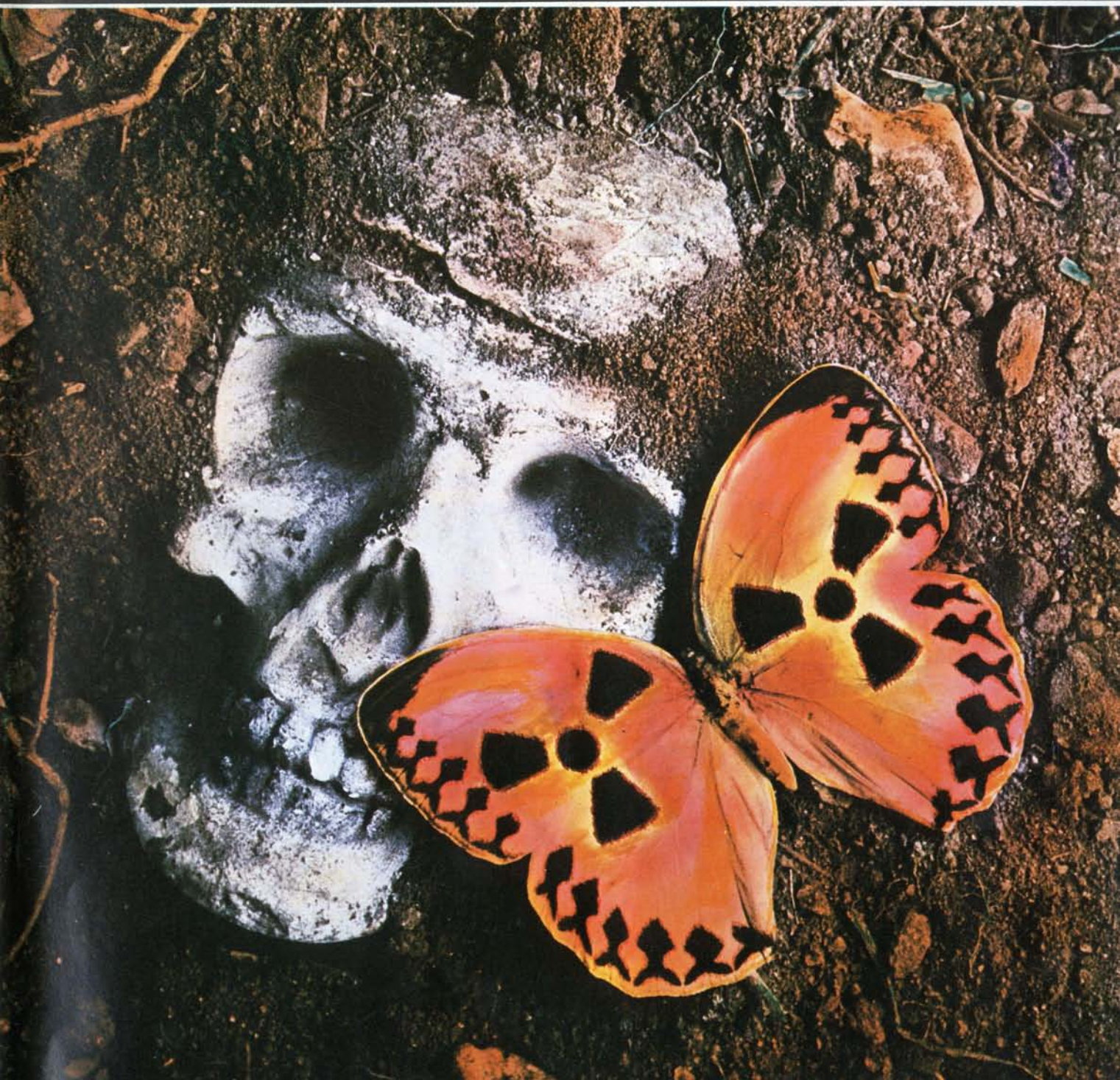


The Ecologist

Journal of the Post Industrial Age Nos. 6/7 July-Aug-Sept 80p

10th Anniversary





Maria Parsons Managing Editor



Katherine James Layout and Design.



Hilary Datchens Secretary to the Editors

Ecologist Office Staff

Subscription Department.

Jayne Rickard



Mandy Rickard



<i>Edward Goldsmith</i>	Editorial	
	Preparing for the Collapse	186

Comments on the last ten years, the present and the future

<i>Robert Allen</i>	How to Save the World	190
<i>Michael Allaby</i>	The thoughts underlying IUCN's World Conservation Strategy	
<i>Andrew MacKillop</i>	Malthus Reinterred	195
	Development is after all the only answer to world poverty	
<i>Nicholas Hildyard</i>	Reaction against Alternative Energy	200
<i>Peter Bunyard</i>	Alternative energy for the Third World, a conspiracy to permit the West to have all the oil	
	Laying Optimism to Rest	203
	Things are too far gone to prevent socio-economic breakdown	
<i>Jimoh Omo-Fadaka</i>	Where Do We Go From Here?	208
	Three new books serve to confirm that the only real answer to the energy crisis is to use less energy	
<i>Lawrence Hills</i>	Ethnic Diversity or Mono-Culturalism	212
<i>Sam Love</i>	If peace is to return to Africa, State frontiers must be changed to reflect ethnic realities	
<i>Nicholas Gould</i>	Ten Years Ago — Twenty To Go	214
	The Ecologist, its achievements and its role in an uncertain future	
	Rethinking Tomorrow	218
	The extravagant predictions of our techno-maniacs are not materialising	
	Gulliver in Automobilia	223
	In which Gulliver describes the folly of the Automobilians	

Replacing the Scientific World View

<i>Robert Waller</i>	Scientific Materialism	224
	Once we have rejected the world view of 'scientific materialism' real 'human progress' will be possible	
<i>Vince Taylor</i>	Subjectivity and Science	230
	Scientific method based on the accumulation of quantitative data does not permit the understanding of complex world processes.	
<i>Edward Goldsmith</i>	The Ecology of Health	235
	To improve a nation's health can only be done by creating social and ecological conditions that most favour it. To do this means changing the course on which our society is set.	

Reports

<i>Nicholas Kollerstrom</i>	The Lawther Report: Whitewashing leaded petrol	246
<i>Dr Roger Thomas</i>	2,4,5-T cover-up by the MAAF	249
<i>Gareth Wardell</i>		
<i>Dr Alan Williams</i>		

ECOpolitics

<i>Peter Wood</i>	The Greens in Germany	251
	Nupe against Nuke	

Books

Cover photo by Terry Why
Cover design by Mike Frost

Note: While every care is taken with manuscripts submitted for publication, the Editors cannot guarantee to return those not accepted. Articles published in the Ecologist do not necessarily express the views of the Editors.

Published by Edward Goldsmith, Ecosystems Ltd, 73 Molesworth Street, Wadebridge, Cornwall PL27 7DS, UK.

Editors: Edward Goldsmith, Nicholas Hildyard. Managing Editor: Maria Parsons.

Book Review Editor: Ruth Lumley-Smith. Design: Katherine James

Associate Editors: Robert Allen, Peter Bunyard, Brian Johnson, Bernard Gilbert, Jimo Omo-Fadaka, Andrew MacKillop, Robert Waller, Lawrence Hills, John Papworth, Nicholas Gould, Raymond Dasmann, Richard Wilson, John Milton (USA), Henryk Skolimowski (USA), Manfred Siebker, Sigmund Kvaløy (Norway).

ISSN 0141-6952

The Ecologist Vol. 10 Nos. 6/7 July/Aug/Sept 1980

Advertising: Maria Parsons
73 Molesworth Street,
Wadebridge,
Cornwall.
Tel: 020-881-2996

Printed by: Penwell Ltd
Parkwood, Callington
Cornwall.



1970



1975



1980



Editorial

by

Edward Goldsmith

It is now ten years since we produced the first issue of *The Ecologist* and it is time to take stock. In the last ten years, general attitudes have changed among a lot of people but *not* among the bulk of our scientists and economists who — incredible as it may seem — still fail to understand the basic features of our relationship with the world we live in, nor among our political leaders, who have still failed to make any significant moves to reduce the impact of our activities on our natural environment and hence to help solve the problems that confront us.

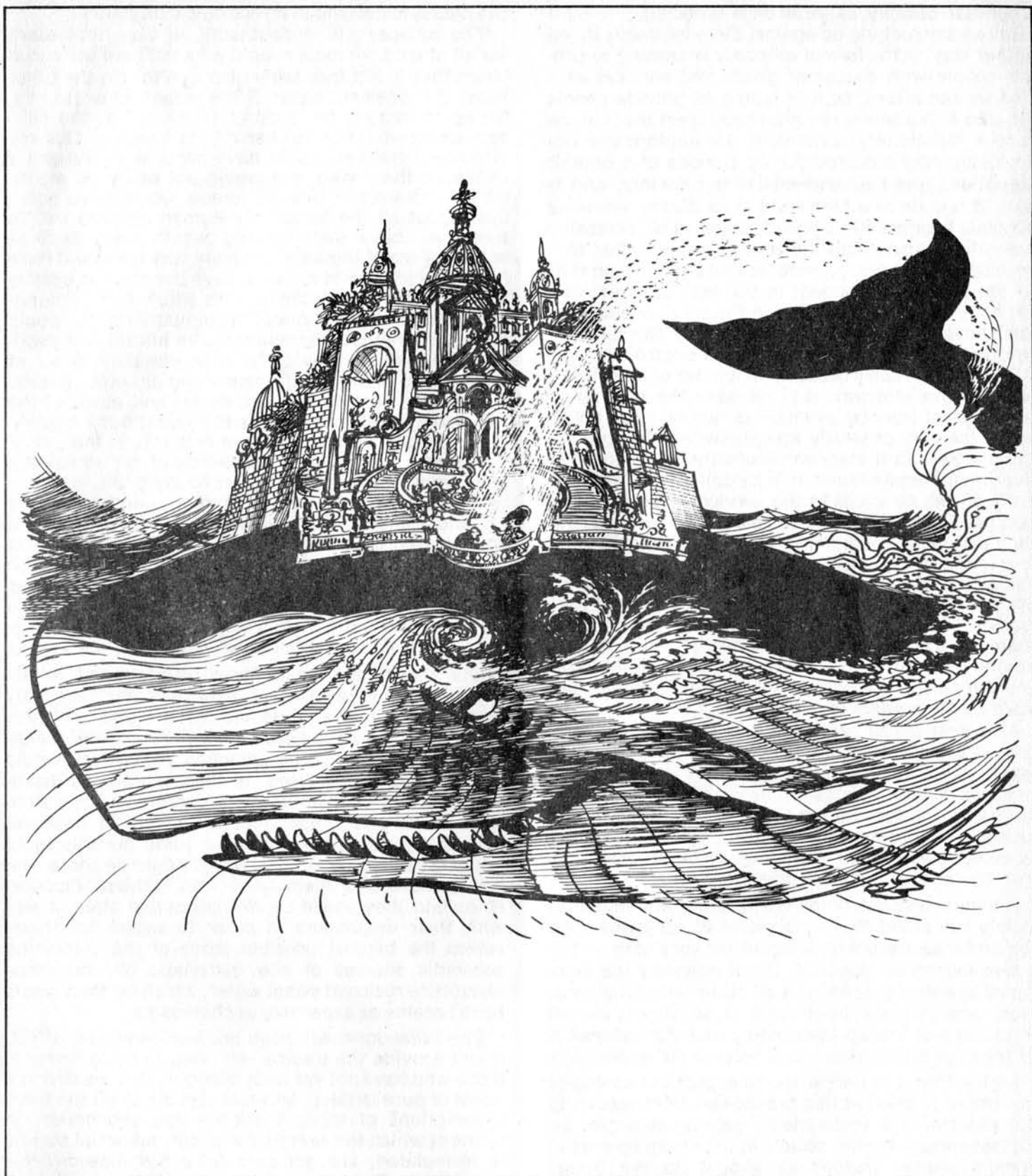
The goal of just about every country in the world today remains the maximisation of GNP regardless of the destruction this must cause to their social and physical environment, and not surprisingly such destruction has continued unabated.

What is new, however, is that this destruction is now noticeably affecting our economic activities. The biological, social and ecological costs that we thought could be incurred with impunity are being translated into economic costs. Nature is at last hitting back, hence the new inflation which differs from the normal type, in that, rather than occur exclusively during periods of boom, it is occurring today during a period of economic stagnation, thereby giving rise to a new situation increasingly referred to as 'stagflation'.

It is easy to see why biospheric costs should be translated into economic ones. Thus our social fabric has been so seriously eroded in recent years that vast sums of money are now required, on a *permanent basis*, not just during boom times, to pay for institutions to which criminals, delinquents, vandals, drug addicts, alcoholics and other victims of social deprivation, can be consigned. Our health has been so seriously impaired by eating devitalised and contaminated foods, by drinking polluted water and breathing the poisonous air of our cities that, both in periods of prosperity and in those of depression, thousands of millions of pounds must be spent on health services.

We have exhausted most economic sources of the key materials entering into the industrial process and are thereby forced to exploit ever less economic ones. Soon, we are told, we will have to obtain water by towing in icebergs from the Arctic, manganese and copper by dredging the floor of the Pacific, natural gas by extracting it from the atmosphere of the planet Neptune, molybdenum by mining it on the moon, and nickel by importing it from the Asteroids. Needless to say, the 'experts', who tell us this, live in a world of their own. The cost of a mini-minor made with materials obtained from such sources, would run into hundreds of thousands if not millions of pounds — certainly not less. I doubt if Sir Michael Edwards would relish the job of having to sell them, especially in the times we live in today.

People seem to have forgotten that it is not just



"Fear not, my Liege, merely a sprinkling of rain. Your Majesty's Fair Land will Ne'er be Inundated."

resources that are required to maintain an industrial society but *cheap resources*. The post-war boom was built up on cheap oil at one dollar fifty a barrel. At forty dollars a barrel, the boom would never have occurred. Nor at that price, can the world industrial system of today expand any further. Only a few rich countries, such as Japan and West Germany, can afford to pay for their oil. The US cannot. They will find it increasingly difficult to fork up the ninety billion dollars a year required to pay for the oil they are today importing, let alone the much greater quan-

ties they would require if their industry were to continue expanding even at the present low rate. It is indeed unlikely that the next boom will occur until oil prices have fallen fairly substantially.

Once the price of all the key inputs into the industrial process have increased as oil has done, however, further economic growth must be impossible. Indeed, the whole industrial process must then go into reverse.

Al this means that we are running up against the 'Limits to growth' *indirectly* via the price mechanism,

rather than *directly*, as we all once expected.

But we are running up against them indirectly in yet another way. If the formal economy is ceasing to provide people with consumer goods and services at a price we can afford, so it is failing to provide people with jobs at the salary required to support them in the present inflationary conditions. Unemployment has previously only occurred during periods of economic stagnation. It is now endemic to our society, and is likely to remain at a high level even during whatever economic booms still lie ahead. Because of increasing automation, manufacturing industries, *whether they are successful or not*, provide less jobs today than they did ten years ago. Indeed, in the last decades, new jobs have only been provided in the service industries which have been relatively unautomated. But it is now their turn to be hit. Indeed, the micro-electronics revolution must seriously reduce the number of jobs in this sector of the economy, and increase the number of people out of work by as much as two or three times.

Now the only generally acceptable way to fight unemployment, in a stagnant economy, is to increase government expenditure. It is by doing this that practically all the new jobs in the service industries have been provided in the last ten years. This was possible when the government only spent a fraction of GNP. It is no longer today when our government spends more than 50 per cent of GNP. To further increase expenditure would mean further increasing taxes on the 'productive' sector of the economy further reducing investment and thereby employment. It could thereby provide jobs in the non-productive sector of the economy *but only at the cost of reducing the number provided by the productive sector*.

Also, one might ask, where will the money come from to provide so many people with unemployment benefits? In the UK we are already spending five thousand million pounds in this way. Can the government afford to fork up ten to fifteen thousand million pounds? It is extremely doubtful, at least without reducing government spending in other areas *and thereby causing still more unemployment*.

We must also ask ourselves whether any industrial society can stand the combination of run-away inflation and massive unemployment for very long — this is also extremely doubtful. Since precisely the same trends are also occurring in all other industrial countries, what we are faced with is an almost certain breakdown of the world economy and the collapse of all those societies that have become its appendage.

I think that it is unrealistic to expect the ecological movement to prevent this breakdown from occurring. Our movement is undoubtedly gaining strength, but not fast enough to shift society in time from its present suicidal course. Instead we should do two things. Firstly, fight a holding action by every means at our disposal against the developers and polluters. Remember that time is on our side, if, for instance, we can put off the building of a nuclear power station for but a few years this may be sufficient to prevent it from materialising. Every year, the extravagant claims of the nuclear lobby are becoming less credible, the insidious pollution caused by the installations they put up become better documented, the demand for electricity is further reduced and less money becomes available for nuclear developments.

The second thing we should do is *prepare for the collapse* and work out how, after it has occurred, we can influence the social groups that will emerge from

the debris to develop in an ecological direction.

The collapse will undoubtedly be very unpleasant for all of us. Like most people we shall hate the social chaos that it will inevitably give rise to. On the other hand, if it does not occur, if the industrial world continued to expand for another thirty years, the consequences would be too horrible to imagine. Our environment by then would have become so hideously degraded that living in it would not really be worthwhile. The world's tropical forests would have gone. Just about all the larger non-human animals except those we have domesticated would have become extinct. Tens of thousands of plant species would have disappeared. The seas would have become too heavily contaminated to provide us with edible fish. Ground-water resources throughout the industrial world would have become too contaminated with nitrate and pesticide residues to provide us with potable water. At least a third of the world's remaining agricultural land would have been turned into desert and much of the rest so degraded as to be able to support but a fraction of the population it supports at present. In the industrial world, a significant proportion of our remaining land would have been lost to housing estates, factories, roads, motorways, reservoirs — enough, in the US and Canada, from which 75 per cent of world cereal imports are derived, for these countries to cease being net exporters of foodstuffs. Our health would have still further deteriorated, among other things cancer would have become generalised. The only way not to die from it would be to die of something else before, and fairly early in life at that.

Our society too would have disintegrated to the point that the patterns of behaviour that are only found today in the worst industrial slums of North America would have become the norm. Crime, delinquency, vandalism, drug-addiction, alcoholism, would be just about generalised. In these conditions democratic government would have become but the flimsiest of facades. Those states that would have remained capable of maintaining some semblance of social order, however superficial, would be those that had transformed themselves into ruthless dictatorships and they would be in a perpetual state of war with their neighbours in order to secure for themselves the biggest possible share of the remaining economic sources of raw materials: oil, minerals, phosphate rock and sweet water, which by then would have become as expensive as champagne.

The breakdown will have another beneficial effect. It will provide the trauma required, to drive home to those who have not yet understood it, that we live in a world of pure fantasy, and that just about all the basic assumptions of modern science and economics, in terms of which the world-view of our industrial society is formulated, are *not only false but indescribably pernicious*. They must be, since they provide the rationale for that pattern of behaviour that is leading to the systematic annihilation of the world of living things of which we are part.

The cultural and ideological void that this must create should favour the adoption of the ecological world-view — that which is the most opposed to the present one. As Henri Frankfort wrote "the Gods of one civilisation are the devils of the next."

It is our task to develop this world-view in all its details so that it may constitute a faithful model of man's optimum relationship with his environment and provide the guide-lines for the ecological societies of the future.

How to Save the World

by

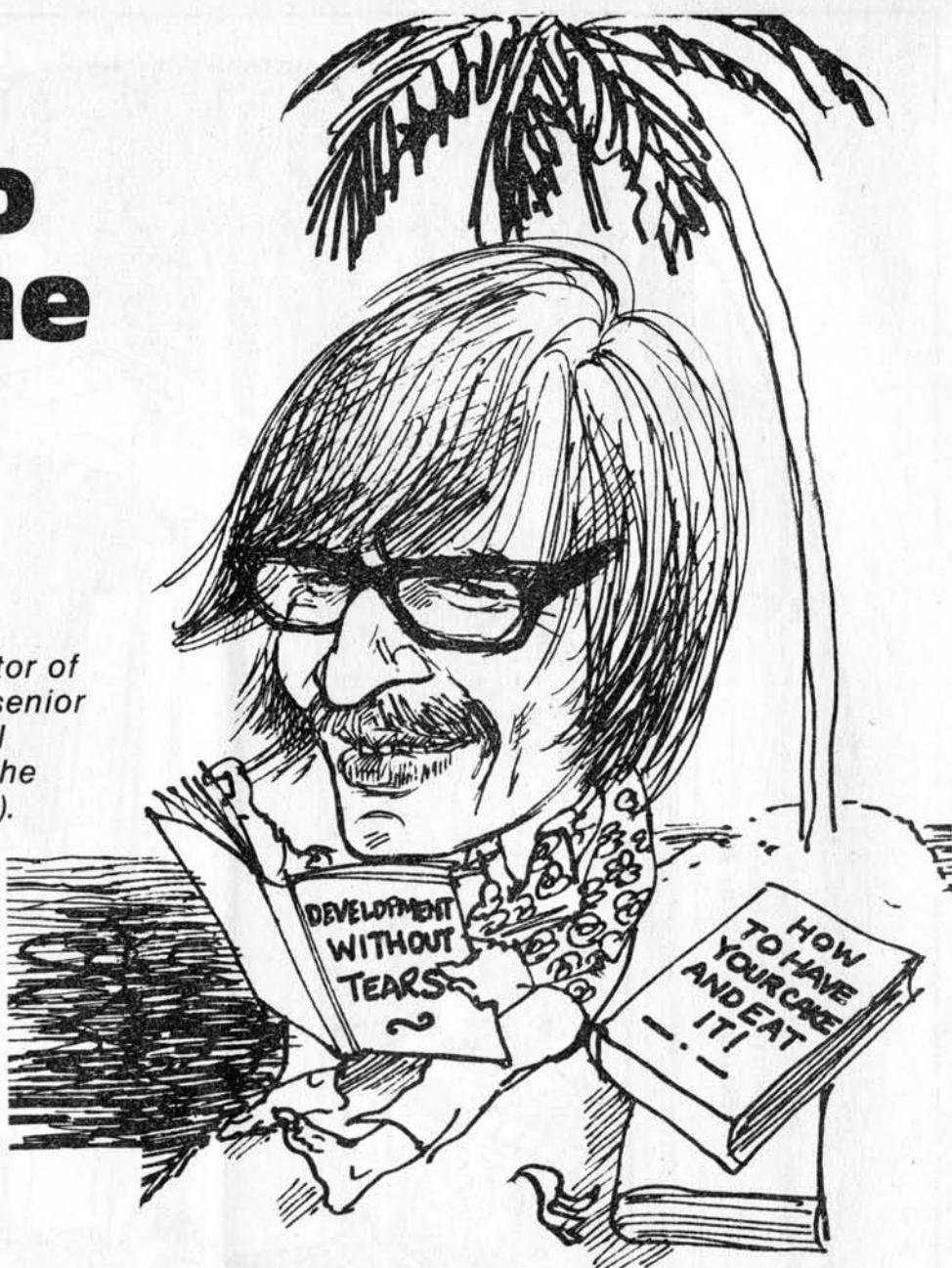
Robert Allen

Robert Allen, associate editor of The Ecologist, is currently senior policy advisor for IUCN (International Union for the Conservation of Nature).

Earth is the only place we know of in the universe that can support human life. Yet human activities are progressively making the planet less fit to live on. Current attempts by a quarter of the world's people to carry on consuming two-thirds of the world's resources and by half of the people simply to stay alive are destroying the very means by which all people can survive and prosper. Everywhere fertile soil is either built on or flushed into the sea; otherwise renewable resources are exploited beyond recovery, and pollutants are thrown like wrenches into the machinery of climate. As a result, the planet's capacity to support people is being irreversibly reduced at the very time when rising human numbers and consumption are making increasingly heavy demands on it.

A Disappearing Planet

The fertile soils of Himalayan valleys are being washed away in such quantities that a new island is forming in the Bay of Bengal,¹ an island of soil which, if the land had been properly managed, would still be growing food. Erosion is also rampant in developed countries. For example, in the century during which it has been cultivated, southern Iowa (USA) has lost as much as half its topsoil.²



If present rates of land impoverishment are allowed to persist, one-third of the world's cropland will disappear in a mere 20 years. The deserts are expanding at a rate of almost 60,000 square kilometres (23,000 square miles — an area twice the size of Belgium) a year. An area twice the size of Canada — 20 million square kilometres (nearly 8 million square miles) — is now on the brink of being turned into desert.³

Huge quantities of fertile soil are stripped from the land each year as a result of deforestation and poor land management: 400 million tonnes a year from Colombia; 1000 million tonnes a year from Ethiopia;⁴ 6000 million tonnes a year from India.⁵ Even in the USA, with the largest soil conservation service in the world, so much soil has already gone that the country's potential to grow food has been cut by 10 to 15 per cent and perhaps by as much as 35

per cent.⁶

Fertile land is also disappearing under concrete and tarmac. Together, the USA and Canada submerge 4800 square kilometres (more than 1.2 million acres) of prime farmland under buildings, roads and reservoirs every year.⁷

In developing countries hundreds of millions of rural people are compelled by their poverty, and their consequent vulnerability to inflation, to destroy the means of their survival. In widening circles around their villages they strip the trees and shrubs for fuel until the plants wither away and the villagers are forced to burn dung and stubble. The 400 million tonnes of dung and crop wastes that rural people burn annually are badly needed to regenerate soils already highly vulnerable to erosion now that the plants that bind them are disappearing.

Fuelwood is now so scarce in the Gambia that gathering it takes 360 woman days a year per household.⁸ Even when firewood is available for sale, it is often beyond the budgets of poor householders. In the highlands of South Korea cooking and heating can cost up to 15 per cent of the household budget;⁸ and in the poorer parts of the Andean Sierra and of Africa's Sahel it can be as high as 25 per cent.⁹ Because of the cost many families are forced to do without.

Lack of soil and forest conservation contributes to the rising energy, financial and other costs of providing essential goods and services. Throughout the world, but especially in developing countries, siltation caused by deforestation and poor land management cuts the 'lifetimes' of reservoirs supplying water and hydroelectricity, often by as much as half. Large and increasing sums of money have to be spent on dredging docks and harbours to counter the effects of siltation. Floods devastate settlements and crops; in India the annual cost of floods ranges from \$140 million to \$750 millions.^{5,10}

The resource base of major industries is shrinking as tropical forests rapidly contract and as the coastal support systems of fisheries are polluted or removed altogether. At present rates of clearance, the remaining area of unlogged productive forests will be halved by the end of this century.¹¹ It has been estimated that tropical rain forests (genetically the richest land environments on the planet) are being felled and burned at the rate of 11 million hectares (27 million acres) a year — about 20 hectares (50 acres) a minute.¹² At this rate *all* tropical rain forests will have disappeared within 85 years. Tropical forests are not uniform, however; nor is their rate of disappearance. The most valuable, and the richest in species, are lowland rain forests, and these are being destroyed at a much faster rate. Some, like the forests of west Africa and the lowland forests of Malaysia, Indonesia and the Philippines, seem unlikely to survive much beyond the turn of the century.

Overfishing has already deprived people of millions of tons of seafood. Now, as overfishing spreads, so too does destruction of the fisheries' support systems. Many coastal wetlands and shallows, the support systems of two-thirds of the world's fisheries, are either degraded already or are being destroyed by

dredging, dumping, pollution or shore 'improvement'. In the USA the resulting losses to fisheries cost an estimated \$86 million a year.¹³

As a result of the spread of environmental destruction, some 25,000 plant species¹⁴ and more than 1000 species and subspecies of mammals, birds, amphibians, reptiles and fish¹⁵ are threatened with extinction. These figures do not take account of the inevitable losses of small animal species, particularly of invertebrates like molluscs, insects and corals, whose habitats are being eliminated in their entirety. Indeed estimates that do attempt to take this factor into account suggest that from half a million to a million species will have been made extinct by the end of this century.¹⁶

Coming to Terms with the Facts of Life

As the biosphere loses its elasticity — its capacity to recover from the effects of human pressure — and as everybody's demands on the biosphere increase, so choices will be harder and the room for manoeuvre will be reduced. If, for example, the USA or other developed countries wish to reduce their dependence on oil imports, they must among other things conserve their farmland and their soil. It has been estimated that in 1978 \$1200 million of fertilizer would have been needed to replace the nutrients lost through soil erosion in that year.¹⁷ The sum would be greater today and will continue to grow, not only because soil erosion is spreading but also because much fertilizer manufacture depends on oil. Now an estimated 50 million barrels of fuel equivalent are used every year to offset past US soil erosion losses.

The devastation of the biosphere is ultimately the greatest of all threats to the survival and well-being of human beings. It is seldom perceived as such because for many peoples and their governments it is overshadowed by apparently more pressing concerns: war, poverty, epidemics, the energy crisis, inflation, unemployment. Nevertheless, failure to conserve living resources is closely linked to the worsening of the other problems. Continuing lack of conservation is likely to make life more expensive for the affluent and impossible for the poor. In so doing it will contribute to the rise in tension between the haves and the have-nots and hence to global instability.

Conservation: How to Have our Cake and Eat it

The biosphere is like a self-regenerating cake, and conservation is the conduct of our affairs so that we can have our cake and eat it too. As long as certain bits of the cake are not consumed and consumption of the rest of it is kept within certain limits, the cake will renew itself and provide for continuing consumption. For people to gain a decent livelihood from the earth without undermining its capacity to go on supporting them, they must conserve the biosphere. This means doing three things:

1. Maintaining essential ecological processes and life-support systems.
2. Preserving genetic diversity.
3. Utilizing species and ecosystems sustainably.

How the World can be Saved

No creature can be in a predicament more treacherous than the one in which human beings find themselves today. To survive, every species must modify its environment. But human societies are altering their environments so drastically — whether out of ignorance, greed, irresponsibility, or the desperate struggle to escape the trap of poverty — that they are making their survival unlikely if not impossible. It is as if the only means of improving our planetary home was to knock down the walls and bulldoze the foundations.

Although environmental modification is natural and a necessary part of development, this does not mean that all modification leads to development, (nor that preservation impedes development). While it is inevitable that most of the planet will be modified by people and that much of it will be transformed, it is not at all inevitable that such alterations will achieve the social and economic objectives of development. Unless it is based on conservation, much development will continue to have unacceptably harmful side-effects, provide reduced benefits or even fail altogether; and it will become impossible to meet the needs of today without foreclosing the achievement of tomorrow.

The way to save the world is to invent and apply patterns of development that also conserve the living resources essential for human survival and well-being. Living resource conservation is often thought of and

treated as a specialized and somewhat limited activity, but in fact it is a process that cuts across and must be incorporated in all human activities. For this to be achieved, each of us will have radically to re-orientate our view of the world and of our place and role in it. Meanwhile, it is essential that conservation and development be fully integrated without delay to ensure that, in their quest for a higher quality of life, people protect those parts of the biosphere that need protecting and modify the rest only in ways that it can sustain. For this we need a world conservation strategy.

A Brief Guide to the World Conservation Strategy

The World Conservation Strategy is intended to stimulate a more focused approach to living resource conservation and to provide policy guidance on how this can be carried out. It concentrates on the main problems directly affecting the achievement of conservation's objectives: the maintenance of essential ecological processes and life-support systems, the preservation of genetic diversity, and the sustainable utilization of species and ecosystems. In particular, the Strategy identifies the action needed both to improve conservation efficiency and to integrate conservation and development.

Irrespective of its purpose, the function of every strategy is to:

- ☐ determine the priority requirements for achieving its objectives;
- ☐ identify the obstacles to meeting the requirements;
- ☐ propose the most cost-effective ways of overcoming those obstacles.

With resources limited and time running out, it is essential to be sure that the available resources and effort are applied to the highest priority requirements first, and only afterwards to lesser priorities. We are in exactly this situation with conservation, yet conservation organizations have seldom attempted to agree priorities. This is understandable, since there are so many urgent problems to be dealt with, people have different perceptions of priorities, and there have been few universally accepted criteria for what is important. However, it is precisely because there are so many requirements, most of them urgent, and many of them alone demanding all or

more of the resources at conservation's disposal, that priorities must be determined and followed. The first need, therefore, is for criteria for deciding priorities. There are three: significance, urgency, and irreversibility.

Significance is determined by asking such questions as:

- ☐ how important is this requirement in relation to the other requirements for achieving the objective concerned?
- ☐ what proportion of the global, regional, and national population depends on this requirement being met?
- ☐ how important is the requirement to the people most affected?
- ☐ how much of a particular resource will be conserved if the requirement is met?

Urgency is a function of the rate at which a significant problem will become worse if the requirement is not met and of the time required to meet that requirement.

Irreversibility is the key criterion: highest priority is given to significant, urgent requirements to prevent further irreversible damage to living resources, notably the extinction of species, the extinction of varieties of useful plants and animals, the loss of essential life-support systems, and severe soil degradation.

Priority Problem Areas

Using these criteria the problem areas of greatest and most immediate concern are outlined below.

Agricultural systems. In view of the scarcity of high-quality cropland, the rapidity with which it is being destroyed, and the rising demand for food and other agricultural products, it is vital that the most suitable land for crops be reserved for agriculture and that all cropland be managed to high standards. Loss of cropland and of soils and the disappearance of genetic resources essential for crop breeding have profound implications for everybody, since they presage the collapse of the biological basis of our food supply. The world's drylands, which cover about one-third of the earth's land surface, are particularly seriously affected. There the spread of desert conditions already jeopardizes the survival of almost 80 million people, and as many as 630 million could be threatened by it in coming years.¹⁸

Forests. Forest destruction means

not only the loss of valuable products but also the decline of essential services, notably protection of watersheds (the upper parts of river basins). At least half the global population is affected by the way in which watershed areas are managed, for although only 10 per cent of the world's people live in mountain regions another 40 per cent live in the adjacent lowland basins.⁸ The most endangered forests are tropical rain forests. The world has only about 10 years to save lowland tropical rain forests and no more than 20 years to save the rest. If it has not done so by then, not only will a huge store of vital genetic resources have been lost for ever but regional climates, and perhaps the global climate, could be changed for the worse.

The sea. The sea is so huge that it seems invulnerable to human impacts. Its most productive areas are close to shore, however, and are very heavily damaged by pollution, habitat destruction and overfishing. Coastal wetlands and shallows, together with the marine fisheries that depend on them, constitute the world's biggest wildlife resource. The mangroves and estuaries that support the fisheries are throughout the world either being polluted or destroyed altogether. Other marine areas are also strikingly important, particularly coral reefs, but are not yet under such universal pressure as coastal wetlands. Action to conserve them should be taken without delay to take advantage of the fact that they are not yet as badly off as temperate estuaries or tropical forests.

Endangered species. Thousands or possibly a million species and many more varieties are threatened with extinction, so it is difficult to know where to begin their conservation. The Strategy recommends concentrating on three types of threatened organism: those that are so different genetically from other species that their extinction would be an exceptionally great loss; those that are, or are closely related to, economically or culturally important species; and those that are so concentrated in certain areas that groups of them can be saved in one operation.

Priority Actions

Three kinds of action are needed to ensure that conservation objectives will be achieved. The first is specific to the problem areas and concerns the priority requirements

for meeting the conservation needs of each. The second kind of action is much more fundamental since it aims to overcome the main obstacles to conservation irrespective of the problem area. The third strikes at underlying factors, such as population growth, over-consumption by the affluent, and poverty.

The priority requirements for achieving conservation with respect to each of the problem areas are discussed in detail in later chapters. Most are obvious; reserve good cropland for crops; manage cropland to high standards; protect watershed forests; protect the support systems of fisheries; control pollution; prevent the extinction of species; preserve as many varieties as possible of crop plants, forage plants, timber trees, livestock, animals for agriculture, microbes and other domesticated organisms and their wild relatives; establish comprehensive systems of protected areas; regulate international trade in wild plants and animals; reduce excessive catches to sustainable levels, and so on.

Obvious though they may be, these and similar requirements are often overlooked. One reason is that competition among different uses of land and water has become so acute that governments have become reluctant to take the action conservationists recommend. Conservationists have given them little encouragement because often they have pushed for extreme courses of action, not recognizing the difficult trade-offs involved. Take, for example, the requirement to reserve good cropland for crops. On the face of it, it is straightforward. The demand for food continues to grow but high quality cropland is scarce. Only one-tenth of the earth's land surface does not have a serious problem in agriculture.⁹ Since it is not possible to relocate prime cropland but it is possible to be flexible about the siting of buildings and roads, agriculture should have precedence. However, the need for farmland competes not just with the need for building land but also with other conservation needs. Many wetlands are often essential nurseries and nutrient suppliers of fisheries, but when drained they make good cropland. Similarly, forest areas rich in species and ideal candidates as nature reserves might need to be cleared for crops or pasture. Governments need guidance on how to decide such difficult conflicts.

If the land is prime quality land,

with no serious limitation for agriculture, then agriculture should still have priority, even over other conservation needs. If the land poses difficulties for farming, however, agriculture, while continuing to have priority over non-living resource uses (such as building), should be subordinated to the needs of genetic resource conservation and (in the case of wetlands) to those of fisheries.

Main Obstacles

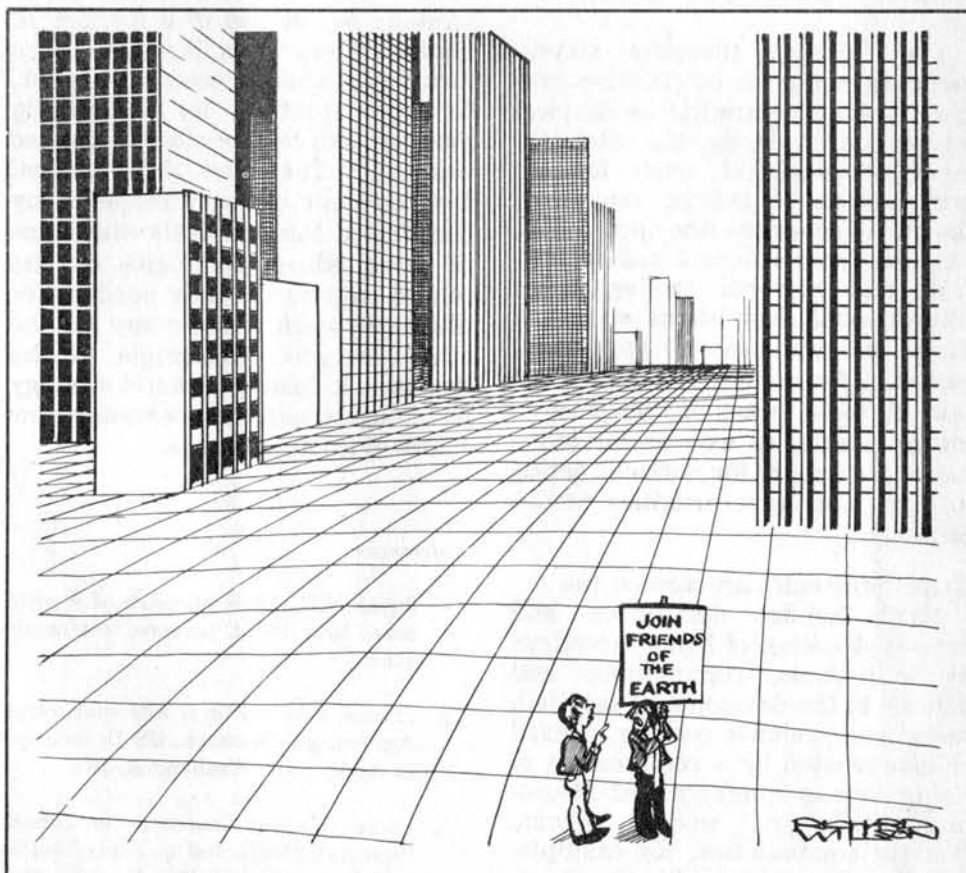
The obstacles to conservation are many and complex but the main ones are outlined below.

1. The belief that the conservation of living resources is a specialized activity rather than a process that cuts across and must be considered by all sectors of activity.
2. The consequent failure to integrate conservation with development.
3. A development process that is generally inflexible and needlessly destructive, because of inadequate environmental planning and a lack of rational allocation of land and water uses.
4. The lack of a capacity, because of inadequate legislation, to conserve; poor

organization (notably government agencies with insufficient mandates and a lack of coordination); lack of trained personnel; and a lack of basic information on priorities, on the productive and regenerative capacities of the living resources concerned, and on the trade-offs between one management option and another.

5. The lack of support for conservation, because of a lack of awareness (other than at the most superficial level) of the need for conservation and of the responsibility to conserve amongst those who use or have an impact on living resources, including in many cases governments.
6. Failure to deliver conservation-based development where it is most needed, notably the rural areas of developing countries.

The need to tackle these obstacles must be kept constantly in mind. A species may be rescued, an area protected, or an environmental impact reduced, but such successes will be temporary or will be overshadowed by much greater failures unless every country's capacity to conserve is greatly improved and permanently strengthened.



"What Earth?"

Accordingly, the Strategy's recommendations for national action are devoted entirely to this set of issues. They begin with the proposal that every country (indeed every governing unit, such as the federal states in the USA and Canada's provinces, with responsibilities for planning and managing the use of living resources) should prepare a conservation strategy. Only in this way can wasteful *ad hoc* action and excessive concern for symptoms rather than causes be avoided.

The Strategy goes on to establish priorities for international action. Although most action must be taken by and within countries, there are several aspects of conservation that can only be tackled internationally. Many living resources are shared by two or more nations. Many occur (temporarily or permanently) in areas beyond national jurisdiction, notably in the open ocean farther than 200 nautical miles from shore. Living resources in one state may be affected by activities carried out in another: for example, fish may be killed by acid rain originating with sulphur dioxide pollution in another country. These resources can be conserved only by international action. International action is also necessary to promote the conservation of resources (such as the genetic resources of crops) vital for the survival of all humanity, as well as to stimulate and support national action.

The Strategy therefore recommends a series of cooperative programmes concentrating on tropical forests and drylands, the establishment of protected areas for the preservation of genetic resources, the global commons (the open ocean, the atmospheric climate and Antarctica), and regional strategies for international river basins and seas. These programmes will provide an essential focus for international action in those areas in which it is indispensable, as well as for international support for national action to carry out other priorities of the Strategy.

Other Strategies are needed too

Much habitat destruction and over-exploitation of living resources by individuals, communities and nations in the developing world is a response to relative poverty, caused or exacerbated by a combination of rising human numbers and inequities within and among nations. Peasant communities, for example, may be forced to cultivate steep, unstable slopes both because their

growing numbers exceed the capacity of the land and because the fertile, easily managed valley bottoms have been taken over by large landowners. Similarly, many developing countries have so few natural resources and operate under such unfavourable conditions of international trade that often they have very little choice but to exploit forests, fisheries and other living resources unsustainably. In many parts of the world population pressures are making demands on resources beyond the capacity of those resources to sustain themselves. Every country should have a conscious and deliberate population policy to avoid as far as possible the development of such situations, and eventually to achieve a balance between numbers and environment. At the same time it is essential that the affluent constrain their demands on resources, and ideally reduce them, shifting some of their wealth to assisting the deprived. To a significant extent the survival and future of the poor depends on conservation and sharing by the rich.

These are some of the underlying factors which inhibit both conservation and development. It is beyond the scope of a conservation strategy to deal with all of them. Living resource conservation is just one of several conditions necessary to assure human survival and well-being, and a world conservation strategy is but one of a number of necessary strategies. Strategies for a new international economic order, for human rights, for overcoming poverty, and for population are also essential. The New International Development Strategy prepared by the United Nations deals with some of these issues. Strategies for the others are still urgently needed, for ultimately each is necessary for the others' success. Meanwhile, for the first time in history, a world strategy for living resource conservation now exists. It is long overdue.

References:

- Jayal, N.D. (1979) Ministry of Agriculture, New Delhi, personal communication.
- Diemel, R.W. (1979) A well kept secret. Agricultural Research, US Department of Agriculture, Washington, DC.
- United Nations Conference on Desertification (1978) *Round up, Plan of Action and Resolutions* United Nations, New York.
- Eckholm, Eric (1976) *Losing Ground: Environmental Stress and World Food Prospects* Norton.
- Das, D.C. (1977) Soil conservation practices and erosion control in India: a case study. In *Soil Conservation and Management in Developing Countries* FAO report of an expert consultation held in Rome, 22-6 November 1976 FAO *Soils Bulletin* 33.
- Pimental, D. *et al* (1976) Land depredation: effects on food and energy resources. *Science* 194: 149-53.
- Council on Environmental Quality (1975) *Environmental Quality: 6th Annual Report* Council on Environmental Quality, Washington, DC.
- FAO (1978) Forestry for local community development. *FAO Forestry Paper* 7.
- FAO (1978) *The State of Food and Agriculture 1977* Rome
- Sterling, C. (October 1976) Nepal. *Atlantic Monthly*.
- Lanly, J.P. and Clement, J. (1979) *Present and Future Forest and Plantation Areas in the Tropics* FO:MISC 79/1, FAO Rome.
- Sommer, Adrian (1976) Attempt at an assessment of the world's tropical forests. *Unasylva* 28:5-24.
- Kumpf, Herman E. (1977) Economic impact of the effects of pollution on the coastal fisheries of the Atlantic and Gulf of Mexico regions of the United States of America. *FAO Fisheries Technical Paper* 172. And Hester, Frank J. (1976) Economic aspects of the effects of pollution on the marine and anadromous fisheries of the western United States of America. *FAO Fisheries Technical Paper* 162.
- Lucas, Gren and Synge, Hugh (1978) *The IUCN Plant Red Data Book* IUCN, Gland.
- IUCN (1975) *Red Data Book* (separate, frequently revised volumes of fishes, amphibians and reptiles, birds and mammals) IUCN, Gland.
- Myers, Norma (1979) *The Sinking Ark* Pergamon.
- US Comptroller General (1977) To protect tomorrow's food supply, soil conservation needs priority attention. Report to Congress, CED 77-30.
- United Nations Conference on Desertification (1977) *Desertification: An Overview* A/CONF 74/1 United Nations, New York.

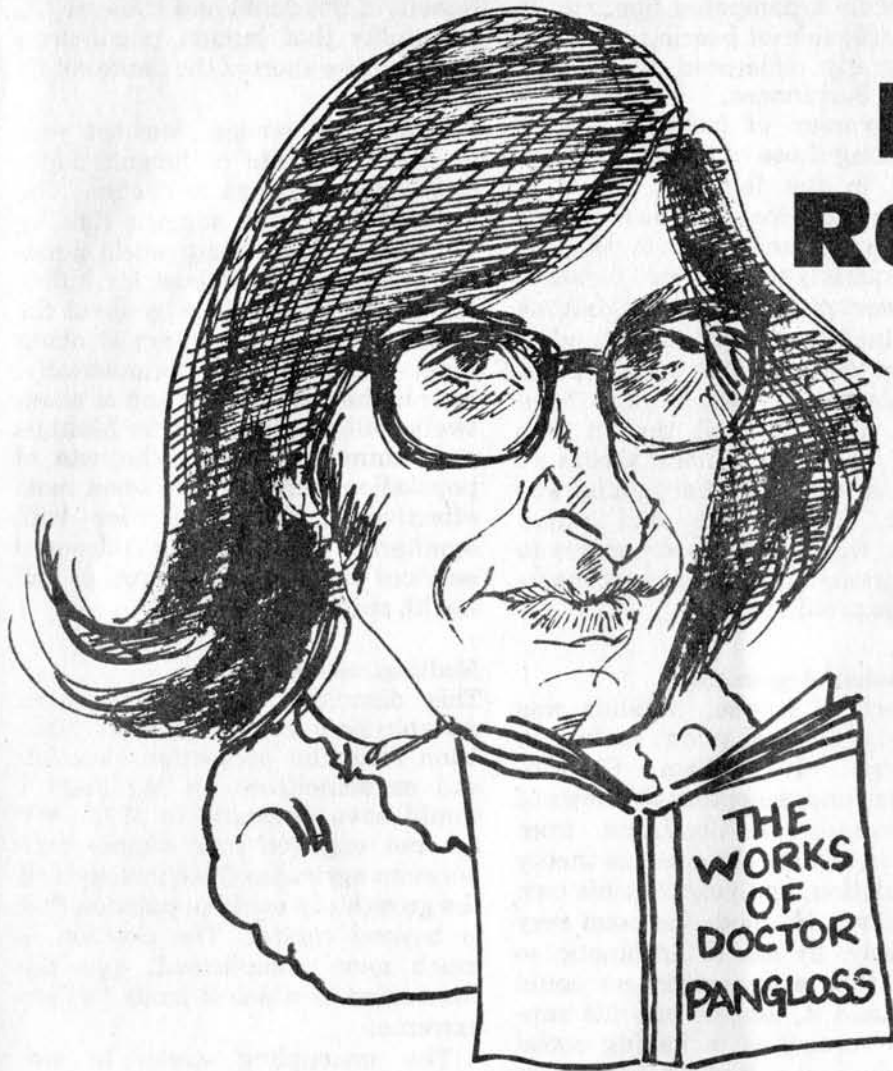
Reprinted from *How to Save the World* by Robert Allen, published by Kogan Page, £2.95.

Malthus Reinterred

by

Michael Allaby

*Michael Allaby,
freelance journalist,
consultant on environmental
subjects, author, currently
working on Oxford
Dictionary of Natural
History (OUP).*



I contributed an article to the first-ever issue of *The Ecologist*. There is something special, almost magical, about writing for the first issue of a magazine. The occasion is important, after all. New ventures sometimes change the lives of those who participate in them, so that on the day of the launch the contributors take a step into what may prove to be a new world, their copy of the first issue a kind of boarding pass. It is not for me to say whether the creation of this particular magazine had any broad historical significance, but it altered my life radically, irreversibly, and for the better. It kicked me, sometimes struggling and screaming, into a whole new career and a new era in my own development. I owe it much. Perhaps it is a measure of my debt that when I look back I find the past decade so crowded with events that that launching ceremony seems at once very close and very remote in time.

Debts must be paid, of course, even if they can be paid only symbolically, and it was with a feeling of

paying a debt that I read again that old article. Given hindsight, you see, the self-critic cannot win. Were I to agree with everything I wrote ten years ago it might suggest I have not developed, that in those years I have learned nothing. If I were to disagree strongly, on the other hand, I must admit that my earlier views were wrong. I am in danger of being trapped either by an admission of complacency and intellectual atrophy or by a confession of earlier ignorance of my subject and of misleading readers.

It was with some trepidation, then, that I thumbed through those yellowing pages to find the article I had called portentously, "One jump ahead of Malthus". That, I thought, is the first thing I would change were I to write the article today. My flirtation with Malthus ended some time ago. I read on and found, as I suppose I should have hoped to find, that according to my present opinions in some things I had been right, in some wrong, and in others I had been right for the wrong reasons.

The article itself was a summary and critique of the Indicative World Plan for Agriculture (IWP) which I had read in a draft form. It had been prepared by and for the Food and Agriculture Organisation (FAO) of the United Nations and it outlined the strategy that journalists nicknamed the "Green Revolution". I began by summarising the IWP, which reasoned that if the hungry were to be fed they must be fed from the output of farms in their own countries. It considered, and dismissed, the possibility of bringing virgin lands into cultivation on a large scale and concentrated instead on proposing improvements for existing farms. These centred on the introduction of new, high-yielding varieties of cereals to replace traditional varieties. By this means farms would become more productive and so employment would be created in rural areas and capital would be accumulated for further improvements. At that point I launched into my criticism, which aimed to show that plausible though

the IWP was in theory, in practice it could not succeed for a hierarchy of reasons, most of them related to the availability of resources of fertiliser, pesticide and water.

Malthus was Wrong

The IWP covered the twenty year period between 1965 and 1985 and so it is too early yet to evaluate its success or failure, but the strategy itself has been modified greatly since it was first published. Though the document itself was sober enough, popular accounts of the "Green Revolution" oversold it to those in the rich countries whose consciences warned them that their affluence was not wholly unconnected with the poverty of others. In the 1960s we were looking for miracles. Today no one expects miracles. The fact is, though, that by and large the world is no hungrier now than it was then. When you remember the gloomy forecasts of world famine, some of them predicting such a famine during the 1970s, this must be counted an achievement. There may be Malthusian limits, but we have not encountered them yet. It may be that we will not encounter them at all, for the world food problem has been cast in new terms.

Malthus, I said in 1970, was right. In fact he was wrong, very wrong. He published his famous essay in 1798, you will recall. The first reliable census of Britain was conducted in 1801 and the compulsory registration of births, marriages and deaths was not instituted in this country until 1837. Although Malthus wrote only theoretically, his work was meant to be understood as a comment on the population increase that was taking place at the time, and yet there were no data of any kind to support any estimate of the rate of that increase or, indeed, of its existence at all. The exercise was purely metaphysical, but that was not the main criticism of it. The results of the first censuses showed that the British population was increasing. To that extent Malthus might have been vindicated were it not for the fact that a simple observation of the society around him would have shown very clearly that his central thesis was wrong. Families were largest among the very poor and smallest among the wealthy. This had been observed, and Adam Smith had pointed it out very clearly twenty years earlier: "A half-starved Highland woman frequently bears more than twenty chil-

dren, while a pampered fine lady is often incapable of bearing any, and is generally exhausted by two or three. Barrenness, so frequent among women of fashion, is very rare among those of inferior station. Luxury in the fair sex, while it inflames perhaps the passion for enjoyment, seems always to weaken, and frequently to destroy altogether, the powers of generation".¹ Malthus maintained that populations tend to increase to the limit of the resources available to them, yet he must have known perfectly well that it was among the poor, whose access to resources was least, that fertility was highest. The middle and upper classes, with much easier access to much greater resources, was markedly less prolific.

Inconsistent Argument

In fact, of course, Malthus was making a political point, mainly in refutation of William Godwin, Rousseau and the optimistic views of the Marquis de Condorcet from whom, in fact, he obtained his theory of population, applying to it his own conclusions. He made his point very effectively, by use of arithmetic so simple that even politicians could understand it, and he and his supporters succeeded in halting social and industrial reform in Britain for almost half a century.² In subsequent editions he cleverly masked the inconsistencies in his argument, the most glaring of which caused him some embarrassment. The core of his argument was that man is incapable of improvement and so is unable to restrain his sexual urges voluntarily. This denial of the possibility of moral advancement was, to say the least, an eccentric position for a Church of England minister to adopt. To escape this trap he found himself manoeuvred into opposition to reform of the Poor Law and so became a principal figure in the movement whose purpose was to keep taxation low by allowing no assistance to the poor.

The Malthusian theory is not even sound ecologically. In harsh environments, such as those in very high latitudes or in deserts, non-human populations are affected strongly by variations in the availability of resources, but in more favourable regions this is uncommon. In most cases the theoretical, Malthusian limits are not reached because other controls operate to maintain stability. Since man, by and large, inhabits the more favourable habitats, perhaps we should give him the

benefit of the doubt and allow of the possibility that human populations will stabilise short of the limits set by resources.

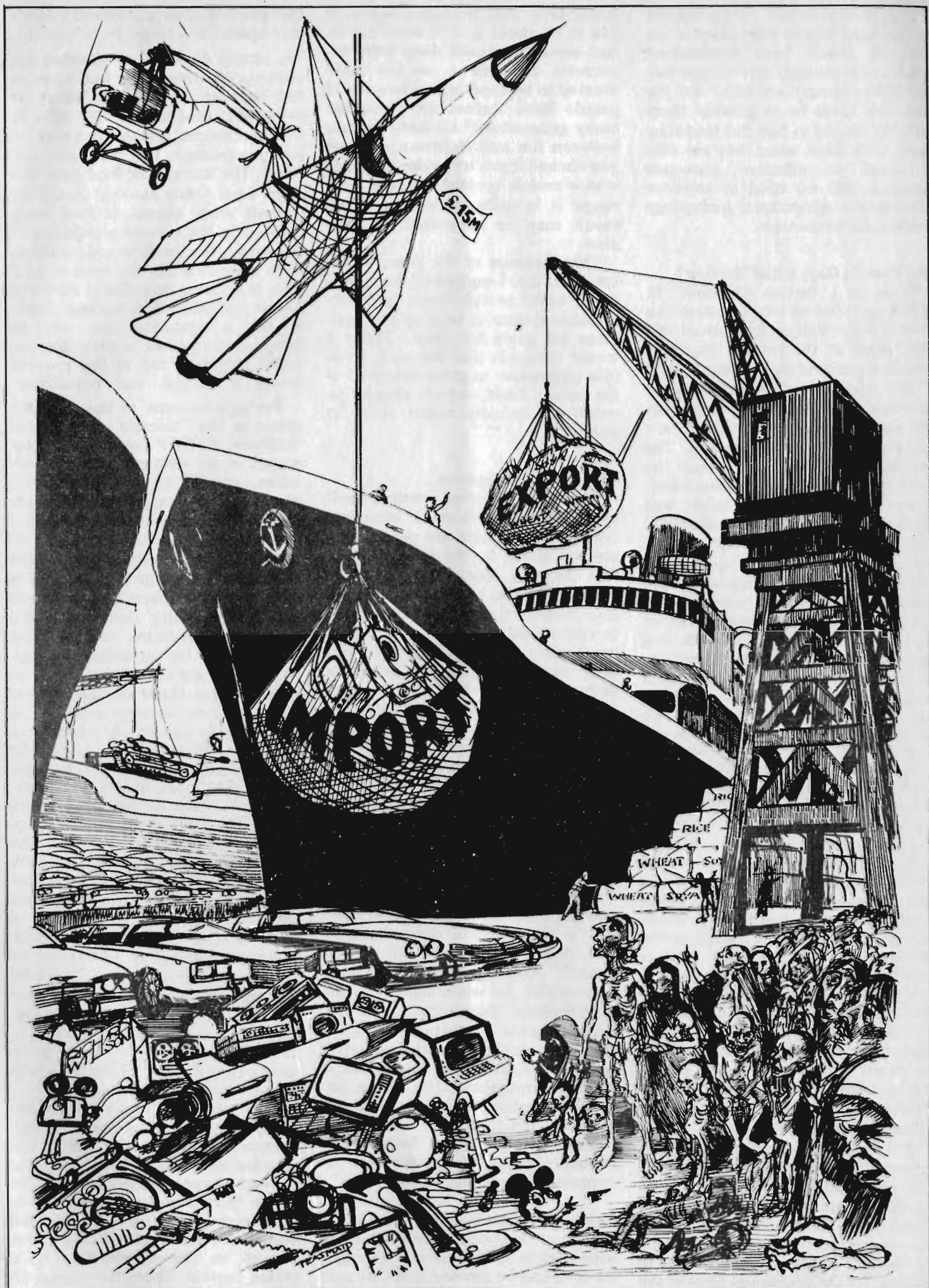
1970, oddly enough, was the year in which the rate of human population growth began to decline. The latest projections suggest that by the end of this century world population may stand at about six billion and that it will stabilise by about the middle of the next century at about eight billion or, less optimistically, later in the next century and at about twelve billion.³ Ironically for Malthus programmes to reduce the rate of population increase have been most effective in those countries with egalitarian policies and good social services that include education and health services.

Malthus was Simplistic

This dismissal of the Malthusian metaphysic uncouples the food situation from the population situation and so demolishes an argument I would have advanced in 1970. We are not engaged in a simple race between agricultural technology and the growth of a world population that is beyond control. The position is much more complicated, and the conclusion to which it leads far less extreme.

The uncoupling works in two ways. In the first place the rate of population change is shown to be susceptible to influences that have nothing to do with the availability of food, in fact an increase in available resources of other kinds tends to prevent further population increase rather than encouraging it. In the second place, the demand for food bears no simple, one-for-one, relationship with population size.

I cannot think how I failed to notice the fact that farmers do not grow food to supply the hungry, but to sell. I had no excuse. I had lived close to farming and farmers for years. I should have realised that like me, they have to earn a living. This, in fact, is the main constraint on their farming. It determines how much food they produce and the methods they use to produce it. Not wishing to commit financial suicide, no farmer will grow a crop he is not reasonably confident of selling, and he will not use methods that increase his production costs beyond the limit his markets will accept. In fact it is not an empty belly that provides entitlement to a meal, but a full purse. We live in a naughty world where, amid the starving masses, we find ourselves having to create a demand for food.



"But if we don't sell our food, how can we earn the money we need to buy it back again?"

This is a criticism of my earlier article, but it is also a criticism of the FAO. It should have emphasised much more strongly the simple fact that if the hungry are to be fed the first step must be to provide them with the means to buy the food they need. Only then, when they are able to exert an effective economic demand, will we need to consider whether the agricultural technology is adequate to the task.

The Protein Gap: a Red Herring?

There is a further criticism. In 1970 I accepted without question the FAO concept that today I would call "the myth of the protein gap". It used to be argued that because much of the clinical malnutrition that is observed manifests itself as protein deficiency, therefore many diets are inherently deficient in protein. The aim must be, then, to increase the protein intake of the malnourished. It was only later that the fallacy was identified. The body demands energy more imperatively than it demands protein. For one thing, energy is needed to metabolise the protein. Deprived of energy, the body may "burn" protein, rather inefficiently, to supply calories and this can lead to symptoms of protein-deficiency malnutrition. If protein is fed to remedy the deficiency, this, too, will be "burned" and it will go on being "burned" until the amount supplied is sufficient to leave a surplus over and above the energy requirement. Such a high protein diet would create health problems of its own, but in any case it would be very expensive because, almost certainly in practice and in fact in the IWP, it would be based on a substantial increase in livestock output using grain as the principal feed. It would require too, a fine calculation of the amount of dietary protein that is needed. This varies very widely according to climate, lifestyle, work and the physical size of the individual and the old FAO recommendation for a specific protein intake is no more than a very rough guide. Actual protein intakes among healthy people are often wide of the recommended figure.

The fact is that people who are hungry are hungry because they do not eat enough. The remedy is to give them more food. In almost all cases (diets based on cassava may be the exception) the food itself can be of the kind people are accustomed to eating. All the traditional diets of the world supply adequate amounts of all nutrients provided the calorific

demand is met. It makes sense, if you think about it. If it were not so and some traditional diets were inherently deficient — as the FAO seemed to be implying — how could people have thrived on them for many generations? All diets contain between ten and eighteen per cent protein and if you try to devise a diet whose protein content is outside this range it is quite difficult and the result may be somewhat unpalatable.

This disposes of the case, which ten years ago I supported, for developing novel protein foods to fortify traditional diets or to supply substitutes for grain-fed meat. Today I would maintain that the only sensible alternative to grain-fed meat is the grain itself, which should be eaten by humans rather than by livestock.

We need Development

The global problem resolves itself into a general problem of economic development. There are people who are poorly fed, for the simple reason that they are poor. Were they less poor they would buy the kind of food they prefer. In most cases this would consist of the food with which they are familiar. I used to be hungry and poor, years ago. I did not dream of exotic cuisines: my ambition was to face a big plate of stew and potatoes. We need economic development, then.

I would not have this misunderstood. Economic development need not be rapacious: the recent *World Conservation Strategy*⁴ has provided a map to guide us toward sustainable kinds of development. Development must not be rapacious, indeed, lest it waste the resources that sustain it and so fail to benefit those who need it. Yet development there must be and those who advocate "zero growth" condemn the poor to their misery and the world food problem to perpetual insolubility. It is not even possible to suppose that we may continue in a world dominated by a rich minority that takes what it wants, or imagines that it needs, for a prolongation of the disparity between rich and poor must lead eventually to world war, fought most probably between superpowers in support of their client states.

Can we Feed the World?

Let us suppose, though, as I supposed in 1970, that the demand for food can be created and that our aim is only to produce more of the kinds of food we produce now. Can it

be done? In a very important sense this question cannot be answered.

We simply do not know whether the entire population of the world can be fed because no one has ever attempted to feed it. The IWP aims to do so, of course, but the first necessary precondition has not been fulfilled. The market for food does not exist. Lord Ashby has said that if the current world output of food were divided by the current population of the world, the result would be about 2000 calories a day for each of us.⁵ This is a ration that should cure the obesity problem, but the true value of the computation lies only in demonstrating that in principle the world might be fed at the present levels of output and population.

Perhaps because of the publicity given to the "miracle" new cereal varieties, the IWP devoted too great a part of its strategy to these varieties, and in my earlier article I carried the exaggeration much further. No one has ever supposed that new cereals will be grown on all farm land: for one thing the amount of land capable of growing cereals is limited and most farm land is poor to indifferent grazing. However, I did a simple multiplication to show that the demand for agricultural chemicals would increase by as much as twenty-seven times on land where the new varieties were exploited to the full. This was simply mistaken, a statistical fudging that began by taking the average chemical use and then scaling it up. In fact, of course, cereal farmers already use much more than the average chemical applications, because the averages include land that receive no chemicals at all, or very little. Nevertheless, I was correct in proposing that any great increase in the supply of chemicals to poor farmers would encounter difficulties. I was right for the wrong reason, because I believed that the constraint would derive from the depletion of petroleum resources. It is amusing to note that in 1972 *The Limits to Growth* study used a figure of 455 billion barrels to denote the size of the world's petroleum resources, yet by 1977, when the conventional view held that petroleum exhaustion was but a few decades away, the official figure for known reserves had increased to 750 billion barrels and estimates of the total recoverable reserves ranged from the conservative 2,000 billion barrels to the optimistic 11,000 billion barrels. There have been interruptions and difficulties of all kinds in the supply of farm chemicals

but these have been political and economic in origin, arising from the instabilities of the Near East and OPEC pricing policies.

In the case of water supply I was entirely correct, and for the right reason. Large scale irrigation systems are very expensive and they create problems for themselves, especially if attempts are made to contain costs by allowing too little provision for drainage.

I was right, too, in advocating the reform of land tenure systems. Since 1970 the FAO has placed increasing emphasis on this need. Unless people can gain access to farm land there is little chance that rural populations will find satisfactory employment or that food output will be increased substantially. These days many people are expressing concern about the rate at which tropical forests are being cleared. That concern has been given much space in the pages of this journal. A major cause of forest clearance is the failure of programmes to reform land tenure systems and the consequent pressure on destitute rural populations to settle any land they can find. The protection of the forests, too, is a developmental problem.

Distribution is The Problem

My conclusion today differs markedly from the conclusion I drew from my analysis in 1970. Today I reject the simplistic view that agricultural development is no more than a race against population growth. The world population seems to be stabilising, but the issue of population is largely irrelevant. People are hungry because they are poor and if they are to be fed it is their poverty we must address and not their agricultural technology. When they are able to demand, in the economic rather than humanitarian sense, the food they wish to eat, it will be time enough to consider how to improve their farming techniques. Such improvements will be possible then, because the existence of markets will encourage farmers to increase their output and so will make them receptive to new ideas that may help them. These ideas will not derive from a simple translation of temperate climate technology into tropical and sub-tropical conditions, but will amount to countless minor modifications of existing practice.

By some arithmetical route I have long since forgotten, I calculated ten years ago that the optimum population for this planet is about 1.5 billion persons. Today I have no idea

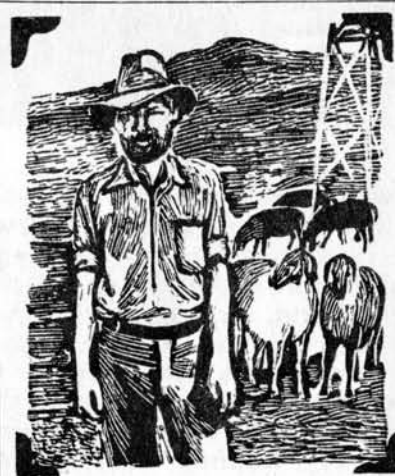
what an optimum population might be. I know that some countries are underpopulated, that their development is inhibited seriously by a shortage of labour. I know, too, that in other regions of other countries services are stretched beyond their limits. Traditionally, such disparities would be resolved by migration, but the cupidity of the rich makes them unwilling to share and the modern nation state is well equipped to prevent the movement of people. The modern rich are much better at building barriers than their grandparents were. In the end, though, it will not be the farmers of the world whose efforts will prove critical. I see no reason to suppose that they are incapable of growing as much food as is needed.

I do not know what will happen in the future. No one can know that. My observation of the present, though, suggests to me very strongly that the single most serious problem facing us is that arising from the relationship between rich and poor states, the so-called North-South confrontation. Unless that be resolved no other problem is important, for our failure must lead to conflict and general impoverishment. If it be resolved, its resolution will embrace all its lesser manifestations, including those connected with the production and supply of food. The world food problem can be solved, then, but I have no idea whether it will be solved. It is not a scientific problem, or a technological one, but one of relationships among human beings. "Science" cannot supply answers to it. Only human beings can find answers to human problems. Science and technology may help to realise those answers, but the answers themselves must be discovered by people and their politicians. This, I think, is a view I have always held and although it is not very evident in my 1970 article, I do not believe I would have disagreed with it then.

References:

1. Adam Smith. *An Inquiry into the Nature and Causes of the Wealth of Nations*. 1776
2. Inglis, Brian. 1971. *Poverty and the Industrial Revolution*. Hodder and Stoughton. London.
3. Rowley, J. 1980. Population growth, in: Allaby M. (ed.) *Encyclopaedia of the 21st Century*. In preparation.
4. *World Conservation Strategy: Living Resource Conservation for Sustainable Development*. Int. Union for conservation of Nature and Natural Resources (IUCN), UN Environment Programme (UNEP), World Wildlife Fund (WWF), in collaboration with FAO and Unesco. Gland, Switzerland, 1980.
5. Ashby, E. 1980. The road to equality. *Nature*, 285, p.117.

John Seymour ON MY OWN TERMS



A new version of this highly entertaining autobiography, first published in 1963, which describes how John Seymour's values and personality were formed during his years in Africa and Asia up to and including the Second World War.

"This racy tale is packed with his own brand of impish humour and irrepressible high spirits . . . His love of the African races shines through every word of the story, and their traditions are treated with compassion and understanding. This is a man who is a Jack of all trades and master of many of them, not the least of which is the art of writing."

—Ralph Potter, *Eastern Daily Press*

With jacket drawing by Sally Seymour. £7.95

Faber & Faber



Reaction Against Alternative Energy

by

Andrew MacKillop

Andrew MacKillop, associate editor of The Ecologist, formerly energy consultant to the Science Council of Canada, lecturer at Hull Polytechnic and currently energy consultant for the Ministry of Planning, Papua New Guinea.

Over the last decade *The Ecologist* has carried many articles, reviews and critiques concerning energy and infrastructure development in the Third World, or 'Less Developed Countries' (LDCs) as the jargon goes. Gradually a new consensus of Western opinion has built up on the subject. The LDCs should 'go solar' right away, leapfrog the West into the renewable energy systems of the 21st Century, escape the trap of high and rising oil prices — and do so by developing solar technologies for regional and rural use before catering for urban consumers. This overall idea has developed the status of a new wisdom. But is it right, and should the LDCs take this path?

The supporting rationale for the new wisdom is gaining more converts, at least in the West, by the hour. The usual arguments go like this: oil and gas supplies are depleting quite rapidly, but demand is still growing fast; the cost of these conventional energy sources is rising, to the point where some solar technologies are close to economic; and anyhow the great bulk of supplies are pre-empted by the West, and refined and distributed by Western oil companies. Producing, refining and distributing oil and gas requires complex, capital-intensive, large scale technologies. The fuels and the systems they depend on (like refining) cause pollution, and — usually the last argument marshalled to support the new wisdom — they are culturally 'inappropriate' to rural traditional peoples.

Each of these arguments contains truth, but not the whole truth, and has to be seen not solely through the Western world view. The process of economic, social and cultural trans-

formation going on in the LDCs has to date been based on fossil fuels (and hydro electricity), using entirely conventional 'Western' technology. These elements of the processes of change have been thoroughly assimilated — usually to a much greater extent than other Western imports, such as multi-party Westminster-style Government. Because of this it is probably wrong to call the fossil fuels and their associated technologies 'Western'. But the emerging global oil and gas resource-supply-distribution picture is itself becoming 'de-Westernised', and this is the first strong argument against the new wisdom.

Supplies to Whom?

The supply question is usually presented as the biggest and best argument for the new wisdom. There is just not enough oil and gas in the world to meet future demand. The LDCs, because of economic weakness, will get squeezed out of the picture first — so they have to go solar. The cause of this problem can simply and fairly be laid on the doorstep of the rich, Northern, developed nations. This group of people, the 20% of the global village who live in the smart part of town, are using 80% of world oil, and around 95% of world traded natural gas. Their political economies supposedly prevent any rational possibility that they can use less, or different forms of energy. Over the past five years the North has responded, if that word can be used, to OPEC measures (price rises, production limits) to reduce demand by indulging in an orgy of inflation and unemployment. This has not gone unnoticed by the OPEC nations, who uniquely stand

at the gap between both sides of the global village — they are ex-colonies of the West, but they hold the bulk of presently proven world oil and gas reserves, the resources that the West believes are its salvation. But they have no wish to extinguish their prime, and often only, export commodity. Neither do they wish the eras of direct colonial, and post-colonial economic domination to linger on. Whilst the West, particularly the USA, is beginning to orchestrate a propaganda campaign to the effect that OPEC is not 'helping' the West by recycling petrodollars fast enough, they have — in fact — invested in and bought merchandise from the West to a far greater extent than mere economic desirability or necessity. In many cases the OPEC nations have imported so much technology and Western expertise to service it that it has had a strong damaging effect on traditional values and culture.

The OPEC countries are rapidly evolving a two-fold political economic policy towards the users of their resources. They are getting tough with the rich industrial nations, and this is becoming much more evident because of the rising instability of the main oil payment currency, US dollars; and much more flexible with the LDCs. These nations, and particularly the newly-independent ex-colonies of the West, are seen by OPEC (most markedly by the Arab OPEC States) as urgently in need of real development support.

Ration the West and help the Rest

Towards the West the OPEC nations have one simple, and bleak, policy: use less or face not only higher and higher prices, but actual

physical rationing by quota or other mechanisms. The biggest reason for this is that oil production, and at a later stage gas production, must plateau off and begin to decline. As an immediate support to the LDCs several of the OPEC nations, (in direct contrast to the West) have radically stepped up their aid. This can be called, cynically, charging people a new 'super high' price for something they cannot do without, and then giving them back a slice of the money that has been 'pirated' out of them. This is now a common response by Western energy and development experts when challenged on the facts of who gives how much aid. The Arab OPEC nations now give around 2.5 per cent of their GNP, on average, to the LDCs — or *seven times* the average for the rich nation OECD club. It can easily be argued that the oil producers are, in fact, taxing the West and transferring some of the revenue to the LDCs, and actually helping the Third World by obtaining money they would not otherwise get from the West.

When we look at the current picture of where OPEC oil production goes, in relation to population size and political-economic affiliation a massive asymmetry can be seen. The OECD group of rich nations are using at least 30 million barrels per day; a mere ten per cent cut in demand would free sufficient oil to supply *all* the needs of the oil importing ASEAN nations, *plus* Pakistan, Taiwan, India and South Korea. That is, a population grouping of 800 million could have all their oil provided by a ten per cent cut in demand by the rich. We should not need to ask whether this is conceivable because many initiatives on energy policy emerging in the West, most notably those following the Tokio 1979 Summit, speak of exactly this kind of cut being desirable and feasible. However, it is much more plausible to argue that this kind of cut in demand could only come about through 'producer power', that is by OPEC deliberately restricting supplies.

It can also be argued that there is an *intrinsic* tendency for self-rationing of energy demand growing within the rich, or overdeveloped, nations. This can be traced to the effects of economic processes such as business cycle recession; increasing structural unemployment; the growth of services and relatively low-energy activities (e.g. electronics). Each percentage reduction in growth of the Western economies

leads to around a one per cent cut in energy demand — appropriate energy management can ensure that this translates to a greater than one per cent cut in oil (and imported gas), for example through upgrading the use of indigenous fuels, and conservation energy. For the poor, or underdeveloped, nations the reverse is true — they *must* use more than one per cent growth in energy demand to get a one per cent growth of GNP, the reason being that as well as economic production they must achieve the growth of capital (and therefore energy-rich) infrastructure and services. On equity grounds it is both rational and realistic to argue for faster growth in the poor nations. But without political admission of these facts it is convenient for the spokesmen of the rich nations, in all kinds of international forums, to say that the poor, as well as the rich must be dragged down by high and rising energy prices. These same spokesmen can then argue, as they do, that yet more western expertise and capital must be used to develop indigenous and usually high cost 'alternate fuels', but they do *not* go on to say that they hope this will cut demand for OPEC oil and gas, reduce prices and lengthen reserves, so that the rich nations do not *themselves* have to develop alternatives.

New Resources through New Co-operation

It is rapidly becoming clear that the world oil and gas resource picture is very poorly known outside the established production zones — which for the 'free' World means North America, parts of South America, Europe and Middle East. A few figures show how little has been spent by the International Financial Institutions (IFIs), the World Bank and its affiliates, on finding more oil and gas, and developing it.

In the period 1974-76, and in relation to expenditure planned by the IFIs for 1977-81, a total of 8.44 billion US dollars was planned to be spent on all energy developments in less developed countries. Of this some 8.367 billion dollars was to be spent on electricity generation and distribution (much of this was oil-fired generation), and some 76 million dollars was to be spent on all oil, gas and coal developments. This means the spending on electricity was planned at around 110 times that for oil, gas and coal supplies (*World Bank Report* 1588, 1977). The sheer inadequacy of this has been recog-

nised, very late in the day, by the World Bank in its 'Programme to Accelerate Petroleum Production in the Developing Countries' (*World Bank* Jan 1979). This makes the point that if nothing is done the LDCs will have an oil and gas import bill of around 38.3 billion US dollars in 1985 compared with 14.3 billion dollars in 1975. Recent price rises ensure that this figure is on the conservative side.

Based on the above figures the aficionados of alternate energy can claim that massive funds should be switched into the solar group of energy technologies. However this ignores at least two crucial points: the alternate fuels, apart from energy conservation (which is not a 'fuel') and *some* solar sources, are often *very* costly; and secondly the likelihood of oil and gas finds, and development of coal, in a very large number of LDCs is very good at the new international oil energy price. With regard to the costliness of alternate fuels it can be pointed out that Brazil, the country that has gone furthest and fastest with power alcohol fuels, needs a price of around 50 US cents per litre for its sugar cane alcohol system to be economic. A price of 150 US dollars per ton for refined oil products (i.e. over 20 dollars per barrel) translates to only a basic price of around 12 US cents per litre. Alternate fuels do not come cheap, and their development is only realistic when other economic, social and political factors play their part in making up the economic deficit they produce. With many millions of workers in the sugar industry, and big land owners and corporations in a poor profit situation because of the low world sugar price, it was to Brazil's net benefit to develop sugar alcohol — there being an additional potential benefit that if enough sugar went into fuel production it might stimulate the world sugar price.*

For most developing countries this is not the situation. Agricultural development should be tilted towards high value crops that can give good wages and fast rural development. But the rationale for accelerated oil and gas prospecting development in the LDCs is an even stronger argument against the 'alternate' fuels. The World Bank group, in its programme to accelerate petroleum production in LDCs made the point that exploration activities in some 39 countries out of 70 surveyed had *completely inadequate* accumulated data on which to make any conclusions regarding potential

reserves; in another 22 exploration was 'moderate', i.e. very small scale in relation to that in the present oil producing areas in the world. Of these 70 LDCs, some 23 were judged to have high to very high potentials for finding and developing commercial oil and gas, with the 'very high' category meaning a good likelihood of finding oil fields able to produce 1.5 billion barrels or more (*World Bank* Jan 1979). If this is then related to the total oil demand predicted for the oil-importing LDCs in 1985, i.e. 7.2 million barrels per day, the possibility of making the entire group self-sufficient for 20 years or more was judged to be very good.

Finding and then developing these sources remains the biggest problem, and it is complicated by the time factor — the rich nations show little inclination of limiting demand, and are becoming more brazen in their threats towards the OPEC nations. If they cannot control their warlike impulses the kind of economic crash envisaged by Paul Erdman in 'The Crash of 79', due to attempts by the West to get oil by force, comes as a real threat to the world.

The IFIs have now acknowledged that there must be a massive increase in oil and gas exploration and

development in the LDCs, and the January 1979 World Bank statement envisaged an increase in such efforts to a level of around 6.66 billion US dollars by 1985, compared to an estimate of some 13.3 billion dollars for oil search and development in rich nations over the same period. While this is of course a welcome development it still only shifts *world* funding for such exploration and development to a situation where the oil-importing, majority population LDCs have the *minority* of funds. Also, the IFIs of course envisage that the bulk of this work will be undertaken by Western companies using Western capital, although the long awaited advent of Technical Co-operation for Developing Countries (TCDC) provides some hope that this will not be the case.

* Another example of the high costs of 'alternatives' comes from Papua New Guinea, where the Department of Minerals and Energy is investing almost nine-tenths of its total planned budget for 1981 in solar energy. In the main, this money will go towards financing two projects for the production of alcohol fuel from cassava.

When one considers that 6 or 7 kgs of cassava are needed for each litre of fuel (which has a fuel value of about 70% that of petrol) and that a kg of cassava — as a *food* crop or even animal feed — is worth at least 10 US cents one discovers that the biomass inputs have an export parity of around 65 US cents per litre. In the world today, there is just one, highly experimental, cassava-fuel alcohol plant, and using data from this and from sugar-alcohol factories, one finds that process chemicals and energy, fixed operating costs and capital charges etc. approximately double costs relative to input biomass costs. Thus it is likely that the true *unsubsidised* costs of such fuels would be around 1.30 US dollars per litre — or about £2.50 per gallon. This is 'alternative energy'. Oil from OPEC, even after refining and after a 10% markup for wholesalers and retailers, is (before tax) about £0.55 per gallon. So if taxation charges were levied on alcohol fuels at the same rate, in the United Kingdom, as for imported and Scottish oil, they would have to retail at possibly £4 to £4.50 per gallon. In my opinion, this is just absurd for developing countries.

Sugar alcohol is even worse. Raw sugar is now worth over £200 per tonne. This works out at around 50 US cents per kg. For alcohol production from sugar, about 3 kgs per litre are needed — thus the input biomass is worth about 1.50 US dollars per litre, and the real production cost will be about 3.00 dollars a litre. Remember that whisky, rum, etc. are biomass alcohols and nobody thinks of them as 'cheap' fuels.

The Ecological Foundation is organising in conjunction with 'The Ecologist', a series of five day courses on the ecological approach to the basic problems that confront our society today.

Two courses will be held in May 1981 at Worthyvale Manor, Camelford, Cornwall. Price: £80 including food and lodgings.

The first course will be a general one. It will seek to cover the whole subject and will be based on a course given by Edward Goldsmith at the University of Michigan in 1975 and to the Students Union of Exeter University in 1978. Lecturers will be Edward Goldsmith, Peter Bunyard and Nicholas Hildyard.

The second course will be on the Ecology of Economics. The lecturers will be Kenneth Penney, lecturer in Economics at Exeter University, Edward Goldsmith, Peter Bunyard and Nicholas Hildyard. Talks will also be given by members of the Ecology of Economics working party of ECOROPA attending their fourth meeting, to be held in Cornwall at that time. Participants at previous meetings have included Nicholas Georgescu-Roegen, Ivan Illich, Orio Giarini, (author of 'Dialogue on Wealth and Welfare', the latest report to the Club of Rome), Jean Pierre Dupuy (author of 'La Trahison de L'Opulence'), René Passet (author of 'L'Economique et le Vivant'), and Joseph Huber, (author of many papers on the emerging informal economy). It is hoped that at least some of the above people will be present in Cornwall in May.

Will those interested in attending these and other future courses, please write to: Maria Parsons, The Ecologist, 73 Molesworth Street, Wadebridge, Cornwall.



Laying Optimism to Rest

by

Nicholas Hildyard

Nicholas Hildyard, joint editor of The Ecologist, writer, currently working on a book for New English Library on cover-ups

I find it ominously appropriate that the first major box-office success of the Eighties should be a film called *Apocalypse Now*. I went to see it again recently in New York at a cinema just off Broadway which, by coincidence, was also showing Bob Guccione's utterly tasteless pornoflick, *Caligula*, a sexual biography of Rome's most perverse Emperor. That too I found appropriate. Billed together, they seemed to epitomise the twin spirits of our age: on the one hand, Nihilism; on the other, Decadence.

It is because today those spirits are flying so high that I am now convinced that the ecological game is up and that the next two decades will simply see us blundering the more resolutely towards disaster. In part, this pessimism is bred by the belief that nihilism will sap our will to act: in part, by the realisation that its counterpart, decadence, is itself bred by despair. As one New Yorker quipped when I naively asked why he had bought a video, "Who wants to watch Eyewitness News filming the first atom bomb to drop on the United States? I'd rather be watching blue movies. Preferably with a joint in my hand."

All of which is in sharp contrast to the mood of the early Seventies when I first joined *The Ecologist*. I was fresh out of school and convinced that Western civilisation was at a turning-point. Even though the rusty

charabanc of the industrial state was clearly trundling towards a particularly dangerous precipice, I felt confident that someone would have the sense to put on the brakes in time to avert disaster. At least the issues were being discussed. Ecology had become a household word and stories which a decade before would never have made a column-inch in the press were now front-page news. *The Blueprint* was a runaway success: Parliament had debated it: and there was even talk of the Liberal party adopting it as their manifesto. It seemed inconceivable that such political flirtations would not end in marriage, or that by 1980 we would still be electing governments committed to economic growth.

Psychological Barrier

I now recognise such euphoria to have been hopelessly misplaced. For one thing, I had underestimated the resilience of industrial culture. As a one-time student of anthropology, I should have realised that we would cling to our ancient shiboleths as fiercely as any other society similarly threatened with change. Indeed, if I had given it more thought, I would also have realised that, psychologically, we are unable to do otherwise.

To be sure, the Seventies saw a growing disenchantment with many of our basic values and institutions as the certainties of the Sixties were swept from under our feet. The world could never be quite the same after Watergate, Vietnam, the advent of the drug culture and the inevitable oil-crisis. Suddenly a new world was upon us: inflation and

recession had become our permanent bed-fellows and politicians could no longer escape the problems of the hour by bland promises of a better tomorrow. Nobody seemed to know quite what had gone wrong but everyone was aware that the dream had turned sour. There, on our colour television screens, we could see the social fall-out of our blind pursuit of material progress. We could watch the battles between skin-heads and rockers out for a Bank Holiday punch-up. We could follow the shattering experiences of battered wives, psychiatric patients, heroin addicts, teenage alcoholics and others unable to cope with the stresses of modern life. We could gaze at the awesome power of toxic chemicals to pollute us literally out of house and home. New expressions (once exclusive to America) began to creep into everyday conversation: we talked of riot police, telephone tapping, race riots and, most frightening of all, holocaust. And as if to remind us of the world we had lost, or were about to lose, the BBC gave us Kenneth Clark's *Civilisation* and David Attenborough's *Life on Earth*, along with numerous nostalgic dramatisations from *Upstairs Downstairs* to *The Forsyte Saga*. But for all the dread awareness that things aren't what they used to be, we seem to have been unwilling to take any action.

Time and time again, we saw the disastrous effects of urban planning, but did we sack the planners? Not a bit of it. We simply asked them to go back to the drawing board and

design more 'social' units. In the meantime, we got down to the job of totting up the costs of vandalism, juvenile delinquency, muggings, broken homes and mounting psychological disorders. And in the worst cases, we demolished the high rise flats as if somehow piles of rubble would exorcise the demon of social disintegration.

□ *Time and time again*, we saw the side effects of three decades of scientific laissez-faire coming home to roost. Drugs that were once hailed as breakthroughs were seen to cause more problems than they purportedly solved. The new super-projects that were to rescue the Third World from hunger and disease brought with them unforeseen ecological disasters. Nuclear power lost its glitter as the appalling dangers of radioactive pollution became apparent. The cancer rate continued to soar as more and more chemicals were pumped into the environment. But did we turn our backs on Science? No, we simply asked the scientists to clean up the mess they had helped to create in the hope that, eventually, they would get the formula right and synthesise a Technological Messiah to rescue us from the edge of the abyss. No matter if we are running out of resources; we will mine the asteroids. No matter if we don't know what to do with our nuclear waste; we will shoot it off to the moon. No matter if we are faced with social problems we can't control; sooner or later we will find the secret of manipulating behaviour to our own ends. Thus, the decade which began with the first moon shots ended on the same note of technological optimism with the birth of the first 'test-tube' baby and the government giving the go-ahead to genetic engineering. And few seemed prepared to speculate on the probable consequences.

□ *Time and time again*, we saw signs of our society coming apart at the seams. Divorce rates soared; one parent families burgeoned; alienation amongst youth reared its ugly head as boomer boys gave way to punks; the crime rate rose year after year. And what solution was offered? More breeze-block community centres.

The Impossible Demand

Why is it that so much philosophising has led to so little action? Why, again, have so many intelligent people, when presented with the facts, still preferred to struggle uphill along the industrial path even though the signs all point to Armageddon? I am drawn to the depressing conclusion that the answer lies in the very nature of the ecological message.

No society can tolerate a challenge to its most basic values. Imagine trying to persuade a group of Amish elders that God doesn't exist or that the Bible is simply a science fiction story. The notion would be thrown out of court before the argument even began. It would be greeted with horror. And understandably so, for to ask a people to reject everything they have been brought up to believe is to ask them to partake in more than a rational debate. It is asking them to be prepared to abandon their way of life, to question their social mores and, most important of all, to abandon their cultural identity.

Yet ecologists are asking nothing less of the industrial world. Indeed their message is probably the most radical to have emerged since Christianity stormed the Roman Empire, (an event, one might recall, that was only achieved through social collapse). At its most banal, the ecology movement is asking people to switch (almost overnight) from thinking of the car as a status symbol to thinking of it as a guzzler of precious resources. At its most radical (and, I believe, realistic), it is suggesting that it is industrialism itself which is at the root of all our problems. For all the talk of revolution, Marxism is tame creed by comparison, questioning only who controls the means of industrial production. Ecologists, on the other hand, are asking whether those means of production are not also the means of our destruction.

That presents an almost insurmountable psychological barrier. To accept the argument means denying the most sacred premises (and I mean that literally) of our society — from ideas of Progress to those of Science and Humanism. Such iconoclasm makes food for dinner party conversation but there are few of us prepared to venture into the un-

known and leave behind all the trappings of the industrial world. To do so is to invite being branded either a crank or a social outcast. Small wonder, then, that the majority in the West likes to believe that our blemes are not so serious that the world can't be saved by rich women giving up their furs and the rest of us installing solar collectors.

On the Fringe

Indeed the extent to which people are prepared to accept the ecological message seems largely to depend on how well they are integrated into industrial society. Those who do well out of it, and whose lives have not been disrupted by it, tend to take the view that ecology can be grafted onto industrialism without major surgery. Then there are those (more dubious about the direction society is taking) who see part of the picture — the dangers of nuclear power, for example — but who are wont to abandon the idea of growth and look to alternative energy sources to maintain our present standard of living, forgetting that what we do with energy is as important as how we generate it. At the far end of the spectrum are those genuinely alienated from society who look towards root-and-branch social and economic change to cure our ills.

That, however, creates its own problems. For whilst it is this last group who are most prepared to question the values of mainstream society, they are largely prepared to do so precisely because they are on its fringes and the new values they promote accurately reflect their marginal social status. I remember a television documentary on the fate of the Californian communes that flourished in the late sixties. At one of them, two young girls, both in their teens, described how they were trying to create a new society, one that could live in harmony with nature and be free from the taboos of middle-class America. Were they in favour of free love? Yes, of course. Did they impose any social constraints? No, that would stifle individual 'self-expression'. What did they think of the family? Not very much, but that was the basis of the commune: they were seeking a new family structure. Sadly, stable societies are not made out of social

experiments. The commune eventually failed and its members drifted back to the fold, often to live precisely the lives they had castigated so roundly a few years before.

The alternative movement has grown up since those early flower power days, but for all the talk of a new society there is still a considerable reluctance to accept the idea of social constraints. One of the first articles I wrote for *The Ecologist* (Vol.6, No.9) was a piece on the social structure of Siena. I pointed out that, in sharp contrast to other cities in the Western world, Siena has remarkably low rates of crime, murder, violence, divorce, drug addiction and other symptoms of social disintegration.

Like other cities, Siena is divided into districts, eighteen in all. But unlike London boroughs or New York precincts, these 'contrada' are more than administrative units. They are discrete social groups. Each has its own seat of government and is, indeed, autonomous. Each has its own flag; its own patron saint; its own taboos; even their values differ in important respects. To be accepted as a citizen of Siena means to have been born into one of the contrada. Thereafter, one's primary allegiance is not to Italy, not even to Siena but to one's contrada.

But loyalty to the contrada is more than simple custom; it is a total, unquestioned commitment; a deeply felt, almost religious way of life based on a subtle web of social relations. In fact, the group's coherence relies on many of the same social constraints found in tribal societies; marriage outside the contrada is frowned upon; children are socialised into a respect for the contrada from birth; roles are as strictly defined as the contrada's physical boundaries; each contrada has traditional allies and enemies; and there is a tendency to view the world through the eyes of the group, indeed the contrada's symbol (usually an animal) is revered as if it were a totem.

Nowhere is the tribal element more evident, however, than in Siena's annual horse race, the Palio. To the tourist, it is a barbarous affair apparently run without any regard for sportsmanship: riders are allowed to whip each other; a riderless horse can win the race; and

bribing jockeys is an accepted practice. But for the Sienese, the Palio is a celebration of the role of the contrada and, ultimately, of Siena itself. Preparations for the race begin the year before it is run; elaborate alliances are made with friendly contrada to outwit rivals; everybody, from young children to their grandparents, is involved in raising money to hire the best jockey. On the evening before the race, huge street parties are held, attended by everyone in the contrada from the richest business man to the poorest road sweeper. Then comes the Big Day itself: the horse is blessed at the contrada's church; a march is held through Siena; and finally the Piazza Del Campo, Siena's central square, erupts as the signal is given for the race to begin. Emotion is at fever pitch, yet the violence seen at football matches in Britain (and more recently amongst British fans in Turin) is unheard of. The race is a psychological catharsis, a purging of animosities, and the very social relations it functions to maintain keep the peace far better than any force of riot police.

I suppose I should have expected it but the article brought a response that seemed irrational in its fury. "Hildyard's 'ideal city' reflects the same mentality that gave rise to the concentration camps", wrote one critic. "Are we really expected to subsume the individual to communal dictatorship?" asked another. Yet there was little criticism of the analysis itself; the arguments pitted against me rested on the *assumption* that a society which exerts social constraints is somehow abhorrent and that the individual must be allowed to reign supreme.

There is a rich irony in that belief, for a strong case can be made that social alienation rises hand in hand with the growth of individualism. One does not have to be a maverick to stand out in Sienese society for the social relations of the contrada supply each citizen with a status and a role in society. Whatever the force of one's personality one is assured of a discrete social identity. Contrast that to the predicament of the individual in a rootless, disintegrated society where social relations are weak and rarely long-lasting. Social prestige must be won by individual

effort, and prestige being a limited commodity, it is available only to the few. Eventually it is only the shark-eating shark that eats its way to the top. The rest of us are condemned to the anonymous, dejected ranks of 'mass society' and without the backing of traditional family and community ties, many fall by the wayside.

For this is the world of the bed-sit suicide, of drug addiction, alcoholism and the cult group. Some (witness the Jonestown massacre) seek succour in the dictatorial whims of a charismatic leader. Others (the Hells Angels, for example) reject all conventional morality and, quite literally, adopt the Maxim of Milton's Satan that "It is better to reign in Hell than to serve in Heaven". Indeed, it is inevitable in this alienated world where recognition is gained by flouting social taboos that violence should be seen as a means of establishing a social identity. A safety-pin through the nose might be painful but at least (for that brief moment before it becomes the fashion) it gets one noticed.

Can we put Humpty-Dumpty together Again?

Of course there are other cult groups (and I number the ecology movement among them) who are genuinely concerned with wresting a new society from the mayhem they see around them. But here one comes to the nub of the problem. If I am right in thinking that the values of industrialism will not be overthrown by rational argument but by increasing social alienation, then the ecology movement's greatest problem lies not in formulating policies for a slow transition to a stable society but, rather, in creating a stable society from a totally structureless one. Can that be done?

Having just returned from a trip to America, my thoughts turn to the social problems faced on the other side of the Atlantic. New York State, for example, has some 15,000 heroin addicts undergoing treatment and an estimated half a million unregistered heroin users in New York City alone. (That figure is increasing as heroin takes over from cocaine as the 'chic' drug and it is no longer uncommon to be offered it at parties). The problem is so vast that many believe there is no solution to it. Consider the

options open to New York's city fathers:

Option One: pursue the conventional approach and try to cut off supplies. Here one meets two insurmountable problems. Now that the Russians have taken over Afghanistan and Iran is no longer an ally, the world's two major sources of opium are outside America's sphere of influence. And even if (miracle of miracles) the narcotic agencies managed to slam the door on heroin smugglers, what would happen if New York was deprived of its daily shot of heroin? If the scenes following the break-up of the French Connection heroin ring in the early seventies are anything to go by, there would be 'panic' on the streets. The price of heroin would rocket. Habitual users, deprived of their fix, would run amok — half a million people (equivalent to 30 army divisions) would be released onto New York's streets to die of 'cold turkey' or simply to take out their frustrations in an orgy of looting and murder. And what could the police do?

Option Two: increase the number of clinics for drug treatment. But where

is the money to come from to finance them when New York is on the brink of bankruptcy? And will treating the symptoms of social disintegration really cure the causes? Indeed, I have heard cynics argue that by making heroin treatment a major industry, drug addiction is bound to flourish because too many people will come to rely, economically, on its continuation and the authorities will be unable to stamp it out.

This brings us to *Option Three:* try to establish the bonds of family and community in such a way that people no longer need to take drugs to escape from the pressures of the world. One is back to the original problem: how to put the social humpty-dumpty together again once he has fallen apart. What, after all, is one supposed to do in a society where teachers have to wear flak-jackets to school because their pupils are liable to stab or shoot them? How can one re-establish community bonds in areas where arsonists not only burn down buildings but also fire at the firemen trying to control the blaze?

Après Le Deluge: Nous?

I am drawn to the conclusion that

once social disintegration reaches that stage, there is little one can do to prevent social collapse. But would that be such a bad thing? For it may be that in collapse we shall be forced to accept the constraints that make for stability. I remember Robert Allen, then joint-editor of *The Ecologist*, suggesting a title for a report that was to be the follow-up to *Blueprint for Survival*. "How about: *Après le Deluge, Nous?*" he quipped. I suspect that he might be right for if one considers the sheer magnitude of the problems facing us today — from resource constraints to the energy crisis, from social disintegration to ecological degradation, from the threat of nuclear war to the problems of over-population — I cannot see how a single solution will be found without the collapse of industrial society. Certainly it will mean that we won't be able to jet over to New York to see *Apocalypse Now* but, then again, we won't need to jet around the world trying to persuade governments to be more conservation-minded. Perhaps, after all, collapse for all its horrific implications will permit us to be The Earth's Inheritors.



I suppose I'll have to give you back your heroin. I don't want New York to pack up all together.

Ecology of the English Chalk

C.J. Smith

June 1980, xvi + 574pp., £23.80 (UK only) / \$55.00, 0.12.651850.5

The Chalk formation of southern and eastern England forms a distinctive tract of country which has sustained and inspired its inhabitants for over 5000 years. This book reviews facets of the English Chalk country: its geological and archaeological history, its climate and soils, its flora and fauna, its agriculture and forestry, and finally the challenge of conserving this rich heritage while yet accommodating the nation's ever increasing demands for resources and recreation.

Section Headings — The making of the chalk landscape. The climate of the English chalklands. Soils of the chalk. The colonisation of exposed chalk. Chalk grassland: I. Climate and edaphic influences. Chalk grassland: II. Biotic influences. Chalk scrub. Woodlands on the chalk. Chalkland resources. Conservation. References. Index.

Advances in Ecological Research Volume 11

edited by A. Macfadyen

March 1980, xii + 430pp., £25.00 (UK only) / \$57.50, 0.12.013911.1

The subject matter of the articles in this series range over the whole field of theoretical and applied ecology, aiming to present the knowledge derived from primary research to a wide audience. The original papers are all reviews, bringing together the work of many researchers from different parts of the globe and offering previously inaccessible material. In this volume there is an emphasis on the animal kingdom, especially birds, mellanic insects and leafhoppers, while two articles on heavy metals and agricultural ecosystems stress ecosystem studies.

Contents — G.R. Potts: The effects of modern agriculture, nest predation and game management on the population ecology of partridges (*Perdix perdix* and *Alectoris rufa*). N. Wallof: Studies of grassland leafhoppers (Auchenorrhyncha, Homoptera) and their natural enemies. M.K. Hughes, N.W. Lepp and D.A. Phipps: Aerial heavy metal pollution and terrestrial ecosystems. Ian Abbott: Theories dealing with the ecology of landbirds on islands. J.A. Bishop and L.M. Cook: Industrial melanism and the urban environment. Author index. Subject index.

Energy Science and Engineering: Resources, Technology, Management *An International Series*

Renewable Energy

Bent Sorensen

January 1980, xvii + 584pp., £20.00 (UK only) / \$46.00, 0.12.656150.8

In recent years, with the growing costs of fossil fuels, the realization that their supply is limited, and doubts about nuclear energy, there has been a great increase in research and speculation on the possibilities of renewable energy resources. The crucial question of whether renewable energy sources can support future energy supply systems has yet to be answered, but in this comprehensive survey of the subject, Bent Sorensen provides a much-needed and easily accessible source of reference for the facts, methods, principles and interrelations in the renewable energy field which will inspire and form a firm basis for further research and planning towards an ultimate solution. The book will be of the greatest interest not only to students of energy science and energy researchers in engineering, physics and chemistry, but also to anyone needing to know the facts about renewable energy, such as energy planners, economists, and those concerned with the alternatives to the present sources of energy.

Contents — Perspective. The origin of renewable energy flows. The individual energy sources. The energy conversion processes. Energy transport and storage. Energy supply systems. Socio-economic assessment of energy supply systems. Index.

Academic Press

A Subsidiary of Harcourt Brace Jovanovich, Publishers
London New York Toronto Sydney San Francisco
24-28 Oval Road, London NW1 7DX, England
111 Fifth Avenue, New York, NY 10003, USA



Where Do We Go From Here?

by

Peter Bunyard

Peter Bunyard, associate editor of The Ecologist, smallholder, freelance writer, consultant editor of UNEP journal Industry and Environment.

Ten years ago when we first published *The Ecologist*, Teddy Goldsmith decided I should become the energy expert. "You're the scientist among us", he declared, as if a couple of years at Harvard studying the sex life and wintering habits of Japanese silk moths had equipped me in some particular way for comprehending the politics and industrial uses of energy. He then gave me a month to write an article on energy. It duly appeared in *The Ecologist* as *The Power Crisis*.

Has so much changed in ten years? I recall that in preparing the article very little at that time suggested the industrialised world was about to plunge into economic depression, and all because of energy. Indeed it was a time of high production and seeming affluence. Moreover Colonel Gaddafi had not yet nationalised Libya's oil and set the trend for jacking up prices: OPEC was a fledgling organisation still to flex its muscles; and who would have imagined another round of war between Israel and the Arabs so close to 1967? Combined those three factors forced the West to realise the power of oil to control their economic destinies.

Yet the writing was on the wall. The extraordinary post-war profligacy in consuming petroleum, the concomitant upsurge in the production of automobiles, the new consumerism and avidity for gadgets,



made it inevitable that those who gained control of the world's cheap energy resources — hence petroleum — could more or less switch the economies of industrialised countries on and off. True there was an economic game to be played; and if the Arabs and their OPEC brethren no longer sold their oil so cheap; they didn't want to make it so dear that the economic edifice of the OECD countries collapsed. For where would their sales be then? Indeed the Saudis, with their envoy Sheikh Yamani, were always trying to moderate the oil price rises demanded by the more militant members of OPEC. Meanwhile in return for owning and selling their oil OPEC members expected their countries to develop, which meant little other than buying in high technology products from the West.

But as we can now see the kind of development bought with oil money appears to have little relevance to the needs of the bulk of the population in developing countries whether they be members of OPEC or not. Iran, with its fervent rejection of Western values and technology, with its self-imposed reduction of oil exports, is a terrible warning to the West of the precariousness of its oil supplies.

The turmoil regarding petroleum supplies and prices during the past ten years will undoubtedly have some bearing on the time left before the world runs out of oil, especially if industrialised economies remain depressed and developing countries remain undeveloping. But even at the present pace of consumption, the known world reserves of petroleum will not last many more decades.

When writing my original energy article for *The Ecologist* I referred briefly to Dr King Hubbert who described the present era of man as "actually one of the most abnormal phases of human history". Last year I read an excellent account of Hubbert's work and how his assessment of the world's ultimate reserves of petroleum appeared increasingly to be vindicated. At a time when United States oil production had risen to new heights during the late 1960s, Hubbert was warning that decline would set in at the beginning of the 1970s and fall away from then on. He based his pessimistic prognosis on the results of a

survey of oil finds in the United States from the beginning of the century on, which showed that exploration was becoming both more expensive and less rewarding. Thus while the first half billion feet of exploratory drilling in the United States yielded discoveries of 95 billion barrels of oil, the next batch of drilling yielded only 24 billion barrels and the last half billion feet only 17 billion barrels. Meanwhile in a counterwise direction, exploratory techniques had been improving, thus reinforcing Hubbert's conclusions of a hump-like rise and fall in oil discoveries — followed ten years later by a similar production curve. Consequently Hubbert believed that the United States would produce some 200 billion barrels of oil overall.

As Professor Owen Phillips of the Johns Hopkins University points out in *The Last Chance Energy Book*, Hubbert has always had disclaimers, and in particular the followers of the geologist A.D. Zapp who in the 1950s assessed American total oil reserves as amounting to as much as 600 billion barrels. In a nutshell, Zapp claimed that the amount of oil to be discovered in the United States depended on the ratio between how much exploratory drilling had been done to the amount that was still left to be done. He reckoned on one exploratory drill for every two square miles in potential petroleum bearing sedimentary basins and, since by 1961 only one fifth of the ground had been covered and had yielded more than 100 billion barrels, the total would be five times greater.

Hubbert was also a professional geologist. The fallacy in Zapp's claim, he pointed out, was to assume that each foot of exploratory drilling would be equally rewarding. In fact oil companies did not drill to a precise grid, but selected carefully where they most expected an exploratory well to pay off. Naturally there were random successes but they had to be balanced against more conventional finds. According to Hubbert, most of the best finds had also been the easiest finds.

Not only was Hubbert right, says Professor Phillips, he actually predicted the very year when American oil production would go into decline, despite the oil companies carrying out more intensive exploration, including offshore.

Elsewhere in the world, oil companies seem to have accepted Hubbert's message as relevant to their own activities, and only a few mavericks like Dr Peter Odell, are of the opinion that the real oil bonanza is still to come. But if governments see the limits to oil discovery and production, they have only marginally altered their commitment to industrial growth and the need to find an energy replacement for oil.

Ironically, the fortunes of nuclear power seem to have declined as expectations of what it will do have risen. In that original *Ecologist* article, I quoted P.J. Searby of the UKAEA as suggesting that nuclear power might be providing one-quarter of the world's energy by the year 2000. Even with the proposed programme of 15 Gigawatts, Britain is likely to have no more than seven per cent of its end-use energy coming from nuclear power by the end of the century, while averaged out over the world, its contribution is likely to be no more than a few per cent at best. France alone might be close to attaining Searby's figure of 25 per cent.

From the very beginning of its development nuclear power has been a beguiling proposition: so much energy, several million times more on a weight to weight basis compared with coal, locked up in a single uranium atom. But it is the getting to that energy and dealing with its consequences that have really blighted the dream. In fact nuclear power should always have stayed an invention of the mind, like H.G. Wells's *The World Set Free* rather than becoming the prime hope for a materialistic utopia. Indeed scientists such as Rutherford and Chadwick who first came to grips with the enormous energies locked in the atom were less concerned with saving the world from an impending energy crisis than in furthering their understanding of the world around them. The Second World War and the one-sided race for the bomb changed all that.

I have certainly found myself seeing nuclear power and its developments in better perspective as a consequence of reading two recent books on the scientists who first split the atom and hit on the notion of fission and the chain reaction. One, *Scientists in Power*, is on the French

scientists, in particular those who, with the Joliot-Curies at the College de France, were on the brink of making the world's first atomic pile just before the Germans invaded France in the summer of 1940. The other book, *The Deadly Element* spreads itself thinner on the ground by telling the story of uranium from its discovery by Klaproth in the late eighteenth century until just after the exploding of the first atomic bomb at Alamogordo in the New Mexican desert in 1945.

Both books are superbly narrated, captivating me completely with the excitements and frustrations of the protagonists as they wrestled with the results of their experiments and tried to make sense of conflicting ideas and baffling phenomena. If anything Spence in *Scientists in Power* is a better hand at characterising the men and women whose story he tells.

But man is never content with ideas, he wants to see them realised, and so we have Concordes, weed-killers, nuclear war-heads, and nuclear power stations. Indeed the incredible coming together of minds during the 1920s, 30s and finally in the Manhattan Project, was bound to lead both to the attempt to get an atomic pile to work and to the making of an atomic bomb. It was both luck if one can call it that and its resources in materials and manpower which led to the Americans developing the first atomic weapons. But it appalled some of the scientists involved that the bombs were used on Japan, especially since the motivation behind the Manhattan Project had been the fear that Germany was on the way to developing its own nuclear weapons. As it happened the Germans had missed out by miscalculating the numbers of neutrons ejected during the fissioning of uranium and hence came to believe that an atomic pile would never work. They also missed out on uranium enrichment — devised in fact by Jewish refugees in Britain — and so were unable to bypass the atomic pile.

It is certainly true that the notion of an atomic pile for generating power had always been one aspect behind atomic research and Joliot in France considered such a development the sole legitimate one. But it is also true that without the incred-

ible impetus given to the development of nuclear bombs nuclear research would not have been nearly so advanced by the 1950s. When we remember too that the light water reactors were developed specifically for powering nuclear submarines, each of which carries enough war-heads to destroy a country the size of Britain, the weapons connection can never be far away. We have seen too how a civilian reactor in India can become a supplier of plutonium for bombs. And the temptation to divert nuclear material can never be far away in this confused and aggressive world.

I feel after ten years of writing for *The Ecologist* that the energy problems I envisaged then have not altered significantly; if anything they have become more clearly defined. Ten years ago it struck me as absurd that Britain's energy consumption would probably have to double by the end of the century if the country was to remain economically viable. Now most people in Britain realise that such a doubling just won't happen; they are even sceptical that the proposed nuclear power programme of Thatcher's government (it's actually a far smaller programme than that tentatively put out by Benn when he was Secretary of State for Energy) will ever get completed. Moreover everyone is having to cut back, whether it is farmers reducing their inputs of nitrogen fertiliser, or the average family thinking twice before taking the car out for a jaunt. As for industry, British Steel and British Leyland in particular, their reductions have become almost legendary.

I must admit I cannot foresee clearly what will happen over the next decade, but of one thing I am certain, our energy consumption will not increase. We have several choices open to us. We can let the government battle on for us, trying to jog us into consuming more energy because it feels it is good for us, like some ancient quack medicine, while we continue to flounder and become progressively less employed and employable. We can try, with government help, to pursue the energy pathway delineated by Gerald Leach and his lot at the International Institute for the Environment and Development — the pathway of making energy go a lot

further through applying small-scale technologies, like heat pumps and driving cars with twice the mileage. Or we can live through a complete revolution in which consumerism and big energy consumption are no longer the aims of society, and are replaced by a much more equitable sharing of resources. Indeed it is becoming increasingly clear that the high energy world of the industrialised countries is one that will never be attained by most people now living, or likely to live. Can the one-sided hogging of resources practised by us and the other OECD countries really be justified morally or politically?

To my mind all of us in the West have got to learn to live more modestly, which does not mean in poverty or deprivation. On the contrary it might give us a chance to re-affirm our ties to society and community.

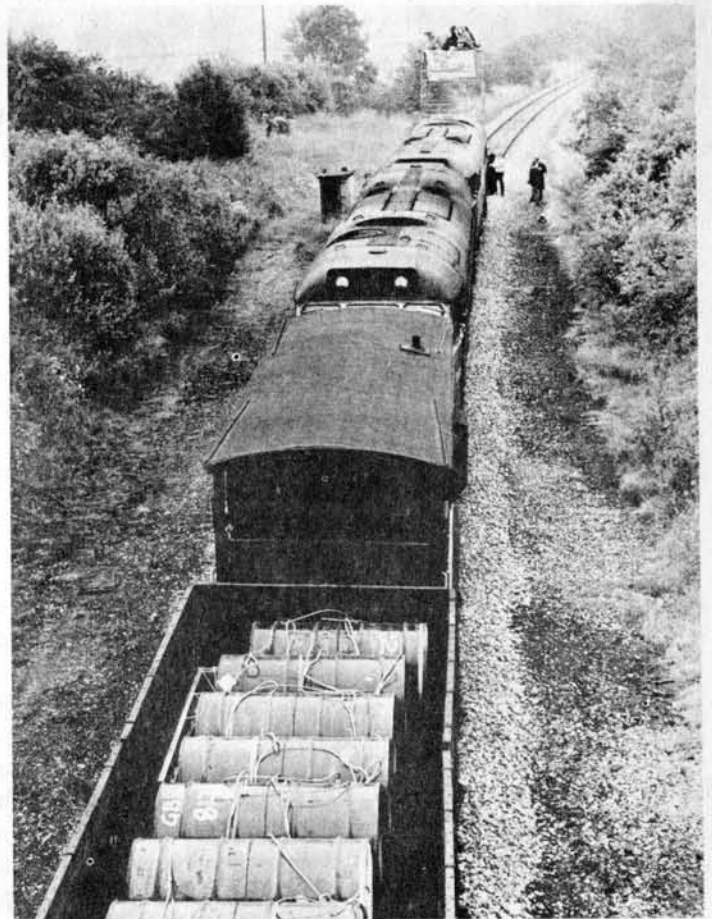
In *The Deadly Element* I was really startled to read a statement by Otto Robert Frisch, who died last year and who at one time was director of high-energy physics at the Cavendish Laboratory, Cambridge. Given his background I had always imagined him to be wholly in favour of nuclear power. Indeed Frisch, with his aunt Lise Meitner, had been responsible for first realising that uranium-235 fissions into two adjacent elements in the periodic table; he also realised that uranium-235 enrichment could lead to an atomic bomb and at Los Alamos was responsible for calculating the critical mass of plutonium to be used in the Nagasaki bomb. This is what he said: "Uranium-burning stations, plutonium breeders, even reactive lithium in hydrogen power stations will always be dangerous to human beings. I look forward to a world where men no longer depend on fossil fuels — not on coal, wood, oil, — nor uranium and hydrogen. It may take a long time, but man must break the habit of using whatever happens to be lying around to meet his growing energy needs. In the end he will be compelled to stop his wandering into such thickets of danger and to turn back to the original source of all energy. He must turn to the sun. I am sure finally, there will be dramatic advance in development of techniques for storing and using this natural font of power."

APPEAL FOR FUNDS

On July 8th 1980, eight young people erected a tower on a railway line to obstruct a train carrying nuclear waste to be dumped into the Atlantic.

Already 120,000 tonnes of nuclear waste have been dumped into the Atlantic. Nobody knows how radioactive material is transported in the marine environment. This dumping is highly irresponsible and must be stopped. The initiative taken by this group is an important one which responsible people should encourage and emulate. Needless to say this was not the case. Instead they were arrested. To make an example of them each was fined £300 and £20 costs. It is essential that this sum is found for them.

If you support their action and would like to contribute, please send donations to:



Bristol University Press

"Sharpness Defence Fund"
c/o Lindsay Adams
The Gables
Butterow Hill
Stroud, Glos
Tel. Nailsworth 3194

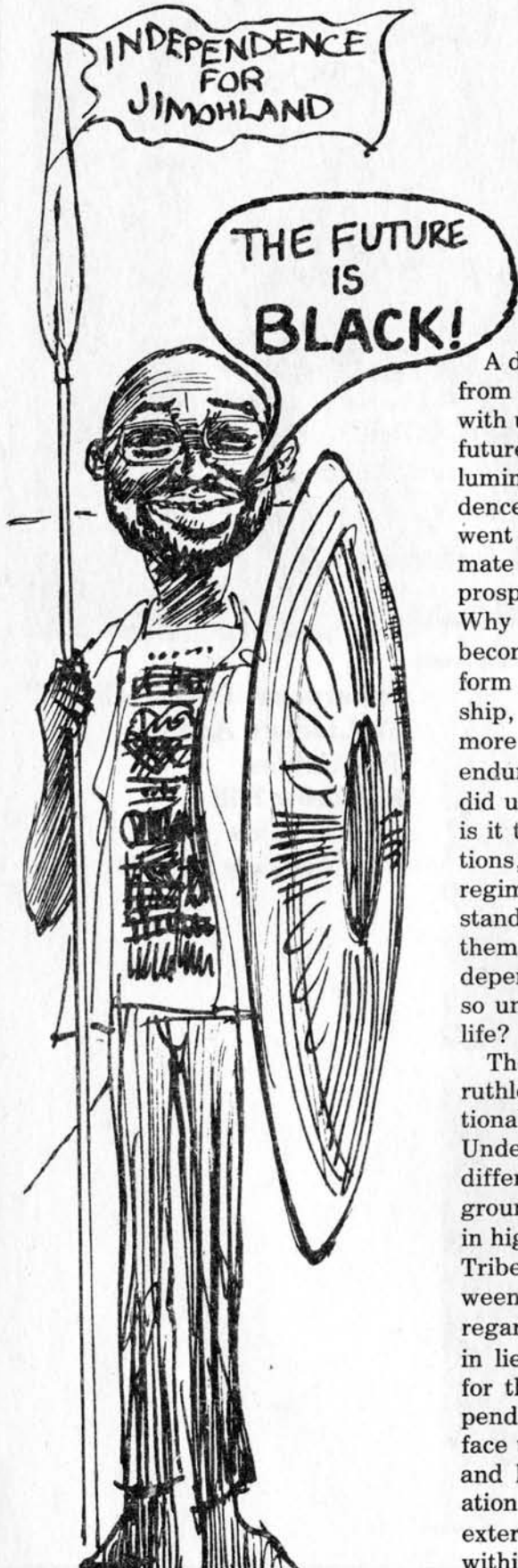


Ethnic Diversity or Mono-Culturalism — The Struggle for Africa

by

Jimoh Omo-Fadaka

*Jimoh Omo Fadaka, associate editor of
The Ecologist, Nigerian economist
UNEP appointed Eco-development
advisor to Papua New Guinea,
environmental advisor to President of
Nigeria.*



A deeply rooted desire for freedom from their colonial rulers, together with unbounded faith in the glorious future that would surely follow, illuminated the struggle for independence in African countries. What went wrong? Why have their legitimate hopes of peace, progress and prosperity turned to bitter strife? Why has independence so often become but the prelude to a new form of military or civilian dictatorship, in which the people enjoy no more freedom, and often have to endure greater hardship than they did under the colonial powers? Why is it that parliamentary-type institutions, inherited from the colonial regimes, have been unable to withstand the pressures imposed upon them by the new forces of African independence? Why have they proved so unsuitable to the African way of life?

The answer lies very largely in the ruthless breaking up of the traditional structure of African society. Under colonial rule people of widely differing cultural and religious backgrounds were often lumped together in highly artificial centralised states. Tribes were arbitrarily divided between two or more states, without regard to their ethnic heritage. Herein lie the roots of today's troubles, for the rulers of these newly independent African countries must now face the consequences of the unrest and hostility inherent in this situation. Although there are still some external threats, the real enemy lies within their own boundaries.

The reasons for this need to be understood for they have an important bearing on the future of Africa. Although the colonial powers continued to use the traditional structure of ethnic government for certain jobs like tax gathering and minor local administration, they were on the whole hostile to ethnicism, because it represented a potential rival to their authority. They therefore sought to subvert it, and where possible nominated their own ethnic chiefs or 'warrant chiefs' who were granted privileges, so long as they did as they were told. One far reaching result of this policy of fragmentation of ethnic groupings has been that when the time came for the people to throw off the burden of colonial domination, their leaders were unable to build the new independence movements within the ethnic structure. In its absence they were compelled to promote their cause within the framework of the artificial colonial divisions, and thus, by a cruel irony, to further weaken ethnic bondings. Although they claimed to speak for all the ethnic groups in their countries they were in fact quite unable to do so and found themselves bound to accept the valuation of the ethnic system placed upon it by colonial administrators — that it is outmoded and represents a hindrance to progress. Their concurrence with this philosophy was indeed a victory for colonial thinking.

Thus the new leaders who emerged after achieving independence,

sought to govern on the monocentralist principles introduced by their former governors. It is to this that the chronic instability of modern African states can be attributed. Ethnicism may be tolerated so long as it is not troublesome, but for the most part it is regarded with suspicion and contempt as something belonging to the past and totally unsuitable in a modern progressive state.

Since independence many states have been politically unstable as civil strife has increased and the demands of different ethnic groups have been heard. Deprived of the dignity and joy they were promised, they seek to break away from the new oppressors to form independent states, or join up with other peoples with whom they share a common cultural heritage. Governments have therefore found it increasingly difficult to maintain their authority, a situation made more difficult by the lack of a common indigenous language. Monocentral government has also signally failed to cure economic ills, and dreams of prosperity have been wrecked on the rocks of increased poverty.

A glimmer of hope rises in the distance, however, as some of the new leaders are beginning to understand that lasting stability can only be reached by accepting and respecting the traditional ties of kinship, culture and religion. Nigeria, the most populous and richest state in Black Africa, is one example. Some recent estimates suggest that her population has already reached one hundred million, which means that one out of every four Africans is Nigerian. One lasting result of the 1967-1970 Nigerian Civil war, in which the Ibos fought unsuccessfully to secede from the Nigerian Federation and establish the new state of Biafra*, has been a radical change in the structure of the Federation. Before the Civil war Nigeria was artificially divided into four states — North, East, West and mid-West, which bore no relation to ethnic groupings in the country. The Federal Government in Lagos had far too much power, and could and did issue orders to State Governors — orders which were frequently ignored — so that friction and dissatisfaction were rife. Today there are nineteen states in Nigeria, roughly corresponding to

various ethnic groups in the country, and none is big enough either to dominate or to threaten any of the others. Moreover the states enjoy considerable political autonomy.

The Governor and members of each State Assembly are elected by all the voters in his state, and the President of the Federation can intervene in the State's affairs only in exceptional circumstances. Although the states depend for 80 per cent of their revenue on federally collected funds, most of these funds are guaranteed under the constitution, and the Federal government cannot withhold them. The nineteen states, regardless of their size or population are represented equally in the Senate. Senators are also democratically elected, as is the President, who must submit for Senate approval, any major policy decision, and the names of people he proposes to appoint to certain key jobs, including Federal Ministers and Heads of Federal Civil Service Ministries.

What in effect the Nigerians have achieved is a system that accords with the realities of political and cultural life in their country. By decentralising the power structure they have made possible a degree of peace and unity among the ethnic groups, that offers much hope for the future.

This was not achieved without three years of bitter civil war, with both sides being supplied with aid from countries with a vested interest in Nigeria's future. To learn the elementary truth that ethnic differences must be respected, many thousands had to suffer and die. Other African countries such as Zaire, Ethiopia, Uganda, Kenya, Burundi, Rwanda, Angola and Chad, who are currently faced with civil strife, either because ethnic groups wish to secede, or at least to gain greater political autonomy, would do well to study the Nigerian experience.

What is at issue, then, is in what direction African politics should move to put an end to the internal strife that is tearing apart so many of the newly independent countries and threatens to engulf the whole continent. The frontiers inherited from colonial rule *must* be changed to reflect ethnic realities, and these groups should wherever practicable be granted political autonomy and

freedom from the fear of domination by another group. If this is done full economic, social and military co-operation between ethnic groups should become feasible, and would lead eventually to the unity and stability that has so far tragically eluded them.

* Omo-Fadaka, J., 'Does Nigeria Exist?' *The Ecologist* Vol.1. No.5. 1970.

Middlesex Polytechnic Courses in Geography and Planning

Opportunities for study of geography, economics and planning are offered on many courses at Middlesex Polytechnic, including

- **BA and BSc Honours in Geography**
Three years full-time
- **BA Honours in Economics and Geography**
Three years full-time
- **BA and BA Honours in Social Science (with planning studies)**
Four years sandwich
- **BA and BA Honours in Humanities (with Geography)**
Three years full-time
- **BEd and BEd Honours (with Geography)**
Three or four years full-time

Post today to:
Admissions Office (ref.C434)
Middlesex Polytechnic,
114 Chase Side, London
N14 5PN. 01-882 1074.

Please send me a copy of your brochure *Courses in Geography, Economics and Planning*

Name and address



Ten Years Ago — Twenty To Go

by

Lawrence Hills

Lawrence Hills, associate editor of The Ecologist, writer, innovator of organic farming and gardening, director of the Henry Doubleday Research Association.

The thirtieth birthday of *The Ecologist* will be in the year 2000, so quickly does the far future become tomorrow, unless all our yesterdays by then, have lighted fools, the way to dusty death. The near past fades even more swiftly, with '(20p)' in brackets after '4/-' on the cover of the first number in those newly decimalised, pre-Afghanistan days, already part of history, like the drawing of a younger, beardless Teddy Goldsmith above the Editorial.

He wrote to me out of the blue, having seen a letter of mine in *The Daily Telegraph*, asked me out to lunch in London, at Rules, and between us we threshed out the ideas that are still behind *The Ecologist*, in about an hour and a half of high speed conversation. I went home walking on air with the prospect of launching a fighting magazine full of environmental ideas, and told my wife Cherry, "I give it two years before it folds, but they will be useful and exciting years". I was wrong. It has lasted ten, and still has the same spirit behind it. I hope I live till I am 88 to read that thirtieth birthday number.

We chose the best title. Had we chosen 'Ecology', which stands for the science itself, this would have meant a fat quarterly in which long papers appeared, 'published' in the scientific sense, involving no payment to authors beyond the glory of sharing their knowledge with their

colleagues. 'Practical Ecology' would have carried many more advertisements for the costly apparatus needed for the study of the interlocking relationships between all the living beings from viruses to whales, Californian redwoods and five hundred foot long kelp fronds filtering their minerals from the seas off Tristan da Cunha, with whom we share a finite world. It would have been thicker and glossier, and its special issues on electron microscopes or computers would have been the thickest of all, because every reader would have been in a position to influence orders for equipment that would make it possible to count, classify, measure, and record all the 53,000 species the world will lose with the Amazon rain forests, in time to get them safely recorded on microfilm before the last trees were turned to ashes.

The sciences, as such, are neutral. The 'hardware' and the 'software' they use are as neutral as stone axes, which can ring bark trees for burning, kill beasts for food or defence, wage war or murder. When we made it *The Ecologist*, we made it a monthly for people who are concerned with the relationships between life on Earth and the environment that is ever changing, increasingly because of our actions. Ecology is spelt 'oecology' in the older dictionaries, because it comes from the Greek 'oikos', which means 'the home' and our one world is the only home any of us have. It also is the only home any of our neighbours have — from oak trees to ospreys, and ecologists are people who do more than study their neighbours; they are good neighbours to all the wild life of the whole world.

I sometimes wonder just why did Teddy choose me to share his idea with? Was it because I seem to be one of the only two men in England who talks faster than he does?

The Organic Approach

I think maybe it was because I am an organic gardener, and director of the largest body of organic gardeners and farmers in Britain. 'Organic' does not mean that our bodies contain more carbon atoms than our chemical-using colleagues. It is merely the short and simple word chosen by Jerome Irving Rodale to mean "growing food in accordance with the principles laid down by Sir Albert Howard in his *An Agricultural Testament*", when the magazine *Organic Gardening and Farming* was started by Rodale in 1942, to reach a circulation of one million today.

In Europe 'ecological' is replacing 'organic' as a name for the ever increasing numbers of farmers and gardeners who use neither chemical fertilisers nor pesticides, but the original word means so much to so many millions of customers that it will survive. To them it implies using only organic fertilisers like bone-meal, compost and manures, and pesticides of vegetable origin like derris and pyrethrum, while to those who grow the food it involves keeping to a set of standards as definite as those that rule a T.T. dairy herd.

But the real difference between organic and inorganic lies far deeper than all this. Inorganic farmers, in general, think only as far ahead as the immediate profit, the next crop, and getting it to market. Those who think organically think further

ahead. They visualise the fossil fertilisers running out, as well as the fossil fuels, the persistent pesticides building up in our body fats, and the different pollutants — from tanker washings to P.C.B.s — poisoning the seas. A good farmer farms as though he would live for ever, by farming for the farmers who will continue to farm when he lies under the land he used to plough. A politician on the other hand, thinks no further ahead than the next election.

The line between organic and inorganic is drawn on decisions that have nothing to do with profits or politics. It is drawn when we say "This we will not do because it harms the future", and it is here that we join with the ecologists who fight to preserve the environment from destruction by industry and by short-sighted greed, to save our genetic heritage and to defend our wild life in every part of the world, because the future would be the poorer for the permanent loss of any single living species. Organic methods of farming and gardening depend basically on keeping a balance between pest and predator, and on preserving the fertility which gives the land the ability to go on growing food on its income, from the sun, the rain and the soil.

Doomwatchers?

The proper study of mankind is not so much Man, as Ecology, which is concerned with the methods by which he and she can maintain the balance between their own ever increasing numbers, and those of our living neighbours on this world we share. *The Ecologist* has never been so much concerned with academic ecology, i.e. the accumulation of observations and the calculation of their inter-relationship, but mostly with how these affect mankind as a whole, and how what we do affects them. Consequently the articles it publishes are designed to warn, to set out constructive alternatives, and to produce action. We are frequently abused as 'Doomwatchers', but though Doomwatchers on the Titanic might have lowered the bar sales, they could have seen icebergs and perhaps saved the ship.

Throughout its ten years of publication we have been well ahead on warnings, with the first article on the energy problem in 1970, and one of the first on micro-chips in 1978. In 1970 we were publishing warnings on the now familiar disadvantages of the 'Green Revolution'. Again, we issued warnings on the Concorde,

which still makes enough loss on each flying day to finance at least three worthwhile projects in any of the biological sciences. In fact, in almost every ecological problem of today, *The Ecologist* has provided space enough for those with knowledge to say something in detail and depth which was commercially unpopular. Above all, *The Ecologist* has given those of us who care deeply about a subject on which they have expert knowledge, the space to say enough about it to stir the world to action.

Looking Ahead

Teddy has asked me to say what I think should be the aim of *The Ecologist* through the twenty years that lie ahead before we come to the end of this century that began with H.G. Wells in 1900 predicting that the Wars of the future would be fought by 'land ironclads' which his illustrator visualised as battleships with metal feet protruding through their bottoms. Recalling, also, that in 1880 a Victorian Doomwatcher predicted that if London's traffic continued to grow, the streets would be buried ten feet deep in horse manure by 1980, I am well aware that any guesses I make may be as wildly out, so I will confine myself to saying what I should like to see.

I have met many scientific men in different countries, whose written work reads like the articles in *Nature* or *Science*, but whose talk in the senior staff canteen sounds like that of *The Ecologist*. I would like to see many more University Professors and other academics, learning a new 'discipline' — that of writing also for the educated, interested and worried people of all countries who read *The Ecologist*. It is not a matter of writing down to a lower level, but saying enough to bring the subject alive and so being able to stir the reader to action. We are going to need a great deal of action if we are to defend the environment adequately in the next twenty years, and this action will not be stirred by those who search desperately for fences to sit on. Unfortunately, so much research, today, is not so much a search for truth but for uncertainty, because in terms of grants and salaries, apparatus and prestige, it is better to travel expensively than to arrive.

The Ecologist is read by people who need help, who are capable of tracking down references, and of seeing where this work will fit on to their own in another field. I very much hope that during the next

twenty years we shall see many articles written by those who have discovered or laid bare something and wish to warn the world in time for them to take whatever necessary action they can suggest from their first hand knowledge.

New Energy: New Problems

We shall know by the year 2000 whether North Sea oil has lasted the optimists' thirty years, or if the pessimists were right and it was only twenty years after all. In any case, we shall need many more articles on the energy problem, which will have many unforeseen developments. In a recent *Economist* (24/5/80) there was an account of increasing problems with indoor pollution from double and triple glazing and wall insulation aimed at reducing the energy used for heating, because of the build-up of noxious substances where there is now only one air change every ten hours, instead of one every hour without insulation.

In less than an hour, a gas cooker (unless vented to the outside air as very few are), produces higher levels of carbon monoxide and nitrogen dioxide in a kitchen than the American standards of pollution permit in the outside air; coal fires can produce an indoor 'acid rain' that damages furniture and probably also our lung linings; while morpholine from floor polish, formaldehyde and other exudates from carpets and plastic furniture and chemical fumes from office machinery are all added dangers to health when we live with them in constantly re-circulated warm air. It should be stressed that though air filters can remove nicotine tars, they leave behind the benzopyrenes, one of the main carcinogens with much smaller molecules, which still continue to circulate. Clearly as more office blocks go 'fuel conservationist' they will have to return to safer and simpler substances without dangerous emissions, and this will require political pressure, since there are high profits involved.

Allergies

Through the next few years we shall need informed articles on the ever rising levels of allergies, producing a range of symptoms that can only be reduced by diets that are themselves grave handicaps. Though orthodox medicine does not yet accept their existence, there have been several books by doctors with experience of these conditions, all best selling paperbacks, because of the number of sufferers. Their basic



Lawrence and Cherry Hills at the Henry Doubleday Research Association in Braintree.

cause appears to be pollution, and their rise in incidence coincides with the increase in the use of North Sea gas, though widely advertised weed-killers have been blamed for food allergies.

Agriculture and The Future

As energy becomes more costly, the 'direct drilling' system will become more popular on farms. But farming year after year without any weed growth whatever, with a crop drilled direct into the bared ground, may well create unforeseen soil conditions. As tractor fuel costs rise, this system might well spread across the world, and the changes caused by these massive monocultures will demand careful and accurate studies and reports. It is, therefore, vitally important that every new agricultural weedkiller should be used repeatedly on the same land as soon as it is introduced, so that there will be a plot where its long term effect can be monitored.

Phosphate prices have increased fivefold in the last ten years, and at Christmas 1979, the U.S.S.R. bought 350 million tons of U.S. rock phosphate, just before invading Afghanistan. The evidence is that Russia's 'New Lands' in Southern Siberia are running low on phosphorus, and it is only the richness of American deposits that have made it possible

for the U.S.A. and Canada to export grain on the scale that has fed so much of the world so far. But only a finite number of seas dried up in the geological past, with large fish kills leaving rich rock phosphate behind, as in North Africa, and several of the U.S. deposits. The lower the grade of rock the more energy must be spent and the more land devastated by open cast mining for every ton of superphosphate manufactured. We in the well-fed West import the phosphates of the world into our countries through our food, and above all in the fishmeal we feed to our pigs, poultry, and even cattle, which we then pour into the sea through our sewage systems. Unless we can find a way of preventing industry from polluting our sewage with toxic metals and substances like PCBs so that it is unsafe to use on the land, and dangerous even to pour into the sea, we draw a black line across the future of humanity.

Sewage: a vital Resource

Once our phosphorus is infinitely diluted in the vast bulk of sea water it has a long slow journey back to the land that will need it more and more as the world population doubles and redoubles. Only nitrogen fertilisers can be made by energy alone, synthesising urea and ammonium nitrate usually, and though these grow the crops, they are merely 'computer

key words' that allow us to loot the bank deposits of the soil.

Therefore, the most urgent field for scientific research is in the treatment of sewage, ideally by improved waterless systems, because water is our other limiting factor, and producing synthetic foods demands rather *more* water than growing crops. Again, I hope to see writers in *The Ecologist* dealing not only with sewage, but with the related aspects of metal pollution, especially the ever-rising level of lead in the air and soil from the petrol we pollute in the interests of performance and a trifling cash saving. The Lawther Report merely whitewashed the subject, but the evidence is that a wide area of London is no longer safe for gardeners to grow their own food, because of the lead in the atmosphere from motor traffic.

Concern for the Chip

Through all its ten year life *The Ecologist* has had before it the idea of the *doubling* rate of world population, with its first article by Michael Allaby in the very first number called 'One Jump Ahead of Malthus', which began with 'The trouble with Thomas Malthus is that he was right'. He is still right. Since the Club of Rome Report, and our 'Movement for Survival' the age of the micro-chip has arrived, and dur-

ing the next twenty years our concern must also be the *halving* rate of employment.

The average loss of jobs from computerisation is 50 per cent, and though those who sell computers, both as enthusiasts and salesmen for the giant companies involved, insist that the fall in prices will mean an expansion of demand and a boom in new industries, all these industries will be computerised and therefore will create only half as many jobs for the same expansion of trade. The effect will be patchy, with some industries suffering 90 per cent losses, like the factory where 24 men now make all the beer cans in Australia, while others such as jewellery manufacture and the Civil Service will hardly be affected at all. But some of the displaced staff could be taken up in dealing with the additional activities that computerisation will make possible, from Income Tax Demands shown on your T.V. to forms that can be completed by pressing buttons at your computer terminal.

There are many books on this subject. Today, almost all of them conclude with a chapter on whether the micro-processor will be able to

replace the human brain. This is an example of the superficial eagerness to answer the unimportant question, rather than the important one that worries the public. It does not seem possible for the chip-conscious *themselves* to think in the wider ways possible for human beings. Only one writer in this field appears to realise that Trades Unions really exist, despite the example of the strike that shut down *The Times*, and many others. The Trades Union answer is to reduce the working week, but if this becomes 2½ days for the same money, all the industries which cannot be computerised completely will have to cut their hours and double their pay or shut down, either from the loss of employees or because of strikes.

The first halving will be followed by further halvings, as the ½p sized chip packs still more 'bytes' and 'bits' of information on to itself, making it possible for smaller, cheaper and lighter microprocessors to replace the only surplus of the Third World, that of willing hands and active brains. With electronic machinery from Japan and the U.S.A., these manufacturers can only use up our raw materials and

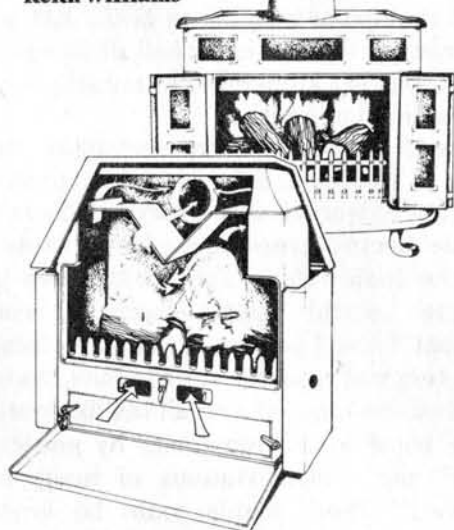
energy faster and faster in producing T.V. games, hi-fi equipment, watches that tell your temperature and pulse rate as well as the time and date, and all the costly futilities we see in the colour supplements.

Again and again *The Ecologist* has set out to warn us against something that authority — academic, governmental, or industrial — prefers to keep hidden, and in even the next five years we shall have to warn against a more serious threat to the environment than D.D.T. Our articles will have to discuss and criticise the micro-chip age, instead of gathering round with rapt attention like children cramming 10p pieces from their parents into 'Space Invaders' machines.

Let us hope that our readers will continue to include enough men and women who can still think with the brains God gave them, to take our One World out of the hands of the short-sighted politicians and trades unionists who can see no further than the money on the table. Let us trust that our thirtieth birthday number will see an Ecology Party Prime Minister, and an *Ecologist* with a five million circulation, for we shall need both very badly by then.

The book of the **WOOD STOVE**

Keith Williams



The Book of the Wood Stove

Keith Williams

£4.95

Does the idea of free fuel for life appeal to you? Would you like a home kept at 70-80°F throughout the coldest winters — without it costing you a penny? If so, this is the book for you.

Keith Williams sets out all you need to know about using wood as fuel. He guides you through choice, installation and maintenance of your wood stove and explains the methods of wood cutting, storing and air-drying. Working on the principle of growing your own fuel, he includes a programme that will provide you with a free fuel supply for life.

Interested? Just fill out the coupon below and we will send you the book post free.

Please send copy/ies of THE BOOK OF THE WOOD STOVE at £4.95 each to:

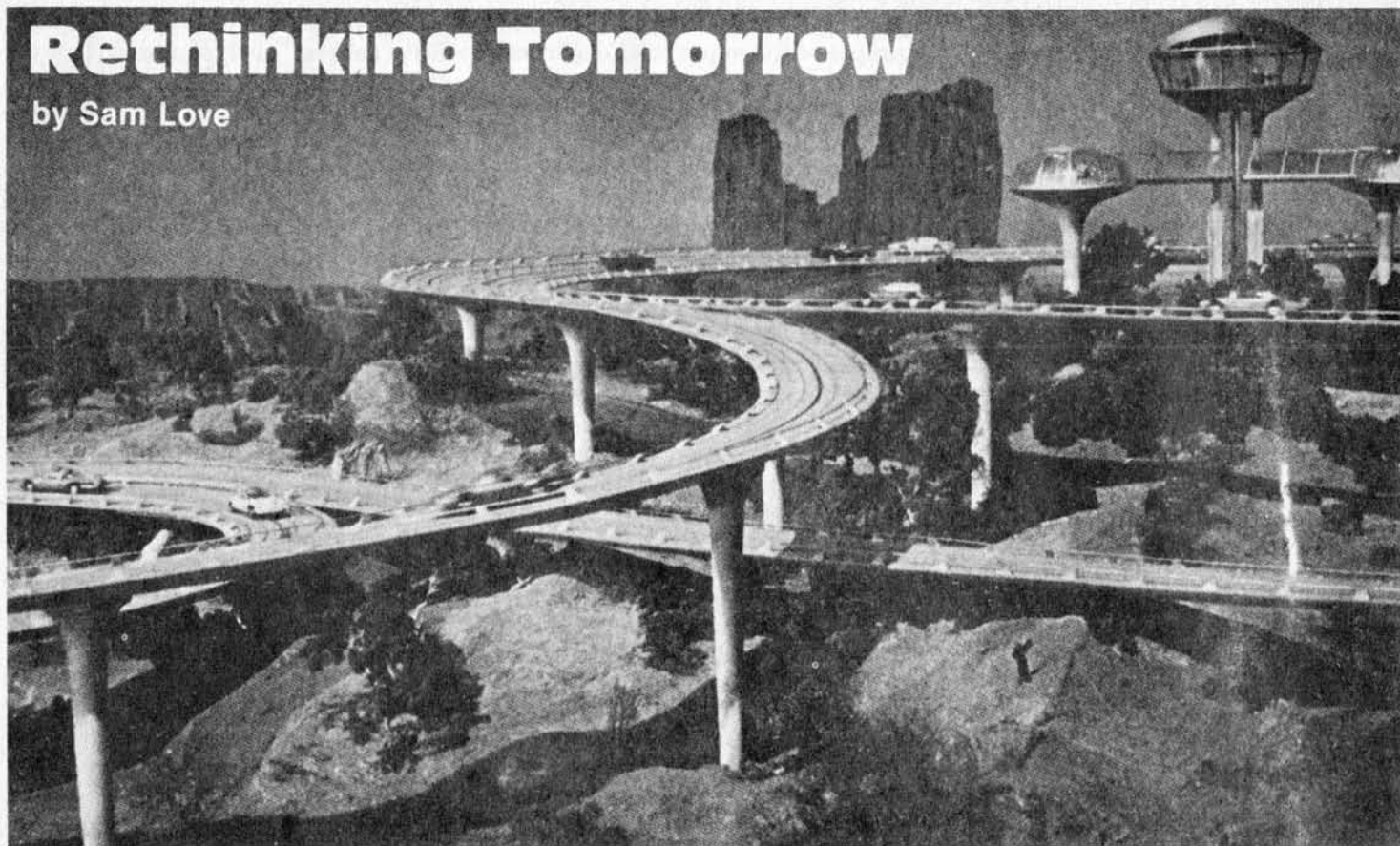
Name
Address

I enclose a cheque for
or my Access/Barclaycard no is

To: David & Charles Dept EC1
Brinell House Newton Abbot Devon TQ12 4PU

Rethinking Tomorrow

by Sam Love



General motors Highways and Horizons Futurama in New York World's Fair. 1939

Sam Love, organiser of Earthday, founder of Environmental Action, environmental lobbyist, author and lecturer.

Forget for a moment your nagging worries about inflation, fuel crises, doomsday, pollution, and overtime work. Not long ago many people had real hope that our society would solve many of these mundane problems. According to actual predictions, life in the 1980s should be something like this:

"BLEEP, BLEEP," resounds from Bill's pillow speakers as he rolls out of bed and hits the "morning activate" button on his bedside computer control panel. Eggs automatically slip from their rack, crack and start cooking on the infrared range downstairs. By the time he's out of the ultrasonic shower, his robot-prepared breakfast is waiting on the counter. No meal pills for Bill — he rejected them in 1977 for real food; there's just no accounting for the foibles of human taste.

A quick glance over his house's control panel and he steps into his disposable climate controlled suit, waiting in a rack by the door. Outside he settles into his "Futuramic" auto-giro and glances at the electronic grass clipper mowing the lawn; its electronic-eye scanner sweeping the grass tops to determine which part of the lawn needs cutting.

One look at his radar scope tell him the air lanes are already crowded so he'll drive the 100 mile an hour lane to the core city complex.

Now that the tough choice of flying or driving is out of the way, Bill activates his vehicle's typewriter size nuclear power plant, which will take his auto-giro five million miles before refuelling. The reactor heats up;

his computer plots his route; his radar engages the steering; and Bill is off with rocket speed to a business appointment fifty miles away. Relieved of the ancient burden of steering, his hands fumble through his morning mail and newspaper, delivered direct to his house by pneumatic tube.

Sound far out? It might to those of us who now believe the future holds such cheerless events as population explosions, gasoline riots, ecological catastrophes and monetary breakdowns. Yet our little composite sketch is based on actual predictions which have appeared in popular magazines in the last forty years. From yesterday the future looked different — technology could perform all manner of miracles and the possibilities seemed unlimited.

We now fret about energy shortages, but it once looked as if we could have abundant power. Charles Steinmetz, who worked with Thomas Edison to develop large-scale electric generating plants, wrote in a 1915 issue of the *Ladies Home Journal* that new generating technologies would make electricity available so cheaply that "it will not pay to install meters." Instead of our meters and monthly electric bills, he expected it to be sold on the basis of a small tax like water. All this would be possible, he projected, by generating electricity at "big central stations of many millions of horsepower." These plants could be located where energy sources were readily available such as water falls or coal mines. He speculated we might even make steam to run the generating turbines by burning coal underground in veins without mining.

While coal development never provided such an abundance of power that it didn't pay to meter it, two decades later similar fantasies were fuelled by the discovery of the process of creating power by fissioning uranium. In a 1941 issue of *Popular Mechanics*, for example, Dr. R.M. Langer of the California Institute of Technology, predicted "power plants the size of a typewriter" containing one pound of uranium. In a bold stroke, he calculated that such a power source contained the energy of 250,000 gallons of gasoline. A car powered by this uranium load could go five million miles without refuelling.

In even bolder strokes, he wrote, "We can look forward to universal comfort, practically free transportation, and unlimited supplies of materials." As for cost, Langer speculated that these miniature reactors would provide cheap power in every home and factory, without distribution lines, and "electricity will cost less than one-tenth of a cent per kilowatt hour." (In contrast, the national average price is now forty times his projection and in some cities people are paying eighty times his rate.)

With such a cheap, convenient source of power, the sky became the limit for fantasies. He foresaw giant flying wings using compressed air or steam for take-off and landing. Once airborne, boiling steel vapour would be propelled out the rear and condense "as fine harmless dust." No doubt Langer never anticipated the environmental impact statement now required of federal projects.

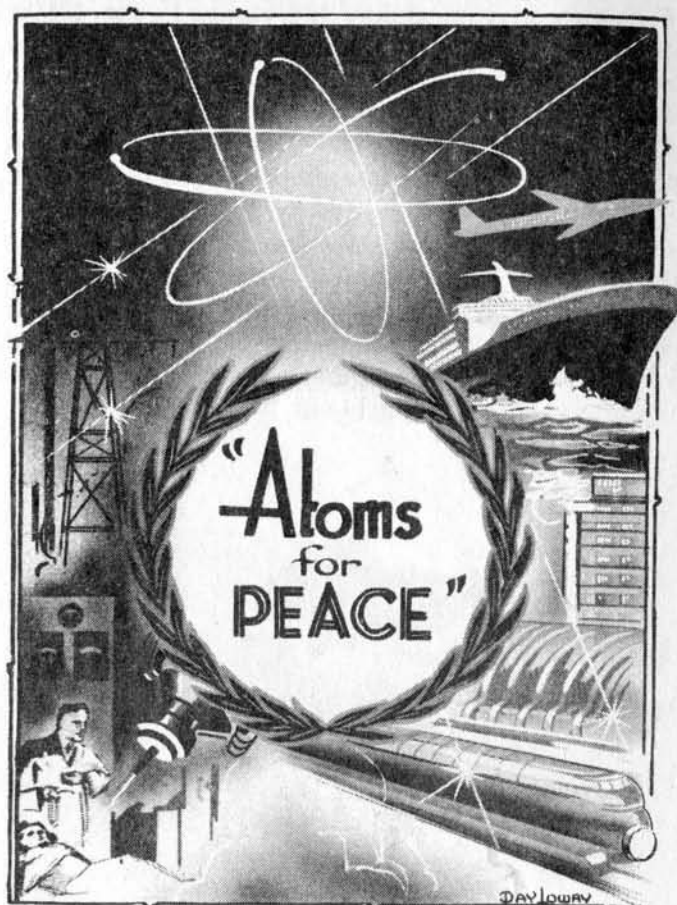
Langer was such an enthusiast of typewriter-sized nuclear reactors that he believed everyone should own one and experiment with it. "There is no end to the practical applications that amateurs can work out once the energy source is available," he wrote. Among other uses, he suggested using the reactors to build a machine to "melt our highways instead of building them as we do now." This trail-blazing device would use intense heat to fuse dirt together into a lava to create a smooth surface for cars.

Langer wasn't alone in his fantasies. A president of the Society of Automotive Engineers predicted atomic auto engines as small as a man's fist. A story carried by Scripps-Howard Newspapers described the "artificial suns" made from chunks of uranium mounted on tall towers. With these we could finally bring under control one of humanity's arch nemeses — the weather. Nature wouldn't stand a chance:

"No baseball game will be called off on account of rain in the Era of Atomic Energy. No airplane will bypass an airport because of fog. No city will experience a winter traffic jam because of heavy snow. Summer resorts will be able to guarantee the weather and artificial suns will make it as easy to grow corn and potatoes indoors as on the farm."

His excitement was shared by Harold Stassen, a special assistant to President Eisenhower on disarmament. In the mid 1950s he wrote articles for popular magazines extolling the possibilities of "Atoms for Peace". One article in the *Ladies Home Journal* read:

"You hear talk from electronic engineers about houses without any wiring, but with portable, cheap baby watchers; bedmakers; cordless irons, lamps and toasters; and light, thin, motorless TV sets,



refrigerators, and air conditioners. Visionaries in the housing field dream of roll-up walls, bubble-shape houses that keep themselves clean, and prefabrication methods that make it possible to "move" from an old house to a new one without leaving your garden and your neighbours.

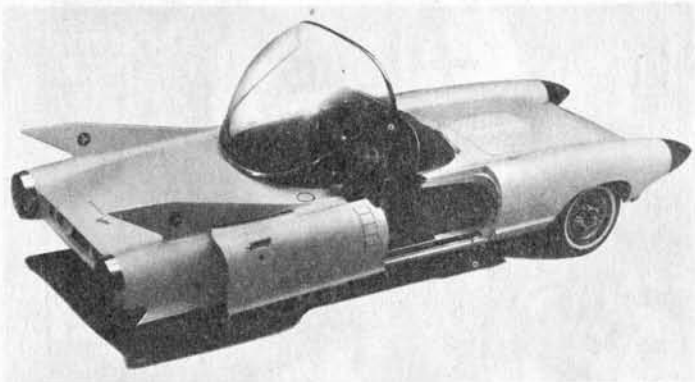
Yes, these things are fantastic — and yet they are not. With low-cost, limitless power — and that's what atomic energy is potentially — all sorts of dreams can come true."

Closely coupled with the fantasies of power were our automobile fantasies. Cheap fossil fuel and new power sources like nuclear transformed "horseless carriages" into fantasy ships. Norman Bel Geddes, designer of the General Motors' Futurama exhibit at the 1939 World's Fair, foresaw highways with multiple lanes — each set to a different speed. Cars would enter on low-speed outside lanes; then, as spaces opened up, the car's automatic "beam" would move it to progressively faster inside lanes. Bel Geddes projected that by 1960 we would have highways with 100 mile an hour high speed lanes. This would permit coast-to-coast auto trips in 24 hours. On these model highways, chemicals, automatically sprayed over the surface, would melt away ice and slush. In cities pedestrians would be restricted to second story sidewalks to separate them from automobiles.

World War II also contributed to our future images. It gave us such design features as tail fins and rocket-shaped rear ends. In 1948 the tail fins appeared on the Cadillac with the "wholly new" V-8 engine. The tail fin, V-8, and automatic transmission became synonymous with the future. Oldsmobile even advertised its automatic transmission as the "Futuramic" transmission.

Fins appeared on almost everything in the 1950s, particularly the Dream Cars — those one-of-a-kind custom creations that were built by Detroit to excite the public. In the 1950s and 1960s the car magazines were full of pictures of exciting new futuristic cars labelled with names that evoked images of science fiction such as Atmos, Golden Rocket, Mystere and Gyron.

Our airplane fantasies were equally as wild. In 1939 G.M.'s World's Fair exhibit confidently predicted Zeppelin bases in cities and seaplane bases on nearby rivers. We didn't get Zeppelins or seaplanes, but World War II did give us giant bombers that inspired numerous visions of flying hotels.



XP-74 Cadillac 1959

Popular Mechanics predicted in 1941 some radically new airplanes including 1) sunplanes with enormous wings treated to capture the power of the sun's rays and turn this energy into enough force to lift and drive the aircraft; 2) beam planes that take their energy from radio beams; 3) magnetic planes which sustain their flight by establishing their own magnetic fields of sufficient strength to overcome the force of gravity, and 4) orbital planes that fly so high they could stand still and let the earth rotate underneath them.

Some builders were so confident that future personal transportation would be by auto-giro or helicopter that apartment houses were actually built in the 1930s with rooftop auto-giro fields "as a convenience to future tenants."

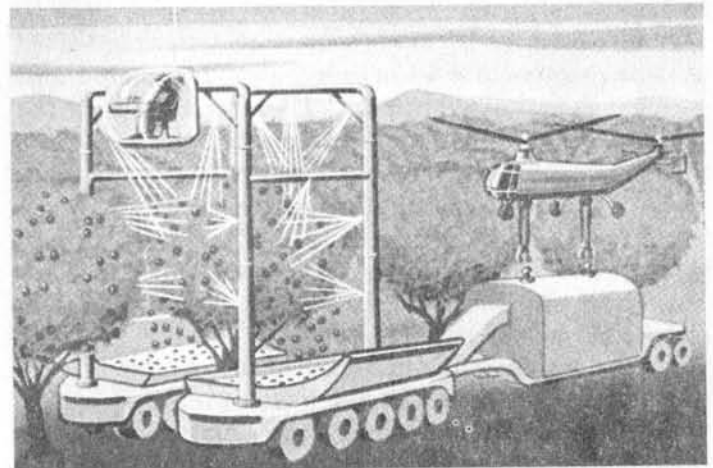
With or without auto-giro fields on the roof, the future house would be radically different according to the conception of many designers and inventors. Among other advanced features, the President of Westinghouse, George Bucher, predicted in 1939 that tomorrow's home would feature "mood control" made possible by new types of electric lamps that "suit light and colour of rooms" to the mood of its occupants. And in a prediction that may yet come true, he foresaw homes equipped with "precipitrons", electrostatic air cleaners to combat air pollution.

As far back as the 1933 Parade of Progress fair in Chicago industrial designers displayed an assembly line built house that could be moved to the site in pre-assembled sections, then bolted together in a matter of hours. This factory house could still be a custom home because buyers could order the number of units they needed and even mix and match room modules from various manufacturers. This approach would drop the \$7,000 price tag of a depression era handbuilt house to \$2,000 according to a 1934 *Harper's* article.

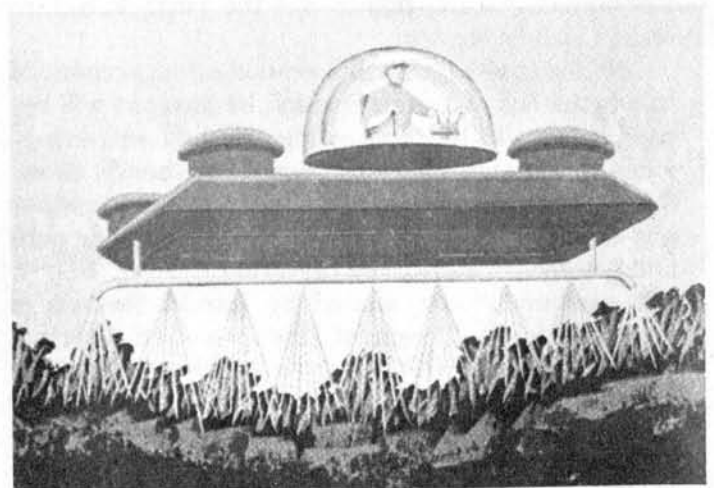
Those dreams of \$2,000 houses are about as far away today as another set of 30s dreams; in 1933 a young starry-eyed designer, Buckminster Fuller, was promoting the idea of houses so energy conservative that they could be heated by the waste heat of the home's electric light bulbs. But Fuller's ideas of conservation lost out to more powerful forces which capitalized on our weaknesses for convenience.

Fuller's ideas of an energy conservative house illustrate that all of our unrealized fantasies have not surrounded larger and larger dreams and schemes. Many visionaries envisioned an entirely different type of future community, one built around human scale settlements harmoniously integrated into nature. Seeds were sown for this vision by Peter Kropotkin, the Anarchist philosopher, in his classic work *Fields, Factories, and Workshops of Tomorrow*. His book weaves an idyllic vision of people living in virtually self reliant communities, balancing manual and intellectual labours. Production units would all be small. Food would be grown in the neighbourhoods or nearby on small farms. Such a society, in Kropotkin's opinion, would require a minimum of government.

This book influenced a number of writers including Ebenezer Howard, Lewis Mumford, Murray Bookchin, and E.F. Schumacher. All have promoted a vision similar to Kropotkin's. Yet this dream is in conflict with the idea that cities should be sprawling masses of buildings and motorways surrounded by industrial ghettos.



Fruit harvesting machine with electronic eyes and computerized fingers for farms of the future.



Combination Hovercraft to do farm jobs by 2000 (Ford filmstrip 1967)

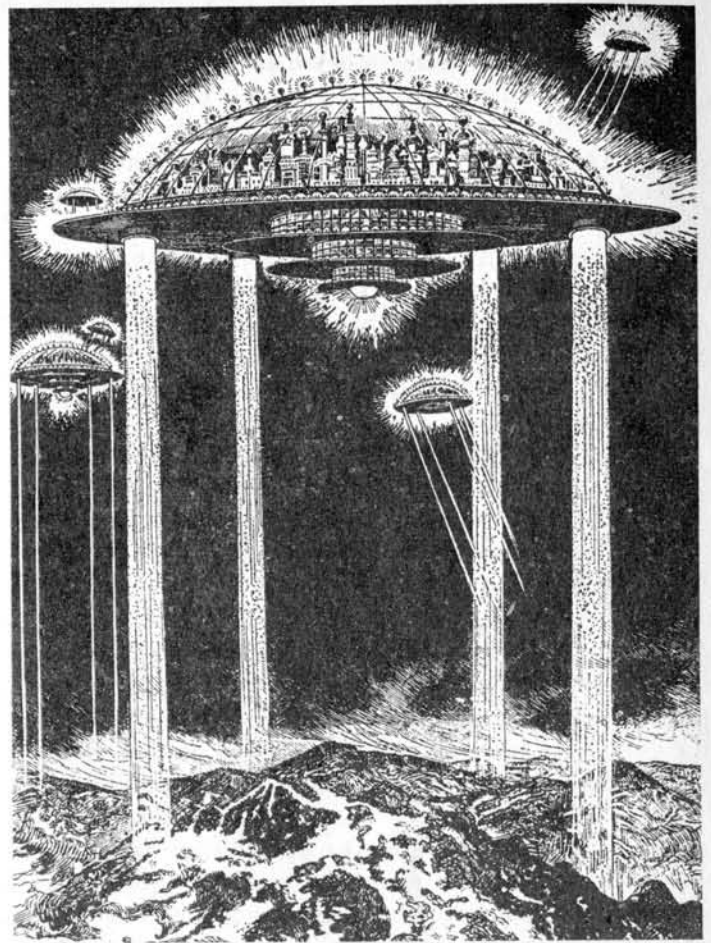
The tension between these two visions can be seen in the two model cities of tomorrow exhibited at the 1939 World's Fair. General Motor's Futurama city portrays a centralized city dominated by the highway. In the central theme exhibit built inside the Fair's 200 foot Perisphere, designer Henry Dreyfuss, constructed Democracy, a core city surrounded by small satellite towns.

In Democracy's satellite towns, agriculture and community would be integrated so that residents could eat garden fresh vegetables, stroll in greenbelts, and walk to nearby workplaces. Dreyfuss speculated that in such a setting "the family will develop good taste because they will be surrounded by good things — music, trees, and other cultural advantages."

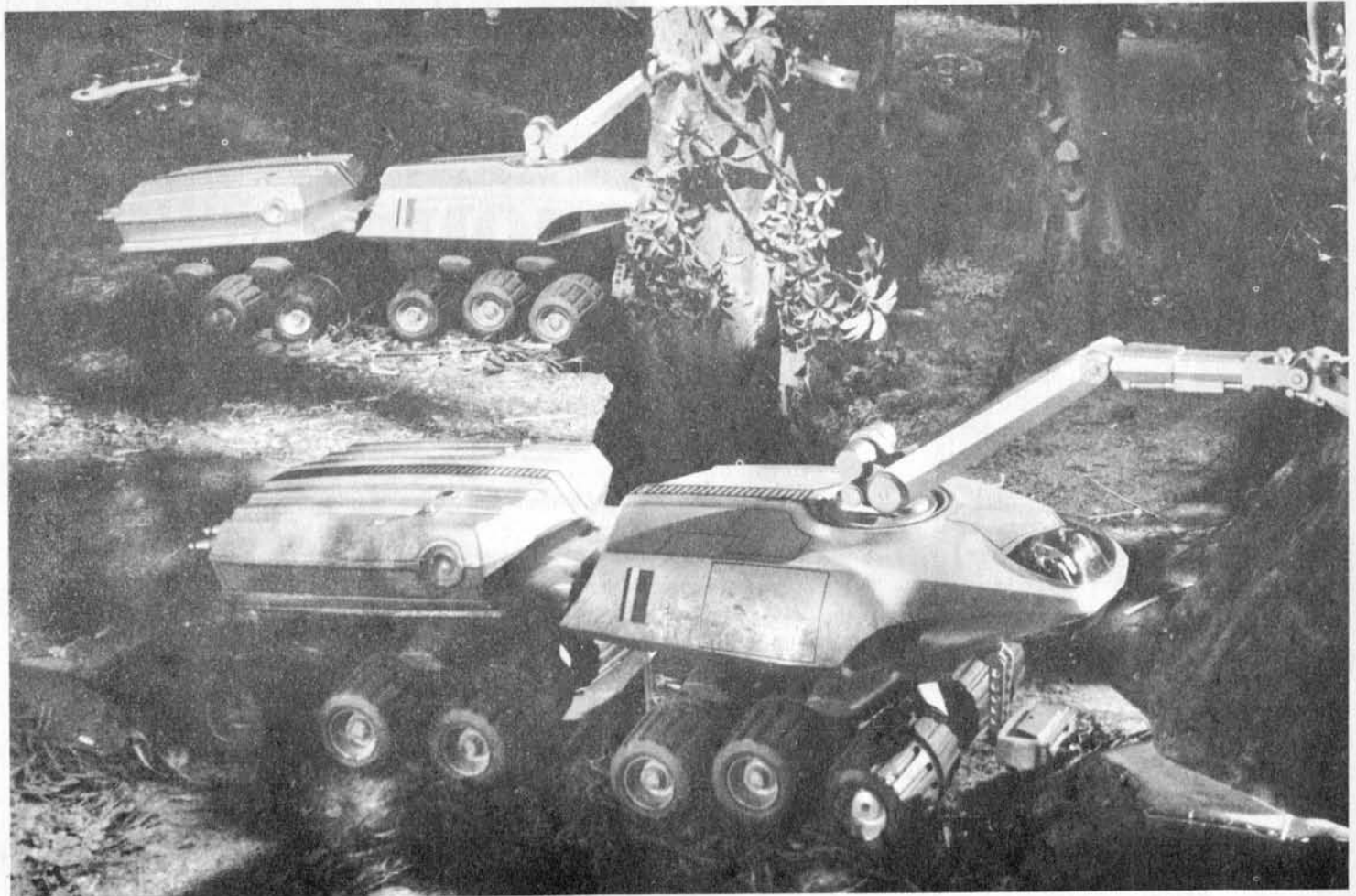
He also speculated that such a community would remove the "idea of haste" and life would become "tempered with leisure, therefore nervous diseases will be eliminated."

Dreyfuss's hope that new designs could improve public taste was shared by David Sarnoff, the President of RCA. In 1939 he predicted that "television drama of high calibre and produced by first rate artists, will materially raise the level of dramatic taste of the nation, just as aural broadcasting has raised the level of musical appreciation."

Considering what has happened to many of these fantasies I have described, I wonder how some of today's dreams will fare two or three decades from now. My candidates for current unrealizable visions include:



A future city suspended on electric rays, as conceived by Hugo Gernsback in 1922.



Giant tree clippers level the jungle with a laser beam leaving an elevated superhighway in its wake. Models exhibited in the General Motors Futurama at the New York World's Fair, 1939.

While coal development never provided such an abundance of power that it didn't pay to meter it, two decades later similar fantasies were fuelled by the discovery of the process of creating power by fissioning uranium. In a 1941 issue of *Popular Mechanics*, for example, Dr. R.M. Langer of the California Institute of Technology, predicted "power plants the size of a typewriter" containing one pound of uranium. In a bold stroke, he calculated that such a power source contained the energy of 250,000 gallons of gasoline. A car powered by this uranium load could go five million miles without refuelling.

In even bolder strokes, he wrote, "We can look forward to universal comfort, practically free transportation, and unlimited supplies of materials." As for cost, Langer speculated that these miniature reactors would provide cheap power in every home and factory, without distribution lines, and "electricity will cost less than one-tenth of a cent per kilowatt hour." (In contrast, the national average price is now forty times his projection and in some cities people are paying eighty times his rate.)

With such a cheap, convenient source of power, the sky became the limit for fantasies. He foresaw giant flying wings using compressed air or steam for take-off and landing. Once airborne, boiling steel vapour would be propelled out the rear and condense "as fine harmless dust." No doubt Langer never anticipated the environmental impact statement now required of federal projects.

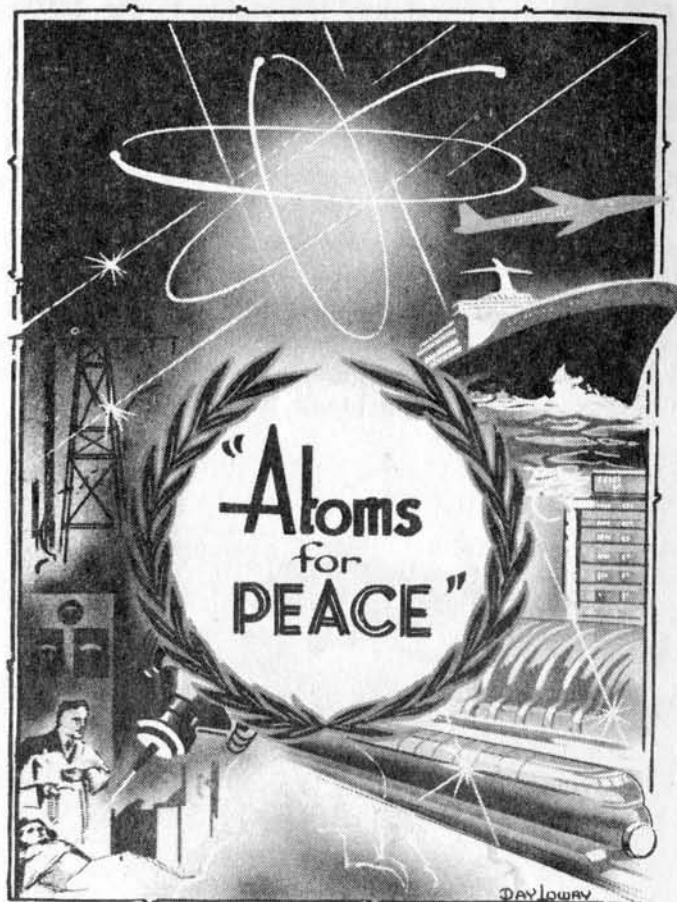
Langer was such an enthusiast of typewriter-sized nuclear reactors that he believed everyone should own one and experiment with it. "There is no end to the practical applications that amateurs can work out once the energy source is available," he wrote. Among other uses, he suggested using the reactors to build a machine to "melt our highways instead of building them as we do now." This trail-blazing device would use intense heat to fuse dirt together into a lava to create a smooth surface for cars.

Langer wasn't alone in his fantasies. A president of the Society of Automotive Engineers predicted atomic auto engines as small as a man's fist. A story carried by Scripps-Howard Newspapers described the "artificial suns" made from chunks of uranium mounted on tall towers. With these we could finally bring under control one of humanity's arch nemeses — the weather. Nature wouldn't stand a chance:

"No baseball game will be called off on account of rain in the Era of Atomic Energy. No airplane will bypass an airport because of fog. No city will experience a winter traffic jam because of heavy snow. Summer resorts will be able to guarantee the weather and artificial suns will make it as easy to grow corn and potatoes indoors as on the farm."

His excitement was shared by Harold Stassen, a special assistant to President Eisenhower on disarmament. In the mid 1950s he wrote articles for popular magazines extolling the possibilities of "Atoms for Peace". One article in the *Ladies Home Journal* read:

"You hear talk from electronic engineers about houses without any wiring, but with portable, cheap baby watchers; bedmakers; cordless irons, lamps and toasters; and light, thin, motorless TV sets,



refrigerators, and air conditioners. Visionaries in the housing field dream of roll-up walls, bubble-shape houses that keep themselves clean, and prefabrication methods that make it possible to "move" from an old house to a new one without leaving your garden and your neighbours.

Yes, these things are fantastic — and yet they are not. With low-cost, limitless power — and that's what atomic energy is potentially — all sorts of dreams can come true."

Closely coupled with the fantasies of power were our automobile fantasies. Cheap fossil fuel and new power sources like nuclear transformed "horseless carriages" into fantasy ships. Norman Bel Geddes, designer of the General Motors' Futurama exhibit at the 1939 World's Fair, foresaw highways with multiple lanes — each set to a different speed. Cars would enter on low-speed outside lanes; then, as spaces opened up, the car's automatic "beam" would move it to progressively faster inside lanes. Bel Geddes projected that by 1960 we would have highways with 100 mile an hour high speed lanes. This would permit coast-to-coast auto trips in 24 hours. On these model highways, chemicals, automatically sprayed over the surface, would melt away ice and slush. In cities pedestrians would be restricted to second story sidewalks to separate them from automobiles.

World War II also contributed to our future images. It gave us such design features as tail fins and rocket-shaped rear ends. In 1948 the tail fins appeared on the Cadillac with the "wholly new" V-8 engine. The tail fin, V-8, and automatic transmission became synonymous with the future. Oldsmobile even advertised its automatic transmission as the "Futuramic" transmission.



by Nicholas Gould

Gulliver in Automobilia: Wherin the Author returns to that Land and finds it but little amended since his earlier Visit.

When I lately revisited the Automobilians after a Lapse of some seven Years, I found that People little chang'd in their Manner of Life. They still continue to busy themselves with incessant Movement from Place to Place; to defile Earth, Air, and Sea with the noxious Effusions of their Cities and Manufactories; to contrive ever more devilish Devices for the Slaughter of their Enemies; and to lay waste the Land, and annihilate the brute and vegetable Creation, by the relentless Proliferation of Mankind and his Works. Their Wealth, too, continues very great, albeit they use it so ill. It was, therefore, with no little Astonishment that I learned from my Converse with those I met that in their own Estimation they were near to Beggary.

It is a droll Experience to be inform'd by a sleek young Gallant, who drives his own Carriage and drinks in the Tavern every Night, that "Times are hard". But this Illusion seems by now so deep-rooted in the Minds of the Automobilians that it is become an Article of Faith with them. The Crisis in their Oeconomy, for so they term it, preoccupies them to the Exclusion of all nobler Topicks, as a Hypochondriack can converse of nothing but his imagin'd Infirmities. And as Doctors dispute whether a sick Man stand in need of Purges and Bleeding, or of rich Broths and Cordials, so the Sages of Automobilia are at odds whether Austerity or Expenditure be the better Regimen for their Nation's Ailments. Some, again, and especially Persons of the devouter Sort, argue that only by a Return to Godliness and Virtue may their former Prosperity be regain'd; a strange Belief, for surely a virtuous People would despise earthly Wealth and lay up their Treasure in a better Place.

All are agreed, however, on the Efficacy of Work as a Cure for their Ills. This Proposition I found laughable, for it was plain to me that the Time already devoted to Work in Automobilia would suffice to build a very Utopia, were the Natives able to discern what needs to be done, and waste no Effort on mere Superfluities. For there a Man may spend several Hours each Day journeying to and from his Place of Employment; and an unconscionable Deal of Labour is expended in the Carriage of Goods from one Region of Automobilia to another, and the Movement of similar Goods back again. In their great Cities the Toil of Thousands scarcely suffices to keep the Roads open and the Waggons moving, whereby their Multitudes of Inhabitants may be supplied with the Necessities of Life.

But Necessities, I must own, form but a small Element in the Commerce of Automobilia. One of their own Sages is reported to have said "Give us the Luxuries, and we will dispense with the Necessities"; and it is by this Rule that they govern their Lives. For example, the Wealth which is by them dissipated in the Smoak of Tobacco would suffice to provide clean Air for all to breathe; the Labours by which they bring Meat from the Antipodes, and costly Fruits from the Tropicks, would be better expended in the loving cultivation of their own Farms and Orchards; and the monstrous Expense of their Armies and Arsenals might instead be used to remove those Inequalities and Abuses it is laid out vainly to defend.

Even the mechanical Contrivances wherein their Ingenuity is most exercis'd serve principally as Palliatives against the Drabness of their Lives: here one Example may suffice. There is in every Automobilian Home a Box, not unlike a Puppet Stage, wherein tiny Simulacra may be observ'd enacting Shews, singing, giving Instruction, and much else besides. Before

these Boxes Millions of infatuated Viewers sit every Night in rapt Contemplation, and in that surrogate World find an Opiate to deaden their Awareness of the Ugliness of their Homes, the Hurly-burly of their Cities, and the Ruin their Greed is bringing upon Mankind.

A Man that is wont to spend his Hours of Leisure in numb Passivity loses at length the Power to enjoy any Pastime save by Proxy. Many hundred Automobilians, therefore, will watch upon their Boxes a Game of Foot-ball, for every One that ever kicks a Ball himself; Thousands listen to counterfeit Musick, whereas mere Dozens divert themselves and their Friends upon their own Instruments. And thus the Practice of those Skills and Arts natural to Humankind, wherein the veriest Savage exercises his Body and Brain to enjoy and impart Delight, are become in this Land the Prerogative of a few Professionals, as they term them, who do for Gain what all should do for Pleasure. The evil Case in which the Automobilians find themselves began, I am persuaded, when they devised Machines to do the Work of Men: it seems like to end with Men reduced to the Semblance of Machines.



SCIENTIFIC MATERIALISM

The Strait-jacket of Western Culture

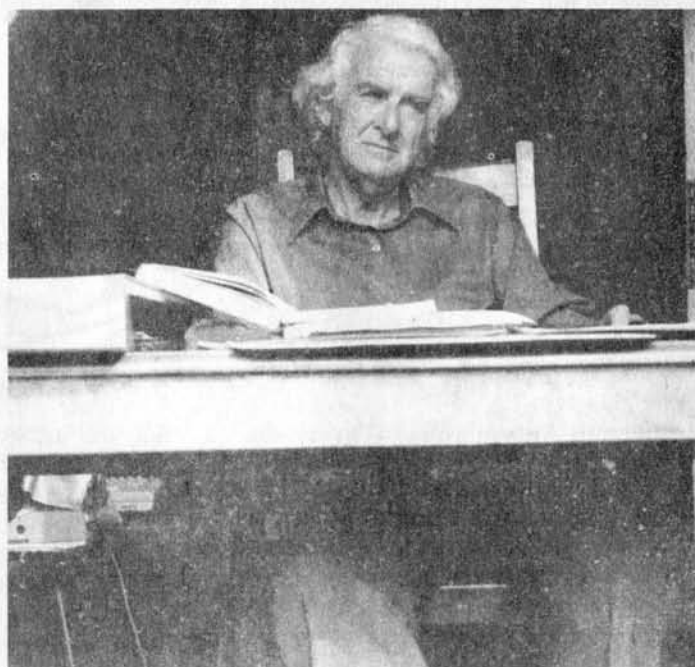
by Robert Waller

Robert Waller, associate editor of The Ecologist, author, poet, novelist, former agricultural producer for the BBC and editor of the Soil Association Journal.

The hostility of the present to the past

As Cain the grain grower murdered his pastoral brother, Abel — the mythical memory of the destruction of the nomadic society by the settled agrarian society — so economic progress has been won at the expense of the preceding society, usually painted black to justify what is being done in the present. The society moulded by the industrial revolution, which displaced the culture of the Middle Ages, had economics for its driving force and economic theories influenced men as religion had done previously. Economics was considered to be a science with laws as exacting as those of the natural sciences: such a belief about the certainty of the truth of economic laws inevitably created fanaticism. A good example of this fanaticism was the rejection of Ruskin's essay *Unto this Last*, despite his great fame. Ruskin was misguided enough to suggest that the economic laws of *laissezfaire* often had immoral consequences, for which blasphemous assertion the Victorians treated him as the Russians treat their dissidents today. Ruskin had to publish his critique at his own expense. Despite their Puritanism and prudery, the philosophy by which the Victorians actually organised their society was that of scientific materialism, though if you were openly a scientific materialist you were denounced. It was the tension between the Victorians' real motives and their pretended motives that made them such neurotic hypocrites.

The culture of western Europe since the industrial revolution has had for its most vital thread the philosophy of science — i.e. scientific materialism. It is a rational impersonal culture; it makes decisions in terms of the inferences and principles implicit in economic theory, whether the theory calls itself Marxist or capitalist. This rationalism has 'murdered' the cultural world of the past, just as Cain murdered Abel. As Cain prospered, and no one, we are told, was allowed to lay a hand on him despite his crimes, so the 'rational', economic culture has prospered also, despite its crimes — some being monstrous such as the destruction of the culture of primitive people to make way for industrialisation.



The culture of the Middle Ages was the opposite of ours; it was created by Christians in response to the Fall of Roman civilisation. The Christian religion was inspired by a spiritual revelation that enabled Christians to transcend the collapse of Roman political 'rationalism.' This revelation was given to them by St Paul; it was not the result of 'rational' thought but of mystical experience. The 'rational' and the mystical are two poles of human life. The rationalists regard the mystics as 'irrational,' while the mystics, those who live by experiences that cannot be explained in 'rational' terms, regard the 'rationalists' as unenlightened barbarians who have never had the experience of 'rebirth.' A balance has to be preserved. It is my contention that the culture of industrial society is the most unbalanced example of the rule of materialism and 'rationalism' in the history of man.

Mediaeval culture

Mediaeval people felt the ambitious will of man was evil; they accepted the Fall of man by his own pride as literally true. They understood the Cain instinct. Original sin had to be redeemed. The order of Christian society was ordained by God and could only be changed for the worse. The ethic of the old world was to conserve the past and hand it on to the future. This did not mean simply leaving things alone; the past had to be recreated in the mind of the present, if society was not to deteriorate; man had to struggle to transcend by his spirit his own unredeemed and evil will. The horrors of the Colosseum, of martyrdoms and of slavery were still vivid memories, as the horrors of an atomic war may be a vivid memory to the future, a dramatic demonstration of man's evil will. How can man transcend his own bestiality, it was asked, except by God's grace and participation in the sufferings of Christ?

But mediaeval man ran into problems he could not master, the negative aspects of his vision. Man's dynamic intelligence cannot always be kept in chains, despite its dangerous incitement to self-will; nor could society for ever be carried on the back of the peasant. Men were not satisfied by the promise of equality in a

future world, they wanted a measure of it now. Worse than all that, Christian society was riven with schismatic wars. These wars arose in part from treating God as an object, as if he could be objectively defined. Wars were provoked by quarrels over definitions! God is not an object that can be defined: he is an experience. So far as religion confuses religious truth with scientific truth, it undermines its own strength.

In order to save Christian Europe from the consequences of its 'objective', materialistic attitude to religious truth — though faith had originally been the fruit of mysticism — it was essential to alter the focus of the mind; to tempt people into concentrating their attention on to something other than rival religious dogmas defining the nature of God and his providence. The transition from the Middle Ages to the present was affected by shifting the thoughts of men from God to nature — though of course the scientific study of nature only includes one dimension of its reality. The scientific study of nature is an impersonal study; theology had been the study of a divine personality. The new, impersonal culture consequently was indifferent to personal experience — to love, friendship, mysticism. But it did have the happy effect for a while of helping to bring the religious wars to an end; though it wasn't long before the new impersonal political dogmas inevitably incited new wars.

Improving the lot of man by science

The new 'rational' scientific culture also had a moral support: the belief began to grow in the period of the Renaissance that by taking thought man could improve the material level of society. Francis Bacon put this cunningly by saying that 'Natural philosophy could restore the prosperity lost at the Fall.' He thus hoped to disarm the hostile ecclesiastics and bridge the gap between his own age and the next.

'Natural philosophy' — the experimental approach to knowledge — became the vogue and in the 17th and 18th centuries an enthusiastic optimism about man's powers to improve the world inspired idealistic people. They affirmed the value of life and the world and turned their back on the pessimism and resignation of the traditional religion. This attitude became known as Social Utilitarianism and is now called 'progressive.' Every idea and project was put to the utilitarian test of whether it contributed to the greatest happiness of the greatest number. This tended to beg the question of what actually does make people happy. The assumption is that if people's material needs are adequately satisfied, it is up to them to decide what makes them happy. Is it any wonder that what they think makes them happy is still more wealth, when religious teachings, sanctions and restraints have been weakened, even despised?

Man is a metaphysical creature not an organic machine

Man is a metaphysical creature; he lives by his imagination which spontaneously creates supernatural conceptions of his creation and the reasons for his existence. This activity, like any other human impulse, can be inhibited, and is inhibited by the culture of scientific materialism. It now expresses itself neurotically in such forms as science fiction. In the past man's moral codes have always had a religious sanction. A scientific

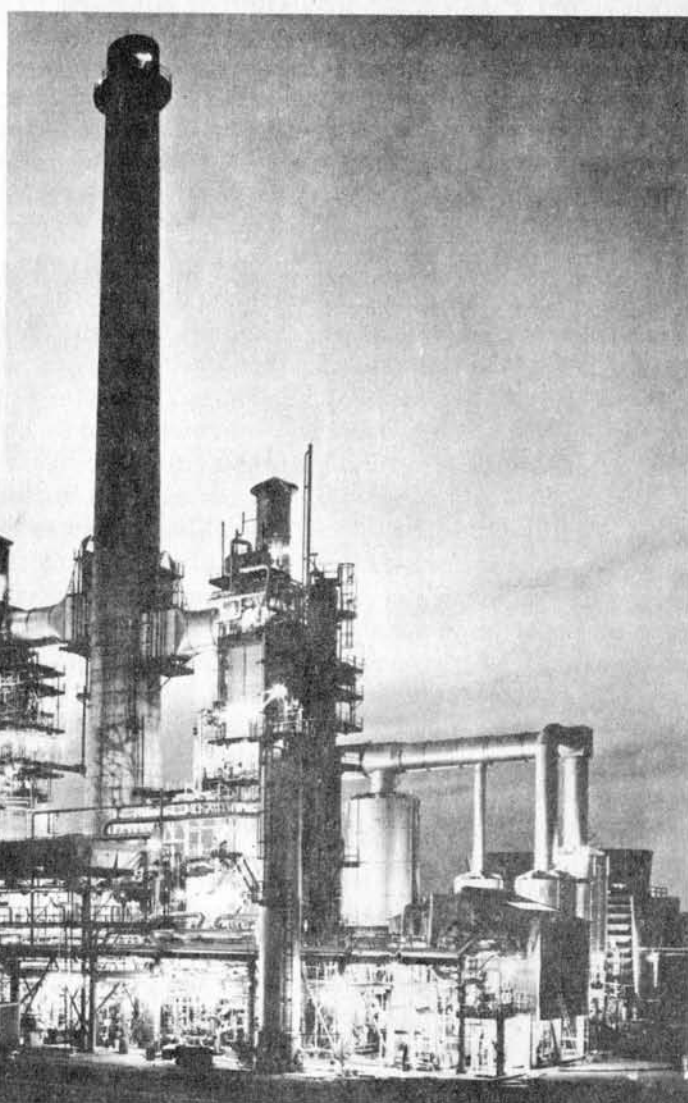
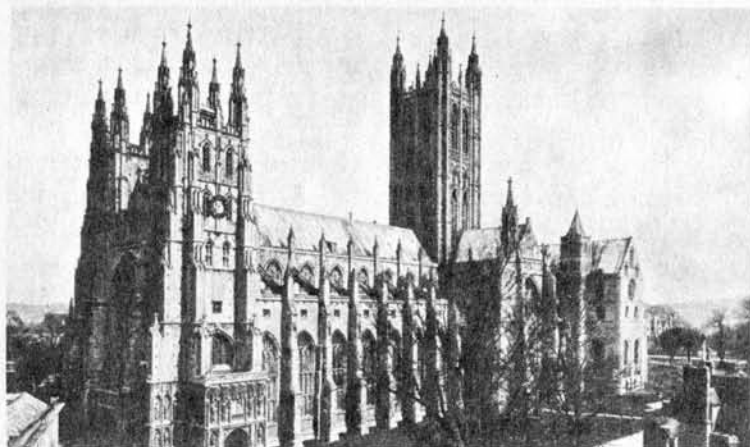
explanation of man's history and behaviour — such as we find, for example, in books like *The Naked Ape* and similar biological interpretations of human nature — can never make sense of the way humanity has organised its societies.

To understand the behaviour of man it is better to begin by studying his myths. At one time it was the gods and semi-divine creatures who determined fate and now it is atoms and molecules and genes, the ego, the super-ego and the id, the laws of supply and demand, etc, etc. All such entities are the equivalent of mythical creations. Try defining *exactly* what any of them are. What is the id? How 'fixed' and invariable are the laws of supply and demand? Is the atom the ultimate particle of matter and if it isn't what exactly is it? All these suppositions — often disguised as scientific facts — they are really the working tools of the moment — if you believe in them, can provide convincing explanations of nature and history. We have but to change the focus of the mind, however, for other mythologies to seem as credible as those which before we had never doubted. The prevailing mythology of today is scientific materialism, which, since it rules out the super-organic, that is reduces all explanations of life to the inorganic or organic levels, effectively wipes out half the human dimension; it has done at the opposite pole what undermined the culture it superseded. As a result, modern man is suffering from a cosmic neurosis which expresses itself as a mad 'rationality,' often violent. His 'irrationality' is camouflaged by his intellectual justifications of his own violence. Equally violent religious fundamentalisms are surging forward all over the world in opposition to western 'rationalism.'

When one half of human nature is condemned as 'irrational' — the spiritual or super-organic side — it is inevitable that the 'rational,' carried to such an extreme, will turn into its own opposite.

The limitations of scientific materialism

Scientific materialism is acceptable if it is confined to the belief that everything that happens requires a material mechanism to enable it to happen. Even thoughts require the mechanism of the brain; but the mechanism is not the thought. The relationship between the thought and the mechanism, like the relationship between the body and the soul, is inexplicable, so much so that man's nature can be described in dualistic terms as logically as it can be described as an indivisible organic unity. The two conceptions are complementary. In stressing the need to study the mechanisms, scientific materialism has advanced human progress; in subordinating the spirit to the mechanism, it has arrested human progress. The person must realise his *intentions* through the mechanisms of life which certainly impose a framework of possibility around action. But to assume that intentions are wholly determined by the mechanisms, is to deprive man of freedom without philosophic justification. Machines do not have intentions. Living organisms are not of course machines even though they have biological mechanisms. They have teleological guidance: the acorn has the aim of becoming the oak. The teleology of man is more complex; it encompasses his stage by stage spiritual develop-



ment that continues after his physical growth has ceased; it is super-organic. Scientific materialism at its lowest is confined to explaining life in terms of the organic; at its highest it includes biological mechanisms. But in both cases it limits explanations to what can be 'causally' determined. In the example of man, his actions, so far as they are intentions, cannot be 'causally' determined, at least in the way in which our scientists use the term 'cause', without denying all freedom to the will.

Scientific materialism is then only valid as a philosophy provided the limitations of science are accepted: provided that we do not assert that all human actions can be causally explained. Scientific materialism cannot cover the whole of experience.

Scientific materialism rejects the inner life as illusory

What did not occur to the enthusiastic utilitarians — who overlooked the implications of the scientific materialism on which their philosophy was based — was that science, applied to society through technology, could reach a stage at which it no longer improved human life, but threatened to undermine its existence by gutting the planet for the sake of realising its ideals of prosperity and equality. It was not until recently realised that industrialism was overriding the teleological processes of nature, including human nature.

We can see now that society has applied the gifts of science very ineptly.

One reason is that, in reaction to mediaeval Christianity, western man has turned too absolutely from the inner to the outer life; he has taught himself to study external nature and to act on the world, but he has not considered it equally necessary to study his own personality, to work on himself. With the rise of psychology this attitude could be changing, but psychology is a science and so can only work within the framework of causality. In theory it must deny free will, though in practice many psychologists recognise that their task is to free man from causality — obsessions which imprison his will power i.e. his freedom of choice, his freedom to be himself and follow his own way. In other words psychology has advanced to the point at which it leads beyond psychology in the sense that Freud understood psychology. As Otto Rank, for a long time a disciple of Freud's, points out in his important book, *Beyond Psychology*, the aim of psychology must be to rescue man from the bondage of scientific materialism and return him to history, philosophy and religion — the activities of the free personality — without depriving him of the value of psychological studies in acquiring knowledge of the mechanisms of the emotions and thus improving his self-knowledge. By self-knowledge he increases his freedom. While psychology assumes it can explain man on every level in scientific terms it prevents us from understanding ourselves. Scientific materialism is also based on the assumption that man is naturally good and only society is bad. This belief was

baldly expressed in the opening lines of Rousseau's *Social Contract*:—"To study man as he is and society as it should be."

With this theme as their prevailing theme, the utilitarian reformers reached the fatal assumption that we only need to increase wealth and distribute it justly for a prosperous and happy society to develop its own momentum. This is the creed by which on the surface we still live, though with increasing disillusion and doubt. The upholders of the old order — kings, priests and aristocrats — were of course exceptions to the general goodness of mankind; which is why radical reformers have always wanted to abolish the Monarchy, the Church and the House of Lords. The danger of the failure of scientific materialism is that it may lead western society into a pessimism as destructive as its present insane optimism. Since scientific materialism has denied us the spiritual creativeness of 'irrational' beliefs — in God, immortality, freedom and truth — if it fails it leaves us with no hope.

The failure of scientific materialism is that it may lead Western Society into a pessimism as destructive as its present insane optimism.

Scientific materialism has led us to a pact with Mephistopheles

In his profound book *The God Within*, Rene Dubos, a scientist whose philosophic mind transcends scientific materialism and recognises its threat to the survival of civilisation, points out that the only successful myth that the West has created is that of Faust. Faust sold his soul to the devil in return for wealth and the fulfillment of his ambitions. In return for present fulfillments, he jeopardised the future, just as we are doing. At the end of Goethe's epic, Faust is redeemed by love, renounces materialism and is received into Heaven. He is reborn by rediscovering the supernatural values of the past.

A group of international economists visited this country a few years ago to report on the state of the economy for the Hudson Institute in New York. The authors agreed that the British had made a faustian pact with Mephistopheles and had sacrificed traditional culture for the sake of economic progress. But, however regrettable this might be, they said, there was no going back. The British must keep on the path they had chosen or go bankrupt. What the economists of the Hudson Institute did not ask themselves was the much deeper question, the unthinkable question: can we survive even if we do try to keep our pact with Mephistopheles? Doubts have increased since the Hudson Report. The point I would stress is that the *industrial society can no more indefinitely suppress the 'irrational' forces in man than mediaeval society could suppress his 'rational' powers.*

As a result of excessive rationalism neurosis has become a national trait

The Victorian neurosis that resulted from the tension between the Christian ethic of love and the rational necessities of economics — as exposed by Ruskin in *Unto this Last* — has in many ways intensified since then. Here is an example: in the 1950s a doctrine of salvation for agriculture was proclaimed, that 'Farming is a business not a way of life.' Eager young graduates like missionaries visited farms for the National Agricultural Advisory Service with the new gospel, though few if any of them I recall really understood what was meant by business or way of life, or the interdependence of the two. It was simply a slogan for applying the new high technology and economic principles based on their use. Human needs and traditional practices were subordinated to an all-embracing, irrefutable principle known as efficiency, which was measured by economy of scale and reduction of costs. All cultural values such as beauty of landscape, humus content of the soil and so on had to take second place to the dictates of efficiency. Efficiency was correlated with necessity, economic necessity. You could in fact farm too well to be efficient and survive within the prevailing framework of economic efficiency. And economics, being a science, had proven laws which only an irrational person would defy.

Innumerable examples could be quoted of the degrading effects on man and society of applying the principle of rational efficiency to our industries. I will quote just one because it illustrates the kind of changes that are going on all the time unobserved by the majority of people and unrestrained, even encouraged, by governments: the building of huge oil tankers, some of them bigger than cathedrals. These colossi refuelled and discharged their cargoes at sea, so that their crews did not go ashore for as much as a year at a time. Is there anything surprising about the fact that the standard of the crews declined? Lively and intelligent people do not want to spend their lives confined to the decks of a ship. The result of this indifference to human needs in order that economic principles can prevail is the increase of disasters at sea, so that in the long run even the economic loss is greater than the gain. The 'rationalists' are inevitably fighting a losing battle, not only because the framework of their thought leaves out of account too many factors, but because human nature is too dynamic and spirited to be made to conform to 'rational' principles.

When the 'rationalists' fail they indulge in moral homilies about the selfishness of people that leads to economic bankruptcy. The mobility of labour is one of the demoralising 'rational' principles. *Isn't there something ironic about the masses being turned into industrial nomads when the object of civilisation was to establish settled communities?* Love of place, loyalty to local institutions in which the displaced may have served for years, are emotions that now have to be devalued so that economic necessity can triumph.

In order to conform to the demands of economic necessity, people have to work for overblown and overcapitalised enterprises; this is as true of Covent Garden, the orchestras that play in the Festival Hall and

the National Theatre, as it is of the steel industry and multinational corporations. Cricket and football are now also the victims of over-capitalisation, so that the traditional values of sport are being degraded. This overcapitalising subordinates human creativity to the need to cover the costs and meet the interest on debts. It leads to the state having to provide subsidies it cannot afford. By allowing and encouraging this kind of economic expansion in the first place the state is guilty of creating the losses it now has to fund.

The quality of literature declines as publishers merge and become bigger; they dare not take risks with so much capital at stake. This ruined the film industry. All the arts degenerate as the commercial salesmen try to increase their enterprises and their profits. That they will not in the long run succeed does not alter the fact that the immediate effect is to add yet another dimension to the blight on western culture, which extends from the humblest life of the workman to the highest levels of creative activity. It is true that huge enterprises sometimes stimulate creative work at first among the stars that can make the grade to their arenas. But even these exceptional people often become dissatisfied as performance loses its joy. There is a negative emotional feedback that undermines spontaneous creativity. This drives people to live on their will power as their spontaneous enjoyment diminishes. The primary symptom of neurosis is will spontaneity, pretending to feel what is not felt, but ought to be. *In a civilisation that has subordinated feeling to 'rational' principles, heart to head, neurosis becomes a national characteristic.* Because they are prosperous, people must go on pretending they are enjoying life, when in fact they are miserable. As with the Romans, a civilisation of bread and circuses develops. Politicians repeat the clichés that were once true but are no longer; and because they have lost the capacity to distinguish between what is true and what suits their political interests, they fail to realise it. The more powerful they become, the more they lose touch with reality and the more neurotic they become, until they end up as caricatures for cartoonists.

Man in a deterministic culture

The 'rational' is that which can be scientifically proved or which can be presented as if it were scientifically proved. Statistics are laboriously selected by research institutes that are supposed to have been abstracted from reality by scientific methods. These statistics are now so comprehensive that there are few areas of human desire and need that have not been statistically described, including our sexual habits, religious and political beliefs, diet, day dreams, preferences in the arts and in particular the way we spend our money. It would be easier to argue that this scientific survey of human life has done more to degrade the quality of living than to raise it. The interpretation of the statistics is more important than the statistics themselves — and of course they are interpreted according to the 'rational' principles of scientific materialism; *they provide the 'evidence' that proves what the statisticians set out to prove in the first place.*

Scientific materialism, as a general attitude to life, — a largely unconscious one, has been fed by the general

theories about the nature of life that have been inferred from the sciences. The theory of evolution persuades us that the environment selects those who are fit to survive — in other words you can use evolution to prove almost anything you like by choosing the environment *that selects those you happen to regard as the fittest i.e. the most desirable.* Marxism is a form of evolutionary economics that demonstrates how men's characters and principles are moulded by their environment, i.e. the economic environment. Again you can use this theory to prove almost anything you like. As for psychology, every action can be shown to have a sexual basis, just as every action, even the most altruistic, can be shown to have a selfish motive, probably determined by our 'selfish' genes which will make us heroically sacrifice ourselves that our children may carry on our genetic inheritance. On this theory the individual is of no importance as a personal creator, his only importance is as a carrier of genes. As soon as he has fulfilled his biological function he might as well die.

Great thinkers though the founding fathers of our present culture undoubtedly were, they have created a mental armour in which we are now imprisoned. Darwin, Marx and Freud explored society according to the philosophy of scientific materialism into which, as scientists, they were born — the age of analysis. They selected from the whole pattern of life the threads which attracted their attention and wove their particular thread into a generalised theory that seemed to explain the whole. What they succeeded in generalising was *their own experience, a partial illumination of a limited field;* unfortunately since that time millions of people have tried to follow and extend their ideas and put their minds and characters in a strait-jacket in the attempt. Natural selection, an interesting contribution to natural history, has now become the only explanation of natural development; psychology, again throwing an interesting light on some emotional conditions, has become the only explanation of the emotional functioning of the personality. Economics likewise is for some the only explanation of social conditions. It is such one-sided beliefs that make scientific materialism so arrogant.

All three of these famous men had their imaginations shackled by their determination to be 'scientific.' What could not be proved became an illusion; the vast, puzzling, inexplicable variety of life and experience had to be forced into the framework of their initial assumptions. They could not bear anything to remain a mystery; they could not endure uncertainty. Fortunately probability now plays a far bigger part in science than certainty; but the mass of people still live unthinkingly as if scientific materialism still ruled. But since scientific materialism binds us to scientific proof for all dimensions of life, it undermines itself, as truth rests upon a philosophical argument and cannot be proved by scientific criteria. (Unless there is such a thing as truth we cannot know there is untruth either, so we cannot choose between the true and the false as a scientist must.) Scientific materialism, as a universal philosophy, is a blind will to believe that science can ultimately prove everything that has no metaphysical support. It's popular advocates have been motivated by

a resentment of religion, the belief that the metaphysical imprisons the human will and makes men 'irrational': leads them astray by directing their attention to illusory values which distract us from improving the world in which we actually live.

Distinguishing between the reasonable and the rational

Before we can learn to balance the active and the contemplative life, we must overthrow the grip of scientific materialism on the modern mind by firmly delineating and recognising the limitations of science. Not until we have done this shall we liberate once again the inner creative forces of the imagination, that is, the forces now stigmatised as 'irrational.' While the 'rational' excludes these forces, reason must incorporate them. Shakespeare understood this when he wrote: "Love hath reason, reason none." (*The Phoenix and the Turtle dove*.) And that is the essence of the matter. It is not logic that dictates to love, but love that determines what is logical on the assumption that love is the highest value. Love must determine the principles of reason. Love is not thought out by man — he could never think it out. It is a spontaneous spiritual experience whose meaning and significance he discovers by contemplating it. Intellectuals in our rational system are ten a penny; they are churned out by our educational system. Wise men are few. *The characteristic of love is to reverence both one's own life, the lives of others and the life of nature.* For the 'rationalist' the Vale of Belvoir must be devastated by coal mining; for those who reverence the beauty of the Vale, life is not worth living if it is sacrificed for yet more sordid prosperity. It is the 'rationalists' who 'dig the mineral and scorn the flower.'

Conclusion: transcending scientific materialism

While recognising the limitations of scientific materialism, we must not be tempted to suppose that the idea of progress is nonsense. If we go back to the Middle Ages we see that it was an idea arising from a new use of the imagination and intellect. It added a new dimension to human life that had not previously existed. If wealth could be increased by taking thought, by constructing machines, by devising better methods of cultivation, then man would have no need to rob his neighbour, loot and conquer in order to increase his wealth. It could be done by industry and trade. Machinery was to take the place of slaves. It is absurd to grovel in front of God and treat every innovation as a sin. God has given us a mind, let us use it. The Reformation, the Enlightenment and the Industrial Revolution are a chain of linked events. They created, as we have seen, a new optimism about man's capabilities and future. To let go of this and to revert to a sado-masochistic fatalism would be a tragedy.

Progress was a real hope and has only become a tragedy because it has not been properly thought out. It has been carried too far along 'rational' lines; in our naive enthusiasm for acting upon the world, we have sacrificed the inner life. Progress has been arrested and imprisoned in the philosophy of scientific materialism. The 'rational' has dominated the 'irrational', that is religion, philosophy and art. What do the mind and the intellect serve? Do they serve love or do they serve

greed and vanity? We have made a fine weapon of the scientific intellect no doubt, but it has ceased to serve the higher needs of mankind; it will not subordinate itself to the soul. The time has come to correct the balance; for the imagination to topple the presumptuous intellect from its throne and make it the servant of the spirit. In fact what we need to be is double revolutionaries changing both the inner and the outer life: active mystics.

Herman Hesse, (*Reflections*. Triad Panther. p.49.) hopefully sketches man's real progress in the future:

"In the phase of innocence, Pious and Rational battle each other very much like children of different temperaments.

In the second phase, having achieved knowledge, the two contrary poles combat each other with violence, passion, and tragedy that characterize conflicts between states.

In the third phase, the combatants begin to know each other, no longer as alien beings but interdependent. They begin to love and yearn for one another. From this point, the road leads to possibilities of humanity, whose realisation has not so far been glimpsed by human eyes."

B.A. Combined Studies

Environmental Studies

With Major Options in Energy and Pollution and Ecology

This CNAA validated, three year multi-disciplinary course is concerned with the impact of technology on the complex network of natural relationships within the environment. It allows you to specialise in Energy and Pollution Studies (including alternative technology) or in Ecology. You must also involve yourself with human behavioural aspects of our environment and you will experience vital involvement in real world problems.

The degree is made up in part of a core of studies which is compulsory to all students. These courses are aimed at giving the student a foundation of knowledge about the society, environment and culture in which we live, and the ways that society, individuals and the environment interact. The other part of your studies will consist of an in-depth analysis of the environmental aspects of either Ecology or the energy and pollution aspects of Physics and Chemistry.

You should have 2 appropriate 'A' levels and a real interest in the environment is essential for this course.

B.Ed (Hons)

Also available is an Environmental Studies (Honours) elective in our B.Ed course.

A forward looking College, we're situated in the beautiful Cheshire countryside and our two campuses offer a superb range of facilities.

Our accommodation and social amenities are also among the best in the country. For further details and an application form, write to the Academic Office, (Admissions), Dept EPE
Crewe + Alsager College of Higher Education, Crewe
CW1 1DU. Tel Crewe 583661.

Crewe+Alsager College
of Higher Education

Subjectivity and Science

A Correspondence about Belief

by
Vince Taylor

Vince Taylor worked for the Rand Corporation on economics and policy analysis, since 1974 on energy problems and is a member of the Union of Concerned Scientists.

A student (who shall remain anonymous) recently wrote to criticize my work on the economics of uranium and plutonium. Underlying the criticism were a number of implicit premises about science, research, and policy formulation that are accepted without question not only by this student but by many others who deal with subjects where science and human affairs overlap; thus the following reply is really directed to a large class of people in hopes of opening the narrow confines of conventional, academic thinking to a broader, richer vision of the world process.

Dear Student:

Ostensibly, you wrote to invite my comments on several points you wished to raise about my writings on the economics of uranium and plutonium fuels. In actuality, you delivered a blanket indictment of my competence and personal integrity in performing research. You assert that my "conclusions are not based on sound economic practice," that my "work shows no knowledge of methods currently available for handling uncertainty in an analytic fashion," that I select methods to "obscure the issues" in order to mask my subjective opinions, that my "own personal feelings, and beliefs dominate...my conclusions," that I have turned "*advocate* and the study (of mine) can no longer be considered a scholarly objective treatment." In short, I am incompetent and hopelessly biased.

You say that you are a Ph.D candidate writing your doctoral thesis on issues associated with the re-processing of spent nuclear fuel to extract the contained plutonium and uranium, that you consider yourself neutral in the nuclear debate, and that you are trying to analyze as objectively as possible the policy questions surrounding reprocessing. To do this, you intend to employ "decision analysis methods ... in a risk-benefit approach" to quantify the major factors affecting the national decision on whether or not to reprocess, including in this quantification "the proliferation risks associated with commercial reprocessing."

You are almost certainly going to feel, at least initially, that this letter is a strange and inappropriate non-response to your criticisms. It is so intended. I don't want to argue with you how my papers fit your criteria for goodness, because, as you will see, I don't agree with your criteria. Instead, I'm going to try to help you to see how I approach analysis and why I write as I do.

The way in which you write about your own research objectives as well as about the deficiencies in my work indicates that a vast chasm separates the points from which we view the role of research in understanding the world process — a chasm that will not be easy to bridge. What touched me most in your letter, perhaps because I fully shared your faith at one time, was the implicit belief that scientific, objective analysis is the ultimate tool for solving the problems of the world. As a corollary, you assume that solutions derived from applying the complex, mathematical, highly abstract models currently in vogue in academia must necessarily be superior to those reached using simpler methods.

Having travelled down the same road myself, I have strong feelings about your belief in the superiority of highly quantitative analysis performed within the confines of greatly simplified models of the world process. My own experience has led me to conclude that unquestioning faith in such "scientific, objective analysis" is, perhaps, the greatest obstacle to improving policy research; thus my principle object in writing this letter is to shake your faith in such analysis by pointing out its apparent deficiencies and failures.

Scientific Analysis and Human Processes

Quite obviously, scientific method is a powerful tool for testing hypotheses and thus discriminating between alternative explanations for some phenomena. This method has given man great power to manipulate aspects of his environment. The application of scientific principles to industrial production has greatly increased the output of all kinds of goods and services. But as the world's ability to produce material wealth has grown, so also have its political, economic, and human problems. Since science has proven so successful in manipulating the physical world, it is not surprising that society has turned heavily toward science for guidance in dealing with these problems. The type of policy analysis which both of us are doing is part of this effort. But, so far, if measured by its achievements, this effort must be counted a total failure. Problems of unemployment, alienation, family breakdown, crime, urban decay, etc., continue to proliferate in spite of the best policy advice science has to offer.

Policy analysis is failing because its practitioners do not understand the processes they are modelling and analyzing. Scientific method has yielded great success in physical sciences because it is possible for scientists

to make repeated experiments under precise conditions, varying only selected parameters. Living organisms are more intractable. Although techniques of statistical analysis can help experimenters to guess about the effects of uncontrolled variables, the power of science has proven to be far less in medicine than in, for example, electronics. When I was studying medical care in the mid-1960s, I was surprised to find that life expectancies for adults had hardly changed since the early 1950s, and for adult males of some ages they had actually declined. This occurred during the great flowering of the National Institutes of Health, when billions were poured into scientific medical research.

In analyzing complex, real-world processes that involve human behaviour, scientific analysis has proven to be extremely limited. One need look no further than a review of past predictions of nuclear-electricity costs and nuclear power growth to see how badly scientific method can fail: since the mid-sixties, estimates of the cost of nuclear electricity have risen sevenfold, more than tripling after adjustment for general inflation. Just since 1973, official U.S. government forecasts of installed nuclear capacity in 1985 and 2000 have decreased to one-third their former level.

An outstanding example of erroneous estimation is in our common field of the economics of spent-fuel reprocessing. In the "Draft Generic Environmental Statement on Mixed Oxide Fuel," issued in August, 1974, analysts of the Atomic Energy Commission used \$30 per kilogram as their best estimate of likely costs of reprocessing nuclear fuel. Today, estimates range well above \$300 per kilogram; after allowing for general monetary inflation, these projections have risen by over 700 per cent in only a few years! Such gross mis-estimation shows a serious lack of understanding of the realities of bringing a large-scale reprocessing plant into actual operation. Don't these enormous errors by supposedly competent analysts create in you any tinge of doubt about the efficacy of scientific analysis in public policy formulation?

Analyses of real-world processes are subject to such catastrophic failures because, in order to reduce analysis to manageable proportions, analysts ignore (or assume to be fixed or to vary as in the past) a multitude of integral aspects of the real-world process being studied. Conceptually, analysis removes a piece of the world process, isolates it, and sees how this isolated piece responds when parts of it are changed. From the information so derived, the analyst infers how this part of the world process will evolve in reality, and more ambitiously, how its evolution will be affected by specific policy initiatives.

The fatal weakness with this approach, for all policy issues of any significance, is that the aspects of the world ignored are usually equally or more important to determining how the process evolves than those parts included in the analysis. Nor does extending the scope of the analysis remedy matters; first, because data requirements expand geometrically with scope (and much of the data for the expanded study will prove to be unavailable or not available on a timely basis — the world just keeps rolling along, outmoding all data collected in the past — forcing the analysts to make heroic

guesses about data values), and secondly, even if the data were available, theories are not available to explain the inter-relationships among the expanded data-set.

Now, you could reply, as do many policy scientists, that we simply need to collect more data and to employ more analysts to study the interrelationships among the larger data-set, thus making our analytical models of the world more accurate. But isn't it obvious by now that more of the same isn't going to lead to better results? Just in the area of the "national reprocessing decision," as you term it: how would you include in your analytical model the influence on the future costs and economic benefits of reprocessing of the need to keep the dangers of reprocessing within socially acceptable limits? How, for instance, would you even begin to describe analytically the obviously important inter-relationship between future reprocessing costs and the need to keep the risk of radiation contamination to workers and the environment to an acceptable level, recognising that new information is constantly changing that interrelationship.

So long as you believe that the only important aspects of a policy issue are those that can be treated within the highly restricted confines of a quantitative, analytical model, you will be blind to evidence that doesn't fit within the model.

Since I have spent most of my adult life working on policy analysis, I'm not ready to write it off as a useless endeavour (although I must admit that I have come very close to this several times in the past). But what I am absolutely clear on is that more abstraction, more complexity, more computerization — in other words, more standard scientific sophistication — is not going to improve the record of policy analysis.

To be able to give truly useful advice to policy-makers, we analysts will first need to greatly improve our own understanding of the world process, for which we must develop routes to understanding not embraced by conventional scientific modes of analysis. You could help in this task, but first you must be convinced that the tools you are presently working so hard to master are inadequate. To do this, I want to make you uncomfortable with your present, educationally derived beliefs, sufficiently uncomfortable so that you begin to ask whether there aren't other, better ways to relate to the world. Did it ever occur to you that some of those people who are saying things that seem wrong or irrational to you are really telling it like it is — but you just can't understand because the concepts that you use to think about the world are getting in the way?

Unquestioned Observations of Reality

My papers obviously have upset you greatly. Why? Perhaps my conclusion that near-term use of plutonium fuels would be a dangerous, unnecessary gamble with a low probability of producing significant economic gains runs counter to the conclusion you have been attempting to support in your thesis. If so, your upset would be understandable. But, I think perhaps you were disturbed for a different reason — because acceptance of these papers would imply rejection of some beliefs (for example, in the desirability of continued technological advance) that are very important to you at the moment. At the conscious level, these beliefs probably don't seem to you to be beliefs at all, but rather, self-evident truths about the world. Actually, however, they are not immutable truths about the nature of reality, but merely working assumptions (although very important ones!) that provide a guide for analyzing, evaluating, and making decisions about the world.

I would like to help you gain an appreciation that came to me slowly, painfully, and with much difficulty: how our intellectual concepts and beliefs limit our ability to perceive what is really happening in the world. When the world "was" flat, the heavens "had" to move around the earth. We see the world through the blinders of our own beliefs. When the world's behaviour resists our expectations, as now seems to be the case in many areas of policy analysis, we need to question whether some of our important beliefs are in accord with reality. Unfortunately, our most basic beliefs are seldom accessible to our conscious mind: they appear to us as simple, unquestionable observations about reality.

For me, an important insight into my own belief structure occurred when, one day, I *saw* that furtherance of individual freedom might not necessarily be good. This came as a shock, since I had previously judged entire societies by the extent to which they furthered "individual freedom". My belief in the primacy of individual freedom was so fundamental that I had never thought to ask whether greater freedom might possibly make people worse off.

So long as I *believed* that more individual freedom was unquestionably better than less, I was unable to see any evidence to the contrary. I saw every suggestion toward less individual choice, less personal freedom as a threat to happiness, never perceiving the possibility that less freedom might make people happier by giving them a greater sense of security, more of a sense of identity with the world around them, or a closer relationship with other people. Once the question was raised, it became obvious that I had assumed an equality between individual freedom and individual welfare — an assumption that had no empirical basis and, moreover, one that would not even be seriously considered by vast numbers of people in the world (for instance, those raised in the context of traditional oriental thinking).

To realize that my intellectual concept of "individual freedom" had little basis in reality opened my eyes to unseen aspects of the world. Similarly, so long as you believe that the only important or relevant aspects of a policy issue are those that can be treated within the

highly restricted confines of a quantitative, analytical model (such as the one you indicate you are using in your thesis), you will be blind to evidence that doesn't fit within the model.

To truly see that one of your own beliefs is just an assumption can be liberating. This experience, though, is not amenable to precise programming. You must stretch your mind, envelop your beliefs with contrary thinking, and allow your imagination to roam into forbidden territory without automatically rejecting its perceptions as "absurdities." Be open to life's teachings which, if my life provides any guide, will soon provide you with ample evidence of the fallibility of many of your most cherished beliefs. Chuang Tsu, a Chinese sage of ancient times, said this about people's beliefs: "Our words fly off like arrows, as though we knew what was right and wrong. We cling to our point of view, as though everything depended on it. And yet our opinions have no permanence: like autumn and winter, they will gradually pass away."

You will not experience the arbitrary nature of your beliefs by reading more scientific, analytical books, or by just thinking about them. Something or someone outside of you must jolt you into opening your eyes, perhaps just for a moment, to an aspect of reality that doesn't fit comfortably in your present belief structure. If this happens, hang on to it! Expand on it, explore it. Don't suppress it and deny it. Rather, ask whether some of your previously-held beliefs need to be opened up to make room for a richer reality.

**We see the world through the
blinders of our own beliefs. When
the world's behaviour resists our
expectations . . . we need to
question whether some of our
important beliefs are in accord with
reality.**

The Indivisible Unity of Life

I would like to change the way you think because it is important for you and important for the world. The old ways were good for old times, but they aren't working any more, either personally or socially. If you go on trying to fit the world into the old ways of thinking, you will be unhappy and confused and will be unable to contribute much to helping the world, our country, your family, or yourself through these troubled times. Do you understand why nuclear power isn't being embraced eagerly by the energy-hungry peoples of the world, or why the demands of your "job" and of your "personal life" so often seem to be in conflict?

By holding fast to certain beliefs, you may be denying a part of yourself that would come to the surface if you were willing to accept a somewhat different set of

values or beliefs. From my own experience, I believe greater acceptance of this other side will make you both a better researcher and a happier person. I have in mind the emotional, feeling, or intuitive parts of your being. That feelings could be as important to understanding and analysis as intellect and logic must sound completely crazy to you, judging from your letter. But if you had lived before the rise to dominance of Western, analytical thinking, for example in medieval times, you would find nothing remarkable in the idea that true understanding comes from more than cerebration.

What I am suggesting derives from a belief in the indivisible unity of life and, therefore, in the importance of making work an integral part of the whole. Accepting and acting on this belief has certainly improved the quality of my work, but perhaps more importantly, it has provided me with an alternative to the standard, highly impersonal, and to my mind, sterile, professional career path. Access to this alternative is a natural outgrowth of treating your life as an integrated whole, not attempting to separate your "professional" from your "personal" life. Isn't it obvious that both aspects of your life will be enriched if you accept them as complementary parts of experience and consciously try to make each one supportive of the other? My own life has become more fulfilling for me since I stopped trying to pretend that I was two people, one at the office and one at home. Now although not all my professional colleagues are my close friends, nor vice versa, I am the same person to them all — leaving me less confused than previously about who I am or what I am doing with my life.

To be able to integrate your life, however, you will first need to re-examine your unquestioning belief in the superiority of "objective" over "subjective" research, a belief apparent in your condemnation of what you consider subjectivity in my writing. Until you relinquish this belief, you will be afraid to approach work with feeling as well as intellect for fear of losing your much-valued objectivity. But, pure "objectivity" doesn't exist, since any observations, experiments, or analysis must always be done by a person, who inescapably must have values, emotions, and feelings that influence his or her work. This is, of course, exactly the point being made by Laplace in the quotation you cite as support for the superiority of objective analysis: "Our passions, our prejudices, and dominating opinions, by exaggerating the probabilities which are favourable to them, and by attenuating the contrary probabilities, are the abundant source of dangerous illusions." (*A Philosophical Essay on Probabilities*.)

You seem, however, to believe that because you *desire* to be objective, you will be immune to those passions, prejudices and dominating opinions which "are the abundant source of dangerous illusion." What nonsense. I am sure that Laplace would agree with me that those most likely to be led into dangerous illusions by their emotions are those who would deny most vehemently that emotion played any role in shaping their opinions about "objective" truth.

Rather than attempting to deny or suppress the obvious truth that I am a feeling as well as a thinking person, I celebrate it! And, then, because I recognize

that I will be the first to be misled if I do not look the truth straight in the face, I guard against the universal, human tendency to favour one's emotional positions. I have no desire to deny that my views of the world influence my work. You term this "subjectivity" and denounce it soundly. I term it "wisdom" and recommend it highly. By drawing on all of my perceptions of the world, I believe I obtain a more complete and coherent view of the world processes that are unfolding than would be possible if I limited myself only to information that I process intellectually and analytically. In a sense, I work backwards from my overall view of the world to the specifics of a given problem, applying the tests of logic and evidence to check the correctness of the perceptions derived initially from feelings and intuitions as well as from thinking. I believe that the competence and usefulness of my work have increased enormously since I began to apply this integrated approach.

The Costs of Uncertainty

Though I don't wish to interfere with the more important message of this letter, perhaps some explanation of my methods will help you to see that my view of the world and approach to research are not incompatible with the goal of improving public policy.

You criticize me for not attempting "a dynamic treatment of reprocessing economic cost-benefits." I don't know what you mean by this phrase, but I can explain why I didn't use present-worth calculations in my analysis.

There are many conceptual problems with time-discounted, cost-benefit analysis. To mention only two: What is an appropriate rate of time discount? How do you make commensurable the narrow dollar costs and benefits of reprocessing and the non-dollar "costs" of increased risk of nuclear war? If one were to incorporate into the analysis all of the possible ways of resolving the controversies surrounding cost-benefit analysis, far

By drawing on all my perceptions of the world, I obtain a more complete and coherent view of world processes that are unfolding than would be possible if I limited myself only to information that I process intellectually and analytically.

from illuminating the consequences of alternative policies on reprocessing, the resulting analysis would submerge them deep into the murkiest of waters.

My objective in all of my work is to explain as clearly and simply as possible what is going on in the world and what is likely to happen if the government (or a company, or an individual) chooses one course rather than another. Thus, I desire to avoid complexity and obscurity whenever possible; and in the case at hand, it does turn out to be possible. First, because the evidence (not my personal prejudices) suggests that reprocessing, if undertaken in the near future, would very

likely be unprofitable. There is no need to discount a future stream of losses to determine that the action leading to these losses is economically undesirable. Second, the real options in the reprocessing decision are to go ahead now or to defer the decision to a later date. Since this later date need be only a relatively short time in the future, say 1985, most of the stream of economic benefits (or losses) resulting from choosing the first option would be available under the second. Again, looking at the issue in this way is both clearer and more correct than the usual time-discounted cost-benefit evaluation, which assumes that we are faced with a once-and-for-all decision on whether or not to reprocess.

I have analyzed these two options in a formal, quantitative format in my testimony for the California Energy Commission in the proceedings of the United States Nuclear Regulatory Commission to determine whether to approve wide-scale use of plutonium fuels. In this instance, I was addressing an audience of experts and thus I considered it acceptable to use a relatively complex analytical framework.

In my testimony, I placed the reprocessing decision in a formal, quantitative structure because I wanted to make an important point about the advantages of deferring decisions in situations of great uncertainty — exactly the point you castigate me for making in the concluding section of "The Myth of Uranium Scarcity." Briefly, the point I make in both places is that the decision to wait (to defer decision) has the advantage that one gains more information as time passes, providing a better basis in the future for assessing the costs and gains of a definite decision. This is the principle that is captured in the academic models of sequential decision theory.

In "The Economics of Uranium and Plutonium" I did modify the exposition by focusing on a central case for quantitative analysis, using values for the key variables that were more favourable to reprocessing profitability than those that seemed most likely on the basis of extensively documented evidence. This analysis showed that even if such favourable values were to be realized, reprocessing would be unprofitable. I did this because there is no shortage of analyses that use a combination of values and technical assumptions that would, if correct, make reprocessing very profitable. I wished to make as clearly as possible, a convincing counter-demonstration to those studies. Far from ignoring uncertainty, as you assert, I always stress that the future is very uncertain. In this essay, I focused attention on the most important implication of the economic uncertainties about reprocessing: that even if all uncertainties were resolved favourably for reprocessing profitability, widespread implementation of this dangerous technology would reduce the cost of nuclear electricity to the customer by less than one per cent.

What I did not do is to treat uncertainty in the "decision-analytic" framework you apparently favour. I rejected this methodology for the same reason that I avoided use of discounted cost-benefit flows — because it would obscure and confuse important conclusions that emerge clearly using simpler, more understandable approaches.

To be able to give useful advice to policymakers, we analysts first need to greatly improve our understanding of the world process, for which we must develop routes to understanding not embraced by conventional scientific modes of analysis.

The Role of the Analyst

You accuse me of relying on personal opinions, feelings, and subjective assessments of likelihood as the major basis for my conclusions. Yet "The Myth of Uranium Scarcity," which you cite as the premier example of this failing, is almost entirely a compendium of official government analyses of uranium availability and cost, and it is on these analyses — not personal opinion or prejudice — that I base my conclusion that supplies of relatively low-cost uranium appear ample to meet expected nuclear fuel needs in this century and, probably, well into the next century.

You seem angry at me because I reach any conclusions at all, equating this act with bias, subjectivity, advocacy, and bad scholarship. You put me in a box labelled "policy analyst," which by your definition precludes having any opinions, no matter how well-informed. But I don't accept your box. I have no intention of performing my work within such arbitrary and self-defeating limits. Out of my own experience, I believe that anyone who limits himself to your definition of "policy analysis" will provide policymakers with nothing of value.

My objective is to educate and advise policymakers about the issues on which I work. To do this, I must necessarily reach conclusions or, in the words you use pejoratively, form opinions. A policymaker wants the opinions of his or her advisors — not ill-informed, emotionally grounded opinions, of course, but opinions nevertheless. You seem to believe that a policy analyst ought to be a policy eunuch. But an advisor without opinions is as useless as a dictionary without definitions. The very reason a policymaker turns to an advisor is because he or she does not have the time and expert knowledge required to study and evaluate all of the contradictory evidence and views pertaining to a controversial issue. He depends upon his advisors to do this for him.

Thus, I consider the act of forming an opinion about what constitutes appropriate policy to be not only a legitimate part of my work but one of its major objectives. This objective is in no way incompatible with high standards of scholarship nor does it preclude fair-minded and balanced assessment of the evidence. The extent to which my work on re-processing and uranium may be more educational and therefore more helpful than others is, I trust, a result of my partial success at illuminating the truth of the situation, not because I have given in to my prejudices or distorted evidence.

Sincerely,
Vince Taylor

Acknowledgment: Reprinted with permission from *Technology Review* February 1977.



The Ecology of Health

by

Edward Goldsmith

Edward Goldsmith, publisher and editor of The Ecologist, author, lecturer, consultant, vice-Chairman of Ecoropa.

Expenditure on Health Services throughout the industrial world has got out of hand. In many countries, it is increasing so rapidly that, at the current rate, it is a matter of decades rather than centuries before it absorbs the whole of the Gross National Product. Clearly, before this point is reached, drastic action to curb health expenditure is required. But how is this to be done? It is generally assumed the problem to be one of organisation. Some critics favour the American system of free medical enterprise, others the nationalisation of medical services as in the UK, while others favour some intermediary solution such as that which has been adopted in France.

If one looks into the question a little more deeply, it becomes apparent that the problem is not *how* but *what* services should be provided.

Those provided today, and are based on modern medical science have failed to deliver the goods. If they had been successful, levels of health would be rising and we would expect to see a reduction in the number of people consulting a doctor, in the number of working days lost through illness and in the expenditure on medical services. The opposite is of course the case. As Powles¹ writes "one of the most striking paradoxes facing the students of modern medical culture lies in the contrast between the enthusiasm associated with current developments and the reality of diminishing returns to health for rapidly increasing efforts."

It is agreed, of course, that modern medicine has increased longevity, but this has been greatly exaggerated. Dr R Logan,² Director of the Medical Research Unit, tells us "that a man today can expect to live three years more than his counter-part in 1841." Most of this improvement however occurred before the introduction of scientific medicine and in the period of rapid increase in the expenditure on health, during which time the improvement in life expectancy has more or less levelled off.

Little has done more to increase the prestige and credibility of modern medical science than its apparent success in eliminating infectious diseases, but this success has proved to be short-lived. We are witnessing today a resurgence of infectious diseases throughout the world, in particular of malaria, gonorrhoea, tuberculosis, pneumonia and cholera, while others such as schistosomiasis and dengue fever are spreading to areas where they have been hitherto unknown.

The total impotence of modern medical science to reduce the incidence of the so-called 'diseases of civilisation': cancer, ischaemic heart disease, diabetes, diverticulitis, peptic ulcer, appendicitis, varicose veins, tooth caries, is apparent to all. Their incidence, in spite of any efforts made by the medical profession, continues to increase along with GNP.

The only realistic conclusion to be derived from all this is that medical science is on the wrong track, and that a new health policy is urgently required. But what form should it take? It seems clear that, before we can answer this, we have first to rethink basic concepts such as health, disease, medicine and health services.

What are Health and Disease

Health, in terms of our technological world-view is seen as the absence of 'clinical symptoms,' and disease as the presence of such symptoms. But what do we mean by 'clinical symptoms'? They are the symptoms of what? Presumably of a disease, but this does not get us very far, because many of the diseases we suffer from are classified purely *in terms of their symptoms*. This is true for instance of rheumatism, arthritis and of many of the 'diseases of civilisation'. It is also true of psychiatric diseases such as psychosis, neurosis and schizophrenia. Often too, the 'symptoms' are but those of the normal workings of the body's defence mechanisms rather than of any really pathological state. As Dr Malleson³ points out, "over millions of years our bodies

and those of our ancestors have perfected defence mechanisms against microbial invasions and noxious chemical substances. These mechanisms are very highly developed. For example, mucus which might be dangerous if it were to accumulate in the trachea is expelled by coughing. Toxic substances in the intestines are eliminated by diarrhoea. Microbial invasion of the body is accompanied by a rise in temperature, which is probably intended to increase the rate at which the defence mechanisms are able to act. To suppress this cough, to prevent this diarrhoea, to reduce this temperature is to counteract essential natural processes.' If the medicines employed are biologically active, they may also produce side-effects and thereby induce diseases where previously there were none.

Often, the 'clinical symptoms' are those of a disease that has taken such a hold over an enfeebled patient that, regardless of the medical treatment provided, it must prove fatal. In these conditions, the object of treatment is nothing more than to prolong human life just for the sake of it and without any regard for the quality of the life thereby prolonged — an absurd and often immoral enterprise, if we take into account the pain that the patient must suffer as a result of the often very drastic treatment that he must undergo just to keep alive from day to day.

Few people realise what proportion of the National Health Budget of an industrial country is spent in this way. According to Professor Ross Hume Hall⁴ of the Canadian Environmental Council, 80 per cent of the health budget of that country is devoted to prolonging the lives of patients who, whatever happens, will die in the next ten months, and in this respect Canada does not appear to be exceptional.

On the other hand, the absence of 'clinical symptoms' in a patient cannot necessarily be taken to denote that he is in good health. Some 75 per cent of people visiting doctors' surgeries today are said to suffer from no recognisable 'clinical symptoms.' Yet they feel ill — and in some sense of the term — they are ill.

Our notions of health and disease are thereby extremely vague and indiscriminate. The trouble is that they are the only ones consistent with the world-view that has developed during the course of our industrial age and which colours our thinking on all the basic problems that confront us today — they are thereby the only ones that, at present, we seem capable of entertaining.

The thesis of this article is that to understand health and disease and in fact any other of these problems, we must see them in the light of a very different world-view — one which we can perhaps refer to as the 'ecological world-view'. This involves, first of all, looking at them in a much wider context. Modern medical science, we must remember, like all the other disciplines in terms of which knowledge has been divided, has been developed on the basis of the experience of the industrial era — a period of about 150 years which is negligible in terms of man's total experience on this planet of several million years. It is in terms of this total experience that we must look at the issue of health and disease. But this is not sufficient. We think of health and disease as it affects man. Man is not some-

thing unique, but a particular form of life or 'natural system'.

General systems theory, over the last thirty years, has shown that systems (such as molecules, cells, organisms, ecosystems etc) which may outwardly appear to be extremely different are, at a certain level of generality, very similar, and that at such a level, their behaviour can be shown to be governed by the same basic laws. Cybernetics, during this same period, has revealed that this principle particularly applies to the method by which natural systems are controlled, a method that is also used for controlling such things as machine tools and guided missiles i.e. the behaviour of man-made systems.

Stability

The most basic thing that natural systems have in common is that they are goal-directed and the goal is stability. This does not mean immobility. An immobile system would not be stable, since it would not be capable of adapting to a changing environment unless the environment were itself totally orderly and predictable. Within such an environment, systems are stable in the sense of displaying homeostasis, which means that after a disturbance they return to a ground position. If the environment, on the other hand, is less predictable, then a system subjected to it must be constantly adapting to change. It is nevertheless stable in the sense that the extent of these changes is minimised. Small changes occur, not for the sake of it, but so as to avoid the necessity for bigger changes. They occur as a means of *preserving the basic structure of the system*, by adapting it to changing environmental conditions. Waddington⁵ distinguished between homeostasis (same position) from homeorhesis (same flow). When I take stability to be the goal of living things I am using the term in the sense of Waddington's homeorhesis.

It can be shown that as systems develop via the evolutionary process so do they become increasingly stable. Thus a pioneer ecosystem is subject to all sorts of discontinuities. These are slowly ironed out as the ecosystem evolves, as pioneering species are slowly replaced by more advanced ones and as a 'climax' or adult state is achieved. A climax forest is subject to few changes. Some tropical rain forests are as much as sixty million years old. They no longer have to grow or change very much for they are designed to apply a moderating effect on climate, reduce the incidence of droughts and floods, population explosions and population die-backs — and other such discontinuities, and are thereby very stable.

The same is true of systems at all levels of organisation. As evolution proceeds, they become better adjusted to the particular ecosystem in which they live and hence to the various forms of life that inhabit it.

Thus it is possible to obtain some idea of the time during which an animal has lived in a specific environment simply by determining to what extent it has learned to live with the other forms of life including the parasites and micro-organisms that inhabit it. If it has lived in it a long time then the diseases that could be caused by the parasites have become endemic. They are relatively mild and their function is simply to kill off the old and the weak, i.e. to apply quantitative and

qualitative controls on host populations.

Consider the case of Myxomatosis. It was a well established disease among rabbits in Brazil among whom it is endemic and causes but mild symptoms. It is unknown among European rabbits which are of a different genus. When myxomatosis was introduced into Australia in 1950, the European rabbits introduced there were exposed to a virus of which they had no previous experience. The first year it killed 99.8 per cent of the rabbit population, in the next year the death rate went down to 90 per cent, seven years later it had fallen to 25 per cent. The rabbit population via the process of natural selection was clearly learning to live with the virus, and selection had undoubtedly also occurred among the viral strains themselves. The relationship between the rabbit and the virus has thus become progressively more stable. They have learned to live with each other.

The same thing has happened to human populations throughout the world as they have been exposed to parasites of which they had no previous experience. The population of the various islands of Polynesia for instance was decimated by the diseases brought there by the European colonialists. That of the Maoris of New Zealand fell from approximately 160,000 to 30,000 and at one time it was thought that the Maoris would become extinct. That of Tahiti fell from a similar figure to about 7,000, that of the Marquesas from 100,000 to no more than about 3,000. Slowly the Polynesian population has adjusted to the micro-organisms that have become a new component of their environment. They have, in fact, learned to live with them and their population has correspondingly grown. In New Zealand it is now two to three times its former size. This does not mean that the Maoris are now a stable population, (they are not, but for a host of other reasons) but they have established a stable relationship with these particular components of their environment.

Health as Stability

Let us take 'health' to be the ideal state of a biological organism, that which it strives to achieve, the goal, one might say, of behaviour at a biological level. We have seen that a biological organism is but an instance of a more general principle that we can refer to as a natural system and that the goal of all natural systems is the achievement of stability. This makes it difficult to avoid associating health with stability, indeed health, if it be taken as a state of organism, is best seen as *that state which enables an organism to maintain its stability*. I think that most students of health, who see their subject matter in anything but the very narrow context within which it is presently studied by modern medical science, would agree with a definition of this sort. It is, for instance, that of the late Professor Audy⁶ who saw health "as a continuing property potentially measurable by the individual's ability to rally from insults, whether chemical, physical, infectious, psychological or social."

If we define health in this way, then our notion of cause-and-effect must be radically modified.

The cause of a disease can no longer be seen to be the immediately antecedent event that triggered it off — the micro-organism for instance that is associated with

an infectious disease — but that constellation of factors that have reduced the resistance of the organism to a point that it falls victim to what, in normal conditions, would induce in it relatively mild symptoms.

**Health . . . "a continuing property
potentially measurable by the
individual's ability to rally from
insults, whether chemical, physical,
infectious, psychological or social."**

Professor Audy

On the subject of tree diseases, Professor Day⁷, one of the few ecologically-minded writers in this field comes to precisely this conclusion. "If an indigenous parasite" he tells us "depends for successful parasitism on an already existing morbid condition in the host, it should be known what such a condition is and how it is brought about. For the means by which this condition is produced is the real cause and should be referred to as such."

If we see cause and effect in this way, then the criterion for determining whether environmental changes can adversely affect health must also be a very different one from that which is currently applied.

It no longer suffices to determine whether such a change actually gives rise to clinical symptoms but *whether it is capable of reducing the overall resistance of living things and hence their stability or health in such a way that they become more vulnerable to other insults*.

On this basis, our notion of what, among other things, constitutes a pollutant must be radically modified, and what are today regarded as acceptable levels of different chemicals in different parts of the environment — such as in the air we breathe, the food we eat and the water we drink, must be drastically revised.

Conditions that favour Health

In theoretical terms, the conditions most favourable to health are easy to define. A biological organism was designed by millions of years of evolution to be able to fulfil its particular functions at each level of organisation.

A healthy body, or a man's 'internal environment', to use Claude Bernard's expression, is thereby one that works as it was designed to by its evolution. But an organism was not designed by evolution to function in a void. It evolved *as an adaptive response to a specific environment — one that has also evolved as an adaptive response to it and to other constituents of its environment — an environment with which, to use Paul Ehrlich's term it has co-evolved*.

It is its relationship to *this* environment that is the most stable, that in which the incidence of discontinuities including diseases is the lowest, that which most favours the maintenance of health.

It is incredible how we have lost sight of this quite evident principle. Most of us will admit that a tiger has been adapted by evolution to live in the jungle. It is clearly the jungle that provides its optimum environment. It is the activities he is capable of indulging in the jungle that best satisfy its physical and psychological requirements. It is the food that he finds here he has best been adapted to eating and digesting. It is the smells he encounters here that he has best been adapted to detecting, interpreting, and enjoying, and the same must be true of all forms of life, including man. All must be best adapted to the environment with which they co-evolved.

What prevents us from facing this fact and understanding its full implications is our blind quasi-religious faith in the omnipotence of science and technology, which we are told can, among other things, confer on man the gift of infinite adaptability. But the changes that they permit are only adaptive if this term is to be used in a very indiscriminatory manner.

True adaptation must refer to change that combats discontinuities by creating *the conditions that must reduce their incidence rather than neutralize them however impressively but at the cost of increasing their incidence in the future, change, in fact, that tends towards stability rather than accommodate instability.*

Most of the changes made possible by medical science are thereby not true adaptations. As Boyden¹² points out our response to the epidemic of tooth decay for instance — (more than a third of the adult inhabitants of the UK have no teeth at all) — is to engage more dentists and provide people with more false teeth. Our response to the present epidemic of cancer — which now kills one person out of four — is to bombard cancerous cells with radiation, or simply to cut them out physically. And so it is with most of the expedients we make use of to combat our ailments. Their function is not to deal with their causes but only to mask their symptoms. While, since they are part of the pattern of resource-intensive and polluting economic activities that are making our planet an ever less suitable habitat for man and other complex forms of life, to apply them is, in the long-run, *to increase the incidence of the diseases they are supposed to cure.*

The Optimum Environment

What then is the environment to which man has been adapted by his evolution and which must thereby most favour the maintenance of his health? The answer, however much we may be loathe to face it, is that of our paleolithic hunter-gatherer ancestors. As Washburn and Lancaster⁸ point out "the common factors that dominate human evolution and produced homeo-sapiens were pre-agricultural. Agricultural ways of life have dominated less than one per cent of human history and there is no evidence of major biological changes during that period of timethe origin of all common characteristics must be sought in pre-agricultural times."

It is easy to see why the environment of hunter-gatherers should have been so favourable. First of all they were constantly on the move which meant that they were not for long in contact with their own excrement, which reduced their vulnerability to many parasitic

diseases. They lived close to nature and had at their disposal a wide diversity of fresh and uncontaminated foodstuffs. The small groups they lived in were dispersed over a wide area and hence lived at a considerable distance from each other, which prevented the spread of diseases from one locality to another. These small groups, what is more, were not capable of supporting a viable population of the parasites associated with the major infectious diseases that have become current among urbanised populations. A population of 500,000 people for instance is required for the measles virus to survive and propagate itself. Also, since hunger-gatherer groups could survive without disturbing their biotic environment in any way they did not interfere with established relationships between parasites and their non-human hosts. Bubonic plague, for instance, developed as a disease of rodents, yellow fever and malaria as a disease of monkeys, rabies of bats. Once we destroyed the habitat of the host animals and modified our own so as to create a new niche for the micro-organisms involved, they were quickly transferred to man. Thus malaria is transmitted by the anopheles mosquito which originally preyed on monkeys living on the canopy of tropical forests and to which it was well adapted, causing but mild symptoms to the host. Once the forests were cut down, the mosquitos had to find alternative hosts and the most generally available one was man. The creation of vast urban conglomerations has also provided a perfect niche for burrowing rodents including the rat that transmits bubonic plague⁹. It has also put us in close contact with parasites that had previously established a stable relationship with the animals we had domesticated. An example is smallpox, a variant of cowpox, which is a disease of cattle.

"As he constructs dams, irrigation ditches to alleviate the world's hunger, he sets up the ideal conditions for the spread of disease."

WHO

Large-scale irrigation projects have also provided an ideal habitat for water-borne diseases. The result is the spread of schistosomiasis which even the World Health Organisation¹⁰ acknowledged to be "man's doing. As he constructs dams, irrigation ditches to alleviate the world's hunger he sets up the ideal conditions for the spread of disease."

With the development of industry, the environment we live in resembles ever less that to which we have been adapted by our evolution. We are forced to live in massive industrial conurbations which bear little resemblance to the natural environment in which we evolved. We live in nuclear families, often truncated ones at that, in a vast atomised society, if indeed we can dignify it with this term — that bears no resemblance to the extended families and other cohesive social groupings within which we have lived over the last few million years. We eat food that is grown by unnatural processes, that make use of a host of chemical substances,

hormones, antibiotics, pesticides including insecticides, herbicides, nematocides, fungicides, rodenticides etc. of which residues are to be found in all commercially available food today. Our food is then processed in vast factories with the result that its molecular architecture is often totally different from that which we have been adapted to eat during the course of our evolution and it is further contaminated with thousands of other chemicals, emulsifiers, preservatives, anti-oxidants etc. designed to impart to it those qualities required to increase shelf-life and otherwise improve its commercial viability. We drink water contaminated with heavy metals and synthetic organic chemicals including pesticides which no commercial sewerage works or water purification plants can effectively remove.¹¹ We breathe air that is polluted with lead from petrol, asbestos particles from brake linings, carbon-monoxide and nitrogen-oxides from car exhausts, sulphur-dioxide from chimney flues, plutonium from nuclear tests, and a host of other radionuclides from the flues of nuclear installations.

It is not surprising that in these conditions we should suffer from a whole new range of diseases which among primitive peoples who lived in their natural habitat were conspicuous by their absence nor that the incidence of these diseases should vary as it does in direct proportion with GNP i.e. with the extent to which our environment has diverted from the norm. It is these that are now referred to as the 'diseases of civilisation.'

It is difficult to avoid concluding that the pattern of diseases we suffer from today is the direct result of a host of changes brought to our environment as, with increasing development and industrialisation, it is made to divert ever more radically from that to which we have been adapted by our evolution and which, as we have seen is the most favourable to the maintenance of our health. Stephen Boyden¹² has formulated this principle very clearly. "The important corollary to Darwinian theory that I wish to stress has not been given a name" he writes "I shall refer to it here as the principle of phylo-genetic maladjustment." According to this principle, if the conditions of life of an animal deviate from those which prevailed in the environment in which the species evolved, the likelihood is that the animal will be less well suited to the new conditions than to those to which it has become genetically adapted through natural selection and consequently some signs of maladjustment may be anticipated. Obvious though this principle is, and obvious though it's importance, it is seldom referred to in the literature, and consequently its significance seems to have been largely overlooked. Although highly pertinent to the study of health and disease in mankind, I have not seen the principle mentioned in any of the standard textbooks of medicine. I have come across only two clear statements of the principle in the medical literature — one in the introduction to *The Saccharine Disease* by Cleave and Campbell (1966) and the other in *Man's Presumptuous Brain* by Simeons (1960).

The term 'phylogenetic maladjustment' (the maladjustment is phylogenetic because it represents a characteristic response of the species to the changed environmental circumstances.) then, specifically refers

to disorders which represent the reactions of organisms to conditions of life which differ from those to which the species has become genetically adapted in evolution through the processes of natural selection. This principle relates not only to environmental changes of a physiochemical or material nature, such as changes in the quality of food or air, but also to various non-material environmental influences, such as certain social pressures which may affect behaviour. Furthermore, signs of phylogenetic maladjustment may be physiological, behavioural or both.

We can easily think of countless examples of the principles of phylogenetic maladjustment operating in homo sapiens. The traditional 'scourges' of mankind, such as plague and typhus and the great deficiency diseases such as scurvy, beriberi, pellagra and kwashiorkor are all straightforward examples of the principle. An examination of reports on the reasons why patients visit their physicians in the most developed countries in Western society today¹³ shows clearly that the majority of the disorders of which they complain fit into this category, and are 'diseases of civilisation', in the sense that they would have been rare or non-existent in primeval society (e.g. virus infections of the respiratory and alimentary tracts, peptic ulcers, cardiovascular diseases, obesity, diabetes and probably much psychoneurosis).

If we have lost sight of this inescapable fact, it is above all that its implications are so far-reaching. Among other things *it makes nonsense of the very idea of progress*, which we have identified with development and indeed with industrialisation — the last phase of development, which consists in bringing about, as systematically and as rapidly as possible, in the name of improving the welfare of mankind, those changes that, by their very nature, *must cause our environment to divert as much as possible from that to which we have been adapted by our evolution.*

Treating the Whole rather than the Part

The biosphere is organised hierarchically. Each system is made up of sub-systems and sub-sub-systems and is itself part of a larger system. Thus a man is made up of tissues and organs, in turn composed of cells, molecules, atoms, etc. and he is himself part of a family, community and an ecosystem. This means that a system's environment is provided by the larger systems of which it is part, while it in turn provides its sub-systems with their environments.

Seen somewhat differently, a system's 'external' environment is the 'internal' environment of the larger system of which it is part and its 'internal' environment is the 'external' environment of the systems of which it is composed. Since, as we have seen, for a system to be healthy its internal and external environments must also be healthy, it must follow that the health of a system can only be assured if that of all the other systems, that make up the hierarchy of the ecosphere, is also assured.

Unfortunately modern medical science is only concerned with the effect on man's health or deficiencies in *his internal environment*. Deficiencies in the external environment are regarded as irrelevant and are usually not even recognised as such. In any case our health

practitioners do not have the expertise to treat such deficiencies nor is to do so regarded as falling within their very limited brief. *Yet there is every reason to believe that the only effective health services must be those that do precisely this — that concentrate on correcting divergences from the optimum external environment so as to assure that external conditions are those most favourable to the maintenance of our health.* There are three reasons why this must be so. Let us briefly consider them.

Order

The first is that the ecosphere and its component sub-systems display order which is another way of saying that it is not just made up of random parts but of parts that are highly organised. This order or organisation exists because the parts are under the control of the system as a whole. They are subject to that set of constraints required to assure the stability of the systems that compose them and of those of which they in turn are part.

If a system ceases to function properly, this must thereby indicate that it is no longer under the control of the larger systems of which it is part. Its behaviour has become random. This must mean that something has gone wrong with the larger system of which it is part and, in such conditions, the adaptive response must be to restore its proper functioning so that it once more becomes capable of exerting effective control over its component parts.

Of course such a correction will not eliminate all diversions from the optimum and hence, at a biological level, all disease. It will only reduce its incidence to that level which is consistent with the maintenance of eco-spheric stability.

Disease, let us not forget, is part of the strategy of nature. It is but a means of applying quantitative and qualitative controls on populations of living things and thereby preserving their structure and viability. Indeed much of the disease-load of modern society can be attributed to the fact, that in the disintegrated society and artificial environment in which we live, natural selection has been temporarily relaxed.

This point is made very clearly by Boyden¹²: "It is worth emphasising" he writes "that one of the most significant influences of civilisation on the biology of mankind has been the removal of 'optimal health' as a prerequisite for individual survival and reproductive success. In the evolutionary environment, survival and reproductive success were dependent on superb physical fitness, acuity of vision and hearing, absence of debilitating or painful illness, mental alertness, a good memory and a state of mind which permitted, when necessary, concentration, patience and a willingness to co-operate with others. None of these attributes is necessary for the individual's survival and reproduction in the protective environment of modern society, although, clearly, many of them are important in relation to life enjoyment. This molly-coddling influence of civilisation has been referred to as 'pseudoadaptation' because, while it mimics true adaptation by allowing the survival and multiplication of human populations under changed environmental conditions, it differs from true adaptation in that it does not involve any

active response on the part of the individual or of society, and consequently the forms of maladjustment are permitted to persist indefinitely."

Natural selection, of course, does not only occur at the level of a population, it occurs at all levels. Professor Bryn Bridges¹⁴ of the MRC Cell Mutation Unit at Sussex University points out, that in a healthy body, cells damaged by exposure to chemicals tend to be effectively eliminated. If we consider the thousands of carcinogenic chemicals which we are now daily exposed to in the food we eat, the water we drink and the air we breathe, there would be very many more cases of cancer than there already are. Sir McFarlane Burnett points out that exposure to a carcinogen is usually not sufficient to give rise to cancer. The body's immunisation mechanisms, which would normally enable it to eliminate damaged cells or an incipient tumour must also be eroded by stress or by the action of chemicals.

If health services were directed at restoring the proper functioning of a social system, not only would the beneficial effect of natural selection be restored, but cultural controls would prevent people from systematically releasing vast quantities of carcinogenic chemicals into the environment.

Indeed so long as effective social controls are not set up to prevent such irresponsible behaviour, other efforts to maintain health must be in vain.

Enabling the Body to Heal itself

There is a second reason for treating the whole rather than the part. It is that the higher the level of organisation at which a disease is treated *the smaller need be the human intervention — the more the healing process can be assured by the self-regulating mechanisms of nature.*

It must be noted that the most successful treatments provided by modern medical science are those that seek to create the optimum conditions within which the healing process can occur on its own. When a surgeon stitches up a wound for instance or sets a broken bone, this is all that he is doing. *Science is incapable of replicating the biological healing process that has evolved as a result of millions of years of evolutionary research and development.*

Nor can science replicate the social healing process. It cannot transform delinquents, criminals, vandals, drug-addicts who are basically the products of a disintegrated family and community into normal well adjusted adults. The reason is again the same. *There is no way of artificially replicating the socialisation process.* All that can be done is to try to recreate conditions which must lead to the development of healthy families and communities within which the incidence of social deviance will be reduced to a minimum, though of course never altogether eliminated.

Logistics

The third reason why one must treat the whole and not the part, is that once the whole has disintegrated beyond a certain point, to treat its random parts in a routine and systematic way presents insuperable logistical problems. To treat the vast mass of people who must inevitably fall sick in the increasingly unhealthy environment of a modern industrial society is already a

very daunting task. Many general practitioners in the United Kingdom see as many as a hundred patients a day. Studies have shown that the average doctor on the National Health Service writes up to one prescription every six minutes. In such conditions there is no way in which he can accurately diagnose the 'causes' of his patient's complaint. All he can do is to dish out biologically active drugs such as antibiotics and cortico-steroids which are likely to have some immediately noticeable effect, hopefully eliminating his patient's symptoms even though, in the long run, they may prolong the course of the disease and give rise to all sorts of side-effects.

At the same time, and in spite of the vast sums of money spent on new hospitals in the last thirty years, these are still incapable of accommodating the increasing number of people who are considered to require hospitalisation, and there is today a permanent waiting list of some six hundred thousand people.

With the inevitable economic decline that faces us today, ever less money is likely to be available for health services and we shall eventually have to face the inescapable fact that, it is, financially and hence logistically, unfeasible to treat disease at an individual level rather than at that of the society and ecosystem whose degradation is its real cause.

What is more, it is not only ill-health that must be dealt with in this way. None of the basic problems that confront our society today, can be solved by themselves without bringing about the most radical changes to the society we live in. Take agriculture. There is no sound agricultural policy that could be introduced without changing all the basic features of our industrial society. That we need smaller farms, that they should be more labour-intensive, that they should be geared to polyculture as opposed to monoculture, that they should be based on sound rotational methods rather than on growing the same crop on the same land year after year, all this we know to be true. But to achieve this goal is impossible in our society as it is structured today, and in which everything militates to encourage precisely that form of agriculture that is the least desirable on biological, social and ecological grounds. Indeed, for it to be possible to reintroduce sound agricultural practices, almost *everything within our society must change including family and social structures, life-styles, education, values, fiscal policies, food distribution networks and international trade.*

Of course, none of these changes are regarded as conceivable; nor of course would be the suggestion, that a Minister of Health, let alone a mere health practitioner, should be able to change the structure of society and its natural environment as the only means of solving the health problems of individual people.

But is such a suggestion all that inconceivable? It undoubtedly is if we consider the problem in the context of today's industrial society. If we view it in the light of man's total experience on this planet however, it is far from inconceivable. On the contrary in primitive societies, and let us not forget that over 95 per cent of all people have lived in such societies, health was assured in just this manner. Health practitioners (Shamans, diviners, etc) maintained the health of their

fellow tribesmen by influencing them to act in that way which maintained their human and non-human environment in the state which most favoured the maintenance of health. Let us briefly see how this was done. As we have seen, society's behaviour pattern is based on a particular model of its relationship to its environment which is usually referred to as its world-view. The world-view of a tribal society is formulated in a language with which few of us are conversant, that of mythology and it is thereby peopled with spirits. These are not organised in a random manner, however, but in such a way that the model they constitute reflects man's relationship with his human and non-human environment, on the basis of which, adaptive responses can be mediated.

The spirits can be divided into three broad categories: The first are the ancestral spirits. These have still retained their social identity and are thereby still seen as members of their respective family, lineage group, tribe and society. In this way their organisation reflects, with extraordinary precision, that of their descendants, and serves to sanctify their social structure and hence to preserve it. Secondly there are the spirits of nature. All plants, animals and even physical things, such as rocks and streams are regarded as imbued with spirits. This also serves to preserve them or at least to reduce the impact on them of man's otherwise destructive activities. As is now reasonably well known, primitive hunters, before killing an animal, first prayed to its spirit to ask for forgiveness for what they were about to do, explaining that they did so only because they had to. Alternatively they obtained permission to do so from the Nature God whose function it was to protect wild animals from man's depredations. The totemic system, whereby a particular clan identified itself with a particular animal, also assured that at least, in this clan's territory, it was regarded as holy and thereby remained unmolested.

For each significant constituent of society and its non-human environment to be represented by spirits is to sanctify them. *To sanctify something is the only cultural device that has ever succeeded in preserving it*, a fact that is only too easy to verify empirically in the light of the pathetic failure of just about all the efforts of conservationists to preserve our now desanctified society and its environment from our increasingly destructive activities.

A society, however, is not alone in its non-human environment. It is surrounded by other, often hostile, social groups. In addition a society does not always display the ideal degree of order. Not all behaviour within it is under control. In other words, it displays some measure of randomness, and thereby contains some anti-social elements. Such elements, together with neighbouring hostile tribes are represented by the third category, namely the evil spirits and witches.

In this way a primitive man is in possession of a model that clearly presents his relationship with those components of human and non-human environment, which he must be capable of dealing with adaptively, if he is to survive.

It is to be noted that the world is not seen as composed of spirits in the way in which scientists see the world as being composed of molecules and atoms.

Primitive man does not have a *reductionist view* of the world. The spirits rather than be components of the ecosphere are seen on the contrary as being organised in such a way as to *reflect its truly hierarchical nature*. They represent it at every level of organisation not just the lowest one as the scientific model does.

It is thereby not surprising that primitive people have a very much more realistic view of causality than do our scientists. An event such as a disease is interpreted or simulated as cyberneticians would say, in the light of a highly complex model or world-view. This could not be in starker contrast to the incredibly naive view of cause-and-effect entertained by science today, in terms of which an event is seen as being triggered off by a single antecedent event rather than being the result of a very complex spatio-temporal pattern of events.

A further advantage of the primitive world-view is that the inter-relationships that are seen to exist between the different spirits who control society, its enemies and its natural environment, are closely established by tradition and carefully explained in terms of its mythology. What is more, such inter-relationships are constantly brought home to people in songs and other ritual activities. Thus among the Canelos Quichua Indians of Ecuador as Whitten¹⁵ tells us "Playing flutes, singing songs and telling myths punctuates discussion of Amasanga (who controls the weather, the thunder and the lightning), Nungui, (who controls the soil-base for the roots of garden-life and pottery clay) and Sanghui (who controls water). These activities, he tells us, "are, among other things, mechanisms for associational, or analogic linking of cosmological, and ecosystem knowledge to social rules and breaches, and social dynamics to cosmological premises."

In this respect, the primitive model is also in stark contrast with the scientific model. Rather than be divided up into watertight disciplines between which inter-relationships are almost impossible to establish; it is on the contrary totally *non-disciplinary* which, in terms of cybernetic theory, is required if the model is to be capable of mediating an *integrated behaviour pattern* as opposed to that *mere patchwork of expedients* that is the policy of a modern nation state.

It is to be noted that the primitive model is formulated in a language which all can understand and whose relevance is drummed home to all during the course of their education and of their ritual life. This too is in stark contrast with the scientific world-view, which we so highly prize and which, on the contrary, is formulated in an esoteric tongue which only a handful of specialists can really understand. This is of particular importance if we consider that stability implies self-regulation. It is cybernetically impossible for a natural system to be governed from the outside, for its goal would thereby be *random to it* and, hence, to the ecosphere of which it is an integral part, and would simply reflect that of the external agencies that were doing the controlling, as it does in our industrial society today. For a system to be self-regulating means, above all, that the behaviour of each sub-system must be subjected to the control of the system as a whole, and this is only possible if all the parts of the system both use and understand the same language i.e. if the language in

terms of which their world-view is formulated is '*demotic*' rather than '*hieratic*'.¹⁶

How then are discontinuities interpreted? In terms of the world-view of primitive peoples, any discontinuity such as the outbreak of a disease, is regarded as being caused by the action of spirits. Sometimes it is seen as being caused by the evil spirits that reside in witches or other anti-social elements, or else they are seen as punishments meted out by the ancestral spirits or the spirits of nature for failure to observe the ritual law and in particular for violating a taboo which in some cases is also seen as increasing vulnerability to witches. A typical example is that of the view of disease entertained by the Luo of East Africa. Among them as Whisson¹⁷ tells us "sickness is believed to be caused by spirits falling into different categories, the most current being the spirits of the parents or grandparents (*vadzimu*) — spirit elders or ancestral spirits and the witches (*muroi*) (*vadzimu* are more often considered responsible for sickness and death than the *muroi* — about twice as often according to my experience). While the intervention of the ancestors might be capricious, the diseases ascribed to them or to God were usually felt to be punishments for the sins of the patients or their families. A man who broke a tribal rule might expect to be punished for it by the ancestors or by God in the form of disease. Any man attacked by disease would therefore feel obliged to examine himself and his relationships with the ancestors. A very minor organic disorder — like several days of constipation — might create a considerable overlay of fear or guilt and reduce the patient to helplessness until the rituals were performed and the ancestors propitiated according to the traditions of the society and the directions of the diviner."

In the Old Testament we will recall that a natural disaster whether a famine, an earthquake, an epidemic or an invasion by the Philistines was almost invariably attributed to failure on the part of the Jews to worship Jahveh in the correct manner, worse still to worship a rival Baal.

**If the behaviour pattern that their
gods imposed was adaptive, then, if
diseases occurred, it was that they
had sinned.**

The tendency of one brought up on the modern scientific values is to scoff at such a diagnosis, it is 'unscientific' and hence, in terms of our world-view 'irrational', but let us look at it a little more closely. The rules that govern the behaviour of a primitive society are justified in terms of its mythology and imposed by public opinion, the Counsel of Elders and the ancestral spirits, are not of a purely random nature. They can in fact be shown to be *highly adaptive*.

In empirical terms this thesis is unassailable since tribal societies in particular hunter-gatherer groups, have been able to achieve an unparalleled degree of stability within their natural environment in which they could have survived and indeed thrived almost indefin-

Oxford University Press

What is Ecology?

Denis Owen

Ecology has become a household word, even the name of a political party, but many people are still unsure of its precise meaning. In this new edition of his book, Denis Owen explains the term and its relevance to our changing world. He discusses important events which have had a drastic effect upon our environment, for example Dutch elm disease and the oil tanker disasters. The book contains many new photographs, and constitutes an up-to-date explanation of ecology for students and general readers. Second edition illustrated £6.50 paper covers £3.50 OPUS.

Rabies and Wildlife

D.W. Macdonald

Rabies concerns everyone who cares about wildlife and about people. This book explains the history of the disease, how and where it has spread, and what steps have been taken to eradicate it. The author believes that wildlife management problems should be tackled only on the basis of a thorough understanding of the behaviour of the species involved: he describes what is known and what is not known about the behaviour of species that spread rabies, examines rabies control schemes that have failed, and looks to new hopes for the future, such as oral vaccination of wild foxes. Illustrated £6.95 paper covers £2.95 published in association with Earth Resources Research.

The Environment

From Surplus to Scarcity

Allan Schnaiberg

The main concern of this book is the environmental degradation created by the social organisation of advanced industrial societies. It addresses such questions as how the social organisation of these societies disguises environmental abuse, how it responds to attempts to raise ecological issues, why people have become complacent about the environment, and why scientists have failed to inform the public about environmental problems. Paper covers £6.75.

itely if their life styles had not been interfered with and their environment annihilated by western man. This being so, failure to observe traditional rules, the breaking of a taboo, indeed sinning in general, can only be construed as a violation of precisely that set of laws that assures a society's success indeed its survival. To sin is thereby to behave in that way which, in these conditions, must lead to the destabilisation of the natural systems that make up the ecosphere and such destabilisation can only give rise to all sorts of discontinuities of which diseases are but one. This being so the primitive diagnosis, however quaint the language in which it is formulated may be, is in fact correct. If the behaviour pattern that their gods imposed was adaptive, then, if diseases occurred, it *was* that they had sinned.

Methods of dealing with Discontinuities

If a disease like any other discontinuity is due to a biological, social or ecological diversion from the optimum, then the solution can only be to restore the optimum. If it has been caused by a witch then the activity of the witch must be neutralised, so as to reduce tensions and, at the same time, to reduce those anti-social activities in which a witch may possibly indulge. If the disease is seen as being caused by violating a taboo then the violator must make amends. In particular, he must make the appropriate sacrifices to his ancestral spirits, fulfil his various ritual obligations to his kin, cease killing wild animals over and above those that he is ritually entitled to kill and otherwise refrain from doing things which can impair the proper functioning of his social group within its specific environment. Individuals as such are also treated. For instance herbs and other traditional medicines may be administered as part of a ceremony and these may often prove effective. *But to cure the individual is not the prime object of the treatment.* It can even be regarded as a mere 'spin-off.' The real role of the treatment is not to restore the biological or psychological stability of the person affected but to *restore the proper functioning of the biological, social and ecological systems whose disruption is the real cause of his problem.*

This is the conclusion of Victor Turner¹⁸ with regards to the Ndembu. "It seems" he writes "that the Ndembu 'doctor' sees his task less as curing an individual patient than as *remedying the ills of a corporate group.* The sickness of a patient is mainly a *sign that 'something is rotten' in the corporate body.* The patient will not get better until all the tensions and aggressions in the group's interrelations have been brought to light and exposed to ritual treatment. I have shown how complex these interrelations can be and how conflicts in one social dimension may reverberate through others. The doctor's task is to tap the various streams of affect associated with these conflicts and with the social and interpersonal disputes in which they are manifested — and to channel them in a socially positive direction. The raw energies of conflict are thus domesticated in the service of the traditional social order."

It is also true of the Tukano Indians of Colombia. Among these people as Professor Reichel Dolmatoff points out, a shaman does not diagnose a disease in biological terms as would do a reductionist scientist, but,

in effect, as an ecological imbalance. "His main concern" Reichel Dolmatoff writes "is about the relationship between society and the super-natural Master of Game, fish and wild fruits, on whom depend success in harvesting and who command many pathogenic agents. To the shaman it is therefore of the essence to diagnose correctly the causes of the illness, to identify the exact quality of the inadequate relationship (be it adultery, overhunting, or any other over-indulgence or waste), and then to redress the balance by communicating with the spirits and by establishing reconciliatory contacts with the game animals. In this way the shaman as a healer of illness does not so much interfere on the individual level, *but operates on the level of those supra-individual structures that have been disturbed by the person.* To be effective, he has to apply his treatment to the disturbed part of the ecosystem. It might be said then that a Tukano shaman does not have individual patients: *his task is to cure a social malfunctioning.* The diseased organism of the patient is secondary in importance and will be treated eventually, both empirically and ritually, *but what really counts is the re-establishment of the rules that will avoid overhunting, the depletion of certain plant resources, and unchecked population increase. The shaman becomes thus a truly powerful force in the control and management of resources.*"

Primitive man, by diagnosing diseases as the symptoms of ecospheric maladjustment, brings about those changes that will put his society back on its correct course and reduce the incidence of diseases.

In this way, primitive man, by correctly diagnosing diseases as the symptoms of ecological maladjustment, whether at the level of the family, community or the ecosystem, brings about those changes that will put his society back on its correct course: that which will assure the systematic reduction of the incidence of diseases.

It is essential to realise that it is not just diseases but all discontinuities that are interpreted in this way. Droughts and floods and military reversals as already intimated, are also seen as signs of ecospheric instability, and all give rise to the rituals required to restore this stability. This thesis has so far been most forcefully put by Roy Rappaport in his study of the Tsembaga of New Guinea.²⁰ "the operation of rituals among Tsembaga and other Maring" he writes "helps to maintain an undegraded environment, limits fighting to frequencies which do not endanger the existence of the regional populations, adjusts man land ratios, facilitates trade, distributes local surpluses of pig throughout the regional population in the form of pork and assures people of high quality protein when they are most in need of it."

As I have already pointed out, this self-regulation requires the concentrated action of the whole social system. All its parts must contribute actively. Each individual must be actively involved in the rituals that will assure his society stability.

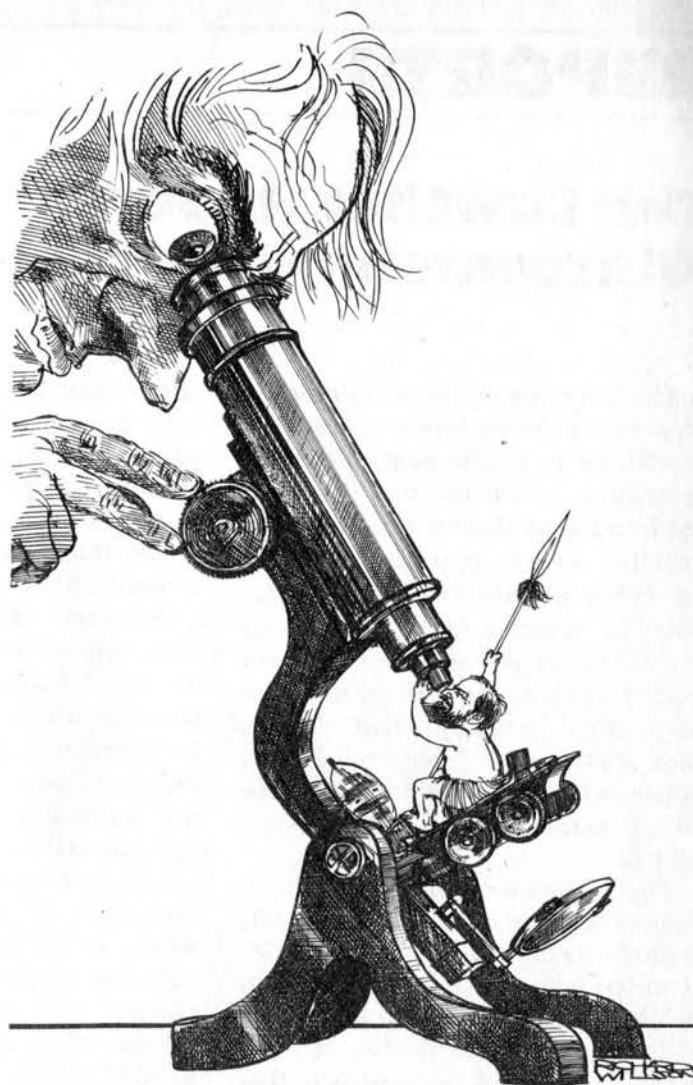
Our modern industrial society cannot function in this way because it has disintegrated into a mass of unrelated and alienated individuals who do not have the capacity to take a real hand in the running of their affairs. In this way we have become totally dependent on external agents of control. At the same time our society is so structured that it is impossible to treat a disease at any level higher than that of the individual. Experts in different fields, reared on the specialist knowledge contained within the watertight disciplines into which modern knowledge has been divided, are employed to fulfil carefully defined tasks. Each specialist has a *limited brief*, he cannot venture outside of what is considered his legitimate field of activity without stepping on someone else's toes, without venturing on to territory over which some other specialist holds sway. Not only does the medical profession have a limited brief but so does the Minister of Health himself. The Minister's territory is well defined. He can order the building of more hospitals, subsidize the production of more pharmaceutical preparations, encourage the recruiting of more doctors and nurses. He can also bring about certain changes to the organisation of his departments, but that is about all. Even if he were made to understand that the clinical symptoms displayed by individuals are but the symptoms of a disease that is afflicting society and the ecosystem of which they are part, that modern medicine can do no more than mask the symptoms of the disease and can in no way cure the disease itself, and that, so long as a society continues to industrialise, the disease can only continue to spread unchecked, he still could not bring about those changes to the health services that he directs that could conceivably make them any more effective. All he could do, if he wished to put his conscience at rest, would be to resign.

It is difficult to see how this state of affairs can possibly be remedied. Our whole society is committed to a course — that of further development and industrialisation — that can only exacerbate all the basic problems that confront it, including the growing ill-health of its members. In the long-run of course, the problem will be solved, for conditions are becoming ever less propitious to the industrial process, so much so that we are faced in the not too distant future with inevitable socio-economic collapse. It is only then that our health can take a turn for the better for out of the ruins of our industrial society we can hope to see emerge smaller, more de-centralised societies that might eventually develop the capacity for cultural self-regulation and thereby create conditions that are more favourable to the maintenance of human health and that of the other forms of life that may have survived the industrial holocaust.

References:

1. John Powles, The Medicine of Industrial Man. *The Ecologist*. Vol. 2 no. 10 October 1972.
2. R Logan, quoted in: A Malleson, *Need your Doctor be so useless?* London, Allen & Unwin, 1973.
3. A Malleson, *Need your Doctor be so useless?* London, Allen & Unwin, 1973.
4. Ross Hume Hall, personal communication.
5. C H Waddington, *The Strategy of the Genes*. London, Allen & Unwin, 1957.

6. J Ralph Audy, *Measurement and Diagnosis of Health*. In: P Shepherd and D McKinley (eds.) *Environ/Mental* — Houghton Mifflin, Boston, 1971.
7. W R Day, *Environment and Disease. A discussion on the Parasitism of Armillaria mellea*. *Forestry* vol. 3, 1929.
8. Sherwood L Washburn and C S Lancaster, *The Evolution of Hunting. Man the Hunter*. Lee and DeVore, Aldine Publishing Co., Illinois, 1968.
9. C C Hughes and J M Hunter, *Development and Disease in Africa*. *The Ecologist* vol. 2 nos. 9 and 10, September and October 1972.
10. WHO Chronicle 1973.
11. M Fielding and R F Packham, *Organic compounds in drinking water and public health*. *The Ecologist Quarterly*, Summer 1978.
12. Stephen Boyden, *Evolution and Health*, *The Ecologist*, vol. 3 no. 8, August 1973.
13. W P D Logan and A A Cushion *Morbidity Statistics from General Practices*. General Register Office Studies on Medical and Population Subjects No. 14 (Great Britain), H.M.S.O. London, 1958.
14. Bryn Bridges, personal communication.
15. N E Whitten, Jr., *Ecological Imagery and Cultural Adaptability: The Canelos Quichua of Eastern Ecuador*. *American Anthropologist*. vol. 80 no. 4, December 1978.
16. Ken Penney of Exeter University has suggested the use of these terms in this context.
17. Michael Whisson, *Some Aspects of Functional Disorders among the Kenyan Luo*. In: Ari Kiev (ed.) *Magic, Faith and Healing*, New York, The Free Press, 1967.
18. Victor Turner, *A Ndembu Doctor in Practice*. In: Ari Kiev (ed.) *Magic, Faith and Healing*, New York, The Free Press, 1967.
19. G Reichel Dolmatoff, *Cosmology as Ecological Analysis. A View from the Rain Forest*. *The Ecologist*, vol. 7 no. 1 January/February, 1977.
20. Roy A Rappaport, *Ecology, Meaning, and Religion*. North Atlantic Books, Richmond, California, 1979.



Daddy
what's an oak
tree?

Only a few generations ago Britain was much more densely covered with woodland than it is today.

One day our native trees may appear only in picture books. Will future generations have to ask questions about the native woods we now take for granted?

Millions of trees have already been destroyed either through disease

or drought or to make way for the ever increasing demands of man.

Now you can help to prevent the destruction of our countryside.

Join the Woodland Trust today by sending £5 for one year's membership, or £50 for life membership. Your subscription will be used to help purchase and care for endangered woods.

Act now. Your children have a right to the woodland we take for granted.

the woodland trust
Ivybridge, Devon PL21 0JQ

Yes! I want to help preserve our countryside for future generations.

Please enrol me for Annual Membership at £5 or more ☐ Life Membership at £50 or more ☐

£1 will be used to plant a tree in your name. And the remaining amount to help purchase new land and to preserve existing woodland.

Mr./Mrs./Miss* (Block letters please)

Address.....

I enclose cheque/P.O.* for £..... * Delete as appropriate. Coupon Code 3H

To: The Woodland Trust, Ivybridge, Devon PL21 0JQ

Don't delay. Help us to save our woodland heritage. Today. Reg. Charity No. 264781

FOR THE GOOD THAT I WOULD I DO NOT BUT THE EVIL THAT I WOULD NOT THAT I DO

The shifting chaos of world problems seems almost beyond solution, but practical changes of real benefit are possible where there is a corresponding inward change towards self realisation.

The ancient wisdom philosophy contained in Theosophical teachings enables all sincere inquirers to obtain greater self knowledge and knowledge of nature's many inner laws and processes.

To this end we provide a helpful range of books, study courses, and library facilities. *Public lectures* are held on Sundays at 7 p.m. in friendly and pleasant surroundings.

For further information please write enclosing s.a.e. or telephone to:

The Information Officer,
The Theosophical Society,
50 Gloucester Place,
London, W1H 3HJ.
01 935 9261.

REPORTS

The Lawther Report: Whitewashing Leaded Petrol

The Government is maintaining its view that existing levels of lead are no danger to public health, despite increasing evidence that the ten thousand tons thrown out by motor vehicles every year is seriously impairing aspects of child development in urban areas. There are at present no plans for reducing petrol lead emissions, and we now have the paradoxical situation that British cars continue to "require" leaded petrol, while cars built for export are being made to run on lead-free petrol.

The Lawther Working Party Report on Lead in the Environment, commissioned by the DOE in 1978, reported last April, finding "no firm evidence" that lead from petrol was a danger to public health. It even managed to find no evidence that petrol lead was affecting the concentration of lead in food: "Normally food is the major source (of lead)" it concluded, "and we have seen no evidence that this is substantially enhanced by contamination of air-borne lead".

Professor Lawther, chairman of the Working Party, was formerly Director of the MRC Air Pollution Research Unit. It is not unfair to point out that in this capacity he could always be relied upon to give the assurance that existing levels of air pollutants were no danger to public health. In a country which continues to maintain a higher incidence of deaths from chronic lung disease than any other nation in the world, such an expert was very valuable; and therefore, some would say, clearly the right person to ask to form this Working Party.

Political factors have played an alarmingly dominant role throughout the lead debate. Government and petrochemical industry experts have appeared if not arm in arm at least saying remarkably similar things. Of course the DOE is concerned not to alarm the public unnecessarily, but

after it has reassured us that lead is safe, can it backtrack? Could it ever admit to having condoned the chronic poisoning of children? Thus a degree of political commitment enters into what should be a purely scientific debate.

Scientists are trained to be cautious and conservative in their judgments. "Alarmist" sounding conclusions which do not appear well founded are likely to mean withdrawal of promotion prospects. They are trained in one narrow field of specialisation, and therefore when confronted with the immensely complex field of research on how lead works in the human organism are liable to advise that no definite conclusion can be reached, and, of course, that "further research is needed". Now this caution may be very commendable from a purely scientific viewpoint but, when presented by medical experts to politicians it assumes a different significance. To politicians the negative statement, "We have no definite evidence that lead is harmful to health" — which is in fact the kind of assurance which environment ministers have received from Medical Research Council experts over the years — sounds like a positive assurance that existing lead levels in the environment are quite harmless.

Lead is one of the most poisonous substances known to man. Its toxic dose is measured in thousandths of a gram, and the maximum level now permitted in foodstuffs is *one part per million*. (For baby foods it is lower, 0.2 parts per million.) Its concentration in city dust is far higher than this, normally between 1,000-10,000 parts per million. Not surprisingly, an investigation by a University College of Wales team last year found that crops grown in the inner London area had above the permitted level and so were unfit to eat.¹ Why was it left to a Welsh



Roger Mayne

Lead poisoning in children is not reversible

university study to find this out? Should not the DOE have given this important warning to city dwellers?

Lead pumped into the air settles as dust and most of our daily lead may not come directly from inhaled air, but from food and drink. The extent to which lead from traffic may or may not filter into food is not at all easy to determine. In 1971 the Medical Research Council (ie Lawther) advised the then environment minister Peter Walker that if lead were removed from petrol a net reduction of our daily lead intake of seven per cent could be expected, and this figure was widely quoted. Where the remaining ninety three per cent was supposed to come from was not specified. The Working Party's report has slightly increased this figure, estimating petrol lead as providing between ten and twenty per cent of our total daily lead.

This view may be compared with a

study of lead pathways in a natural ecosystem carried out at the California Institute of Technology.² It investigated the contribution of airborne lead (over 90% of which comes from petrol) in plants and animals in Yosemite National Park, this being several hundred miles from the nearest city. A specially contamination-free laboratory was used to measure the very low concentrations involved, designed for the analysis of lunar materials. Using isotope studies and also the lead/calcium ratio it was found that in this remote primitive area airborne lead comprised 50% of lead in the soil humus and 95% of the lead in animals. The amount of industrial lead added to the ecosystem each year was 30 times larger than the total amount of lead passing along the food chains each year. It was further estimated that lead body burdens of average persons in the U.S. were more than 100 times above natural levels.

Normally when a new chemical is introduced to our environment it is required that it first be demonstrated to be safe in the concentration used. But with lead the situation has been very different. It has first been added in a fairly permanent manner to our environment, over many decades, and then much later investigated as to whether it is acting as a poison to children. Government research has been conspicuously not directed towards carrying out such investigations but rather to criticising or dismissing them.

Can a safe level of lead be defined? The problem here is that lead is the one pollutant whose normal levels in man approach and can overlap those at which toxic effects begin to be noted. Medical experts dispute whether symptoms of lead poisoning begin in adults at 0.4 or 0.8 parts per million, and in children at 0.2 or 0.3 parts per million. Sensitivity to lead poisoning varies very widely between individuals.

Astonishingly, the Working Party recommends that blood lead concentrations below 0.35 parts per million are quite harmless. This apparently includes children as well as adults. This should be compared with the standards established last year by the U.S. Occupational Safety and Health Administration: it has established approximately 0.4 parts per

million blood lead as the maximum safe level it permits for workers. Thus one has two different recommendations for much the same value: one finding concentrations above it hazardous and another giving assurance that concentrations below it are perfectly safe! Nothing could better emphasise the fact that lead is the pollutant whose concentrations found in the blood of the man in the street come close to those at which behavioural impairments occur.

The central issue involved concerns the vulnerability of the nervous system of a growing child to ambient lead. If an adult thinks he is system of a growing child to ambient lead. If an adult thinks he is suffering from lead-poisoning (the typical symptoms of which are headache, fatigue, dizziness, irritability and depression) he can move to a different environment and will, in time, recover. The lead stored up in his bone tissue will eventually be replaced by calcium and the blood level will return to normal. But because in a young child the blood-brain barrier is not so well developed as in later life, any lead present in the organism is able to work upon the developing brain. The symptoms are of a rather general nature and difficult to pin down; conditions as diverse as "hyperactivity", "emotional disturbance" and "intelligence retardation" may be involved. In contrast to the effect on adults, lead-poisoning in children is not usually reversible.

Several surveys have shown that groups of disturbed and mentally retarded children have higher blood lead levels than the normal population. To such surveys the standard reply has been that disturbed or retarded children could be more likely to chew lead paint from old buildings or lick their fingers after getting them covered with city dust! Thus the correlation observed need not show a causal link. In the early 70s there was no definite refutation of this view.

When the Birmingham Spaghetti Junction survey results came out indicating a doubling in blood lead levels in those living near the junction, government experts merely objected that two different groups had carried out the measurements before and after the construction of

the motorway. They therefore questioned the reliability of the conclusions. Such scepticism may be commendable in terms of the stringent criteria of scientific research, but it was not very reassuring to parents in the area. Such a radical increase in the blood lead levels hardly agreed with the official view of the extent to which airborne lead contributed to total body lead.

In 1978 a number of investigations altered the framework of the lead debate by providing strong evidence that at levels well below that previously regarded as a safety threshold, a clear negative correlation existed between I.Q. measurement in children and their body lead level. One of these was the German survey by Winneke on school children, which found such a correlation with tooth-lead levels in the range 7-13 microgrammes per gramme. The mean lead level in Birmingham children is 11.8 microgrammes per gramme. Thus the *majority* of Birmingham children evidently had tooth-lead levels within or above the range found by Winneke to be significantly associated with reduced I.Q.

The implications of these surveys, if true, are deeply disturbing. Therefore one needs to inquire whether there is any possibility of an alternative explanation of the data. Motor as well as verbal intelligence measurements were taken by Winneke, which would tend to show if apparent I.Q. underscoring was merely due to class background, this in turn being linked to a higher lead exposure. Also a matched pair technique was used, comparing pairs of children with comparable social backgrounds but with different body-lead content; again to overcome the possibility of varying social backgrounds causing the observed results. Detailed questioning of parents about any history of pica (that is to say, chewing old paintwork) was able to eliminate this as a possible cause. Because lead is stored in bone tissue, this provides a far more reliable guide to total body lead content than blood samples, and this can be conveniently sampled by measuring lead in teeth removed from children. This measure indicates total exposure to lead throughout a lifetime, not merely the level at the time of taking the sample.

The Working Party found the Winneke survey to be a "particularly crucial" investigation, though inconclusive on account of its small sample size. It concluded that there was an "urgent need for independent replication" of such investigations. Will the DOE follow up this recommendation?

In 1977 a study at McGill University, Montreal, took a group of "learning disabled" children and compared their hair lead with that of a control group.³ This control group was matched for age, and social, economic and geographic factors. Fourteen different metals were measured, and lead in the hair of the learning disabled group was found to be between five and six times higher than that of the normal children. This difference was much larger than for any of the other metals. This investigation was dismissed by the Working Party on the grounds that its definition of learning disability was "unacceptable psychometrically". This is a rather frivolous dismissal of a survey indicating massive lead differences between two groups, one educable and the other not.

If the Working Party is adopting such a strictly behaviouristic attitude then one would have expected it to be interested in animal experiments. There have been several surveys showing diminished learning and problem-solving ability in animals correlated with raised blood lead levels at concentrations below that recommended as safe by the Working Party. Why does their Report not mention them? Epidemiological surveys can be criticised on the grounds that their correlations do not demonstrate a causal connection, because of the many variables involved; but with animal experiments it is much easier to argue that a correlation shows a causal connection.

Dr Winneke, working at the Institut für Lufthygiene und Silikoseforschung at Düsseldorf University, gave one group of rats a high-lead diet and then tested their learning ability.⁴ This diet was given to the mothers and then to their offspring, and this latter group tested. The result was decreased problem solving ability and increased restlessness as compared with the control group. This difference in

learning ability was found with blood lead levels in the range 0.2-0.3 parts per million. (Winneke also noted that for easy learning situations the two groups scored equally well, and suggested that this could account for some previous surveys which had failed to find significant differences between high and low lead groups.) This investigation led Winneke on to his human studies already mentioned.

Other animal experiments have shown behavioural learning impairments in sheep at comparable blood lead concentrations. If the Working Party wish to argue that these animal experiments are not relevant to man then one would have liked to hear their reason for this. In the absence of any such reason it would surely be more prudent to assume that they are relevant until shown otherwise.

There is one other recent investigation with conclusions quite as alarming as these I.Q. studies. Professor Bryce-Smith and his colleagues at Reading University measured lead concentration in still-born children and found these to be five to ten times higher than those in live newborn children. Does this mean that lead is actually killing children? Bryce-Smith in his report in *The Lancet* described this effect as "only the tip of the iceberg" and wondered what foetal lead was doing to children who survived birth.⁵ Confirmation of this effect was found by Wibberley, though the elevations in lead level he found in stillborn children were somewhat lower than those found by Bryce-Smith; in addition he found raised levels in malformed children.⁶ As early as 1968 Schroeder had reported raised levels of lead in stillborn fetuses.⁷ Surprisingly, the working Party's report makes no mention of this phenomenon.

In 1978 the Conservation Society Pollution Working Party submitted its report on "Mental Health Effects of Lead on Children", as requested by the Government, to the DOE. Its authors, Bryce-Smith, John Mathews and Robert Stephens, have made out what is, in the view of this writer, the first comprehensive review of the situation to establish beyond any shadow of doubt a chain of causation linking lead from car exhausts to mental health effects on

children. Of the I.Q. surveys here referred to, it concluded "It is scarcely necessary to stress the seriousness of the situation which appears to have developed. The findings, if correct, have economic and social implications so great as to be virtually incalculable". The DOE returned the document without comment. Apparently it was this report which stimulated the DOE to set up its own Working Party.

The Conservation Society report was published in the Swedish journal *Ambio* (Vol VIII, No 6, 1978). Why was the report not published by a journal in this country, where its conclusions are most relevant, but in a Swedish journal whose influence here is minimal?

One cannot expect to put immense quantities of a deadly poisonous substance into the air without adversely affecting the populace. This should be fairly self-evident to anyone, except, seemingly, a government expert. It may not seem a good way of caring for the country's most important investment - its children. In fact Britain is very much behind other countries in making a move to reduce petrol lead. Accordingly the reader may be wondering whether there is some insuperable obstacle involved in converting cars to run on lead-free petrol. The two following quotations may cast some light on the situation. The first comes from the *Ambio* article!

"The 'official' majority line previously endorsed by H M Government is that such a move would be expected to be costly to the motorist and wasteful of petroleum. But the United States companies Standard Oil of Indiana (SOI) and Universal Oil Products (UOP) appear to believe otherwise. SOI has published costings which indicate that there would be a financial saving to the motorist from the use of lead-free petrol. This saving would result from the longer life of the engine, components and lubricating oil on lead-free petrol. Data published by UOP indicates that the difference in petroleum/energy requirements is very small if the energy cost of producing the lead additives is included ... an increase in the average working lifetime of cars consequent upon the introduction of lead-free petrol would be expected to produce sub-

stantial corresponding energy savings in the medium-term, together with savings of other resources consumed during motor vehicle manufacture."

Thus one reason for keeping lead in petrol would appear to be as part of a policy of promoting obsolescence.

The second quotation comes from 'Rational Use of Potentially Scarce Metals', the report of a NATO Science Committee Study Group, published in 1976. Under the heading "Lead" there is a section on Petrol Additives which reads as follows:-

"This major use of lead is totally dissipative, environmentally undesirable, and unnecessary — the lead increases performance rather than efficiency, and engines can be designed to operate efficiently on low-octane lead-free fuel."

The question facing us may be as simple as this: is the performance of our cars, or of our children, more important?

References

1. B.E. Davies, et. al, Lead pollution of London soils: a potential restriction on their use for growing vegetables. *Journal of Agricultural Science*, 1979, 93, 749.
2. C.C. Patterson, 1975 Sierra Studies Report, California Institute of Technology. See also D.M. Settle and C.C. Patterson, Lead in Albacore: Guide to Lead Pollution in Americans, *Science*, 1980, 207, 1167.
3. R.O. Pihl and M. Parkes, Hair Element Content in Learning Disabled Children *Science*, 1977, 198, 204.
4. G. Winneke et al, Neurobehavioral and Systemic Effects of Longterm Blood Lead Elevation in Rats, *Archives of Toxicology*, 1977, 37, 248.
5. D.G. Wiberley et al, *Journal of Medical Genetics*, 1977, 14, 339.
6. D. Bryce-Smith et al, *Lancet*, 1977, i, 1159.
7. H.A. Schroeder and I.H. Tipton, *Archives of Environmental Health*, 1968, 17, 965.

Nick Kollerstrom

2,4,5-T Cover-up by the MAAF

In the debate over the continued use of weedkillers containing 2,4,5-T, one fact has defused the whole controversy — that of the 10,900 tonnes of herbicides used annually in the United Kingdom it is claimed only 3 tonnes of 2,4,5-T is applied.

In March 1979 the Advisory Committee on Pesticides Review of the Safety for Use in the United Kingdom of the Herbicide 2,4,5-T estimated that only about 3 tonnes were used annually in the United Kingdom — about one tonne in forestry, one tonne in agriculture and horticulture and one tonne for all other purposes. Usage is thus barely 0.005 per cent of the amount of active ingredients used for crop protection in the United Kingdom.

Similarly, the Royal Commission on Environmental Pollution's report on Agriculture and Pollution published in September 1979 says that: "It should be noted that there are major differences between the United States (where 2,4,5-T is banned for certain uses) and the United Kingdom in the usage of 2,4,5-T. In the United States about 3,000 tonnes of 2,4,5-T are used every year whereas in the United Kingdom only about 3 tonnes are used."

In the parliamentary debate on 2,4,5-T on 18th December 1979 in the first paragraph of Jerry Wiggin's reply on behalf of the Government he says that, "You may be interested to learn that 2,4,5-T accounts for 0.005 per cent of active ingredients used in crop protection in the United Kingdom."

Clearly the alleged scant use of 2,4,5-T was one of the main reasons for not banning the herbicide. The whole debate was defused and trivialised by this 3 tonne figure.

We have just received information that use of the controversial herbicide 2,4,5-T in the United Kingdom is on a scale at least 20 times and perhaps 100 times that previously admitted by Government bodies.

Concern over the use of the weedkiller 2,4,5-T developed as a result of its widespread use as a defoliant in Vietnam. Our interest springs from the recent campaign by the Agricultural Workers Union to have it banned because of the possible health hazards from its use.

It is self-evident that the 3 tonne figure is a nonsense. 2,4,5-T is a very popular herbicide in forestry. In hedgerow and roadside weed control and on motorway embankments mixtures of 2,4-D and 2,4,5-T are widely used. It is the leading herbicide used by British Rail in its weedkilling and bank control programme.

Whenever you visit a garden centre or the gardening section of a large store you will find at least one and perhaps several weedkillers containing 2,4,5-T. In the British Agrochemicals Association's Directory of Garden Chemicals, of the 43 herbicides listed, three contain 2,4,5-T and one the closely related fenoprop. Of the 15 herbicide/fertiliser mixtures two contain fenoprop. Clearly then 2,4,5-T and its derivatives are popular herbicides.

There are 25 different weedkiller formulations on the market in the United Kingdom containing either 2,4,5-T alone or in combination with another herbicide, usually 2,4-D. Would it make any sense to have 25 products sharing 0.005 per cent of the herbicide market? It would provide less than £4,000 a year of business for each product — not enough to pay one employee let alone the formulation, packaging and marketing of the herbicide!

Clearly the 3 tonne figure was absurd and the true quantities used in the United Kingdom were obviously very much greater.

Over the last few months, we have put down over twenty questions in the House of Commons on the use of 2,4,5-T but have found it extraordinarily difficult to obtain information as to the quantities used in the United Kingdom.

2,4,5-trichlorophenoxy acetic acid is not manufactured in the United Kingdom but is imported mainly from Germany. We have asked repeatedly as to the amounts of these imports and have been told that the information is not available as the substance is not separately distinguished in the Overseas Trade Statistics.

Eventually in April we wrote to the Statistical Office of H.M. Customs and Excise and were given a detailed breakdown of import consignments. They show that over the period 1975-9 total United Kingdom imports of 2,4,5-trichlorophenoxy acetic acid amounted to 677 tonnes and that during 1979 alone 116 tonnes were imported. This is *forty* times the amount quoted by the Advisory Committee on Pesticides. Further, there may well be a good deal more for the figures do not include imports of ester or amine derivatives of 2,4,5-T, imports of the closely related 2,4,5-trichlorophenoxy propionic acid (fenoprop) and its derivatives or imports of formulated products ready for sale containing these herbicides.

We received this information on 7th May but decided not to go to press until we received replies from the dozens of letters we had sent during April to Government departments, industrial companies, organisations and individuals to collate information about 2,4,5-T.

We have just received a very surprising reply from Earl Ferrers, Minister of State at the Ministry of Agriculture, Fisheries and Food. Dated 4th June, he says that, "The British Agrochemicals Association have just obtained for us details of the total supplies of herbicides containing 2,4,5-T which were marketed during 1977-79 for eventual use in the United Kingdom. These were in 1977 about 46 tonnes, in 1978 about 52 tonnes and in 1979 about 58 tonnes of active ingredient."

Suddenly the truth is beginning to emerge. These figures are *twenty* times those quoted by the Advisory Committee on Pesticides — and we believe we are still quite a way from having the full story.

The British Agrochemicals Association attach great importance to the 2,4,5-T question as evidenced by the numerous references in their 1979-80 Annual Report and by the virulent inaugural address of their new Chairman Dr. D.G. Hessayon on 13th May. It is very curious when the product is supposed to be commercially unimportant accounting for no

more than 0.005 per cent of the herbicide market!

We also noted with interest that on 22nd May the Government suddenly announced that the permitted level of 2,3,7,8-tetra-chlorodibenzo-p-dioxin (TCDD) impurity in 2,4,5-T and its derivatives has been reduced from 0.1 to 0.01 parts per million. We very much welcome this decision but find its timing curious. We are also concerned as to the sensitivity of detection of this impurity level and would point out that with a chemical as incredibly potent in its carcinogenicity and genetic damage as is dioxin, the only safe level is an absolute zero.

We have just received replies to a series of parliamentary questions concerning the use of 2,4,5-T by the Forestry Commission and feel very unhappy with them. We have been told that barely one tonne a year is used and that the herbicide is applied to less than 0.1 per cent of the Forestry Commission's land annually. Yet the Forestry Commission spends over £2 million a year on crop protection, enough to purchase several hundred tonnes of weed-killers. In their booklet *Chemical Control of Weeds in the Forest* about one fifth of the text is devoted to the use of 2,4,5-T.

The academic Bible on herbicides is the Weed Control Handbook published by the British Crop Protection Council. In its 1978 edition it points out that in forestry 2,4,5-T is the most commonly used herbicide. The National Farmers Union have gone to great lengths to point out that the amount of 2,4,5-T used in agriculture is very small compared with forestry work.

Yet in a letter from the Forestry Commission, their Chairman, Sir David Montgomery expects us to believe that 2,4,5-T has been applied to only about 1,200 acres a year of their land during the last two years! There would not be the vigorous protests we have heard from forestry workers if that was the scale of its use and there would not be the dozens of serious incidents of deformities and health hazard catalogued in the recently published dossier compiled by the National Union of Agricultural and Allied Workers.

Our experience in rationally trying to determine the facts in this debate raises some fundamental questions about the access to information of a democratically elected representative of the people. We have asked several parliamentary questions

where the information should be available without excessive difficulty. Yet either the Civil Service does not devote sufficient resources to answer questions laid down by Members of Parliament — the total spent annually is only £1 million on Parliamentary Questions — or information is being suppressed.

The Royal Commission on Environmental Pollution reported that, "It is clear that much information is collected about pesticide use in the United Kingdom but we are not convinced that it is sufficient or that it is made available sufficiently freely. We would say that we can see no good reason why data on the quantities of active ingredients manufactured and sold should not be made freely available and we would urge that steps should be taken to that end."

Just as disturbing is the origin of the 3 tonne figure. Who gave this to the Advisory Committee on Pesticides and how could they have been so misled? How could they have accepted that usage of 2,4,5-T is barely 0.005 per cent of the herbicide market?

The Advisory Committee is a body of ten academics including four professors and fourteen high ranking civil servants. They were looking at 2,4,5-T for the *ninth* time. How could they have accepted these figures? Derivatives of 2,4,5-T are quite important herbicides and the country's leading experts on pesticides should have known this. If they did not then they are incompetent! The Advisory Committee is totally discredited by this incident.

It seems clear to us that the Agrochemicals industry in this country has been guilty of a gross deceit of the Government, of Members of Parliament and of the people of this country as to the scale of use of this particular herbicide.

2,4,5-T is one of the first herbicides to be used on a large scale in this country, having been introduced in the 1940s. The dollar value of the sales of 2,4,5-T and 2,4-D in the United States exceeds that of all insecticides combined!

It is interesting to speculate as to the true scale of usage of 2,4,5-T in the United Kingdom and to the profits made on its sale. The figures we received from H.M. Customs showed that 2,4,5-T costs less than £3 kg. to import yet when a farmer buys a gallon can of herbicide containing 2 kg. of active ingredient, it will cost him over £20. When you as an individual buy a small can from a

store or garden centre the markup will be up to ten times the original cost. Naturally that information didn't come from parliamentary questions.

Many people have drawn attention to the unsatisfactory nature of the dual role played by the Ministry of Agriculture, Fisheries and Food in being responsible for both the promotion of agricultural productivity through the use of pesticides and the protection of the public and workers in the industry. These roles are contradictory.

The Royal Commission on Environmental Pollution advocated bringing together the existing Pesticides Safety Precautions Scheme and

the Agricultural Chemicals Approvals Scheme and placing them under MAFF. This would not be a satisfactory solution — the contradictory roles of MAFF would remain.

The Health and Safety Executive is currently taking over responsibility for regulating exposure to radiation and to dangerous pathogens, so it is the natural candidate to regulate pesticides.

The Advisory Committee on Pesticides should be disbanded and a reconstituted Advisory Committee set up to include representatives of unions and employers in the agricultural industry and other representatives of the public interest. The new committee should then be re-

sponsible to the HSE.

We believe the Ministry of Agriculture, Fisheries and Food should urgently carry out a major inquiry into the true extent of usage of 2,4,5-T and indeed of all pesticides in the United Kingdom as recommended in the RCEP report and we will be pressing for this in Parliament.

Dr. Roger Thomas, M.P., Gareth Wardell, Dr. Alan Williams.

*For further information, please contact:
Gareth Wardell
67, Elder Grove,
Carmarthen 4068
Cwmaber,
Alltynap Road,
Carmarthen 5825*

ECopolitics

The Greens: Success and Failure in West Germany

It was widely forecast at the turn of the year that the creation of a new Green party in West Germany out of scores of diverse environmentalist, anti-nuclear or protest groups would be difficult.

Events so far have shown that political effectiveness and cohesion are proving hard to attain, despite impressive achievements at the regional elections held in various parts of the country, and that the contention of Green movement's founder, Herbert Gruhl, that a party could be created neither to Left nor Right but "out in front", is under severe test.

The decision to form a "Green" party in West Germany at national level was taken late last year in the wake of the success of ecologist candidates in the Bremen city-state elections, where they gained four seats in the 100-member parliament. It was clearly envisaged that the Green party would put up candidates for the federal elections this autumn, but the decision was not taken until later and there is still uncertainty about the party's programme.

The problem that really troubled the Karlsruhe congress that formally set up the Green party was that of double-membership and, like the party programme, this issue is still not decisively resolved.

There were 548 votes at Karlsruhe for the proposition that a Green party member could be whoever acknowledges the party's tenets, but who is not a member of another party, while 414 delegates voted that double-membership should not be excluded.

Those who voted for the openness of the Green party to Marxists, socialists,

Christians and others said they believed political problems could not be solved by a highly centralised party with bureaucratic control. There was no need for one world-view and Marxism and ecology were not mutually exclusive. This last point was put strongly by groups from Berlin and Hamburg.

The opponents of double-membership argued that it was now time for the Green party to develop its own identity and one of the Bremen Four, the architect Olaf Dinné, said the voting public would want to know whether or not the Greens were going to be steered by communists.

The relevance of Herr Dinné's argument was the belief on the part of most who voted against double-membership that communist groups would diminish the party's credibility and might well destroy it. Early experience of attempts to link ecology and Leftist-alternative groups in the late-seventies, which (it was claimed) foundered because of undermining by the Federation of Communists (KB), was very much in their minds.

Since Karlsruhe, the establishment of the party's identity has been helped by electoral success and there has been a strengthening of attitudes in favour of one-party commitment. The large group in North-Rhine Westphalia decided quite early on this year that to contest the regional elections on May 11 effectively meant abandoning double-memberships.

The main poll results this year in Baden-Württemberg, where the Greens polled 5.3 per cent of the vote and won six seats in the Stuttgart parliament, and in North-Rhine Westphalia, where

they polled a creditable 3 per cent, have to be seen against the continuing controversy in West Germany over nuclear power, nuclear waste re-processing and other major environmental issues.

Under an agreement reached in late-February between the government and the regions, the approval of new nuclear plants by the regions up to 1985 would be dependent on assured facilities for the interim storage of nuclear waste. After 1985 no permissions could be granted without progress having been made by the regions towards the creation of one or more re-processing plants and also plants for final storage of waste, with or without associated re-processing. At the very least, the regions would have to show they had found a site for re-processing.

Test boring started early on at the Gorleben site in Lower Saxony to see if the underground salt-domes were suitable for a final storage scheme. Protests were organised by local environmentalist groups and continued into the spring.

Meanwhile, the German Association for Nuclear Waste Reprocessing (DWK), representing 12 power supply companies, fixed on Gorleben as a suitable second interim storage site, the first being at Ahaus. Local agreement to the scheme has come from both county and commune, subject to extensive safeguards and conditions.

However, further attempts by the DWK to find suitable sites for a major re-processing plant, now Gorleben has been ruled out on political grounds, have met with scant success. In Hessen they obtained agreement in principle from the minister-president, Holger

Börner, but this plan is wilting under opposition from the Social Democrats in the south of the region.

The DWK's latest overtures were made with obvious confidence to the Bavarian M.P. and candidate for Chancellor, Franz Josef Strauss. The companies complimented Strauss on the political stability of this realm, but Strauss replied that this stability was not a natural endowment and the DWK project did not seem calculated to strengthen it.

In any case, Strauss argued, a final judgement would be possible in the mid-80s as to whether direct final storage of nuclear waste was technically more advantageous than re-processing with associated final storage, and it was therefore premature to look for sites now.

What Minister Albrecht was not prepared to risk politically over Gorleben in 1979, Strauss is not prepared to risk in Bavaria in 1980. Such attitudes in experienced politicians testify to the high state of sensitivity in West Germany over nuclear power to which the often-despised Green movement has largely contributed and from which it ought to benefit electorally.

For in spite of the gibes, there appears to be considerable sympathy for the movement in unexpected quarters. Although the Green party did not win any seats in North-Rhine Westphalia, an opinion poll disclosed interestingly that half the population of West Germany's largest region was not

opposed to the idea of having ecologists in their regional parliament and a third of them would welcome the idea.

The party's main problems are those of organisation, cohesion of policy and countering internal squabbles. There are ominous signs that the June conference at which a final decision on contesting the national elections and on agreeing a party programme will be taken, will be a turbulent one.

There has been talk of a rival conference and at least one major splinter group, with a base in Baden-Württemberg, wants changes to the draft programme agreed in March at Saarbrücken.

The deep perplexities of responsible elements in the Green movement find their embodiment to a considerable extent in the former parliamentarian, Herbert Gruhl, the founder of Green Action Future (GAZ).

Gruhl is worried about the influence of the extreme-Left in ecological politics and, for that reason, declined to sit on the executive committee of the Green party earlier this year. At the same time he wants to keep open communications with all those who want and who might help to create a more humane society in the Federal Republic. Moreover, the future as seen by ecologists is not readily identified with current West German capitalism or with a government led by Franz Josef Strauss.

However, there is no doubt that the activities of some "alternative" groups

have created severe problems for mainstream ecologists. Several anti-nuclear groups took part in the riot in May, for example, in Bremen. In the course of a demonstration against the army — and by implication against NATO — over 240 policemen were injured, many seriously.

Herbert Gruhl's anxieties, then, appear justified, while at the same time his controversial position within his own 1800-member organisation reflects the tragic strains and divisions to which the Green movement is exposed.

Responding to a call made at a recent GAZ national conference for new and more effective forms of organisation, Gruhl responded with an almost Roman dignity. "I shall not found anything more that is new", he said. "I am the founder of the GAZ. Perhaps it would have been better to have let the organisation go. But I still stand here to take responsibility and not to say: go and do what you want".

The development of the Green movement in West Germany in the next two or three years may well be a conflict between activism and responsibility and between elements in the movement that call for the destruction of West German society and those that call for its steady transformation. In any event, the role in that development of the ageing ecologist, Gruhl, is likely to be crucial... and symbolic.

Peter Wood

Nupe Against Nuke

There has been a breakthrough in the battle against nuclear power. The National Union of Public Employees (NUPE), (700,000 members) has, at its annual conference in Eastbourne, come out openly against the continuation of our Government's nuclear power programme. After discussing energy policies, it adopted the following resolution:

"39. That this Union calls on the Government to abandon its plans to develop at least 10 further nuclear power stations at an estimated cost of £10,000m in the next 10 years. This Union believes that future public expenditure on the development of energy programmes should be directed towards:

- (i) programmes which save energy such as the comprehensive insulation of houses — rather than those which merely generate more energy to be wasted.
- (ii) programmes which utilise safe renewable sources — such as solar, tidal and wave power —

rather than those sources which are limited;

— whilst maintaining employment opportunities during any period of transition to those new sources of energy.

This Union believes that the development of nuclear power is against the interest of workers because:

- a) It is clearly dangerous both to workers in the industry and to those living within "fall out" reach of nuclear installations at proposed sites for the transportation and storage of nuclear waste, now and for future generations.
- b) It requires a centralised and repressive management which weakens or removes many basic trade union rights and civil liberties.
- c) It involves increasing unemployment in the energy industry.

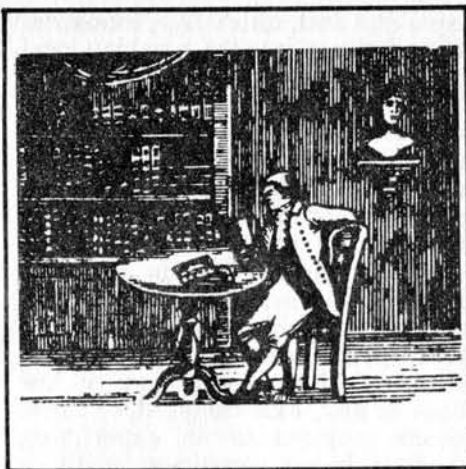
This Conference believes the nuclear

power programme to be contrary to the interests of our society, and therefore totally oppose it. The Conference instructs the Executive Council to:

- (i) make fraternal links with other bodies involved in opposing the programme, in particular the National Union of Mineworkers;
- (ii) organise an ongoing campaign in NUPE on a regional basis;
- (iii) take every opportunity within the media to make this view known."

It is hoped that other trade unions will soon follow the example so bravely set by NUPE and make use of what influence they have to prevent the further systematic and irreversible contamination of our island with radioactive wastes, and the further wastage of public funds on a programme that for a whole host of reasons (see Nuclear Power: The Grand Illusion, *The Ecologist* April 1980) is doomed to inevitable failure.

A Decade of Books



The last ten years has produced a rich crop of books on ecological subjects, and any single review must be partial and selective. The books I shall be talking about below are, setting aside their historical significance, the basis for a kind of liberal education in the ecological perspective; they all yield insights that, to me at least, seem crucial to an understanding of the 1980s. There are works I've omitted which are very highly regarded in some quarters — Kenneth Watt's *The Titanic Effect* is one such — but, in the end, any choice must be personal, reflecting the interests and idiosyncracies of the chooser, and I stand by this selection.

The long view down the past decade comes to a full stop at two much-publicised documents: *A Blueprint for Survival* and the Club of Rome's *Limits to Growth* succeeded in establishing, as a fruitful subject for debate, the proposition that unlimited economic growth is neither feasible nor desirable. This simple idea has profound implications which have been worked out in a number of key books.

First of all, the growth mythology has to be challenged on its home ground: economics. *Poverty and Progress* by Richard G. Wilkinson refutes the orthodox view of economic development as an abstract process driven by the human pursuit of progress and efficiency, and argues that cultural innovation and social change occur only in response to ecological instability; as long as a society can derive its subsistence satisfactorily from its local environment by existing means, there is no inducement to change. It is only when, for whatever reason, the resource base can no longer support the population on the basis of traditional practices, so that their livelihood is put in jeopardy, that new approaches are sought. As Marshall Sahlins argued in *Stone Age Economics*, there are grounds for regarding nomadic hunter-gatherer groups as the original affluent

societies, because the abundance of food sources available to them was such that only a small part of each day had to be spent in procuring the means of subsistence, leaving ample time for recreation and social activities. Such societies change their mode of life not because it is onerous, but because circumstances render it unviable. As well as drawing on anthropological accounts of pre-industrial societies, Richard Wilkinson applies his thesis convincingly to an interpretation of the English Industrial revolution, producing a string of examples of technical innovations that lay unused for years, until changing circumstances forced them to be taken up by "a society with its back to the ecological wall."

If growth is the response of a society to ecological disequilibrium, what would the economics of a culture that was in equilibrium with its environment look like? Herman Daly addresses this problem in the collection *Toward a Steady-State Economy* and, more systematically, in *Steady-State Economics: The Economics of Biophysical Equilibrium and Moral Growth*. Developing a theory in which stocks are to be held constant, flows through the system minimised, and services derived from the system maximised, Daly outlines an economic policy which would allow us to live off our solar income rather than depleting our geological capital, and proposes three specific institutions designed to introduce and maintain a steady state, beginning not from some hypothetical clean slate but from the North American *status quo*. Public acceptability of the measures that Daly proposes is, he believes, likely to be good (they are based on an impeccably conservative market mechanism, while aiming to establish distributive justice between rich and poor), and can only be improved by his demonstration that they are not only desirable but practicable.

Daly stresses that institutional change will not suffice to bring about

a stable society without an accompanying change in values, what he calls, with Emersonian echoes, "moral growth." This brings us to the two big names in the philosophical implications of growth: Ivan Illich and E.F. Schumacher.

For a work professing to be a study of economics to begin with appeals to wisdom and end by prescribing a magnanimous prudence coupled with justice, fortitude, and temperance as the remedy for our economic and social ills in unexpected, to say the least, and might be thought likely to diminish its sales potential. Quite the contrary: *Small is Beautiful* succeeded in breaking out of the minority-interest ghetto, and taking its place on station bookstalls among spy novels and collections of knitting patterns. The popular dailies reviewed it ("a book of heart and hope and commonsense about the future .. tremendously thought-provoking book" — *Daily Mail*), and a new phrase entered the language. It's deservedly influential, enshrining — though not necessarily originating — many of the values which sustain current ecological movements: the idea of a human scale, an appreciation of work as a means of self-realisation rather than as demeaning repetitive activity, a belief in intermediate technology and communal ownership, and an attitude of respect for human potential and for the natural systems on which we depend. Schumacher's most striking shortcoming is his lack of political acuity; but that he has in common with no small number of the ecologically concerned.

Ivan Illich has pursued a coherent set of preoccupations through a series of books, examining such diverse aspects of archetypal Western society as education, medicine, bureaucracy, the professions, work, energy, and transport within a single perspective. Though his calculatedly iconoclastic style can be wearing at times, at least two of his books are essential reading: *Tools for Conviviality*, for the pure doctrine, and *Limits to Medicine* (ponderously subtitled *Medical Nemesis: The Expropriation of Health*) for a passionately argued, and by now very well known, assault on technological medicine, decrying the "iatrogenic epidemic" which is the consequence of the medical profession's monopoly on health care. The pure doctrine, starting from the principle that there are limits of scale beyond which mechanisation and technological means of production enslave people rather than liberating them, proposes a distinction between industrial society, in which individuals are isolated from one another, deprived of opportunity to exercise their innate abilities, and

subject to technocratic control, and a convivial society, "in which modern technologies serve politically inter-related individuals rather than managers." Offering an analysis of the social role of tools that recalls Lewis Mumford in its scope and power of generalization, Illich argues that now, as at no previous time in history, we have the technical means to design tools for an efficient but convivial society. What is required is for us to realise that the present direction of scientific research is the result not of any intrinsic characteristics of the process, but of ideological prejudice: it is open to us to redefine high technology, not as the replacement of human skill by programmed machinery, but as the means to labour-sparing, work-intensive, decentralised productivity. Details of the argument, or remarks made in passing, can be more than irritating but, taken in one gulp, *Tools for Conviviality* is a stimulating and refreshing draught.

In the first half of the 1970s, the two topics popularly associated with ecology were pollution and population. Fears about increasing levels of pollution and their possible environmental consequences were given academic recognition in the SCEP report, *Man's Impact on the Global Environment*, the result of a month's intensive study by specialists in more than a dozen disciplines of possible pollution-triggered changes in climate, ocean ecosystems, and large terrestrial ecosystems. Sponsored by MIT, the report is located in the tradition of "More research is required" but, in gathering together existing information on levels of pollution and their likely repercussions, it performed a useful service, and the recommendations for action made on the basis of this information do not stop short of a call for a change in lifestyle and, to that end, funding for education in ecological awareness. A well-intentioned attempt to take a global and long-term view, it deserves close scrutiny by anyone wishing to understand the interaction of anthropogenic pollutants with natural systems.

More journalistic, and none the worse for that, is Anthony Tucker's *The Toxic Metals*, first published in 1972, and yet to be bettered on its narrow subject. Minamata disease is a celebrated case of industrial pollution: in 1953, the fishing community of Minamata, Japan, was stricken by a bizarre epidemic, which killed and maimed its inhabitants in a particularly painful way. Medical authorities were baffled, and it was not until 1967 that the mystery was finally solved. In fact, the disease was a form of poisoning by organic mercury; the source of the mercury was the fish that formed the villagers'

staple diet and, ultimately, industrial waste dumped into the bay by a local chemical plant. Anthony Tucker discusses the implications of the Minamata investigation in depth, exploring the problems that beset attempts to control pollution: problems of ignorance, problems of monitoring, problems of vested interest. One point will always remain true, no matter how much progress is made in analytical techniques or enforcement procedures: the long-term effects of chronic exposure to low doses of any toxic material will first become evident in an experiment which is being conducted, with or without consent, on all of us who breathe, drink, and eat. In the UK, we should perhaps worry most about another of Tucker's case studies, lead, which, as Dr Bryce-Smith has tirelessly warned us, may cause irreversible neural damage, especially in those who are most vulnerable: children.

Pollution can best be regarded as a symptom of the industrial disease, though it's one we'd be foolish to disregard. The same can be said of the population explosion. In the early 1970s there was a glut of scare-mongering and superficial books on the world's population, and what should be done about it. These — Paul Ehrlich's *The Population Bomb* is one — have not worn well with the passing of the years. A more ecological perspective on the question of population and poverty emerges from two of 1976's flood of new publications: Erik Eekholm's *Losing Ground: Environmental Stress and World Food Prospects*, and *How the Other Half Dies: The Real Reasons for World Hunger*, by Susan George.

Erik Eekholm is a researcher at the Wordwatch Institute, whose quarterly *Worldwatch Papers* deserve honourable mention for their rare blend of documentation and commitment, though the Institute's Director, Lester Brown, began the decade with at least one blunder of judgement: an enthusiastic championing of the Green Revolution, that myopic technical fix.

Losing Ground is a model of its kind: a scrupulously researched and elegantly presented analysis of environmental deterioration through out the world, which integrates both ecological and social factors. Eekholm discusses deforestation, soil erosion, desertification, the silting of irrigation systems, and flooding — all seemingly 'natural' processes that diminish the world's potential food production — and shows that these may be traced back to particular choices of the pattern of development, and to inequitable land distribution. His most spectacular example is El Salvador, one of the

countries closest to environmental ruin in South America, where the best cropland, amounting to a third of the total, is in the form of large, privately owned estates, growing cash crops for export, while the peasants must scratch a living from the land that remains, even cultivating the deforested upland slopes, with a terrible toll in soil erosion and flooding. Denied security in land, the poor react as the poor in the Third World consistently do, by producing more and more children to help in the search for food and to support their parents in old age.

How the Other Half Dies takes up this theme and extends it, arguing that a redistribution of wealth and of land is the best remedy for the problems of the world's hungry. The world food market ensures that those who can pay the highest prices will not starve: those in the developed countries. Howard Odum has remarked that a part of the potato you eat is no longer stored solar energy: it is oil. It's also been said that, in eating a steak, you are effectively cannibalising a human being somewhere in the Third World, because that cow was fattened on the grain that could have kept him alive. The alternative would be for non-Western, non-Soviet-bloc countries to become self-sufficient in food, rather than growing for export, but this flies in the face of conventional development wisdom, that cash crops are an important source of the foreign currency a country needs to mechanise and establish its industry. That conventional wisdom, in turn, is sustained by vested interest: by the developed countries that want not only the food but also the export markets which the underdeveloped countries represent; by multinational corporations with their agribusiness profits; and by the elites in the food-exporting countries themselves, which have been systematically trained and programmed in Western priorities, and live well as a result. This is an important book, cutting through a lot of sanctimonious cant. It is this kind of edge which one looks for in vain in *Only One Earth*, by Barbara Ward and Rene Dubos, an unofficial report commissioned for the UN Conference on the Environment held in Stockholm in 1972. There are certainly good things that could be said about it but, for me at least, this could never be one of the books of the decade.

If population and pollution were the ecological campaigns of the early 1970s, it is energy questions which have most caught public attention in the last few years. Undoubtedly the classic work in this field is Amory Lovins' *Soft Energy Paths: Towards a Durable Peace*. Built around a com-

parative analysis of two alternative energy strategies for the United States, a hard path which is basically a continuation of 1976-7 federal policy and a soft path of energy conservation, better matching of energy quality to end use, development of renewable sources, and transitional reliance on improved fossil-fuel technologies, the discussion elucidates not only the feasibility of the two policies but also their social implications. Whereas any energy plan for the next fifty years will entail significant social change, the two paths lead in rapidly divergent directions: the hard path must lead to a centralised, technocratic, repressive society and, globally, to nuclear proliferation and a mounting risk of war, whereas the soft path offers the opportunity of moving to a pluralistic, decentralised society and, at the same time, can be much more flexible and rapid in its response to changes in energy needs or supplies. This conclusion is lent urgency by the reminder that the two alternatives are mutually exclusive: if we don't make a deliberate choice soon, the hard path will score a pre-emptive victory. *Soft Energy Paths* has already been widely influential; some energy commentators believe that it will still be read and in use at the end of the century.

Peter Chapman's *Fuel's Paradise: Energy Options for Britain* uses the techniques of energy analysis to establish the UK's current (1976) energy needs and proceeds, on that basis, to evaluate three different energy policies: business-as-usual; technical-fix, which assumes a smaller fuel demand, but achieves this by increases in fuel efficiency rather than changes in lifestyle; and low-growth, which aims at attaining a sustainable steady state. Chapman concludes that the low-growth strategy, though desirable in the long term, is politically out of the question at present, and advocates a technical-fix policy as a way of buying time in a socially acceptable manner. *Fuel's Paradise* doesn't display the awareness of human, as distinct from technical, issues that is *Soft Energy Paths*' great strength, a point which Chapman himself acknowledges in his introduction to the new edition, but it is worth reading, nevertheless, for anyone wanting to get a grasp of energy analysis as a discipline, and for the rigorous sanity of approach: "It seems to me that slogans like 'ecodoomster'... and 'optimist' are irrelevant to discussions about the future. If someone points out a potential problem, they are being neither optimistic nor pessimistic, they are simply displaying an important aspect of human intelligence, namely the ability to anticipate events. If someone else

dismisses the problem or — worse — ignores it, I don't think they are being optimistic or pessimistic, I think they are being stupid."

A *Low Energy Strategy for the United Kingdom*, by Gerald Leach and his colleagues from the International Institute for Environment and Development, is an exercise in bridging the credibility gap: a technical-fix scenario which demonstrates that, by dint of nothing more alarming than energy conservation and substantial but perfectly painless improvements in energy efficiency, the UK — and, analogously, other Western countries — could have continued economic growth over the next fifty years while using less primary energy than it does at present. This demonstration involves closing the energy gap and shattering the economists' iron law linking increase in prosperity with growth in energy demand: nothing that hasn't been done before, but performed here without any hint of radical intent and so, possibly, with more chance of influencing policy. In strictly ecological terms, then, Leach's report isn't very interesting (his *Energy and Food Production* offers some far more eye-opening conclusions) but it has its place in the campaign against nuclear power.

Turning finally to texts which take nuclear power specifically as their subject, it would be cruel of me to suggest that you plough through *The Windscale Inquiry Report, Volume 1*, historic document though it is, but there are Walt Patterson's two books: *Nuclear Power*, on the technical aspects, and *The Fissile Society*, which touches on the prospects for liberty in the plutonium state.

As I said when I began, this is in no way a comprehensive survey of the books which appeared during the 1970s; I've mentioned nothing on radical technology, for example. It's already clear, however, that writers with broadly ecological perceptions have produced work of intellectual power, sharp intuitive insight, and strong emotional commitment during the last ten years; a considerable body of theoretical and polemical writing has been laid down. What's needed in the 1980s is not so much the extension of this testament of the written word, as the building up, on the strength of this heritage, of political organisations and the working out of effective forms of political action. If this were an easy task, it would by now be well on its way to accomplishment; but, as we have had occasion to remark already, there are options which soon must close.

Bernard Gilbert

Note: Such of the books here reviewed as are still in print — most of them, it seems — are available from Conservation Books, in Reading, whose assistance in providing book lists and books during the preparation of this review is gratefully acknowledged.

Man in his Environment

In *Topsoil and Civilization* Vernon Carter and Tom Dale describe how for thousands of years succeeding civilizations have systematically deprived the land of its topsoil — by deforestation, over cropping, over grazing with sheep and goats and poor husbandry, until inevitably this has led to the silting up of waterways and the devastation of the land from flooding and erosion. History, as usual, has taught us little, for modern man is still making the same mistakes and is compounding these by his use of poisonous chemicals. Today, however, there are significant differences. In the first place, whereas the peoples of all earlier civilizations have been able to extend their frontiers and move to pastures new when their own lands have no longer been able to support them, in our own times we have seen the closing of many frontiers and the hardening of governments towards would-be immigrants. Today there are no more promised lands for the homeless and the dispossessed to colonise. Secondly, in our time, neither ignorance nor innocence can excuse our continuing to exhaust natural resources and pollute both land and sea. The worst offenders are the well endowed and educated nations of the industrial world, where there is no lack of information. Indeed a look at the titles in the field of man in his environment that have come out in the ten years since the first issue of *The Ecologist* appeared, reveals an astonishing cascade of publications following Rachel Carson's *Silent Spring* — from the exhortatory and doom-laden, to the practical and informative. No bookshop or library is without the best of them; ecology has almost become popular.

And not only individuals but organisations are in the business of proliferating environmental understanding, both general and specialist — from the World Wildlife Fund, and its parent IUCN, which produced the strategies revealed in Robert Allen's *How to Save the World*, reviewed in our last issue of FoE, The Farm and Food Society, the Ecology parties scattered throughout the World, the many many others in the USA, Canada, Australia, the Third World and Europe, and the

Soil Association, which though politically less active than these others, continues nevertheless to produce excellent books. From Sam Mayall, doyen of organic farmers we have *Farming Organically*, and from the late Joy Griffith-Jones a series of delightful booklets within everyone's means, among them *The Value of Weeds*, *Make Your Plants Work for You*, and *Friend and Foe in the Garden*, as well as that anonymous and astonishingly compact work *The Self Sufficient Smallholding*, of which John Seymour wrote 'If all our agricultural land was farmed like this we could stop importing food tomorrow'. And then, of course, there is the Henry Doubleday Research Association which is synonymous with that most prolific, energetic and knowledgeable organic Gardener Extraordinary, Lawrence Hills. No single man, surely, has done more, through articles, lectures, letters to the Times, and his many books, to popularise the organic approach, and to inculcate in his followers a proper horror of chemical fertilisers, pesticides and herbicides. However the importance of *Organic Gardening*, *Fertility without Fertilizers*, *Save Your Own Seed*, *Weedkillers without Worry*, and many others, goes beyond their practical information and common sense instruction, because well-thumbed copies of these works are to be found among the gardening books of many unawakened soul whose sympathy for Ecopolitics is nil, and whose faith in Divine Providence renders him immune to the warnings of the Doom Brigade — but who, as a gardener seeking the advice of another gardener, will unwittingly be introduced to an ecological view of plants and their environment. Also useful in this field are W. E. Shewell-Cooper's *Complete Vegetable Grower* and *Compost Gardening*.

For years before *Self Sufficiency* made them famous, John and Sally Seymour really did feed their family and their guests entirely on home produced food, and John's more recent lavishly produced and superlatively illustrated *Complete Book of Self Sufficiency* and *The Self Sufficient Gardener* are almost irresistible. 'Anyone planning to become a modern peasant' wrote our reviewer of the former 'cannot afford to be without this book' and I wouldn't quarrel with that. John Seymour has a passionate conviction about the way land should be used, and he takes his readers with him wherever he wants them to go by his enthusiasm and his obviously personal experience. Of survival handbooks in general I am inclined to be considerably more wary, for I have yet to encounter one that convinces me that it would be a real help if I were

turned out on the hillside to fend for myself. The difficulty here, as with the various experiments that the BBC among others, have set up, into primitive living, is that it is really impossible to simulate the conditions of breakdown in which survival techniques would be needed. On the run, I suggest, we would steel eggs or even in desperation try and milk a cow in a field, rather than experiment with making a stew of unlikely food plants. If we are speculating on a situation following the total collapse of city services, then I fear the urban populations will burst like a flood into the countryside, pillaging, looting and terrorising those who have food or land. Too late then to start learning how to make a cross bow or fix a plough behind the old brown ox. And yet these experiments and these handbooks are not without value, for they exert a curious fascination and may at least make another area of the population think about the implications of social breakdown, so that they too arrive, by another route, at some comprehension of man's dependence on nature.

Among popularisers whose importance must not be overlooked is Richard Mabey with his widely read *Food for Free* and *Plants with a Purpose*, both rekindle interest in the wild plants of our countryside, and remind us that our forefathers made much use of these in a variety of ways, not only for food, but for cleaning and tanning, dyeing and curing and of course for simples and cures. Juliette de Bairac Levy is perhaps the best known of modern herbalists, and her *Illustrated Herbal Handbook* is recommended, so too is Jean Palaiseul's *Grandmother's Secrets*. For those who distrust modern medicine's dependence on synthetic chemically produced drugs all these books offer practical alternatives.

Fears about the effect on our physical well-being of modern drugs is paralleled in the growing concern we feel about the ill effects of processed foods, and of foods adulterated by the injection of harmful chemicals into the diets of farm animals. Among books on the subject are Doris Grant's *Your Daily Food* and, perhaps the leading work in this field, Ross Hume Hall's *Food for Nought: The Decline in Nutrition*. Ross Hume Hall is well known to readers of *The Ecologist*, but this important work has yet to appear in the U.K. When we are convinced of the poisonous effects of much manufactured food and want to be told what to do about it we find once more a huge range of books to choose from. Beatrice Hunter's *Natural Food Primer* and Rodale's *A to Z of Organic Food Terms* can be followed

up with *Eating Your Way to Health* by Robert Bircher, Shewell Cooper's *Vegetable Growing and Cooking the Natural Way* and Beatrice Hunter's *Natural Food Cookbook*. Most of the vegetarian cookery books now appearing are also based on organic foods.

An understanding of man's relationship to nature is the aim of the Aldus series which includes Robert Allen's *Natural Man*, M. Ross MacDonald's *Every Living Thing* and Michael Boorer's *Forest Life*; the message is clear and unequivocal and the books are excellently produced and illustrated — and provide a good introduction to the subject as do the Living Earth Series which include *Green Worlds* (D. Bellamy and M. Borer) *Man and Nature* (M. Ross MacDonald and Robert Allen) *Deserts and Grasslands* (J. Cloudsley Thompson and E. Duffey) and *Worlds Apart* (J. Burton and J. Sparks).

Among the special pleaders for whom *The Ecologist* has always tried to find space in its review columns are the whales with Richard Burton's *The Life and Death of Whales* and the FoE *Whale Manual* being of particular value. Forests have recently received much attention, and important among books reviewed in this field have been *The Equatorial Rain Forest*, J. Flenley and P.W. Richards' *The Tropical Rain Forest*.

'Time is not on our side' said Sir Frank Fraser Darling in his 1969 Reith Lectures (*Wilderness and Plenty*). Are we now eleven years nearer to disaster? Perhaps we are, but if there is still a chance to save the world, we may take a crumb of comfort when we reflect how much wider is public understanding of environmental problems and the desperate need to reverence our natural surroundings — an understanding that has come about at least partly as a result of the efforts of the writers mentioned in this brief survey of the books of a decade.

Ruth Lumley-Smith

Except where otherwise indicated all titles mentioned in this review are available from:

Conservation Books,
228 London Road, Reading,
Berkshire, RG6 1AH.

CLASSIFIED

CONFERENCES AND COURSES

WHAT ON EARTH ARE WE DOING? A thought provoking and informative course on environmental conservation is to be held at the Snowdonia National Park Study Centre. The conference will be of vital interest to all who care about the countryside such as members of County Naturalists Trust, Ramblers Associations etc. Dates: Friday November 28th — Wednesday December 3rd 1980, Course Fee: £51.20. Further details from: E.E. Bradbury, Plas Tan y Bwlch, Snowdonia National Park Study Centre, Maentwrog, Bleanau Ffestiniog, Gwynedd LL41 3YU, U.K.

ALTERNATIVE TECHNOLOGY. A University of Exeter course of 20 weekly meetings, starting on the 7th of October 1980. No previous knowledge is required and should be of particular interest to local environmental groups or individuals, wishing, for instance, to reduce their fuel bills. For details contact: Ken Penney, BA, Department of Economics, University of Exeter, Exeter, Devon. UK.

THINK 80. Cheltenham's Second Festival for creative thinking and living on August 30/31 1980. Contact: The Secretary, Think 80, P.O.Box 88, Cheltenham, Gloucestershire. Tel: 27821.

'Power Plays' performed by Inter-Action theatre group at Action Space, Chenies St., WC1. Tel: 01 637 7664. Exhibition by Friends of the Earth, Sunday 5th October at 7.00pm. Tickets £1.70 in advance, £1.90 on the day.

PERSONAL

MODERN DRUGS waste resources and pollute body and mind when used indiscriminately. Keep mind and body healthy with TAI-CHI and CHI-KUNG, the ancient and popular Taoist moving meditation. Not a cult. Based on 'CHI', the body's own natural energy. Send stamp for free details: TAO (E9), 129 Lathom Road, London E6.

HAIR ANALYSIS, atomic spectroscopic reveals environmental toxic exposures and nutritional mineral deficiencies. Send two tablespoons of hair + £8.00 to Envirolabs, Box 38 Station B, Toronto, Canada.

P.I.P.P. (PERSONAL INTRODUCTIONS FOR PROFESSIONAL PEOPLE) offers a specialised and selective introduction service for professional and executive people. For details send S.A.E. to P.I.P.P., P.O. Box 1, West Kirby, Merseyside, L48 3LA

SITUATIONS WANTED

GRADUATE (age 25) with a post-graduate qualification in Information Science-Librarian-ship seeks employment compatible with a non-exploitive, cooperative way of working. Contact: Kay Henning, 8, Rustic Place, Anstruther, Fife KY10 3EP. U.K.

ENVIRONMENTAL HEALTH GRADUATE (F) seeks employment from Oct. 80 for 1 year in the field of Ecology and Conservation, as experience before doing MSc in 1981. Please contact: Miss M. Bryce-Smith, 112 Woodhill, Woolwich, London SE18.

SITUATIONS VACANT

PIXTON BUILDERS LTD., Forest Row, Sussex. We need tradesmen, particularly carpenters, to both work on our sites and to train younger members of our company. Please phone Forest Row 3784.

ESTABLISHED SCHOOL COMMUNITY seeks person(s) to join us. The main skills we are looking for are Maths (teaching, incl. some exam work), practical engineering, self sufficiency skills and an ability to cooperate in an informal learning environment. We can offer accommodation and a little money — our school is a small secondary boarding school in the country with an organic farm and garden. We want to develop more self sufficiency in alternative technology. Details please to: The Staff Cooperative, Monkton Wyld School, Charmouth, Bridport, Dorset, Tel: Char 60342.

BOOKS AND PUBLICATIONS

PASSIVE SOLAR HOME PLANS. A complete set of blueprints of our favourite passive solar design is now being made available for U.K. enthusiasts. This design is easy for owner builders, offers self-sufficient living and can be built in any convenient size. Send a £10.00 Money Order to CRS., P.O.Box 11341, Station H, Ottawa, Ontario, Canada, K2H 7V1.

PRELUDE IN ECONOMICS by Christopher J. Budd. 78pp, £1.50 incl. p&p - A survey in economics in which man is treated as a spiritual being and capital is not regarded as material wealth. Available from Johanus Academy of Sociology and Economics, Hoathly Hill, West Hoathly, Sussex, RH19 4PN. U.K.

NUCLEAR POWER SOURCEBOOK is a very useful short bibliography which lists the titles of all the books and articles, that have appeared in the last ten years on different aspects of the nuclear issue such as the early history of nuclear power, the nuclear controversy, the fast reactor controversy, public hearing at Windscale etc. It is available from Friends of the Earth, Birmingham, 54-57 Allison Street, Digbeth, Birmingham 5, U.K. Price 15p plus a large SAE.

MISCELLANEOUS

PREDATORY MAN is destroying the world! Help pioneer aware and compassionate living the healthy sustainable VEGAN way. Send 65p for recipe book with self-sufficiency gardening hints and full supporting leaflet. Vegan Society, Dept. R. 47, Highlands Road, Leatherhead, Surrey.

EARTHWISE is launching a mail order business in ecologically sound products and promotional goods. Send large s.a.e. for catalogue to: 15, Goosegate, Nottingham. (All proceeds to support environmental information charity).

MAN WITH VAN WANTED. Good profits to be made for person with van willing to distribute and sell books on Alternative Technology and Self Sufficiency for author. Contact: Patrick Howden, Tel. Porth Towan 890598 or Redruth, 216962.

FRIENDS WANTED. Married, nonsmoking, vegetarian couple expecting our first child. We have no close friends. Would like to meet people similar interests, outlooks, for us and child. Our interests: conservation, nature and resources, 'FOE,' 'Amnesty,' 'Education Otherwise,' (educating children outside school system), Montessori approach to education. I am unemployed Montessori teacher, my husband post office clerk. We wish simple, relaxed, non-extroverted, nonracist people. Pilar Naidu, Poste Restante, London, NW5 2BY.

THE ORGANIC LIVING ASSOCIATION welcomes new members. Organises festivals, courses, lectures, meetings, bi-monthly newsletter promoting conservation, ecology, human and animal health. Annual Membership £1.35, family £2.10. Greenways, 200 Wells Road, Malvern Wells, Worcs. U.K.

REMOVE MENACE OF STRESS with relaxation for everyday living. The cassette which guides you gently into deep relaxation, relieving day-to-day tensions recommended by London Cardiologist; Croydon AHA anti-smoking groups; migraine, phobias and relaxation for living societies. One user writes: 'Your wonderful cassette has helped me more than any other.' Obtainable from Mary Barfield (Box TE) 2 Toot Rock Coastguards, Pett Level, East Sussex TN35 4EW. Inclusive cost (UK) £3.50.

SPONSORED ROLLER SKATE for Nuclear Disarmament. From Bristol to Amsterdam starting on 24th September. Details from: Michael Hart and Roland Miles, 4 Caledonia Place, Clifton, Bristol. Tel: (0272) 312321.

PROPERTY

NORTH NORFOLK: 153 acres of woodland and marsh with long river frontage and interesting flora and fauna for sale. Long & Beck, Chartered Surveyors, 2 Oak Street, Fakenham, Norfolk. 0328 2231.

NORTH YORK MOORS NATIONAL PARK TO LET BY TENDER

LOW HORCUM FARMSTEAD HOLE OF HORCUM NEAR PICKERING NORTH YORKSHIRE

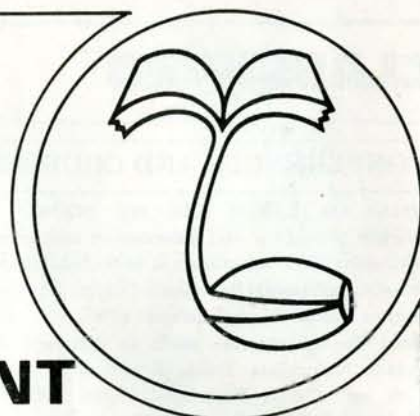
North Yorkshire County Council offer to let the above-mentioned property on a 21-year lease.

The property is situated in an extremely attractive location and requires extensive renovation and improvement.

Further details and tender forms available from the County Valuer and Estates Officer, North Yorkshire County Council, County Hall, Northallerton, telephone Northallerton 3123 Extension 418.

Closing date for tenders 19th September 1980.

COMMERCIAL RECYCLED PAPERS



**EACH YEAR IN BRITAIN
WE USE PAPER EQUIVALENT
TO 175,000,000 TREES, THREE FOR
EACH OF US, A FOREST THE SIZE OF
WALES. LESS THAN A THIRD OF
THIS GETS RECYCLED**

- * *Do you use recycled paper?*
- * *Does your employer use it?*
- * *Do other organisations with which you are associated use it?*
- * *Can YOU help to increase the use of recycled paper?*

We have recently been appointed sole distributors of the ARMAGEDDON range of recycled papers, having stocked some of them for over two years. We particularly wish to promote commercial orders of 250kg upwards (100 reams 85gsm A4 equivalent). This is because high transport costs make it more difficult to compete with local suppliers of virgin paper in the case of smaller orders. We offer a delivery service anywhere in mainland Britain.

We invite potential customers to contact **John Treble**, by letter or phone, to discuss their requirements. The more customers can anticipate their needs, the more likely we are to be able to help them.

These papers are already used by several Local Authorities and we anticipate a massive increase in demand when people realise that **high quality** recycled papers are available.

COMMERCIAL RANGE: writing, typing, duplicating, printing, plain-paper copying, and drawing papers and boards; stationery and printing sizes; plain and printed envelopes.

DOMESTIC RANGE: plain paper, letterheads, notelets, and envelopes.

SPECIAL OFFER: while stocks last, we can offer 100% recycled BOSP envelopes (address under flap) at £7.20 per 1000 (excl VAT & carr.) in 100gsm white, sizes C6 and DL, and in 100gsm green, size C6. Minimum order 5000; carriage charged at cost.

**Conservation Books, 228 London Road, Reading, Berkshire, RG6 1AH.
Tel: Reading 663281 (STD Code 0734)**