarks and policies with respect to the corn laws, rent, and the like, that Ricardo's sympathies lie entirely with the industrial entrepreneur who alone, in Ricardo's system, epitomized economic rationality. Ricardo was in fact offended by the role the landed interest played, and since he discounted the problem of effective demand entirely, Ricardo came to regard the landed interest as a mere barrier to progress and to the achievement of social harmony.

Ricardo's model building analytics permitted him to argue positively for change. He was not deterred by empirical evidence, and he had no sense of debt to history. His normative analytics allowed him to see the possibility for changing and improving reality, rather than just understanding and accepting it. Like August Losch (another great normative thinker) Ricardo could take the view that "if my model does not conform to reality then it is reality that is wrong" [7S, p. 363], Ricardo could project upon the world a working model of capitalist society constructed in the image of an idealized social harmony achieved through the benificence of rational economic man. Ricardo sought to change reality to fit this image, and in the process he played an important and vital role in furthering the progress of industrialization in nineteenth century England.

Marx

Marx argues that both Ricardo and Malthus were projecting ideological assumptions without admitting or even perhaps being aware of them:

[Malthus's theory] suits his purpose remarkably well—an apologia for the existing state of affairs in England, for landlordism, "State and Church" . . . parsons and menial servants, assailed by the Ricardians as so many useless and superannuated drawbacks of bourgeois production and as nuisances. For all that, Ricardo championed bourgeois production insofar as it signified the most unrestricted development of the social productive forces... He insisted upon the historical justification and necessity of this stage of development. His very lack of a historical sense of the past meant that he regarded everything from the historical standpoint of his time. Malthus also wanted to see the

freest possible development of capitalist production ... but at the same time he wants it to adapt itself to the "consumption needs" of the aristocracy and its branches in State and Church, to serve as the material basis for the antiquated claims of the representatives of interests inherited from feudalism and the absolute monarchy. Malthus wants bourgeois production as long as it is not revolutionary, constitutes no historical factor of development, but merely creates a broader and more comfortable basis for the "old" society [25, pp. 52-3].

The contrasts between Malthus, Ricardo, and Marx are usually portrayed in terms of their substantive views on such issues as the population-resources problem. The more fundamental contrast, however, is surely one of method. Marx's method is usually called "dialectical materialism," but this phrase conveys little and conceals a lot. Fully to understand it requires some understanding of German critical philosophy and in particular that branch of it which most fully developed a non-Aristotelian view of the world—the most eminent representatives in this tradition being Leibniz, Spinoza, and Hegel. The nature of this non-Aristotelian view requires exposition.

Marx's use of language is, as Oilman has pointed out, relational rather than absolute[4]. By this he means that a "thing" cannot be understood or even talked about independently of the relations it has with other things. For example, "resources" can be defined only in relationship to the mode of production which seeks to make use of them and which simultaneously "'produces" them through both the physical and mental activity of the users. There is, therefore, no such thing as a resource in abstract or a resource which exists as a "thing in itself." This relational view of the world is fundamentally different from the usual and familiar Aristotelian view (characteristic of logical empiricism or Ricardian type model building) in which things are thought to have an essence of some sort and are, therefore, regarded as definable without reference to the relationships they have to other things.

On this basis Marx evolves certain fundamental assumptions regarding the way in which the world is structured and organized. Oilman suggests that: "The twin pillars of Marx's ontology are his conception of reality as a totality of internally related parts, and his conception of these parts as expandable relations such that each one in its fullness can represent the totality" [50, p. 495]. There are different ways in which we can think of such a totality. We may think of it as an aggregate of elements—a mere sum of parts—which enter into combination without being fashioned by any pre-existing relationships within the totality. The totality can alternatively be viewed as something "emergent[,J]; it has an existence independent of its parts while it also dominates and fashions the parts contained within it. But Marx's non-Aristotelian and relational view permits him a third view of the totality in which it is neither the parts nor the whole, but the relationships within the totality which are regarded as fundamental. Through these relationships the totality shapes the parts to preserve the whole. Capitalism, for

[4] Oilman, B. *Alienation: Marx's Conception of Man in Capitalist Society.* London: Cambridge University Press, 1971.

example, shapes activities and elements within itself to preserve itself as an on-going system. But conversely, the elements are also continually shaping the totality into new configurations as conflicts and contradictions within the system are of necessity resolved.

Marx rarely used the word totality to refer to everything there is. He usually focused on the "social" totality of human society, and within this totality he distinguished various structures. Structures are not "things" or "actions," and we cannot establish their existence through observation. The meaning of an observable act, such as cutting a log, is established by discovering its relation to the wider structure of which it is a part. Its interpretation will depend upon whether we view it in relation to capitalism or socialism, or whether we place it in relation to some quite different structure, such as the ecological system. To define elements relationally means to interpret them in a way external to direct observation; hence the departure from empiricism accomplished by relational modes of thought.

Within the social totality Marx distinguishes various structures[5], The "economic basis" of society comprises two structures—the forces of production (the actual activities of making and doing) and the social relations of production (the forms of social organization set up to facilitate making and doing). Marx thus distinguished between a technical division of labor and a social division of labor. In addition, there are various superstructural features: the structures of law, of politics, of knowledge and science, of ideology, and the like. Each structure is regarded as a primary element within the social totality and each is capable of a certain degree of autonomous development. But because the structures are all interrelated, a perpetual dynamism is generated out of the conflicts and interactions among them. For example, Marx sees a major contradiction between the increasing socialization of the forces of production (through the intricacies of the division of labor) and the private-property basis of consumption and ownership in capitalist society. Within this system of interacting structures, however, Marx accorded a certain primacy of place to the economic basis. In arguing thus, Marx usually appealed to the fact that man has to eat in order to live and that production-the transformation of nature—therefore has to take precedence over the other structures in a conflict situation. There is a deeper reason for the significance which Marx attached to the economic basis; it is here that the relationship between the natural and social aspects of life become most explicit.

Marx's conception of the man-nature relation is complex[6], At one level the human being is seen as a part of nature—an ensemble of metabolic relations involving constant sensuous interaction with a physical environment. At another level, human beings are seen as social—each as an ensemble of social relations [7]—and capable of creating forms of social organization which can become self-regulating and self-transforming.

[5] Godelier, M. *Rationality and Irrationality in Economics.* London: New Left Books, 1972.

[6] Ricardo, D. *Principles of Political Economy.* London: Cambridge University Press, 1951.

[7] Marx, K. *The Economic and Philosophic Manuscripts of 1844.* New York: International Publishers, 1964.

Society thereby creates its own history by transforming itself, but in the process the relationship with nature is also transformed. Under capitalism, for example:

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Nature becomes for the first time simply an object for mankind, purely a matter of utility; it ceases to be recognized as a power in its own right; and the theoretical knowledge of its independent laws appears only as a strategem designed to subdue it to human requirements, whether as the object of consumption or as the means of production. Pursuing this tendency, capital has pushed beyond national boundaries and prejudices, beyond the deification of nature and the inherited self-sufficient satisfaction of existing needs confined within well-defined bounds and [beyond] the reproduction of traditional ways of life. Capital is destructive of all this and permanently revolutionary, tearing down the obstacles that impede the development of productive forces, the expansion of need, the diversity of production and the exploitation and exchange of natural and intellectual forces *[24,* p. 94],

Marx saw the capitalist law of accumulation always pushing society to the limits of its potential social relations and to the limits of its natural resource base—continuously destroying the potential for "the exploitation and exchange of natural and intellectual forces." Resource limitations could be rolled back by technological change, but the tide of capitalist accumulation quickly spreads up to these new limits.

Marx also argued that capitalism had successfully brought society to the point where mankind could be free of nature in certain important material respects. Human beings are now in a position to *create* nature rather than mindlessly to alter it. Through the creation of nature—a creation that has to proceed through a knowledge and understanding of nature's own laws— human beings could be freed to discover their own essentially human nature within the system of nature. There is, for Marx, an enormous difference between this unalienated creation of nature and the mindless exploitation under capitalism which, in the haste to accumulate, is always concerned, as Engels has it, "only about the first tangible success; and then surprise is expressed that the more remote effects of actions directed to this end turn out to be of a quite different, mainly of an opposite, character" [3, p. 296].

In the final analysis, the conflict and contradiction between the system of nature and the social system could be resolved only by the creation of an appropriate and entirely new form of human practice. Through such a practice, human beings will "not only feel, but also know their unity with nature" and thereby render obsolete "the senseless and anti-natural idea of a contradiction between mind and matter, man and nature, soul and body" [3, p. 293].

Marx's methodology allows that knowledge and the processes of gaining understanding are internal to society. Subject and object are not regarded as independent entities but as relationships one to the other. This conception is very different indeed from that of traditional empiricism in which the subject is presumed to be "instructed by what is outside of him," or from that of a priorism and innatism (clearly implied in Ricardo's method) in which the subject "possesses from the start endogenous structures which

it imposes on objects" *[34,* p. 19]. Marx in fact fashions a methodology similar to the contructivism advanced by Piaget: "Whereas other animals cannot alter themselves except by changing their species, man can transform himself by transforming the world and can structure himself by constructing structures; and these structures are his own, for they are not entirely predestined either from within or without" [33, p. 118]. The subject is thus seen as both structuring and being structured by the object. As Marx puts it, "by thus acting on the external world and changing it, [man] at the same time changes his own nature" [23, Vol. 1, p. 175].

The thinking subject can create ideas in the imagination. But ideas have at some stage to leave the realms of abstract knowledge and to enter into human practice if they are to be validated. Once incorporated into human practice, concepts and ideas can become (via technology) a material force in production and can alter the social relations of production (through the creation of new modes of social organization). Although many ideas remain barren, some do not—"at the end of every labour process we get a result that already existed in the imagination of the labourer at its commencement."

Ideas are therefore regarded as social relations through which society can be structured and reconstructed. But concepts and categories are also produced under specific historical conditions which are in part internal to knowledge (the categories of thought handed down to us) and in part a reflection of the world in which knowledge is produced. The categories of thought available to us are, as it were, our intellectual capital which it is open to us to improve (or destroy). If, however, ideas are social relations, then it follows that we can gain as much insight into society through a critical analysis of the relations ideas express, as we can through a study of society as object. The analysis of ideas in Marx's work is as much directed to understanding the society that produced them as it is to understanding what it is they tell us about the reality they purport to describe. Marx is, thus, adopting a

 methodological framework that is perpetually revolving around the question: what is it that produces ideas and what is it that these ideas serve to produce?

Marx's substantive conclusions on the "population problem" are in part generated out of a vigorous criticism of writers such as Malthus and Ricardo. Marx set out to transform the categories handed down to him, for he saw that to do so was necessary if the realities of life were to be transformed. Marx traced the structure of Malthus' and Ricardo's thought back to their respective theories of value. Out of a criticism of these and other theories of value, Marx arrived at the theory of surplus value. Surplus value, he argued, originated out of surplus labor, which is that part of the laborer's working time that is rendered gratis to the capitalist. In order to obtain employment, a laborer may have to work ten hours. The laborer may produce enough to cover his own subsistence needs in six hours. If the capitalist pays a subsistence wage, then the laborer works the equivalent of four hours free for the capitalist. This surplus labor can be converted through market exchange into its money equivalent—surplus value.

And surplus value, under capitalism, is the source of rent, interest, and profit. On the basis of this theory of surplus value, Marx produces a distinctive theory of population.

If surplus value is to be ploughed back to produce more surplus value, then more money has to be laid out on wages and the purchase of raw materials and means of production. If the wage rate and productivity remain constant, then accumulation requires a concomitant numerical expansion in the labor force—"accumulation of capital is, therefore, increase of the proletariat" *[23,* Vol. 1, p. 614], If the labor supply remains constant, then the increasing demand for labor generated by accumulation will bring about a rise in the wage rate. But a rise in the wage rate means a diminution of surplus value, falling profits, and, as a consequence, a slower rate of accumulation. But:

this diminution can never reach the point at which it would threaten the system itself ... Either the price of labour keeps on rising, because its rise does not interfere with the progress of accumulation ... Or accumulation slackens in consequence of the rise in the price of labour, because the stimulus of gain is blunted. The mechanism of the process of capitalist production removes the very obstacles that it temporarily creates *[23,* Vol. 1. p. 619].

Under these conditions, the "law of capitalist production" that is at the bottom of the "pretended natural law of population" reduces itself to a relationship between the rate of capitalist accumulation and the rate of expansion in the wage-labor force. This relationship is mediated by technical change, and the increasing social productivity of labor can also be used as "a powerful lever of accumulation" *[23,* Vol. 1, p. 621]. The use of this lever permits an expansion of surplus value through a growing substitution of capital for labor in the production process. Marx then proceeds to show how these processes combine to create a "law of population peculiar to the capitalist mode of production," adding that "in fact every special historic mode of production has its own special laws of population, historically valid within its limits alone" *[23,* Vol. 1, pp. 632-33]. Here we can see a major departure from the thought of both Malthus and Ricardo who attributed to the law of population a "universal" and "natural" validity.

Marx largely confines attention to the law of population operative under capitalism. He points out that the laboring population produces both the surplus and the capital equipment, and thereby produces the means "by which it itself is made relatively superfluous" *[23,* Vol. 1, p. 632]. He then goes on to say:

If a surplus labouring population is a necessary product of accumulation or of the development of wealth on a capitalist basis, this surplus population becomes, conversely, the lever of capitalist accumulation, nay a condition of existence of the capitalist mode of production. It forms a disposable industrial reserve army, that belongs to capital quite as absolutely as if the latter had bred it at its own cost. Independently of the limits of the actual increase of population, it creates for the changing needs of the self-expansion of capital, a mass of human material always ready for exploitation *[23,* Vol l,p. 632],

This relative surplus population has, however, another vital function—it prevents wages rising and thereby cutting into profits:

The industrial reserve army, during the periods of stagnation and average prosperity, weighs down the active labour army; during the periods of overproduction and paroxysm, it holds its pretensions in check. Relative surplus population is therefore the pivot around which the law of supply and demand of labour works. It confines the field of action of this law within the limits absolutely convenient to the activity of exploitation and to the domination of capital *[23,* Vol. l,p. 632].

The production of a relative surplus population and an industrial reserve army are seen in Marx's work as historically specific, as internal to the capitalist mode of production. On the basis of his analysis we can predict the occurrence of poverty no matter what the rate of population change. Marx explicitly recognizes, however, that a high rate of capital accumulation is likely to act as a general stimulus to population growth; it is likely that laborers will try to accumulate the only marketable commodity they possess, labor power itself *[23,* Vol. 3, p. 218]. Marx was not arguing that population growth per se was a mechanical product of the law of capitalist accumulation, nor was he saying that population growth per se did not affect the situation. But he was arguing very specifically, contra the position of both Malthus and Ricardo, that the poverty of the laboring classes was the inevitable product of the capitalist law of accumulation. Poverty was not, therefore, to be explained away by appeal to some natural law. It had to be recognized for what it really was—an endemic condition internal to the capitalist mode of production.

Marx does not talk about a population problem but a poverty and human exploitation problem. He replaces Malthus' concept of overpopulation by the concept of a relative surplus population. He replaces the inevitability of the "pressure of population on the means of subsistence" (accepted by both Malthus and Ricardo) by an historically specific and necessary pressure of labor supply on the means of employment produced internally within the capitalist mode of production. Marx's distinctive method permitted this reformulation of the population-resources problem, and put him in a position from which he could envisage a transformation of society that would eliminate poverty and misery rather than accept its inevitability.

Methodology and the population-resources relation

The contrasts between Malthus, Ricardo, and Marx are instructive for a variety of reasons. Each makes use of a distinctive method to approach the subject material. Marx utilizes a non-Aristotelian (dialectical) framework which sets him apart from Ricardo and Malthus who, in turn, are differentiated from each other by the use of abstract analytics and logical empiricism, respectively. Each method generates a distinctive kind of conclusion. Each author also expresses an ideological position, and, at times, it seems as if each utilizes that method which naturally yields the desired result. The important conclusion, however, is that the method adopted and the nature of the result are integrally related.

It is surprising, therefore, to find so little debate or discussion over the question of method for dealing with such a complex issue as the populationresources relation. Here the ethical neutrality assumption appears to be a major barrier to the advance of scientific enquiry, for if it is supposed that all scientific methods are ethically neutral, then debates over methodology scarcely matter. The materials on the population-resources relation published in recent years suggest that the Aristotelian legacy is dominant: we still usually "think Aristotle" often without knowing it. Yet the Aristotelian cast of mind seems ill-suited for dealing with the population-resources relation, and so there has been a methodological struggle internal to the Aristotelian tradition to overcome the limitations inherent in it. There has been, as it were, a convergence toward Marx without overthrowing the Aristotelian trappings. Marx accepts that the appropriate method to deal with the

MALTHUSIANISM, OVERPOPULATION & LIMITS TO GROWTH population-resources relation has to be holistic, system-wide in its compass, capable of handling dynamics (feedbacks in particular), and, most important of all, *internally dynamic* in that it has to be capable of producing new concepts and categories to deal with the system under investigation and, through the operationalization of these new concepts and categories, change the system from within. It is this last feature that gives to Marx's work its dialectical quality. Most contemporary investigations of the population-resources relation recognize all of Marx's requirements save the last, and rely upon systems theory for their methodological foundation. Systems-theoretic formulations are sophisticated enough (in principle) to do everything that Marx sought to do except to transform concepts and categories dialectically, and thereby to transform the nature of the system from within. Some examples will bear out this point.

Kneese *et al.*[8] adopt what they call a "materials balance" approach to the population-resources relation which is, in effect, a two-stage input-output model. The first stage describes the flows within the economy; the second stage describes the flows within the ecological system; and the two systems are linked by the physical principle that matter can neither be created nor destroyed. The model is descriptive in the sense that the coefficients have to be estimated from empirical data, but experimentation on the model is possible by examining the sensitivity of results to changes in the coefficients.

In the study by Meadows *et al.*[9] methods derived from systems dynamics are used; a system of difference equations is simulated to indicate future outcomes of popula-

[8] These estimates are based on 1986 statistics from WRI and IIED, *World Resources, 1988-89* (Basic Books, New York, 1988). Note that the assumptions in the statement include that energy-use differentials will remain the same as the babies grow up, and that technological changes will be parallel in all nations. Statistics are also very rough estimates, especially in the poorer nations, and a disproportionately larger fraction of damage from energy use is likely to come from *non-commercial* energy use (such as agricultural burning and the gathering of fuelwood by individual families). None of this changes the validity of the basic point.

[9] Meadows, D. H,, D. L. Meadows, J. Randers, and W. W. Behrens, *The Limits to Growth.* New York: Universe Books, 1972.

tion growth, industrial expansion, resource use (both renewable and non-renewable), and environmental deterioration. The system in this case incorporates feedbacks (both positive and negative) and is, in contrast to that of Kneese *et al.*, oriented to development through time. The Meadows model has come in for a great deal of criticism and a team from the University of Sussex [10] has examined the model in detail. They reformulated it in certain important respects; showed some of the problems inherent in the data used to estimate the equations; and concluded that some unnecessarily pessimistic assumptions were injected into the Meadows model.

The essential point to note, however, is that *all* of these formulations lead to neo-Malthusian conclusions; strongly voiced in the Meadows model; somewhat muted in the case of Kneese *et al.* (who speak of the *new* Malthusianism); and long run in the case of the Sussex team's investigation (rather like Ricardo they seem to suggest that the stationary state is inevitable but a long way off).

The neo-Malthusian results of these studies can be traced back to the Aristotelian form in which the question is posed and the answers constructed. And it is, of course, the ability to depart from the Aristotelian view that gets Marx away from both the short run and long run inevitabilities of neo-Malthusian conclusions. Marx envisages the production of new categories and concepts, of new knowledge and understanding, through which the relationships between the natural and social system will be mediated. This relational and dialectical view of things comes closest to impinging upon traditional concerns with respect to the problem of technological change. It has, of course, long been recognized that Malthus was wrong in his specific forecasts because he ignored technological change. Ricardo saw the possibilities of such change, but in the long run he saw society inevitably succumbing to the law of diminishing returns. The difference between the Meadows model and the Sussex team's refashioning of it is largely due to the pessimism of the former and the optimism of the latter. In all of these cases, technological change is seen as something external to society—an unknown that cannot be accounted for. But, for Marx technological change was both internal to and inevitable within society; it is the product of human creativity, and stems from the inevitable transformation of the concepts and categories handed down to us. Only if we let ourselves be imprisoned within the system of knowledge handed down to us will we fail to innovate. Further, it is unnecessarily restrictive to think that human inventiveness and creativity apply only in the sphere of technology—human beings can and do create social structures as well as machines. This process Marx regards as essential and inevitable precisely because man could and would respond to the necessities of survival. The only danger lies in the tendency to place restrictions on ourselves and, thereby, to confine our own creativity. In other words, if we become the prisoners of an ideology, prisoners of the concepts and categories handed down to us, we are in danger of making the neo-Malthusian conclusions true, of making environmental determinism a condition of our existence.

[10] Cole, H. S. D., C. Freeman, M. Jahoda, and K. L. R. Pavitt. *Thinking about the Future: A*

It is from this standpoint that Marx's method generates quite different perspectives and conclusions from those generated by simple logical empiricism, Ricardian type normative analytics, or contemporary systems theory. Let me stress that I am not arguing that the latter methods are illegitimate or erroneous. Each is in fact perfectly appropriate for certain domains of enquiry. Logical empiricism has the capacity to inform us as to what is, given an existing set of categories. Insofar as we make use of this method, we are bound to construct what I have elsewhere called a *status quo* theory[11]. The Aristotelian manner in which normative, analytical model building proceeds yields "ought-to" prescriptive statements, but the categories and concepts are idealized, abstracted, and *stationary* tools imposed upon a changing world. Systems theory is a more sophisticated form of modelling relying upon various degrees of abstraction and a varying empirical content. Dialectical materialism, in the manner that Marx used it, is "constructivist" in that it sees change as an internally generated necessity that affects categories of thought and material reality alike. The relationships between these various methods are complex. The methods are not, obviously, mutually exclusive of each other; but different methods appear appropriate for different domains of enquiry. And it is difficult to see how anything other than a relational, constructivist, and internally dynamic method can be appropriate for looking into the future of the population-resources relation, particularly when it is so evident that knowledge and understanding are such important mediating forces in the construction of that future. Results arrived at by other means may be of interest, only if they are set within the broader interpretive power provided by Marx's method. All of this would be a mere academic problem (although one of crucial significance) were it not for the fact that ideas are social relations, and the Malthusian and neo-Malthusian results arrived at (inevitably) by means of other methods are projected into the world where they are likely to generate immediate political consequences. And it is to these consequences that we now turn.

The political implications of population-resources theory

At the Stockholm Conference on the Environment in 1972, the Chinese delegation asserted that there was no such thing as a scarcity of resources and that it was meaningless to discuss environmental problems in such terms. Western commentators were mystified and some concluded that the Chinese must possess vast reserves of minerals and fossil fuels the discovery of which they had not yet communicated to the world. The Chinese view is, however, quite consistent with Marx's method and should be con-

Critique of the Limits to Growth, London: Chatto and Windus, 1973.

[11] Harvey, D. *Social Justice and the City.* Baltimore: Johns Hopkins Press, 1973.

sidered from such a perspective. To elucidate it we need to bring into our vocabulary three categories of thought:

(1) *Subsistence.* Malthus appears to regard subsistence as something absolute, whereas Marx regards it as relative. For Marx, needs are not purely biological; they are also socially and culturally determined[12], Also, as both Malthus and Marx agree, needs can be created, which implies that the meaning of subsistence cannot be established independent of particular historical and cultural circumstances if, as Marx insisted, definitions of social wants and needs were produced under a given mode of production rather than immutably held down by the Malthusian laws of population. Subsistence is, then, defined internally to a mode of production and changes over time.

(2) *Resources.* Resources are materials available "in nature" that are capable of being transformed into things of utility to man. It has long been recognized that resources can be defined only with respect to a particular technical, cultural, and historical stage of development, and that they are, in effect, technical and cultural appraisals of nature [4; 39],

(3) *Scarcity.* It is often erroneously accepted that scarcity is something inherent in nature, when its definition is inextricably social and cultural in origin. Scarcity presupposes certain social ends, and it is these that define scarcity just as much as the lack of natural means to accomplish these ends[13]. Furthermore, many of the scarcities we experience do not arise out of nature but are created by human activity and managed by social organization (the scarcity of building plots in central London is an example of the former;

the scarcity of places at university is an example of the latter). Scarcity is in fact necessary to the survival of the capitalist mode of production, and it has to be carefully managed, otherwise the self-regulating aspect to the price mechanism will break down[14],

Armed with these definitions, let us consider a simple sentence- "Overpopulation arises because of the scarcity of resources available for meeting the subsistence needs of the mass of the population." If we substitute our definitions into this sentence we get: "There are too many people in the world because the particular ends we have in view (together with the form of social organization we have) and the materials available in nature, that we have the will and the way to use, are not sufficient to provide us with those things to which we are accustomed." Out of such a sentence all kinds of possibilities can be extracted:

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[12] Brown M. and Goldin, I., *The Future of Agriculture, Developing Country Implications (Paris-.* OECD, 1992).

[13] Pearson, H. "The Economy Has No Surplus: A Critique of a Theory of Development," in K. Polanyi, C. M. Arensberg, and H. W. Pearson. *Trade and Market in Early Empires.* Glencoe, Illinois: Free Press, 1957.

[14] Harvey, D. *Social Justice and the City.* Baltimore: Johns Hopkins Press, 1973.

(1) we can change the ends we have in mind and alter the social organization of scarcity;

(2) we can change our technical and cultural appraisals of nature;

(3) we can change our view's concerning the things to which we are accustomed;

(4) we can seek to alter our numbers.

A real concern with environmental issues demands that all of these options be examined in relation to each other. To say that there are loo many people in the world amounts to saying that we have not the imagination, will, or ability to do anything about propositions (1), (2), and (3). In fact (1) is very difficult to do anything about because it involves the replacement of the market exchange system as a working mode of economic integration; proposition (2) has always been the great hope for resolving our difficulties; and we have never thought too coherently about (3) particularly as it relates to the maintenance of an effective demand in capitalist economies (nobody appears to have calculated what the effects of much reduced personal consumption will have on capital accumulation and employment).

I will risk the generalization that nothing of consequence can be done about (1) and (3) without dismantling and replacing the capitalist market exchange economy. If we are reluctant to contemplate such an alternative and if (2) is not performing its function too well, then we have to go to (4). Much of the debate in the western world focusses on (4), but in a society in which all four options can be integrated with each other, it must appear facile to discuss environmental problems in terms of naturally arising scarcities or overpopulation—this, presumably, is the point that the Chinese delegation to the Stockholm Conference was making.

The trouble with focusing exclusively on the control of population numbers is that it has certain political implications. Ideas about environment, population, and resources are not neutral. They are political in origin and have political effects. Historically it is depressing to look at the use made of the kind of sentence we have ju& analyzed. Once connotations of absolute limits come to surround the concepts of resource, scarcity, and subsistence, then an absolute limit is set for population. And what are the political implications (given these connotations) of saying there is "overpopulation" or a "scarcity of resources"? The meaning can all too quickly be established. Somebody, somewhere, is redundant, and there is not enough to go round. Am *I* redundant? Of course not. Are *you* redundant? Of course not. So who is redundant? Of course, it must be *them.* And if there is not enough to go round, then it is only right and proper that *they,* who contribute so little to society, ought to bear the brunt of the burden. And if we hold that there are certain of *us* who, by virtue of our skills, abilities, and attainments, are capable of "conferring a signal benefit upon mankind" though our contributions to the common good and who, besides, are the purveyors of peace, freedom, culture, and civilization, then it would appear to be our bound duty to protect and preserve ourselves for the sake of all mankind.

Let me make an assertion. Whenever a theory of overpopulation seizes hold in a society dominated by an elite, then the non-elite invariably experience some form of

political, economic, and social repression. Such an assertion can be justified by an appeal to the historical evidence. Britain shortly after the Napoleonic Wars, when Malthus was so influential, provides one example. The conservation movement in the United States at the turn of this century was based on a gospel of efficiency that embraced natural resource management and labor relations alike. The combination of the Aryan ethic and the need for increased lebensraum produced particularly evil results in Hitler's Germany. The policy prescriptions that frequently attach to essays on the problems of population and environment convey a similar warning. Jacks and Whyte[15], writing in the twilight years of the British Empire, could see only one way out of the scarcity of land resources in Africa:

A feudal type of society in which the native cultivators would to some extent be tied to the lands of their European overlords seems most generally suited to meet the needs of the soil in the present state of African development ... It would enable the people who have been the prime cause of erosion [the Europeans] and who have the means and ability to control it to assume responsibility for the soil. At present, humanitarian considerations for the natives prevent Europeans from winning the attainable position of dominance over the soil [77, p. 276].

Such direct apologetics for colonialism sound somewhat odd today.

Vogt, whose book *The Road to Survival* appeared in 1948, saw in Russian overpopulation a serious military and political threat. He argued that the Marshall Plan of aid to Europe was the result of an unenviable choice

POPULATION, RESOURCES AND THE IDEOLOGY OF SCIENCE between allowing the spread of communism and providing international welfare, which would merely encourage population increase. He also points to the expendability of much of the world's population:

There is little hope that the world will escape the horror of extensive famines in China within the next few years. But from the world point of view, these may be not only desirable but indispensable. A Chinese population that continued to increase at a geometric rate could only be a global calamity. The mission of General Marshall to this unhappy land was called a failure. Had it succeeded, it *mi*ght well have been a disaster *[41,* p. 238].

It is ironic indeed that this prediction was published in the very year that Mao Tse-tung came to power and sought, in true dialectical fashion, to transform China's problem into a solution through the mobilization of labor power to create resources where there had been none before. The resultant transformation of the Chinese earth (as Buchanan[16] calls it) has eliminated famine, raised living standards, and effectively eliminated hunger and material misery.

[15] It may well be more 'natural' for nature to be perpetually out of balance, displaying wild cycles with great regularity.

[16] Harvey, D. *Social Justice and the City.* Baltimore: Johns Hopkins Press, 1973.

It is easier to catch the political implications of overpopulation arguments in past eras than it is in our own. The lesson which these examples suggest is simply this: if we accept a theory of overpopulation and resource scarcity but insist upon keeping the capitalist mode of production intact, then the inevitable results are policies directed toward class or ethnic repression at home and policies of imperialism and neo-imperialism abroad. Unfortunately this relation can be structured in the other direction. If, for whatever reason, an elite group requires an argument to support policies of repression, then the overpopulation argument is most beautifully tailored to fit this purpose. Malthus and Ricardo provide us with one example of such apologetics. If a poverty class is necessary to the processes of capitalist accumulation or a subsistence wage essential to economic equilibrium, then what better way to explain it away than to appeal to a universal and supposedly "natural" law' of population?

Malthus indicates another kind of apologetic use for the population principle. If an existing social order, an elite group of some sort, is under threat and is fighting to preserve its dominant position in society, then the overpopulation and shortage of resources arguments can be used as powerful ideological levers to persuade people into acceptance of the status quo and of authoritarian measures to maintain it. The English landed interest used Malthus' arguments thus in the early nineteenth century. And this kind of argument is, of course, even more effective if the elite group is in a position to create a scarcity to demonstrate the point.

The overpopulation argument is easily used as part of an elaborate apologetic through which class, ethnic, or (neo-) colonial repression may be justified. It is difficult to distinguish between arguments that have some real foundation and arguments fashioned for apologetic reasons. In general the two kinds of arguments get inextricably mixed up. Consequently, those who think there is a real problem of some sort may, unwittingly, contribute strength to the apologists, and individuals may contribute in good faith to a result which, as individuals, they might find abhorrent.

And what of'the contemporary ecology and environmental movement? I believe it reflects all of the currents I have identified, but under the stress of contemporary events it is difficult to sort the arguments out clearly. There are deep structural problems to the capitalist growth process (epitomized by persistent "stagflation" and international monetary uncertainties). Adjustments seem necessary. The welfare population in America is being transformed from a tool for the manipulation of effective demand (which was its economic role in the 1960s) into a tool for attacking wage rates (through the work-fare provision)—and Malthus' arguments are all being used to do it. Wage rates have been under attack, and policies for depressing real earnings are emerging in both America and in Europe to compensate for falling rates of profit and a slowdown in the rate of capital accumulation. There can be no question that the existing social order perceived itself to be under some kind of threat in the late 1960s (particularly in France and the U.S.A., and now in Britain). Was it accidental that the environmentalist argument emerged so strongly in 1968 at the crest of campus disturbances? And what was the effect of replacing Marcuse by Ehrlich as campus hero? Conditions

appear to be exactly right for the emergence of overpopulation arguments as part of a popular ideology to justify what had and what has to be done to stabilize a capitalist economic system that is under severe stress.

But at the same time there is mounting evidence (which has in fact been building up since the early 1950s) of certain ecological problems that now exist on a world-wide as opposed to on a purely local scale (the DDT example being the most spectacular). Such problems are real enough. The difficulty, of course, is to identify the underlying reason for the emergence of these difficulties. There has been some recognition that consumption patterns induced under capitalism may have something to do with it, and that the nature of private enterprise, with its predilection for shifting costs onto society in order to improve the competitive position of the firm, also plays a role [17], And there is no question that runaway rates of population growth (brought about to a large degree by the penetration of market and wage-labor relationships into traditional rural societies) have also played a role. But in their haste to lay the origin of these problems at the door of "overpopulation" (with all of its Malthusian connotations), many analysts have unwittingly invited the politics of repression that invariably seem to be attached to the Malthusian argument at a time when economic conditions are such as to make that argument extremely attractive to a ruling elite.

Ideas are social relations; they have their ultimate origin in the social concerns of mankind and have their ultimate impact upon the social life of mankind. Arguments concerning environmental degradation, population growth, resource scarcities, and the like can arise for quite disparate reasons and have quite diverse impacts. It is therefore crucial to establish the political and social origins and impacts of such arguments. The political consequences of injecting a strongly pessimistic view into a world structured hierarchically along class and ethnic lines and in which there is an ideological commitment to the preservation of the capitalist order are quite terrifying to contemplate. As Levi-Strauss warns in *Tristes Tropiques'.*

Once men begin to feel cramped in their geographical, social and mental habitat, they are in danger of being tempted by the simple solution of denying one section of the species the right to be considered human *[17,* p. 401].

Conclusions

Twentieth century science in the western world is dominated by the tradition of Aristotelian materialism. Within that tradition, logical empiricism, backed by the philosophical strength of logical positivism, has provided a general paradigmatic basis for scientific enquiry. More recently the "model builders" and the "systems theorists" have come to play a larger role. All of these methods are destined to generate Malthusian or neo-Malthusian results when applied to the analysis of global problems in the popula-

[17] Kapp, K. W. *The Social Costs of Private Enterprise.* Cambridge, Massachusetts: Harvard University Press, 1950.

tionresources relation. Individual scientists may express optimism or pessimism about the future, while the results of scientific investigation may indicate the inevitable stationary state to be far away or close at hand. But, given the nature of the methodology, all the indicators point in the same direction.

The political consequences that flow from these results can be serious. The projection of a neo-Malthusian view into the politics of the time appears to invite repression at home and neo-colonial policies abroad. The neo- Malthusian view often functions to legitimate such policies and, thereby, to preserve the position of a ruling elite. Given the ethical neutrality assumption and the dominant conception of scientific method, all a ruling elite has to do to generate neo-Malthusian viewpoints is to ask the scientific community to consider the problems inherent in the population-resources relation. The scientific results are basically predetermined, although individual scientists may demur for personal "subjective" reasons.

It is, of course, the central argument of this paper that the only kind of method capable of dealing with the complexities of the population-resources relation in an integrated and truly dynamic way is that founded in a properly constituted version of dialectical materialism.

This conclusion will doubtless be unpalatable to many because it *sounds* ideological to a society of scholars nurtured in the belief that ideology is a dirty word. Such a belief is, as I have pointed out, ideological. Further, failure to make use of such a method in the face of a situation that all regard as problematic, and some regard as bordering on the catastrophic, is to court ignorance on a matter as serious as the survival of the human species. And if ignorance is the result of the ideological belief that science is and ought to be ideology free, then it is a hidden ideology that is the most serious barrier to enquiry. And if, out of ignorance, we participate in the politics of repression and the politics of fear, then we are doing so largely as a consequence of the ideological claim to be ideology free. But then, perhaps, it was precisely that participation that the claim to be ideology free was designed to elicit all along.

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