

# The New Ecologist

Journal of the Post Industrial Age

No.1

Jan-Feb 1978 60p



Small Trades  
or  
Small Industries?

A Plan for Rural India

The Road to Utopia

The Hidden Costs  
of Nuclear Energy

Waste Management  
Buys Time

ECOpolitics



## LIVES

You cannot cage a field.  
You cannot wire it, as you wire a summer's roses  
To sell in towns; you cannot cage it  
Or kill it utterly. All you can do is to force  
Year after year from the stream to the cold woods  
The heavy glitter of wheat, till its body tires.  
And the yield grows weaker and dies. But the field never dies,  
Though you build on it, burn it black, or domicile  
A thousand prisoners upon its empty features.  
You cannot kill a field. A field will reach  
Right under the streams to touch the limbs of its brothers.

But you can cage the woods.  
You can throw up fences, as round a recalcitrant heart  
Spring up remonstrances. You can always cage the woods,  
Hold them completely. Confine them to hill or valley,  
You can alter their face, their shape; uprooting their outer saplings  
You can even alter their wants, and their smallest longings  
press to your own desires. The woods succumb  
To the paths made through their life, withdraw the trees,  
betake themselves where you tell them, and acquiesce.  
The woods retreat; their protest of leaves whirls  
Pitifully to the cooling heavens, like dead or dying prayers.

But what can you do with a stream?  
You can widen it here, or deepen it there, but even  
If you alter its course entirely it gives the impression  
That this is what it always wanted. Moorhens return  
To nest or hide in the reeds which quickly grow up there,  
The fishes breed in it, stone settles onto stone.  
The stream announces its places where the water will bubble  
Daily and unconcerned, contentedly ruffling and scuffling  
With the drifting sky or the leaf. Whatever you do,  
A stream has rights for a stream is always water;  
To cross it you have to bridge it; and it will not flow uphill.

*Henry Reed*



# In this issue

No. 1. January/February 1978

---

## EDITORIAL

Nicholas Hildyard	Under the Guillotine	2
-------------------	----------------------	---

---

## COMMENT

Report from Atlanta	3
---------------------	---

---

## ROUND-UP

Nuclear power - Nuclear disillusion - Lost lands	4
--	---

---

## FEATURE ARTICLES

Nicholas Hildyard	Small Trades or Small Industries? Small trades are being taxed out of existence; is the Prime Minister's new enthusiasm for small industries actually going to help the right people?	7
-------------------	--	---

Shankar Ranganathan	A Plan for Rural India Can voluntary labour schemes alleviate unemployment while making a valid contribution to the conservation so urgently needed?	10
---------------------	---	----

Ruth Lumley-Smith	The Road to Utopia Throughout history men of vision have proposed Utopian communities. Have they a role to play in the post-industrial world?	13
-------------------	--	----

Colin Sweet	The Hidden Costs of Nuclear Energy Cheap nuclear energy is a myth sustained by a misleading system of accountancy	17
-------------	---	----

Andre Van Dam	Waste Management Buys Time Time, talent and resources are wasted; saving them can improve the quality of life and extend the time left for planning an alternative future	20
---------------	--	----

---

## REPORTS

Peter Bunyard	Soft Technology - A new way of coping with sewage	22
---------------	---	----

Michael Allaby	Horticulture - An unusual method of greenhouse ventilation	24
	Wildlife - Disturbing aspects of conservation	25

Ross Hume Hall	Food - Dangerous practices in food technology	27
----------------	---	----

---

## ECOPOLITICS

France - Spain - Europe - New Zealand	30
---------------------------------------	----

---

## GLEANINGS

---

## BOOKS

---

## This Month's Authors

---

## LETTERS

---

## Classified

*inside back cover*

This Month's Cover: Photographs by courtesy of COSIRA (*Council for Small Industries in Rural Areas*).

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

Published by Edward Goldsmith

Editors: Nicholas Hildyard, Ruth Lumley-Smith

Associate Editors: Robert Allen, Michael Allaby, Peter Bunyard, Brian Johnson, Jimoh Omo Fadaka,  
Andrew MacKillop, Robert Waller, Lawrence Hills, John Papworth, Nicholas Gould, Raymond Dasmann (IUCN),  
Richard Willson, John Milton (U.S.A.) Henryk Skolimowski (U.S.A.) Manfred Siebker

Advertising Department: 73 Molesworth Street, Wadebridge, Cornwall PL27 7DS U.K. For rates please see inside back cover.

Published by Ecosystems Ltd., Registered Office: 73 Molesworth Street, Wadebridge, Cornwall PL27 7DS, U.K.

Distributed by: A.M.D. Ltd., Roding Trading Estate, London Road, Barking, Essex IG11 88U.

Designed and Printed by Penwell Limited, Parkwood, Callington, Cornwall. Tel: St. Dominick (05795) 522.



## Editorial

### UNDER THE GUILLOTINE

There is an apocryphal story about a famous Victorian writer of penny-dreadfuls that illustrates the Establishment's attitude to ecological action. Leaving his hero tied to the rack in a convent, with a guillotine only inches away from his neck, the author departed from his office and got blind drunk in a local gin palace. Come the copy-date for the following week's instalment, he had not returned to write the sequel. In vain his colleagues racked their brains for a way in which the hero might escape from almost certain death, but none of them could find a solution. Finally, the writer re-appeared, swept away the hacks around him and wrote, 'With one leap, Oswald was free!'

However acute the problems that face us, and however much we know that they threaten the very survival of the planet, we cling faithfully to the belief that some miracle leap will bring us to safety: whether we wait upon a technological Messiah, or rely upon the wonders of a free market economy, we believe in a *deus ex machina* who will come to save us. There has been much debate, even much agreement over the coming crisis, but the practical measures that have to be taken to halt the slide to disaster can be counted on one hand. The hour-glass is rapidly running out and as the sands sift away, the greatest crisis we face is our own inertia — we have reached the eleventh hour, and still we debate what action we should take.

Recently Carroll Wilson, Director of the Workshop on Alternative Energy Strategies, wrote to *The Wall Street Journal* complaining that their editorials had added 'unpardonable confusion to the already confused debate' on energy policy.

'When they have implied', he wrote, 'that no-one should talk about scarcities until we have deregulated energy prices, junked President Carter's bankrupt energy programme and seen what the resulting incentives will produce in new reserves, they have failed to look at the clock. And when these writers insist 'it has become increasingly difficult for any serious person to believe that we face the imminent exhaustion of energy resources,' they state a truism but obfuscate the point . . . for what is imminent is the deadline for action.'

Together with his 35 distinguished colleagues on the WAES project, he has concluded that vital timing of the deadline is mainly in the hands of the 'swing' producers in the Arabian Gulf. If they are willing to triple their current oil production over the next two decades, they

could stave off the prospective energy shortage until the late 1990s. But it is unlikely that they will be willing to do so. Even at present prices they are only able to spend 30 million dollars a day at home — and that still leaves them the rest of their daily income, some 100 million dollars, to dispose of by investing abroad. "Tripling production — even if it did not increase the real price of oil — is clearly out of the question," states Wilson.

If the Arabs decide, on the other hand, to maintain production at present levels, on the reasonable basis that oil in the ground is worth more than the dollars they cannot usefully spend, then our predicament is still worse. "Such a course would pitch the world into an acute crisis only four to five years from now — much too short a time to allow us to adjust."

Our only hope of persuading the Arabs to boost their production enough over the next decade to allow a smooth transition away from oil, is to give them solid proof that we are intent on making that transition — and that means letting them see that we are pursuing a vigorous programme of energy conservation, and that we are developing alternatives. President Carter's plan, though moving in the right direction, says Wilson, is too timid to do the necessary job in the time available.

In a sense, ecologists have themselves to blame for much of the inertia that surrounds government. Their fault lies largely in having failed to deal with the practicalities of transforming society. Many agree with their analysis of what has gone wrong. Some people in positions of power agree in whole or in part with ecological policies of decentralisation, re-establishment of the extended family and a labour intensive economy. But when it comes to the practical details, the means of decentralisation, of decreasing consumption or achieving self-sufficiency, there is a chorus of dissension, and often ideas are not aired for fear that they will weaken the movement.

*The Ecologist* has discussed the problems exhaustively for seven years: now the time has come to seek practical solutions: to lobby government and demand positive policies: and to act as a forum for the exchange of information, the encouragement of innovative ideas, and the bringing together of the talent that is being applied, worldwide, to the problems of the future. To this end the editors of *The New Ecologist* will be glad to receive news, views, reports, conference notes and other material that will strengthen the ecological movement and hasten the construction of a bridge to an ecological society.

Nicholas Hildyard

**THE DR. E.F. SCHUMACHER MEMORIAL FOUNDATION**  
The Foundation has been formed in order to further the work begun by the late Fritz Schumacher, and to sponsor projects and activities that he would have supported. The first meeting was held in London on 30th November 1977, following the Memorial Service at Westminster Cathedral.

Trustees of the Foundation are: Mrs. Verena Schumacher, George McRobie, John Seymour, Leopold Kohr and Satish Kumar. Sponsors are Yehudi Menuhin, Malcolm Muggeridge, Elaine Morgan, Ernest Bader, Edward Goldsmith, Maurice Ash and Gerard Morgan-Grenville.

Would anyone interested in supporting the Foundation and helping the Trustees please write to Satish Kumar, Editor of *Resurgence*, Pentre Ifan, Felindre Farchog, Crymych, Dyfed, Wales.



# CONFERENCE REPORT

## ATLANTA THROUGH THE EYES OF RICHARD WILLSON

During the last decade Atlanta has been the fastest growing city in the US and it is ironical that an ecological conference should be held there, amidst the architectural phantasmagoria that resembles a set from *Star Wars*. One wonders whether the citizens of Atlanta, who were partly responsible for funding the conference, were pleased or dismayed by the message that clearly emerged, that the extravagant trappings of a rich city lifestyle are a certain recipe for disaster.

Although they came from different ends of the political spectrum, it was clear that certain fundamental ideas were common to all present; no-one doubted that the Western socio-economic system is unsustainable. We are faced with a series of crises the synergistic effect of which we are only just beginning to appreciate. As Tom Starr pointed out fifty per cent of the dust in the atmosphere is now generated by activities of human origin, and man must recognise himself as an agent of climatic change. We have been



Tom Starr

living in a period of exceptionally favourable climatic conditions unlikely to recur and it is now urgent to shift the emphasis from high yielding crops that can only function in optimum conditions to those that are adapted to large fluctuations in climate. He proposed a world bank of different genetic strains to cope with changing conditions. Since even such measures could only work where population levels were within the carrying capacity of an area, he further argued that Aid should be confined

to those countries having suitable family planning policies.

Garrett Hardin pursued the same theme in his emphasis on the need for every nation to become self-sufficient. He forecast a sharp decline in trade as energy costs soar and resources become depleted. When minerals are exhausted artefacts and food will become the only trading commodities, and as populations grow there will be fewer surpluses for export.



Garrett Hardin

Declining living standards will have to be offset by social innovations and he pointed to a need for a new ethic which emphasises social responsibilities as opposed to individual rights. Devolution of central power to the State level would be essential. Only in small communities could his life-boat ethic be humanely implemented. Perhaps, too, he said, we have underestimated religion as a force for social control. "When we intellectuals are gone, the bible-punching fundamentalist sects will still be here."

Sharp differences of ideological outlook emerged at this point and the idea of cutting Aid aroused hostility. David Morris maintained that Aid has never been altruistic since it was designed to lock the Third World into the Western economic system. The U.S.A. is probably the only country in the world that could actually achieve self-sufficiency. It should lead the way in developing alternative technology, particularly in the field of energy that could arise out of a decentralised society, and which would be most appropriate to the Third World. Transfer of such

alternative systems would be much less imperialistic than existing Aid programmes.

On the need for devolution and greater regional autonomy Left and Right were agreed. Morris suggested that cities should control their own banks, pension funds and insurance schemes so that neighbourhoods could plan their own development. Other advantages of devolution would be a reduction of travel and a decline in the demand for energy intensive transport; a more direct relationship between governors and governed and a decline in social anomie. As Edward Goldsmith said "By decentralising one is not merely solving one problem; one is solving a whole host."

Medical care was cited by Drs. Armelagos and Katz as a prime example of a system that has become over bureaucratised and unable to adapt. They gave examples of the widening gap in understanding between the medical profession and the patient, and suggested that health care needed to be redefined. Rather than investing in enormously expensive technology that the country may soon be unable to afford, we should be tackling the sources of physical and mental stress.

The question that emerged from all the discussions of alternative futures was how far do lifestyles have to change to bring about a humane and sustainable system and what model does one use for planning a future society? For Eugene Odum, Director of the Institute of Ecology at the University of Georgia,

(Continued on page 29)



Eugene Odum

# ROUND - UP

## A MARGINAL ENERGY SOURCE

It is often said that solar energy, wind-power, geothermal energy and so on are only marginal sources of energy, but so it seems is the current panacea — nuclear power. When Carroll Wilson was researching his Workshop on Alternative Energy Strategies (WAES) report he asked the experts from fifteen countries, who were working with him, to estimate what proportion of their countries' energy requirements would be likely to be furnished by nuclear power in the year 2000. The average answer was 20 per cent, and although they took into account the logistical problems involved in putting up the power stations and associated facilities, it was taken for granted that the necessary capital would be available. Since in America some nuclear power station projects are already being cancelled for want of capital this appears to be a rash assumption. The likely disruption of nuclear development by the anti-nuclear lobby was also ignored in these calculations. Carroll Wilson's own assessment, allowing for the total range of problems, was that ten per cent was a more realistic figure.

He also asked his colleagues what would be the maximum contribution that breeder reactors could be expected to make to the energy needs of their respective countries by the end of the century. The answer was no more than one per cent, a figure which Carroll Wilson also considers should be reduced by half, which makes them totally irrelevant to the problems of the energy gap predicted for the end of the century. His view was underscored by the remarkable conclusions of a recent world energy meeting in Florida

where the American nuclear establishment appeared to be rejecting the breeder reactor. According to Alexander King, ex-Science Director of OECD and co-founder of The Club of Rome, delegates to the Conference tended to regard nuclear power as a temporary expedient to tide us over until alternative energy sources can be developed. Without a permanent nuclear energy industry the fast breeder reactors become totally irrelevant.

## HOSTILITY UNDERMINES NUCLEAR INDUSTRY

Once aroused, public opinion has a vicious bite, as the nuclear industry is discovering to its cost. Forced to defend itself in public, its image sullied, and its integrity questioned, the industry is on the retreat. Now adverse publicity, particularly on the continent, is beginning to hit where it hurts most — at the morale of employees. Disenchantment at its power stations, disillusionment in the universities, and disinterest amongst its would-be prize recruits are all placing a powerful brake on the nuclear bandwagon.

Increasingly, employment in the nuclear industry is being looked upon as distinctly anti-social. Not surprising then that Wouter Van Dieren, a Dutch journalist, reports the symptoms of growing personal stress amongst nuclear employees: heart and stomach diseases, aggressiveness, feelings of guilt and a general despondency are becoming increasingly noticeable and are beginning to worry the authorities.

Perhaps more seriously, the industry is having problems finding the top level recruits that it needs for its programme to flourish. Students who are willing to apply

for a job are probably not the best ones, and at the State University of Groningen, Holland, such was the disinterest that a professor of nuclear technology has been forced to leave because there were no students for him to teach.

'The best students,' warns Hannes Alfven, the Nobel prize winning physicist, "do not go nuclear any more, and many of those already in the nuclear trade are switching over to other activities if they can — and the best usually have this possibility. This is important because it means that as time goes by it will be increasingly difficult to solve those remaining problems in nuclear energy which are not already solved. It is, for example, often claimed that reactor safety and waste disposal problems will be solved more or less automatically with experience. However one should keep in mind that these extremely sophisticated and difficult problems are now in the hands of people who often do not belong to the elite which developed nuclear technology in the past. In fact, it was in part this elite which earlier discovered the dangers of nuclear energy, and publically opposed it — or left it quietly." However much money flows into nuclear research, he went on, "without high quality people to deploy it sensibly, little progress will be made in solving the problems facing the industry."

And where have all the brilliant technicians and physicists gone? Alfven suggests that the field which is proving most attractive to them is alternative technology. This is good news for ecologists — and that can only be bad news for the nuclear industry.

## AGE OF MIRAGES

The technological euphoria of the early 1960s is an eye-opener. Addressing young scientists, in Washington 1966, Vice President Hubert Humphrey gave a glowing vision of the technological marvels that scientists were expected to invent by the end of the century. "If any age," he said, "can claim to be a golden age of discovery, ours can. Yet we have barely begun. Here are some of the developments we can look forward to in the next 20 years. In agriculture, we can expect the large scale use of desalinated sea water: in medicine, the transplantation of natural organs and the use of artificial ones: in psychiatry, the widespread application of drugs that control or modify the personality: in industry, the extensive use of automation up to and

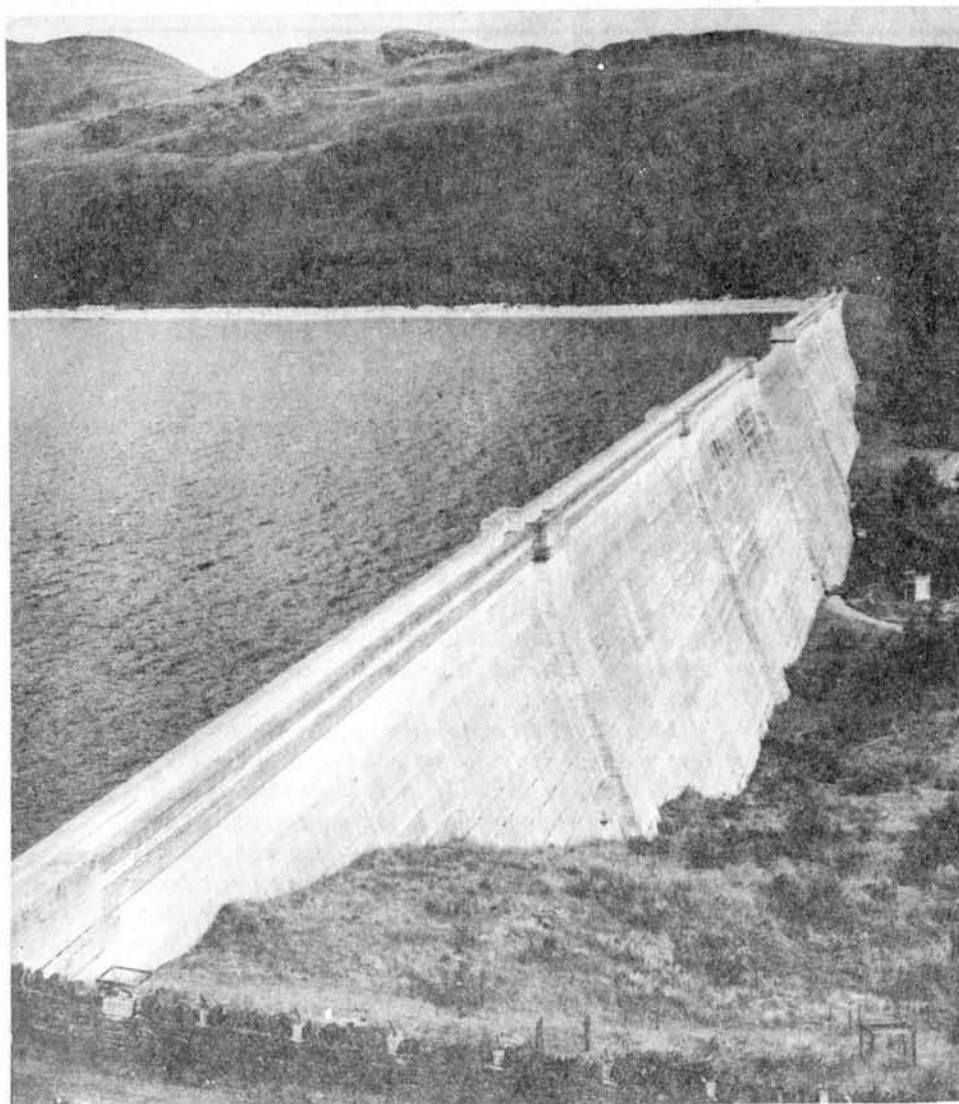
including some kinds of decision making at managerial level: in space the establishment of a permanent base on the moon. Some of you would say that there is nothing very surprising here. And you would be right. Experience shows that it takes 10 to 30 years for a new idea to make its way from inception in a scientist's mind to a general application in everyday life. Therefore, the world of 20 years from now already exists, in embryo, in today's advanced research establishments."

"For the year 2000", he went on, "we can foresee some really far-out developments: the virtual elimination of bacterial and viral diseases: the correction of hereditary defects through the modification of genetic chemistry: the stepping up of our food supply through the use of large

scale ocean farming and the fabrication of synthetic proteins. In space, the landing of men on Mars and the establishment of a permanent unmanned research station on that planet and the creation in the laboratory of primitive forms of artificial life. This can indeed be *the Age of Miracles. It will be your age.*"

Test-tubes in hand, and set-squares at the ready, we are set to march into paradise à la Herman Khan — we have it on the authority of the US Presidential Administration no less. The capacity of government for self-delusion seems to know no bounds. If it is any Age at all, it must surely be the Age of Mirages.





Haweswater Dam

Photo: Barnaby's Picture Library

## DROWNING THE FUTURE

In 1938, the last residents of Mardale, a beautiful and secluded valley in the eastern fells of the Lake District, were driven from their homes by their new landlords, Manchester Corporation. The little stone church, the Old Dun Bull Inn and the scattered farm dwellings were razed to the ground, a 33 metre high concrete dam was built at the head of the valley, and the gentle pastures and tumbling becks of Mardale disappeared beneath the new Haweswater reservoir.

Gradually peace returned to the valley. Although the original beauty was lost for all time, it became once again a place of solitude, a haven for wildlife and one of the least frequented areas of the Lake District (except during periods of low rainfall when tourists would come in coachloads to gaze at the ruined buildings that emerged from the depths).

Now the peace of this wilderness area has again been disrupted by the North West Water Authority's proposal for a new dam, 76 metres high. This is one of four alternative schemes to provide water for Greater Manchester into the 21st century.

The people of Bampton, in whose

parish lies the site of the proposed dam, have good reason to fear that Haweswater will be selected when a decision is announced in Autumn 1978: the water authority owns all the surrounding catchment area; the pumping station already exists and a new pumping station has been built which is apparently larger than is necessary for the existing draw-off, a fact that has not escaped the notice of local people.

As soon as the water authority published its short-list of alternative sites, the Parish Council called a public meeting and formed the Haweswater Action Committee.

The Parish Council's most significant objection is that there is a serious doubt as to whether additional resources on such a vast scale are in fact needed. In their report, the NWWA's 'Best Guess' forecast of the demand for water in 2001 is 3,829 megalitres per day, instead of the 2,247 megalitres per day used at present. The report forecasts a population in the year 2001 of 7,200,000, a mere 200,000 more than it is today. Even allowing for a moderate increase in industrial wastage, the Parish Council question how an increased population of only 2.85 per cent can possibly generate

an increased demand in water of 70.4 per cent?

Other local objections include the loss of a wide swathe of primeval forest which would disappear under water; the devastation of valuable sheep grazing land, which could affect the viability of several tenant hill-farms: the unsightly scar around the lake and the impossibility of satisfactorily landscaping the new dam which would tower over the valley.

The Parish Council is also seeking to promote the introduction of national water metering. They point out that where it has been enforced, as in Malvern, it has brought substantial reductions in use. Before water was available on tap, says their report, the average British domestic consumer used five gallons a day. Now he wastes nearly as much by washing under a running tap and through inefficient plumbing, while the total domestic use per person has soared to something in the area of fifty gallons per day. Since exhortation coupled with the hosepipe ban produced up to 30 per cent voluntary savings during the 1976 drought, it is clear that waste would be substantially reduced by the introduction of even a modest meter charge. The NWWA, however, disputes that water metering would bring any significant reduction in demand.

The Parish Council suggest that the real problem is not one of supply, but of water storage. They propose a series of satellite reservoirs around the great conurbations. Manchester is surrounded by hollow pockets of derelict land which could be used for storage, and have the additional benefit of providing a recreation area on the city's doorstep.

Although the NWWA are conducting Environmental Impact Studies of the four alternative sites, this is contemplated with suspicion by the people of Bampton who know the Authority's past record of obtaining their demands in the Lake District, and in particular because the oversized pumping station seems to pre-empt the issue.

"We feel that the Environmental Impact Studies are just a P.R. exercise, merely to determine the cheapest source of water for the authority," said Gerry Storey, the Chairman of the Parish Council. "We are not seeking just to prevent these disastrous proposals from taking place at Haweswater, but to persuade the water authority that there are other ways in which they can meet their supply requirements. If a scheme of the envisaged size is proceeded with at any of the alternative sites, then it will be another nail in the coffin for the quality of life in that area."

John Bodger

---

# Freeman books for Ecologists

---

## Ecoscience

### Population, Resources, Environment

Paul R. Ehrlich, Anne H. Ehrlich, Stanford University  
John P. Holdren, University of California, Berkeley

We are pleased to announce the long-awaited successor to *Population, Resources, Environment* ..... *Ecoscience*. This new edition maintains the high standard of the two previous editions, while offering expanded coverage of all topics.

ECOSCIENCE is comprehensive. It features:

- a thorough introduction to basic ecological principles.
- a major section on energy problems.
- a strong presentation of raw materials.
- new coverage of geophysical and climatological aspects of the environment.
- a provocative discussion of the potential for social, political and economic change.

ECOSCIENCE is authoritative.

The authors are actively involved in both basic research and public policy. It has been reviewed by experts in the field.

ECOSCIENCE is a valuable reference.

- It includes extensive current information on population, resources and energy.
- Technical data is presented in boxes and a series of appendixes so they will not interrupt the flow.
- Footnotes are given in the text allowing rapid documentation of material presented.
- Some 3000 annotated bibliographic entries appear.
- Comprehensive subject and source indexes are supplied.
- The book is fully metricized with a conventional conversion table appearing at the end.

1977, 1051 pages, 371 illustrations, hardcover £28.40, softcover £12.90

## Managing the Commons

Edited by

Garrett Hardin, University of California, Santa Barbara,  
and John Baden, Utah State University.

The 'commons' are the world's common resources. With the increasing awareness that our natural resources are finite, it has become apparent that *how* we use these resources is of vital interest to all mankind. To maintain the world's resources there must be some sort of limitation placed on the individual's or group's freedom to exploit them. *Managing the Commons* addresses the problem of freedom of individual actions vs. the total general welfare. It shows how obsolete societal norms and sanctions of behaviour can be self destructive. Finally, it provides insight into the fact that population control is a crucial factor in determining if there are enough 'common' resources for future generations.

*Managing the Commons* is an anthology of 26 articles that explore the economical, sociological and ethical implications that must be considered when managing the world's common resources. Selected readings trace the development of the concept of commons and focus on ways in which the potentially destructive concept of independence of individual action may be altered to *promote* man's welfare and survival. This collection includes Garrett Hardin's classic essay 'The Tragedy of the Commons', other original material by the editors, and a new essay by Kenneth Boulding.

1977, 294 pages, 25 illustrations, softcover £5.10

## Ecology and the Politics of Scarcity

William Ophuls

*Ecology and the Politics of Scarcity* is a probing analysis of the political and social implications of the environmental crisis. To continue to grow according to current pattern, employing extreme technological measures, will almost certainly lead to a "technocracy of the kind described by Aldous Huxley in *Brave New World*". The human and moral alternative to our present course, as Ophuls demonstrates, is the creation of small-scale, simple, frugal, steady state societies.

This book is a consistent political argument that modern civilization, which is both a product of the Enlightenment and the Industrial Revolution, has outlived its usefulness.

1977, 303 pages, 13 illustrations, hardcover £10.40, softcover £5.10

---

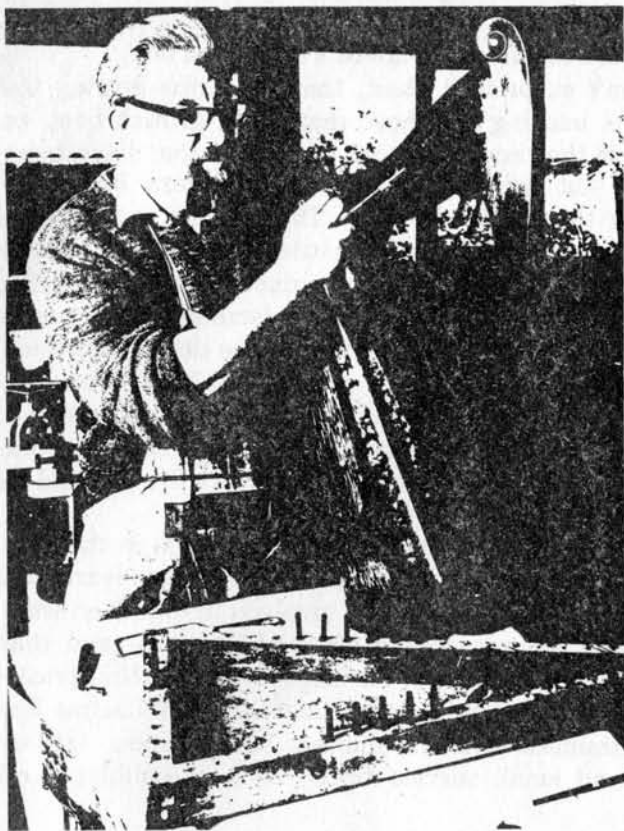
Available through your usual bookseller



W. H. Freeman & Company Limited  
58 Kings Rd., Reading RG1 3AA

---





# Small Trades or Small Industries?

Nicholas Hildyard

**The sudden discovery by the Government that small industries can make a positive contribution to the economic and unemployment problems of this country is a glance in the right direction. But it is not just a question of size. Small manufacturers that are merely satellites of the industrial giants succeed or fail with those they supply. Those that offer most, and most need tax relief, are the small family firms, the craft industries and the local traders whose continued presence is vital to a stable society.**

In the United States, President Carter praises *Small is Beautiful* as one of the most important books of the century and meets Schumacher: In Germany, Herr Ertl, the Farm Minister, fights and wins his battle for higher food prices to protect the smallholder: in Britain, the Confederation of British Industry (CBI) urges the government to give small businesses a fairer deal, the National Enterprise Board (NEB) starts to invest in them, and the government appoints Harold Lever as a Cabinet Minister with special responsibility for the small man: small is clearly fashionable. "The seven million workers in smaller enterprises, and the millions of small employers have been rediscovered like a lost tribe," writes Denis Howell in *The Times* (9.12.77). A realisation that the benefits of gigantism are not all that they were meant to be, is creeping over government. It makes a welcome change from the mood of the fifties and sixties when economies of scale were the order of the day. But has the government got hold of the wrong end of the small stick? And is it in danger of turning it into as hefty a cudgel as that wielded by the 'big is best' brigade?

On March 3rd 1977, the Prime Minister told the House of Commons that he had asked the NEB to investigate the investment potential of the North East and North West. He was concerned, he said, about the high unemployment there — the more so after the closure of Plessey Electronic's factory at Sunderland which threw another 2,000 people onto the dole queue, and raised the level of male unemployment in the area from a depressing 13 per cent to an intolerable 15 per cent. When the report came out a few months later, it was not what one might have expected from the NEB whose popular image derives from its role as saviour of British Leyland: far from plumping for the

large companies as the best investment opportunities, they opted decisively for the small firm. "In the past," said the report, "the North East has benefited from the setting up of factories by large multinational or national concerns. They have provided valuable jobs, but, since their head offices are elsewhere, local ability to determine their own destiny is small and little use is made of local services. Most of the larger companies which have their headquarters in the North East are in industries which are contracting their employment. It is therefore becoming increasingly clear that the smaller manufacturing companies based in the North East must be regarded as a sector with important potential for employment growth." The same prescription is handed out for the North West: it is the small firm that should be encouraged — their capital efficiency is greater, their employment potential higher, and their stability stronger. Even in the harsh economic climate of the past two years, when large firms have been shedding labour, the smaller firms have on the whole kept a constant labour force — sometimes even increasing it. Where money is pumped into larger companies, the NEB stated, its only result is higher productivity, which in the absence of a major expansion in demand, actually reduces employment.

It is by no means the first report to have come out in favour of small industries, and, judging from past experience, one is justified in wondering how seriously it is being taken. After all, back in 1971, the Bolton Report put forward an almost identical message — and it came to nothing. The small firm still had to play second fiddle to their big brothers, who received all the attention, the tax concessions, the handouts and the benefits that they needed to prosper. What makes the NEB report different, however, is that it is intended

as a practical remedy to an immediate problem. It is not the work of a committee reporting after two or three years deliberation, nor yet another political sop to small business interests, exploited for electoral purposes, and then forgotten. It is a down-to-earth recommendation, and one, significantly, that the NEB is following itself. They have an impressive record: since they were set up just over two years ago, they have invested in some 1,500 companies, which, with one or two notable exceptions such as Leyland, have been small. The truth is that small is now economic in a way that it has not been for the last quarter of a century.

Here one comes to the nub of the problem, and the point where government and ecologists part company. Whilst the trend towards smaller units is wholly desirable, the direction that it is taking is not. Small has become economic for the wrong reasons, and investment is going into the wrong type of industry. Quite simply small firms have found favour only when they offer the best source of economic growth and employment for the immediate future.

Increasingly, large companies are finding that money earmarked for investment is being siphoned off into channels that bring no gains whatsoever in output: into maintenance, administration, pollution and health controls, and into other costs which previously they had treated as externalities. One calculation, according to *The Economist* (12.11.77), suggests that 12 per cent of the chemical industry's investment in 1976 was devoted to equipment that did not contribute directly to production. Much of the money going into the steel industry finds its way into current expenditure rather than plant. Despite its capital intensiveness wages are, surprisingly, its largest item. In such circumstances, investment is effectively a handout intended to keep the company afloat. British Leyland is another case in point.

In the United States, the situation is just as bad. Last month, according to an informed source in Washington, the presidents of five major US corporations went to Jimmy Carter and asked him when the United States government was going to start investing in America — by which they meant, in the great Henry Ford tradition, themselves. Staunch supporters of private enterprise to a man, it would have seemed inconceivable a decade or so back that they would be asking for federal aid. Yet costs had risen so fast, they said, that without it, they would be in severe difficulties. A large proportion of whatever money is forthcoming will be used in shoring up the companies concerned, rather than in creating jobs or allowing for expansion.

If economic expansion is what one is seeking, then clearly it makes sense to invest where money will best be employed to that end. Recognised to be more efficient in its use of capital than the large firm, the small industry fits the investor's bill ideally — the more so when there is little money around to invest. Britain, after all, faces an investment crisis (see *The Economist*, 12.11.77). With the added bonus of better communications between management and labour, less frequent confrontations, lower labour turnover, and fewer strikes (between 1967-69, only 1½ per cent of all the firms with 200 employees or less were affected by

strikes), it is not difficult to understand why the small man has become government's blue-eyed boy.

It isn't surprising, then, that the firms getting the greatest backing are those that profit growth best, or that it is the manufacturing industries that have been singled out for special attention. I stress industries because that is what they are. They are not small craftsmen, independent and versatile; they are industrial firms locked firmly into the industrial system. Often making components (such as windscreen-wipers, parts for computers etc.), their fortunes are dependent upon the vagaries of the larger companies. It is estimated, for instance, that if Leyland collapsed, it would not only throw its 200,000 employees out of work, but some one million people working in small ancillary firms would be dragged down too.

Nor is it the manufacturing sector which in the past has been hardest hit. It comes as a surprise to learn that 94 per cent of all those firms involved in manufacturing in Britain have less than 200 employees — and that the average number per business is only 25. Numerically small firms are still dominant. Where the decline has been dramatic is in the number of craftsmen, tradesmen, and small service firms, such as cobblers and

#### CHECKLIST FOR ACTION

- **Investment in Trades . . .** A limit should be placed upon the amount of capital permitted in setting up a new firm. Small traders need little capital so this would ensure that investment goes where it is socially and ecologically most valuable.
- **Rebates for Firms Employing Apprentices . . .** The value of serving an apprenticeship cannot be underestimated; yet small traders can seldom afford to take on an apprentice. Tax rebates should be given to those that do.
- **A Retrospective Capital Transfer Tax . . .** Small firms are crippled by Capital Transfer Taxes; effectively they are a tax on their assets. Large Corporations escape such taxes since legally a Corporation cannot die. A retrospective Capital Transfer Tax should be introduced, payable only if the firm is sold — thus ruling out exemption being used as a loophole for tax evasion.
- **Special Tax Rates for Family Firms . . .** Many small traders rely on family labour for their survival. Such skills passed down from generation to generation are an asset. But with the burden of insurance contributions, company taxes and personal taxes, increasingly they are being forced to take second jobs, or abandon their firms altogether.
- **Special Conditions for Grants . . .** Grants being awarded for building should be conditional on an undertaking to use local material and labour. Grants for new manufacturing firms should only be given to those using renewable resources.
- **Taxes on Growth . . .** To prevent small firms growing into big ones, there must be a tax on growth.



small shopkeepers. In 1930, there were 93,000 small firms employing ten people or less: by 1968, the number had been halved, to some 37,800. In retailing, between 1966 and 1971, the number of small shopkeepers shrank by 31,000. "Since the start of the sixties," writes Rosemary Brown (*The Times*, 21.3.77), "small grocers have dwindled by about a third, while independent shoemakers are down by over a half. Tobacconists, confectioners and newsagents are disappearing at the rate of 1,000 a year. Some 5,000 butchers (more than one in six) have vanished since 1971." From the economist's point of view, none of this is of great significance. If a cobbler is put out of business by cheap, imported shoes, and his place taken by a heel bar in the local shopping precinct, often manned by someone who has no training in making shoes, the economist does not bat an eyelid. After all, the shoes are still getting repaired, and an economic transaction is still taking place — and for the economist that is all that matters. That the shoes are shoddy, do not last long, and are poorly repaired is irrelevant to him: still less relevant is the knowledge that a whole network of economic and social relations have been destroyed with the passing of the cobbler from the community.

One cannot explain this decline in quality by an increase in size: the heel bar is probably no bigger than the cobbler's workshop. The lesson is clear: just because a firm is small that does not make it ecologically desirable, for size is only part of the equation. To give another example. With the redevelopment of Birmingham in the sixties, the old Jewellery quarter, an area of highly skilled craftsmen, collapsed. Unable to afford the higher rents of the shiny new blocks that took the place of their old workshops, the jewellers all but disappeared: of the firms that moved out of the quarter between 1961 and 1971, 85 per cent ceased trading within two years (*New Society*, vol. 38, no. 742). Crucified because they did not conform to cornucopian economics, they have been replaced by a mix of small and large firms that do: boutiques, stationers supplying the offices in the city centre, and department stores. Sadly, this new breed of small man has not been able to piece together the shattered criss-cross of economic ties or duplicate the sheer variety of skills that once made the area such a vital and socially satisfying place to live and work in. The area is now dead, socially and economically.

Wherein lies the key to their failure? In part it is because business — concern for cash flow — has replaced trade: the market mentality has finally crushed the market-place mentality. It is a trend that not only distinguishes the old Birmingham from the new, but which is general to the whole of Britain — and it is the key to the type of small firm that we should encourage. For it is trade that builds up the multiplicity of relationships that help bind a community together: trade between the tobacconist and the butcher, between the butcher and the grocer, between the grocer and the cabinet maker, between the cabinet maker and the publican, between the publican and the baker. Diversity, complexity, variety and interdependence — the very characteristics of a stable ecosystem — are the qualities that emerge from the social and economic interactions that come from trading.

Backing the small industrialist, dependent as he is on overseas markets or servicing the dinosaurs of British industry, will not help re-establish this 'community economics'. It can only increase vulnerability. If Britain is to be set on the road to a Conserver Society, let alone an Ecological one, the time has come to favour the small trader — the really small firm which puts craftsmanship, quality and social responsibility above the demands of rapid turnover. One means might be to follow the example of Mike Frank's Clerkenwell Workshop (see box) and invest in similar projects. But without reforms of the tax structure and the subsidy system, both of which are cut to suit the cloth of the large industrialist, such efforts can do little more than act as a holding operation — a last ditch attempt to salvage skills before they disappear altogether. Special tax concessions must be introduced for family firms; for firms that train apprentices; government grants to local authorities should be tied to how much use is made of local services and resources; subsidies for new enterprises should take into account the quality of goods, the ease of their repair, and their durability; investment should be channelled not into firms that are most likely to increase turnover, but those that will increase the number of traders in their area: and taxes must be structured as an incentive to decrease economic growth (see Box: A Checklist for Action). If small is to be ecological, we must be clear where support is needed. It would be a pity, after all, if we backed the small man simply to let him grow big.

#### Four Hundred jobs and seventy trades under one roof

Sixty thousand square feet under one roof in a Victorian Warehouse in Clerkenwell Green have been converted into 130 workshops housing seventy different craft industries. Here more than four hundred skilled and semi-skilled artisans benefit from Mike Franks' imaginative scheme, which has already received a Certificate of Merit from the Business and Industry Awards Panel. Among those following their trades in the complex are furniture and cabinet makers, watchmakers, goldsmiths, potters, harpsichord makers, illustrators, printers and joiners. Darbey's for example is a family firm of braid makers. Tom Darbey is a spinner, his wife a tassel maker, their son a spinner and weaver and his wife a weaver too. They work in silk cotton and wool making braids and fringes for stately homes the world over. Previously they worked in a small shopping parade in Leytonstone, uncomfortably spread throughout a two storey building and yard. For this unsuitable and oversized space they were paying £4,500 a year. At the Clerkenwell workshops they have space tailor-made to their requirements at half the rent. What is significant about the Clerkenwell workshop is the positive contribution it makes to encourage the craft industries and to create jobs at a fraction of the cost involved in large industries. The cost per job at the Workshop is £500. Compare the National Enterprise Board's £100,000 invested in Kelland Electrics last year in order to provide an extra forty jobs or the £500,000 per job required by BNFL. Obviously it must be economic good sense to support such a project and to provide as a fringe benefit of great social significance, the sort of employment that offers a high degree of job satisfaction.

# A PLAN FOR RURAL INDIA

Shankar Ranganathan

**Although it is universally acknowledged that many of India's most serious problems stem from her millions of unemployed, little is being done. A distinguished environmentalist looks at one solution successfully applied in the U.S.A. in the thirties and asks, is it feasible here?**

The estimated number of unemployed people in India in 1976 was 53 million: 40 million in the countryside and 13 million in the cities. The projected figure for 1994 is 166 million, in more or less the same ratio, for the rural and urban unemployed. This is assuming that the provision of jobs follows the pattern of the last thirty years. Agriculture currently employs 160 million, more than six times the number employed in industry.

It is clear that capital-intensive industry has not helped to solve India's basic problems. Such capital expenditure as has taken place has benefited only a small percentage of the population — those employed in the production and distribution of industrial goods. Earning five to ten times the per capita income of India, the industrial labour force, which is at most five per cent of the population, belong to India's minuscule affluent society. Rural India has subsidised this costly industrial experiment and derived hardly any benefit from it. Affluent villagers, who are but a small percentage of the rural population, own cycles, watches, transistor radios and buy soap and terylene shirts. This is about the limit of industrial influence in rural India.

As a result of rural unemployment, millions are migrating from the villages to the towns and cities, seeking work which is almost non-existent, and adding congestion and chaos to already overcrowded areas. There are frequent exhortations by ministers, bureaucrats and even representatives of industry that labour-intensive cottage industries should be developed. Not much thought however has been given to what these cottage industries will pro-

duce. If they are to cater for the requirement of urban India, which seems to be the gist of current thinking, the logic is wrong. Five hundred million people cannot be employed merely to satisfy the needs of the fifty million or fewer people in India with money to spare for anything more than food and the essentials of life.

There is no question that India faces a Herculean task if she is to overcome these problems. No question either that her problems are greater than any other country has had to face. There can be no easy answer but one method of reducing unemployment, that the Indian Government might seriously consider, is the example of President Roosevelt's Conservation Corps of the early thirties.

## **A Nation Reclaimed**

America had been hit by the Depression and unemployment was at an all time high of 25 per cent. Most of the country's youth were without jobs; crime was on the increase. In March 1933 Roosevelt,

tive programme aimed at the reclamation at the same time of the young manhood of America and her wasting natural resources.

The President's plan was "to create a Civilian Conservation Corps to be used in simple work, not interfering with normal employment, and confining itself to forestry, the prevention of soil erosion, flood control and similar projects. More important than the material gains will be the moral and spiritual value of such work. It is not a panacea for all the unemployment, but it is an essential step in this emergency . . ."

To select the men for his plan all branches of the armed forces and State conservation and welfare schemes were used, together with the Department of Labour. The scheme caught the imagination of the country and a strange new army was born, armed with shovels and living in tents dotted right across the continent. The CCC's defiant slogan "We can take it" was heard throughout the land.

**"Preventing the decadence of young manhood is a problem that transcends all others. A nation's youth is its greatest asset. In 1933, the waste of human resources, as represented by idle young men, staggered the imagination. In the United States, the Civilian conservation Corps was the right answer to the employment problem."**

the newly elected President, called together the Secretaries of War, Agriculture and the Interior, the Director of the Bureau of the Budget, the Judge Advocate General of the Army and the head of the Department of the Interior, and outlined to them a far reaching and imagina-

## **What the CCC Achieved**

Work on flood control was dramatic and the benefits enormous. The Department of Agriculture reported that in the first two years, the CCC had pushed conservation progress ahead by more than ten years. In addition, it stimulated business



recovery. It was a life saver to many small businesses and industries and especially to the communities where CCC camps were located. Over the years, more than 2000,000,000 dollars of CCC appropriations flowed back into business and industrial channels. The actual dollar value of the work performed was from 82 to 90 per cent of the cost of doing it under the best industrial competitive conditions — and this labour was performed by volunteers who had never had previous experience of this type of work.

With an expenditure of 2,969,000,000 dollars the Corps aided directly about 15,000,000 people, besides the enrolled members at least 1,000,000 specialists trained in CCC camps on work

wind erosion. Millions of acres have been denuded of their forest cover; these areas are briefly cultivated and then, because there is soon no top-soil, they are abandoned to become wastelands. According to Dr. Swaminathan, Director General of the Indian Council of Agricultural Research, the annual loss of top-soil from wind and water erosion is six billion tonnes, which represents a loss of some six million acres of cultivable land. The value of nutrients lost amounts to some 40 million dollars and the loss of potential food grains amounts to 300 million. Soil erosion can therefore be said to be costing the country about 1.2 billion dollars annually.

Drought and floods caused by deforestation also cost the country

equal value. It would surely be justifiable to spend one per cent of this value each year to protect and improve India's most important asset and its productivity. 3,600 million dollars would be little more than the CCC spent in their entire nine years of existence. And, it should be remembered, the 3 billion dollars the CCC spent covered the cost of executing projects which added over 2 billion dollars to the value of land assets, and stimulated several businesses and industries. Perhaps more important still, it enabled nearly 3 million young men to be trained.

There is so much that must be done in rural India to build up her land assets. Erosion and flood control through reforestation:



Stumps of trees killed by increased salination in the water



Soil erosion following indiscriminate deforestation



Unemployment and over-population: Could a voluntary labour force provide a solution to their problem?

projects which included thousands of bakers, mechanics, repair men, road and bridge construction workers, radio operators, loggers, surveyors and many others. 40,000,000 acres of farm land benefited from erosion control measures; drainage, ditches and improved grazings. The value of the work completed was estimated at more than 200,000,000 dollars.

#### A Corps for India

More than forty years ago Col. Brayne wrote that soil erosion was the biggest single cause of poverty in India. Today some 225 million acres of land are threatened by water erosion and another 125 acres by

dear. At least a third of the land area of India needs to be forested to afford protection to the soil and to minimise the threat of drought and floods. Today the area of forest is less than half of that and rapidly decreasing.

What value can we put on the 350 million acres which make up the entire soil bank of India, today? This is fifty per cent of the total land area — much in excess of what the cultivated area should be for a country with India's geographical features and erosion potential. Would twenty times the current value of the total annual crop be considered reasonable? Say 360 billion dollars? The country has no other asset of

counter bunding: the planting of windbreaks; the growing of fuel wood forests: the storage of water for irrigation through percolation tanks: the sinking of wells: the development of fish-farming: the improvement of water supply and sanitation systems: and the implementation of better agricultural practices to improve productivity — these are tasks of major importance which should be undertaken urgently. Where efforts have been made in the past to tackle these problems, they have failed. What has gone wrong? Failure has been due partly to a lack of co-ordination which has often led to interdepartmental rivalry made worse by a lack

of understanding. The most important aspect of any scheme must be to provide good training. People must be trained to help themselves; education and training, in India, are grossly neglected. There are very few projects outside those in industry (and very few even in it) where training and development at all levels are given the importance they deserve.

If the Indian Government really means to give priority to rural development, as they say they do, finding the money for a conservation corps should not be a major problem. To consider it one is to admit that money cannot be diverted from industry, because industry generates profits out of which taxes are paid, which meet the Government's expenditure. Tolstoy expressed this attitude about the rural poor better than anybody else when he said: "I sit on a man's back choking him and making him carry me and yet assure myself and others that I am very sorry for him and wish to ease his lot by any means possible except getting off his back."



Indiscriminate burning of trees provides only temporary soil fertility

There is another potential source of funds — the World Bank. It could underwrite a land use programme in India on the lines of the CCC if its members thought that help in this direction was more vital to India than help to build industry which is only widening the gap between the rich and the poor. Returns from improvements to the land could be much faster than returns from industry, which generally has a long gestation period. Thus the World Bank would not only set India on the road to progress, but also would recover

its money faster than from industrial projects. An organisation on the lines of the CCC needs to be set up soon in India. If it succeeds, it could become the biggest project of its kind the world has ever seen. It could provide jobs for millions and increase the nation's wealth through improving its land. Through disciplined training, it could create a large and effective workforce, based in the villages where they are needed and geared to the development of rural India.

# BEE Bulletin of Environmental Education

The essential guide to the theory and practice of environmental education, with emphasis on the urban scene and general ecological problems. BEE includes articles and study ideas from active teachers and creative environmentalists, and news and reviews of interest to all disciplines concerned with social and physical aspects of the environment. Through its problem-oriented approach to environmental studies it seeks to foster the understanding of planning questions which is the necessary pre-requisite of public participation in environmental goal-selection and decision-making.

Past issues are still available as are offprints of key articles. For a list of these and a free sample copy of BEE, please write to:

Education Unit,  
Town and Country Planning Association,  
17 Carlton House Terrace,  
London SW1.



**Annual subscription only £5.00 a year (11 issues).**

## Henry Doubleday Research Association

The following titles by Lawrence D. Hills and Cherry Hills are available from The Ecologist office.

Organic Gardening	Lawrence Hills
<i>Penguin</i>	90p.
Grow Your Own Fruit and Vegetables	Lawrence Hills
<i>Faber Hardback</i>	£3.50
Comfrey, Past Present & Future	Lawrence Hills
<i>Faber Paper</i>	£3.00
The Fruit Finder	Lawrence Hills
<i>H.D.R.A.</i>	50p.
Save Your Own Seed	Lawrence Hills
<i>H.D.R.A.</i>	50p.
Comfrey The Herbal Healer	Lawrence Hills
<i>H.D.R.A.</i>	50p.
Comfrey Report — The Story of the World's Fastest Healer	Lawrence Hills
<i>H.D.R.A.</i>	£1.00
Fertility Without Fertilisers	Lawrence Hills
<i>H.D.R.A.</i>	£1.00
Good Food, Gluten Free	Hilda Cherry Hills
<i>Roberts Publications</i>	£2.00
Living Dangerously	Hilda Cherry Hills
<i>in paperback</i>	£3.00

Please include 20p in the £1 for postage.

Order from:

The Ecologist, 73 Molesworth St.,  
Wadebridge, Cornwall PL27 7DS U.K.



# THE ROAD TO UTOPIA

Ruth Lumley - Smith

**Although the extended family within a self-sufficient, humane community offers the ideal solution to most social problems a study of past attempts to establish a communal way of life shows how hard it is to recreate the bonds of a natural community.**

Is the principle of the communal way of life a valid proposition for the post-industrial age? In the past the extended family, the tribe and the traditional community provided all the social bonds necessary for the effective functioning of the group. Can the same fundamental needs of society be fulfilled by the modern concept of the commune? In the future we shall of necessity have to relearn not only the self-reliance and skills of our pre-industrial ancestors but also the social constraints lost in the maelstrom of the last two hundred years. Can such groups function without the ties of blood, tribe or religion? Do they offer any solutions that a larger and more complex organisation cannot provide?

The concept of *community*, of sharing, of self-sufficiency and mutual aid has fired the imagination of men from Plato to the present day. Not only Utopian idealists and the religious of many faiths, for whom the monastic life has offered a retreat from worldly distractions, but practical men; social reformers and pioneers in a hostile environment in the New World. From medieval monasteries to the present day, history provides plenty of examples. Particularly since the Industrial revolution and the massive emigration from Europe to the New World, there have been many attempts to create the ideal community. Very few have survived more than a limited number of years; by far the greater number have succumbed to the pressures created by schisms and disillusionment among their adherents. Is there a common factor that can be isolated to explain this phenomenon? Is there one virtue or one trait above all that can be said to be the *sine qua non* of a successful Utopia? I suggest that there is, and that this common

factor is discipline allied to a shared concern with something more than material well being. It is no accident that the greater number of successes have been among those with a religious foundation.

Discipline implies leadership, since without the authority of a strong leader, discipline is inclined to soften and controls disintegrate. But this is too simple. Strong leadership and stern discipline may turn overnight to tyranny and dictatorship; equally, blind faith can turn a blind eye to injustice. Leadership and discipline therefore function best when the leaders themselves are disciplined. Examples of such authority are legion: the ship's captain, the matron of a hospital, the leader of an Everest expedition. In these cases the need for unquestioning obedience is not challenged. How strange then, that the idea of submitting to authority is so much abhorred in modern communities. However impractical it is the idea that everyone must be concerned in every decision affecting the group is clung to with passion, while the concept of a *leader*, a trusted — even a beloved — father figure whose word carries authority because he is judged to be wise, is suspect or, as Philip Brachi puts it 'is a soft option'. Is there not a lack of realism in the fanatical belief that government by Group agreement is better than an agreement to accept the word of an elected leader chosen for his proven quality? From most reports of modern secular communities it emerges that lack of leadership has led to lack of the essential discipline required for a community to succeed.

In tribal societies the elaborate web of social relations backed by the forces of traditional rites and customs, create a respect for leadership

and a sense of discipline that is internalised. There is little need for an elaborate set of rules. A council of elders guides the members and the fear of tribal displeasure or ostracism exercises a powerful control. Traditions are passed down from one generation to another and are interpreted by the shaman or headman. They are obeyed without question. Only when the authority vested in him is undermined by the advent of an alien culture — the Church missionaries are a prime example — does the social control that has maintained the tribe in equilibrium, break down.

I met the *siriam* (governor) of the Indians at Samachuqui, a strong intelligent man elected by the males of his community, he held absolute authority. I asked him how long he would serve in office.

"No set time" he answered. "I can be *siriame* for as long as my people want me."

"How do your people pay you?"

"No pay," he replied with dignity. "It is my duty. I have no special privileges. I am the judge when wrongs are done, and I impose punishments. I sometimes represent my people before the state authorities. I order religious ceremonies. I deliver sermons. I settle inheritance disputes."

"Does anyone disobey you?" I asked.

He shook the cane he carried, his symbol of office — a yard-long silver knobbed Brazilian wood staff called a *disora*.

"When I speak over the *disora*, I have authority," he said quietly. "A Tarahumara would sooner kill himself than disobey his *siriame*."

James Norman, *National Geographic*, Vol. 149, No. 5, May 1976

Most successful communities have been based on a common religious belief. St. Benedict, founder of the Benedictine order, but influential also in the formation of rules for other monastic orders laid down the times for prayer and work, ordering every hour by the monastery bell. The monastic hierarchy was practical and comprehensive. No area of doubt existed.

### Monastery Life

The primary responsibility of the Superior was to be the father of the house (abbot derives from *abbas* meaning father) since he was not merely an earthly father but a father in God, he was regarded as taking the place of Christ, and a command from him was to be treated as a command from God, for which reason he was accorded intense respect. Undue familiarity was to be avoided, and all rose and bowed when he passed by. His authority was absolute.

"His command," wrote the *Customs of Barnwell* "ought to possess such a weighty authority over all that no one should presume to neglect or defer whatever he has directed, provided it be not against God."

J.C. Dickinson, *Monastic Life in Medieval England*

The monastic officers were called *obedianties*; they commanded because they obeyed. Nowhere else could those who had to keep order over a large area find men so fit for their business. From the cloisters of the monasteries the Christian kings of Europe drew officers trained in regular habits of routine, business and accountancy, and still more important, in ideals of public service. The Church offered a far wider choice of public servants than the Feudal families.

Arthur Bryant, *The Medieval Foundation*

In an age when there was so much lawlessness, and when the idea of control was so uncommon in the ordinary life of men, the monasteries were schools of discipline, and there were no others. They upheld and exhibited the then almost original idea that men needed to rule and govern themselves; that they could do it and that no use of life was noble and perfect without this ruling.

Dean Church. Quoted in *Monastic Life in Medieval England*

The most successful communities in eighteenth and nineteenth century North America were those created by religious sects that had come out of Europe. Among the most remarkable were the Hutterite Brethren whose way of life was preserved through centuries of persecution in their countries of origin in central Europe. They emigrated to Canada and to South Dakota where they established communities so strong that they have survived even the pressures of modern society. The faith that binds them and holds them together to this day is expressed in the Articles of Incorporation filed when they first arrived in their adoptive country. They define their purpose as follows: "The fundamental principles of our faith, as concerns practical life, are community of goods and non-resistance. Our community life is founded on the principles of 'What is mine is thine', or in other words, on brotherly love and humble Christian service."

It cannot be doubted that they achieve their aims through stern discipline and acceptance of a set of rules that permeate every aspect of their lives. Each community is presided over by a head Preacher and a council of Elders. Equally successful have been the Doukhobars who emigrated from Russia to Canada in 1899, and the Amanites who established a series of Amana village communities in Iowa in the 1850s. Like the Hutterites their life is simple, industrious and austere, and all their doings relate to their common purpose of serving God.

### New World Communities

What was the reason for the success of these nine societies? That eight of them were religious communities is an important but not a necessary condition of successful communal living. Owing final allegiance to God, implicitly obeying His representatives — who were often credited with supernatural powers — and using communism as a means to an end, it was natural that the sectarians should submit easily to order and discipline. The non-religious did not submit so easily. Many of them such as the younger Icarians\* had been rebels against civil authority before joining communities, and they were too inclined to remain rebels against all discipline. For them com-

munist was an end in itself, and they would not tolerate the strict moral government exercised by the religious groups. They were impatient for change; but the abolition of evil by a mere change of environment, as predicted by Owen and Fourier, never came; instead dissension usually proved that human waywardness dies hard. The Icarians were exceptional. They alone succeeded in substituting communism for religion — but at tremendous cost in hardship and misadventure. However they prove the truth of Nordhoff's assertion that 'a commune, to exist harmoniously, must be composed of persons who are of one mind upon some question which to them shall appear so important as to take the place of religion.'

Mark Holloway, *Heavens on Earth*.  
Dover paperback 1966

\* The Icarian communities were founded by Etienne Cabet who brought his followers out of France in the 1840s. They settled in New Orleans, but subsequently moved to six different locations. Although they survived incredible hardship in pursuit of their Utopia, they finally came to grief in 1898, split by internal schisms.

Of an entirely different order among recent experiments in community living are the Kibbutz — or Kvutza — in Israel. The passion that informed the pioneers of the early settlements was their vision of a Jewish National Homeland. The land in which they settled was so poor, and the funds available to them, so meagre, that they were driven through necessity to join together and form farming groups. Thus it was initially for survival in a harsh environment that the Kibbutz system arose, and it was their determination to wrest a living from that land, that held them together and gave them the will to overcome incredible hardships. Many of the earliest pioneers, especially the young settlers, expected a degree of freedom that proved disastrous. They had come to escape the persecution and pogroms of their countries of origin and they were suspicious of all authority.

They came from oppression and easily became contemptuous of order as such. They were ready to sacrifice health and even life, but they were impatient with regular work and sober routine . . . in the proper mood they could work with superhuman energy, but the following day they were listless and unable to work . . . like any other group the Kvutza had to go



through the process of self-discipline. It had to co-ordinate and regulate its functions. This stabilisation claimed its victims. Those who could not bear the disillusionment left for the cities or emigrated or in some tragic cases committed suicide.

*Co-operative Living in Palestine.*  
Henryk Infield. Kegan Paul 1947

other hand the growing dependence of the kibbutzim on sophisticated agricultural machinery and modern technology make them a less significant model for a post-industrial age.

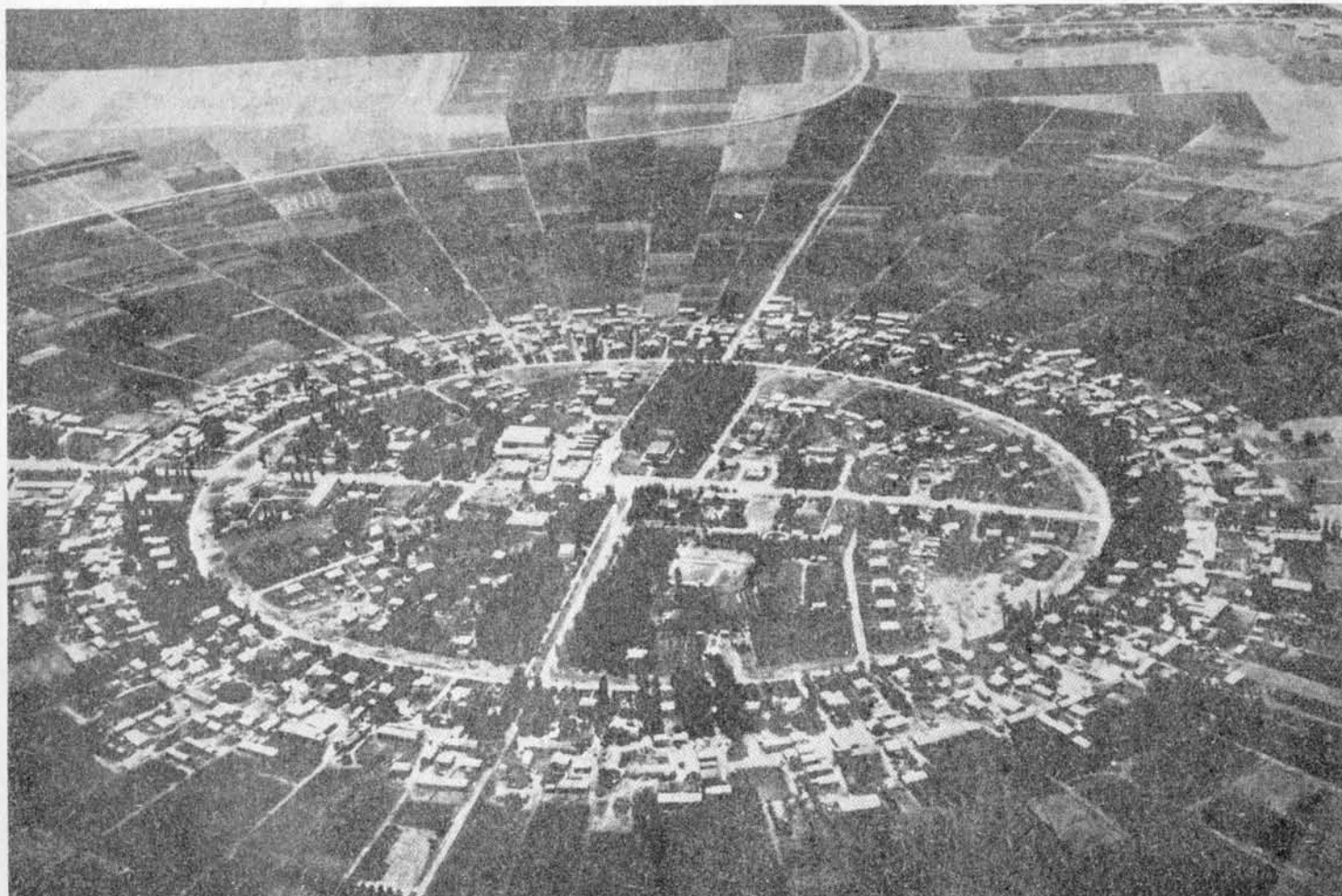
Kibbutzniks, or at least all those I talked with, are quite aware that, while they wish the kibbutz were the universal image of the good life, as it is for them and many others, it is not for all. They are also very concerned about the number of persons who leave the kibbutz. They are well aware that the kibbutz movement has so far survived, has even grown in population, not so much by keeping or increasing its own, but by attracting new blood from the outside. And a great deal of effort goes into recruiting . . . both in Israel and abroad. . . . It is impossible to say what the kibbutz would be like today if no one had ever left. What divisive, even disruptive influence might its leavers have exerted had they stayed? Or what reforms might they have pressed for and got through? This question is important because kibbutz educators wish to feed Israeli society with future leaders for the good life. I found the system of education strangely contradictory . . . its

goal is to have the next generation carry on kibbutz life exactly like their parents, and also wield moral leadership in Israel (if not the world), preferably as political leaders. I have mentioned the feeling of many thoughtful Israelis that were it not for the kibbutz, the creation of a new state simply to harbour a persecuted religious minority would by now be of limited appeal.

*The Children of the Dream*  
Bruno Bettelheim. Paladin Paperback 1971

During the nearly seventy years since the first kibbutz was founded the movement has grown and adapted to the changing scene. The single most significant change has been the modification of the pioneers' vision of unpaid work. Originally conceived as an agricultural co-operative with a high degree of self-sufficiency, a large number have now developed industries turning out processed foods, plastics and electrical goods. With the increasing complexity of kibbutz economy this had led to hired labour in direct contradiction with the socialist ethic (see *Israel Society* in *Encyclopaedia Judaica*). Perhaps the most remarkable feature of the movement has been its flexibility and ability to survive profound changes. On the

The common factors that emerge from this brief look at communities established before 1914 is that those that were successful were essentially inward looking. They were established and maintained to provide a *modus vivendi* that would realise the spiritual aspirations of a particular and exclusive group of people. Membership was strictly confined and the rule proscribed the extension of the society to embrace those who did not conform. The size of the community was clearly important. The Hutterite custom of subdividing, in order to keep each community to the ideal of 150-200 people suggests that the stability of the



Co-operative farming in Israel

commune depended to a considerable extent on the leader both knowing and being known by every member. Clearly the qualities most valued in community life, and those required of the members of those societies we have described as successful, are those of industry, prudence, thrift and unquestioning obedience. While these are admirable traits and of unquestioned value in any context, they are not, and never can be enough for a complete society. A living society must embrace innovators, philosophers, artists, rebels and wits. It must be animated by a spiritual conviction.

What of the modern communities that have mushroomed in the thirty years since the end of the last war? Have they found solutions undiscovered by earlier experiments? The record shows that many have failed. It would be invidious to generalise about the reasons, and it is difficult to get an objective view once the communards have dispersed. However BRAD (Biotechnic Research and Development) was one that attracted considerable notice in its time. Here Philip Brachi reflects on the reasons for its demise.

#### *Reflections on a Deceased Community*

Measuring a commune's success by its years on the ground (or quite different perhaps, by how long the average member stays), is like gauging human well-being by economic growth or a people's spiritual growth by their church attendance. Asked to write a piece about why the community in which I lived for two and a half years failed, I want to challenge the premise. It is true that it came to an end, but looking back with understanding I am now certain that it was not a failure.

Strong leadership, or at least a binding common cause or creed, is usually deemed essential for any enduring community; and that is probably correct. But for a community to work well in terms of personal growth — and after the communal experience that, for me, is the essence of what life, and *a fortiori* communal living, is all about — then something of the opposite is true. In accepting leadership one is agreeing to boundaries: limits to personal responsibility and possible evolution. Whereas, if the underlying aim is to enable each individual to realise his or her whole

self, boundaries play no part. Gently, voluntarily approached, such an aim is, I believe, quite compatible with building a communal home, running a farm or whatever the group's material *raison d'être* may be; it can become transcending, but need not be all-consuming.

A leader, though, offers a soft option: a mother or father figure to love, hate, shelter behind or stab in the back. Self-consciously libertarian perhaps, our own early efforts at being leaderless were not very successful. We agreed responsibilities and tried to reach all major decisions by common consent; it meant much talking! One or two amongst us, established leaders in the jobs they had left and fearful of the progress of the crucial building programme, found the role hard to relinquish. Others, myself included, were nervous at such directly physical responsibility, and tacitly sought dependence. Leaderless it is less comfortable for everyone; but then growing up was never an easy ride.

Our venture therefore resisted direction; instead it evolved, steered by an aggregate of individual wills, resulting sometimes in synergy, sometimes attrition. Naturally enough this caused problems; though these were not necessarily negative or unproductive in the lives of the eight or ten of us there.

As with marriage or any new venture, we each entered the commune with a fantasy; not in the sense of mad delusions, but a well worked out scenario of expectations. For a time you project, superimposing your fantasy upon unfolding reality; until the scene diverges dramatically from your personal script: your wife walks out; the newborn calf dies; the home-made windmill fails to work; your husband sleeps with the woman downstairs; the barley crop rots. Then you either freak out completely, adjust your fantasy, or draw a deep breath and begin to grow up.

In such a situation the community's founder, probably by definition the person with the longest-running and most detailed fantasy, is likely to be the first casualty of disillusion. This happened, and fifteen months into the project we lost our obvious if unofficial leader. Some joined, but more left: a year later we were reduced to just four adults.

We spoke and wrote of freedom, but when we had the chance to know it fully, we felt its threat of change, profound, personal, painful at first. Rather than face that growth, sooner or later, on one pretext or another, most took

avoiding action. The end was in July 1976.

Looked at in this way the modern community seems to offer little upon which to found a complex, vital and stable future society. If its members regard it primarily as a place where they can realise themselves without, apparently, submitting to leadership or discipline, they are irrelevant to society as a whole. Philip Brachi's exposition indeed crystallizes what I take to be the fundamental weakness of the modern concept of community living. The obsession with personal freedom that is the very antithesis of freedom as it is understood in the religious sense as embodied in the words "Whose service is perfect freedom." (*Book of Common Prayer. Second Collect for Peace*)

To offer a serious solution for the future communities must then be capable of expanding beyond the acknowledged requirements of a common good for a select society towards the *uncommon* ability to absorb a much wider range of social needs. They cannot recreate the in-built constraints of the extended family or the tribe. But they can seek to adapt what is best from them to the requirements of a changing situation. They will be valid only when they apply the lessons of the past to the realities of the present. The road to Utopia is littered with failures.

#### DEMOCRACY

One point among the many in which we detect the hold of abstraction is the authors' emphasis on democracy as the governing means. Maybe this is simply because we are not very ready democrats, having seen nothing to convince us that democracy does not in practice result in the vitiation of the industrial conscience, the compromised rule of, at best, the highest common factor, and paradoxically, a very efficient vehicle of individual despotism. But in so saying we know we are swimming against the tide of opinion. For vast numbers of people, as Aldous Huxley was saying in the 'twenties, "The metaphysics of democracy . . . has become a universally and absolutely true theology which it is all humanity's highest duty to put into practice" regardless of the practical requirements of each particular case. We would argue that the democratic design is intrinsically artificial, and that in a living community, government should either rest with those with the greatest experience — perhaps a group of 'elders' — or with that curious amalgam of obedience and shared decision-making, which characterises a monastery.

John Lane and John Moat. From a book review in *Resurgence*, October 1977.



# THE HIDDEN COSTS OF NUCLEAR ENERGY

by Colin Sweet

**A lynch pin of the pro-nuclear argument is that atomic energy provides cheap electricity. Many are sceptical of such claims, realising that a lot of figures have been omitted from the accounting — the cost of R and D, of dismantling the obsolete stations and of waste management — but having no access to all the figures, such scepticism has remained little more than a hunch. Colin Sweet was a witness at the Windscale Inquiry. Using conventional economic accounting, he shows that nuclear power must be considerably more costly than has ever been admitted by any of the authorities. The CEBG claims that reprocessing amounts to no more than 8 per cent of the total costs of nuclear generated electricity. According to Sweet, the costs are 20 per cent — and that 20 per cent is of a much higher figure.**

The economic benefits of commercial nuclear power have always been presented as a reason for its growth and development. Without such a claim to buttress its demand for capital and scientific manpower, it would not have been an acceptable alternative to fossil fuels. In the competitive energy markets today, this claim is if anything more important as the real costs of energy rise, and the demand becomes increasingly price sensitive.

Yet the nuclear power industry in the U.K. has never demonstrated or been required to demonstrate, that it really is the low cost producer that for the last fifteen years it has claimed to be. The contradiction is to be explained by the power of the corporate institutions, which in certain cases are able to sustain their economical image by their political and institutional power. Whether in the long run, it is possible to maintain such an image, contrary to the market forces, is

debatable. It will depend on how much real price competition there is in the given market, and upon other factors, including state policy. The extent to which the state through complex funding systems and elaborate tariff and pricing policies is able and willing to sustain a particular industry, either for non economic reasons, or because it cannot resist the autonomous power of the corporate institutions, is a factor which must loom large. In the history of nuclear power these are threads which will be found to be continuously woven into every stage of development. In the United Kingdom, it should be remembered that unlike other countries, especially the U.S.A. and to some extent the German Federal Republic, the nuclear power industry has been from the first within the state sector. Politically speaking it has never accomplished the transition from being a military supply industry to that of a commercial enterprise. Had it been subject to the operation of the price system in the classical liberal model, the industry would have evolved differently, more open and less protected than it is today.

*Indeed, if it could have been effectively demonstrated at the Windscale Inquiry that the economic cost is high, then the trade off between cost and risk, which is implicit in the total presentation, would have collapsed as a proposition and an important pillar on which nuclear power policy rests would have been severely shaken.*

Nuclear power costs are normally divided into the capital costs, which are recognised to be high, and fuel cycle costs, which are usually stated to be low. The conventional appraisal of the competitive position of nuclear power *vis-à-vis* fossil fuels in particular has hinged on this particular cost structure. Thus it has been held, that if nuclear fuel cycle costs are low, an increase of several magnitudes in the cost of uranium will not have an important effect on overall generating prices. In principle the CEBG, adhered to this position at

Windscale in their first submission. Indeed, the only economic statement they offered at all, was that as re-processing costs were only 8 per cent of total generating costs, any rise in reprocessing costs as a result of THORP would have only marginal effect on the price of electricity. But before the Inquiry was completed it was revealed in reply to questions asked by the Windscale Appeal that the following cost structure now obtains.

Table I

	Fixed costs pence/kWm	Fuel etc. pence/kWm
1974/5	.34	.14
1975/6	.28	.39
1976/7	.24	.45

These figures which have not been released publicly show a dramatic change in the cost structure of nuclear power. In 1975 a CEBG study contended that the capital cost/fuel cycle ratio was 70:30. Now it is shown to be almost 35:65. The CEBG claimed at the Inquiry, as a part of the case, that reprocessing costs are only 8 per cent of total costs. As we show below this is plainly not true, in the light of their own breakdown of costs as given in Table I.

The question arises, as to what has caused the sharp reversal in the capital cost/fuel ratio? It cannot be because the fuel costs have remained relatively steady while capital costs have fallen. Alternatively it cannot be because fuel costs have risen while capital costs have remained steady. Neither explanation accords with the known movement of prices and costs. Fuel cycle costs have certainly risen, and very rapidly, so that the prediction that they could exert no more than a marginal effect on total costs has been exploded. But that alone does not explain the situation. The capital costs of nuclear power have also risen by an enormous amount — indeed this must be the most disturbing feature of the whole trend of cost for those who believe in cheap nuclear power. The explanation lies

in two facts a) both fuel cycle costs and capital costs have risen, b) fuel cycle costs appear to have outstripped capital costs, because they are being more truly reflected in current CEGB figures. Capital costs on the other hand, appear to be lower because they are based on past costs (with hidden subsidies), which have been outdated by inflation. The present capital costs, and future costs of the AGR programme, which we know to have risen by an order of magnitude, are not yet showing in the particular accounting system that the CEGB uses. This time-lag in the statistics, makes the published figures for generation costs of only limited use. As we show below the last

raise the cost of the non-nuclear stations. Hence when figures of different costs for nuclear and non-nuclear stations are published, an adjustment for the favourable load factor to nuclear stations ought to be made which would have the effect of raising their economic cost above their operating costs, and compensating the other stations accordingly. This is not done. However no distinction is made when it comes to *pricing* electricity. Hence, the relative cost efficiency of stations is concealed in the pricing system. If the price of nuclear power rises above that of say coal fired stations, this will not be known by the consumer. All he will be aware of is that the cost of electricity is rising.

amount to 2,400 dollars. For reprocessing costs to be only 8 per cent of the fuel, it follows that the total generating costs would have to be 5,626 dollars. This is clearly not the case, because the real figure is 2,400 dollars, and reprocessing costs are 20 per cent of total costs, not 8 per cent.

At no point in the Inquiry were BNFL able to make the economics of the oxide reprocessing plant (THORP) convincing. BNFL sought to argue that the ultimate viability of the project was that the profit lay in the foreign contracts and these would be cost plus contracts. They clearly believed in the infallibility of cost plus contracts, and indeed the Inspector said that it was his under-

**TABLE II** Cost Escalation in Fuel Cycle Costs in \$ per kilogram

	I 1968 to 1980	II 1969 (only)	III 1970-80	IV 1972 (only)	V 1976	VI 1977	VII (IAEA 1976)	VIII BNFL	IX Recycling via THORP
Uranium Oxide	17.5	15.4	17.5	22	66	66	339-500	292.4	1336
UF 6 Conversion	1.32	2.31	23.5	1.35	9.7	7.7		17.24	8.6
Enrichment	30	26	42	42	80-120	110	296-450	182.00	197.2
Fabrication	86	82.5	70	70	120-150	75	120-150	122.4	17.0
Shipping	8			5					59.5
Reprocessing	27.4	32.5	45	35	150-300	425	150-300	425	
Waste	4.30								
Financial change	10								
Aggregate	184.52	158.71	161.02	175.35	425.7-645.7	683.7	905-1400	1039.04	1618.3

**SOURCES:**

- COL. I** Bonanni et al "Nuclear Fuel cost Trends up to 1980" IAEA Conference on Economics of Nuclear Fuels Gottwaldow 1968.  
**COL. II** Hundt "Fuel Cycle Costs for Medium Sized Light Water Reactors" IAEA Istanbul 1969.  
**COL. III** Edison Electrical Institute estimates. Given in "The Nuclear Fuel Cycle" ed. Eliot and Weaver. Univ. of Okla. Ph.  
**COL. IV** U.S. AEC (now ERDA) "The Nuclear Industry 1973" WASH 1174 US Govt. Printing Office Washington D.C.  
**COL. V, VII** R. Krymm 2 A New Look at Nuclear Power Costs IAEA Bulletin IAEA Bulletin VOL. 18 No. 2.  
**COL. VI, VIII & IX** C. Allday (British Nuclear Fuels) The Windscale Inquiry July 1977 Dept. of the Environment transcripts.

ten years of capital construction figures which the CEGB has not incorporated in its current output figures, are exceptionally heavy. The effect of this will mean that when these new stations are on stream, and if the fuel cost is fully reflected in the figures, the leap in the total cost will be staggering.

The effects of nuclear costs on electricity prices is distorted again by the peculiar accounting practices used. Nuclear stations are costed separately from fossil fuelled stations. They operate on base load, which means that they have the economic advantage that they are run for the maximum hours in the year, compatible with safety and maintenance requirements, while the fossil fuelled stations are run normally well below their capacity. This keeps the cost of nuclear output down, while relatively it must

The rise in reprocessing costs was not known until the Windscale Inquiry. It was assumed that the world price of 30-40 dollars per kg. in 1973/4 held for the U.K. The underlined figures in Table II show what has happened to prices since then. The announcement by BNFL at Windscale that this base price to domestic consumers would be 450 dollars per kg. (exchange rate of \$1.7 to the £ sterling) came as a shock. The likely effect that it has had upon the total fuel cycle cost is shown by totalling the shopping basket of items given in the columns of Table II. Now it can be seen why the CEGB figure of 8 per cent for reprocessing costs, given at the Inquiry is not a true figure. Column IX shows the fuel cycle at 1600 dollars. As we can see from Table I, fuel cycle costs are approximately two thirds of total costs, which

standing that the project would not proceed if the Japanese contract failed. The base price for spent fuel service for foreign contractors was given at £160,000 per tonne, and for home consumers £250,000 per tonne. In return for the lower price the foreign contractor pays in advance and thus provides capital for the early stages of construction. This is the same system that was adopted by BNFL from 1970 onwards when it began to build its gas centrifuge plant for uranium enrichment at Capenhurst under the Tripartite treaty with Holland and West Germany. The result, as its managing director was reported as saying in the *Financial Times* (16.9.77), has been a shortfall of orders. The scale of the Capenhurst plant has been extensively downgraded, while the cost of the enrichment service has escalated several



times above the basic price. This should not surprise anyone. To believe that cost plus contracts can guarantee profits, is to believe in suspending the law of markets. Faced with far higher prices than they contract for, buyers will move away to other sources of supply, or they will build their own facilities, or, eventually, they will do both things simultaneously. This is precisely what Western Germany, which has the largest demand for reprocessing in Western Europe, is preparing to do.

BNFL admitted that the cost of one tonne of reprocessed fuel, after enrichment and fabrication would be over £800,000, and that this would be *twice* the cost of fresh uranium fuel. This clearly made nonsense of the supposed economic benefits of reprocessing. As for the costs of nuclear power stations themselves, we are already seeing a massive escalation in these.

When all the AGR stations come into operation the 1966/7 figure of .69 p/kWhr will be seen to be a gross underestimate. Table III shows

that the cost of the five AGR stations is over £3,000 million.

It is interesting that Professor David Henderson has produced his own estimate independently of the one given at Windscale, and his is over £3,700 million. At Windscale the CEGB tentatively suggested that AGR power would cost 1p/kWhr. My own estimate is between 1.5 and 1.8 pence/kWhr. Certainly the days of cheap nuclear power, which probably never existed, will have to be acknowledged publicly to have come to an end.

**TABLE III**

**Capital Costs of the AGR Programme**

	Construction	Interest during Construction	Initial Inventory plus interest for 3 years	R & D Charge	Total cost of reactor
Dungeness 'B'	320	224	£40	na	584
Hartlepool	250	137.5	£40	na	427.5
Heysham	270	135	£40	na	445
Hinkley B	147	65.5	£40	na	252.5
Hunterston B	163	72	£40	—	275
Total cost of Programme	1150	634	£200	na	£1984m
<hr/>					
Total costs to 1980	= £1984m + R & D				
Plus interest on capital over 20 years	= 971.25				
Total cost	2855.25 + R & D				

The Wadebridge Press Announces:

## THE STABLE SOCIETY: ITS STRUCTURE AND CONTROL: TOWARDS A SOCIAL CYBERNETICS

by

Edward Goldsmith

There is much talk of a steady-state or stable society. Few however have considered what this really implies.

In this book the author considers a traditional human society (one that has not disintegrated into the atomised society we live in today), as a natural system and shows how it is controlled and hence how its stability is maintained.

The book is divided into four chapters based on papers that have appeared in *The Ecologist* from 1974-76.

1. Society as a System.
2. The Family Basis of Social Structure.
3. The Religion of a Stable Society.
4. Science and Social Control.

These are supplemented by 12 appendices.

The author hopes that this book will stimulate a new approach to the study of human societies — one that might be referred to as 'Social Cybernetics'.

**Price: £3.80 hard cover**

**£2.60 paperback**

# WASTE MANAGEMENT BUYS TIME

Andre Van Dam

"Wilful waste makes woeful want"  
(Scottish proverb)

Waste management is no cure-all. It is a state of mind that aims at trade-offs between public needs and private wants — between investment and consumption — this generation and the next — growth and equity — productivity and employment. Above all it buys time while long-term programmes for resource conservation are set up.

The definition of waste is complex. It is difficult to distinguish between waste and residues, between consumption, luxury and extravagance. Armaments and arson are evidently wasteful. What about feather-bedding, absenteeism and lockouts? Obesity and slimming devices are pure waste. What about traffic jams, queueing and reams of paperwork?

There are four types of waste which lend themselves to rational management. Conservation of energy; recovery of inorganic and organic resources; avoidance of premature obsolescence and the use of human talents and time.

## Conservation of Energy

According to Ford Foundation's Energy Policy Project, at the end of this century the U.S.A. can save as much energy as it presently consumes — 88 quadrillion BTUs. The Worldwatch Institute reckons that the United States waste more petroleum than the Third World consumes. From 1949-1974, Western Europe trebled its energy consumption, while Japan quintupled it. In the same time, the share of natural gas and petroleum in total energy demand rose from 15 per cent to 65 per cent in Western Europe, and in Japan from 10 per cent to 75 per cent. Clearly, energy conservation is the pivot of rational waste management.

Is energy conservation a matter of price? Price-demand elasticity remains to be tested. It is estimated that a *real* increase of 10 per cent in the consumer price will decrease demand by 2.5 per cent. However, an indiscriminate price increase penalizes small and economically weak consumers. Waste management would call for a steeply progressive energy tariff, proportionate to the rate of usefulness and wastefulness of processes and products as well as to the deterioration they cause in the environment.

Energy conservation can be achieved too by the reduction of the distance between home and work; the thermic insulation of homes and buildings; the utilization of low-quality energy where high-quality (high temperature) energy is not required; waste reduction in private oil furnaces; in collective heating facilities; in energy plants themselves. Electric and nuclear

plants discharge a trillion gallons of waste heatwater in the nearby streams and lakes, causing ecological hazards of great magnitude. Such heatwater must be utilized to provide nearby manufacturing industry with steam; residential homes and offices with hot water; greenhouses and aquaculture with warm water.

Conservation of energy also calls for solar, tidal and wind energy; liquid and gaseous fuels from coal; geothermal energy and biomass — rather than nuclear power and petroleum. Solid waste (refuse) can be transformed into fertilizers and steam. America's solid waste could yield sufficient energy to yearly save half a billion barrels of petroleum, partly by recycling and partly by direct conversion.

One BTU thus saved is cheaper than one BTU generated. It frees financial and other resources to stimulate growth where it is most desirable. It calls for the computation of energy costs in processes and products. This can be most immediately applied in the area of power and speed.

**Conservation cannot alter the finite nature of conventional energy sources but waste-management can delay their ultimate exhaustion while plans for an alternative future are developed.**

## The Waste of Wheels

The private motor car has lightened man's burden and has quickened his pace. It has brought supermarkets, tourism and new horizons. Its ripple effect in manufacturing industry is prodigious. It has indeed become the pivot of modern society. It also happens to constitute a leading source of waste. Half the petroleum fed into the internal combustion engine is lost in the transition to power and speed. Motoring weakens man's roots in time and space, disables and kills millions of people and contributes heavily to mental and nervous disorders.

The motor vehicle causes heavy air pollution. For instance, over the past ten years the emission of lead by automobiles in the United States has risen five-fold. Moreover wastefulness can be measured in mileage-per-gallon (mpg). Some years ago the average limousine performed only 10 mpg. The U.S. Government now demands an average 24 mpg by 1980, in order to reduce the burden of petroleum imports. Furthermore waste management stretches the life of the motor car from the present average of 5 years to, say, 7 years. In addition, resource recovery upon completion of a car's lifetime should be mandatory. The motor industry absorbs 5 per cent of all plastics, 10 per cent of all aluminium and copper, 20 per cent of all steel and ferrous castings, 30 per cent of zinc and 70 per cent of lead.

The ultimate effect of such measures upon the economy is difficult to gauge. It depends largely upon the way in which the consumer will apply the resources freed by more judicious husbanding of the private motor car. It will entail a change in lifestyle, reduce the suburban sprawl, transform commuting patterns, alter urban planning, induce leisure activities, e.g. gardening, furniture-building, reading, community



recreation. Shifts from energy-intensive motoring to labor-intensive ways of life amplify total employment, and enrich work and leisure.

### Recovery of Resources

The United States produces 4 billion tons of solid waste per year. It consists of 65 per cent agricultural, livestock waste, 25 per cent minerals and mining waste, 10 per cent manufacturing, consumer, distribution and community waste. The environmental risks of waste disposal focus on recovery of household waste. The US Conference of Mayors anticipates that half the cities will no longer dispose of sanitary landfills by the end of the 1980s.

The rag-and-junk man illustrates that resources recovery is nothing new. He has been replaced by the 700 firms forming the U.S. National Association of Secondary Materials — which collect, convert, manufacture, process, recover and/or refine waste products. Such a procedure obeys economic criteria, to the exclusion of ecological, ethical and geopolitical ones. It is for instance reflected in the facts that capital gains tax exemptions, depletion allowances, preferential shipping rates and federal and other procurement specifications favour virgin materials over recycled ones. A reversal of the existing trend is overdue because secondary production is less energy-intensive and nature-polluting than primary production.

Recycling can be complex as reflected in plastics, which are non-biodegradable. Over the past 7 years, Japan increased its output of recycled plastics tenfold. It crushes plastics into a molten, uniform material which is mixed with paper and sand and nails — to produce benches, fence rails, gutters and drain pipes. In addition, Japanese farmers protect crops with recycled polyvinyl chloride pellets.

The U.S. Environmental Protection Agency indicates that every ton of recycled steel saves 100 kilos of air pollutants, 25,000 liters of fresh water, enough electric power for one average American home during 8 months. Glass is a recycling problem, due to the backward distribution channel and crushing technology. Yet, glassphalt is a good example of turning used glass profitably into solid roadpaving material.

### Waste of Time and Talents

The waste of people's talents and time is tragic. To be unemployed is to be deprived of income, of hope and self-respect. To be underemployed is to fritter away time and experience in tasks far below one's capacity. Featherbedding and absenteeism are waste which man inflicts upon himself and others. Society-at-large ultimately bears the cost of strike and work stoppage. Bureaucracy and queueing-up constitute the wasteful cost of large organizations.

In considering manpower as capital, rather than cost, society-at-large improves not only the quality of work, but also that of life itself. Reduction of wasted talent and time should bring about a new feeling of self-realization; closer kinship between work and leisure. It would call for smaller work units, training and recycling of manpower.

Meaningful employment and leisure can diminish societal ills such as juvenile delinquency, divorce and

alienation, drug addiction and suicide, and violence in general. Incidentally, such an economy would reduce the waste embedded in premature obsolescence whereas cheap energy accelerated its incidence.

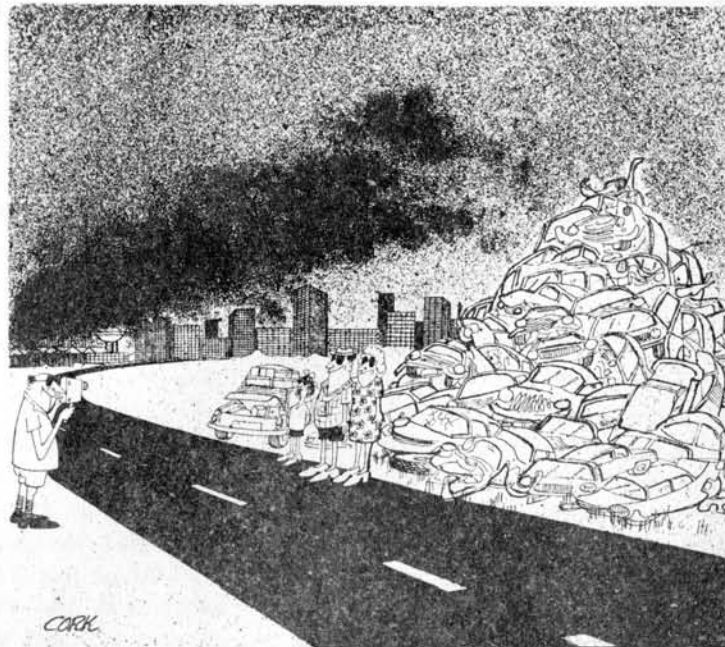
There is an urgent need to strike a responsive chord with consumer and producer, voter and neighbour, to engage voluntarily in a waste management effort — in office, factory, community and home. It is more comprehensive than turning off the lights, making bread-pudding out of stale bread or moving thermostats up or down. It requires a new set of building blocks for the economy and for economic growth.

Perhaps compulsory and voluntary waste management might prove a matter of changing status symbols. A shoeshine is a symbol of prosperity; a shine on the sleeve one of indigency. The informal way people spend their vacations may forebode a readiness for a less formal way of life. It translates into a divorce between incomes and lifestyles. Citizens may move away from purely acquisitive attitudes to person-centered or community-oriented activities.

### The Crux of the Matter

The heart of the matter is the ultimate application not only of money but also of other resources, as they are freed by waste management. It is amply demonstrated that services grow at a much faster pace than products. The computation of housework and creative leisure activities would only enhance this trend. Hence the thesis that a waste management-induced service economy would ensure sustained economic growth. This is the more valid because waste management relaxes limits to growth, whether due to ecological constraints, scarcities or cost factors. These limits have been abundantly analysed in the Club of Rome's and other studies.

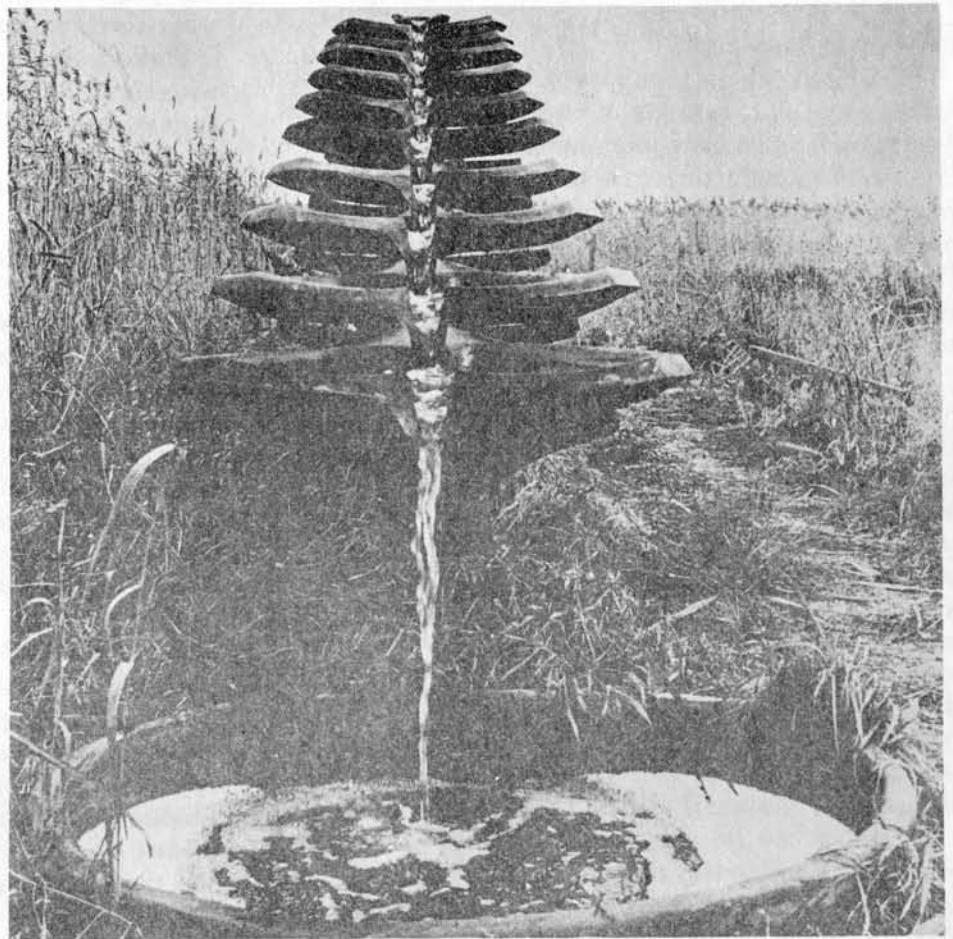
Progress is more often achieved under duress, revolt or war, than out of foresight or enlightened self-interest. In the final analysis, it is the constituencies' choice. Having been flooded with proposals for a less wasteful way of life, will they suffer from a drought of flexibility, imagination, and political will? The answer is blowing in the wind . . .



### Sewage Treatment in a Swedish Sculpture Garden

For a sculptor to have turned his hand to the treatment of sewage may seem the most awful come down in the history of art, but a few moments beside John Wilkes' Flowforms, with the water swirling down in fascinating rhythmical criss-cross patterns, always changing yet hypnotically similar, soon dispels any doubts about artistic aesthetics. My first experience of his Flowforms was at the Rudolf Steiner Seminariat at Järne, some fifty kilometres south of Stockholm. A young woman, a visitor like myself, was sitting beside one of John Wilkes' cascades, dreamily looking out over what I knew to be a sewage pond. Engrossed in watching the sun set over the Baltic, she had no idea that the pleasant pond beside her, with its fringe of trees and shrubs and its cascading water, received the raw sewage from a community of more than two hundred people.

I spent the next ten days at Järne, living only a few yards from the ponds, in an old wooden building. Even though it was the height of summer and my windows were open day and night, I was never troubled with bad smells. The system to all appearances was working well. There are three Flowform cascades at Järne. Two operate in the first pond which receives the raw sewage from the houses, and one in the second pond. The water then passes out to two other ponds and filters out into the Baltic. When Arne Klinborg, a well known Swedish painter and his colleagues started the Järne seminariat in 1965, they inherited an archaic sewage system consisting of no more than an outfall pipe into the first pond, which emptied directly into the Baltic. The smell was atrocious and during the summer the surface of the pond became covered in a thick slimey scum. Since Klingborg planned to develop the seminariat into a village community of 250 people it was clear that something drastic had to be done. But he was opposed to a



Platform at Järne

Photo: Beta Bergstrom

conventional 'out of sight — out of mind' approach, seeing instead an opportunity of finding an ecological solution in which sewage waste, as the bottom rung of the food ladder, would be transformed through natural processes into higher forms of life.

Having seen Wilkes' Flowforms, Klingborg was certain that here lay the solution to the basic problem of aerating the pond and providing a dynamic flow of water and nutrients through living organisms. With the help of Lars Fredlund, an architect who had joined the seminariat, the ponds were cleared and the cascades installed. Now the sewage system is receiving its full complement of waste — some 15 cubic metres per day — yet there is negligible smell and absolutely no sign of solid matter.

One of the fundamental differences between the Järne ponds and conventional sewage works is that whereas the latter attempt to maintain a standard ecology with the production of purified effluent, at the seminariat the ecology of the untreated effluent varies dramatically

with the changing seasons. In winter, when temperatures fall to minus 15°C and lower, little biological activity takes place and solid matter spreads across the bottom of the large pond as a heavy sludge. Despite a coating of ice the cascades keep running, and because of the low temperature, are carrying a greater oxygen load than in summer when the solubility of gases decreases.

The bacterial count increases substantially over the winter months; the coliform bacteria sensitive to 35°C reaching a concentration of nearly half a million per hundred ml., and the thermostable coliform bacteria a concentration of 230,000 per hundred ml. By April the bacterial count is negligible being 49 and 8 per hundred ml., respectively. The situation then remains stable until November when the bacterial count begins to rise again. Algal growth begins surprisingly early in the year, with *Chlamydomonas* colonising the surface areas of the ponds in January even though they are still covered in ice. A great many other algae and protozoa



follow, including *Euglena*, *Cryptomonas*, *Phacus*, *Spondylomorum* and various paramecium-like organisms. As the water proceeds from one pond to the next the overall ecology seems to change, thus substantiating Klingborg's idea of converting sewage waste into higher forms. Whereas ducks, moorhens, frogs and fish take happily to the third and fourth ponds, they are rarely found in the first and second. Together with Fredlund, Klingborg has planted an interesting selection of vegetation around the edges of the ponds, and clearly the root-systems are taking up the minerals, thus contributing to the overall ecological cycle.

It certainly doesn't surprise John Wilkes that his Virbela Flowforms should function as excellent air exchange devices. They are the result of years spent observing how water flows down rivers and streams, always looking for immediate tendencies since these might be the key to its ability to replenish itself even when loaded with pollutants. As I understand it, Wilkes' Flowforms are sculptured artefacts to give water the pattern of flow to which it is innately striving in its natural environment, but which it rarely achieves. In fact Wilkes has created a kind of 'super' stream to which water responds, not only with

a marvellous swirling energy, but also by revitalising itself.

Water tends to flow downhill because of gravitational forces, and because of our obsession with such forces, we are inclined to neglect others of a more subtle nature; we generally assume that water will always try to take the shortest path between two points. In reality its natural movement, as when it goes down a plug hole, is to form whirlpool-like spiralling vortices. The meandering course of a river is nothing other than an allusion to such innate tendencies.

Wilkes has established a workshop at Emerson College in Sussex, where in addition to running the Sculpture Department, he directs the Flow Research Group, which has the task of developing the work further, both functionally and aesthetically. An American biologist is working with him to put facts and figures together, about the efficacy of Flowforms in aerating water. "In one river under observation the cleansing of pollutants took some eight kilometres," Wilkes told me. "What I would like to discover is whether we can achieve the same counter pollutant effect in a much shorter distance, by creating a rhythmical order in what is normally chaotically streaming water."

The Järne sewage ponds tell

their own tale, but Wilkes is not happy to let the evidence rest there. He is keen to have scientific evidence to back up his hunch that the Flowforms are not only efficient aerators, but that they actually 'revitalise' the water. There are questions he would like to have answered. Why do fish, for example, stay right under the cascade rather than close to the normal turbulence? He hopes that the answers he seeks may come from an experimental sewage farm to be set up at a state run organic farming school in Holland, in which the cascades will be run parallel to a natural fall, so that the two systems can be closely compared.

John Wilkes has projects for his cascades in many other parts of Europe, not all of them linked to sewage treatment. A park in Stuttgart has one, and there is another in a children's recreation area in Stockholm. He expects to install one outside the Ethnographic Museum in Stockholm. His real achievement is to have brought function into close harmony with form, in stark contrast to the modern tendency to have function at any price and form at the least cost. Who else in the world has managed to make sewage treatment a truly pleasant experience?

Peter Bunyard

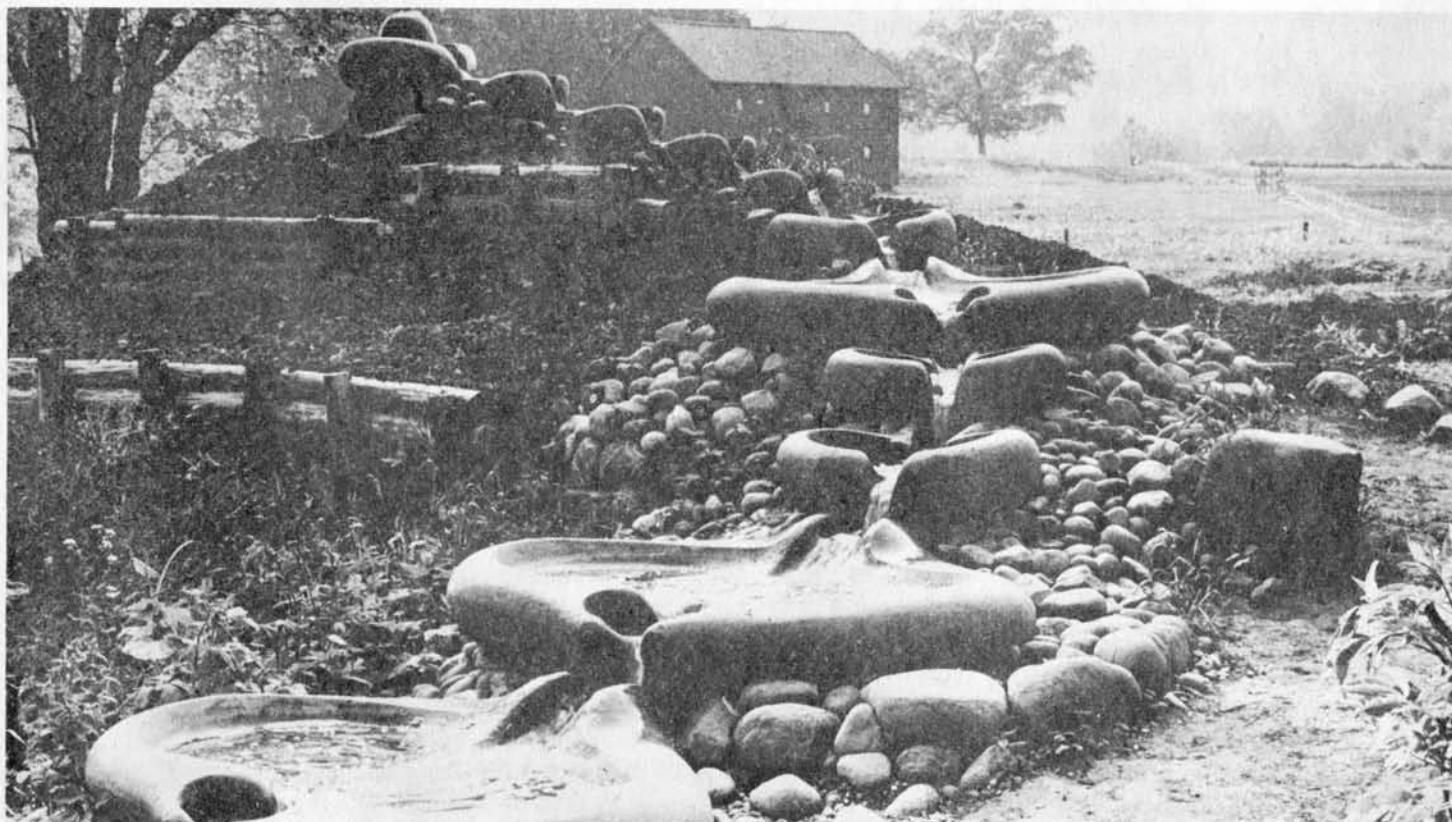


Photo: Beta Bergstrom

## Fairies at the Bottom of the Garden

No Pests \* No Fertiliser \* Little Water \* Huge Crops

From time to time professional scientists are dislodged from their normally tranquil surroundings by the ravings of an amateur inventor who has discovered a panacea that, at one stroke, will remedy all that ails the world. Invariably the inventor regards rigorous investigation of his claims as an attempt to steal his invention, and criticism he interprets as rejection. Once in a blue moon a dialogue is possible across this formidable cultural barrier, but most such encounters lead to confrontation. The inventor who imagines himself rejected, ends by being genuinely rejected. The scientist returns to his own work half amused, half offended, and determined not to let it happen again. Of course, it does. The chance of an amateur stumbling upon some important discovery is remote, but it does exist.

Very occasionally, it may be that an idea is turned down because its true value is obscured by the extravagant claims made for it. Just such a case may have occurred recently in a small, remote coastal town in south west England, where lives a man who claims to have developed a new system of greenhouse design. His five greenhouses, he claims, produce prodigious yields without using any fertiliser and only a very little water. Pests and diseases present no problems, despite the fact that for five years he has added nothing whatever to the soil, has not moved any of his houses, and has sterilised nothing. Plants do not "die". Those plants and parts of plants that he removes do not decompose. Flowers, kept in his home, without water, for months after they were cut, retain their colour and scent.

It is hardly surprising that the horticultural scientists who have visited him and with whom he has corresponded — at length! — dismiss him as a crank. After all, he seems to have discovered, simultaneously, immortality and perpetual motion. Nor does it help to find that his own explanation of these extra-

ordinary phenomena is some special quality of the light inside his greenhouses. The light is very intense, he says, and he does not allow people to enter on sunny days unless they wear dark glasses. He photographs his plants regularly, but his camera is always fitted with an ultraviolet filter without which, he says, films simply fog.

**Michael Allaby investigates some extravagant claims and finds a new method of greenhouse ventilation that opens up valuable possibilities for the future**

So he is dismissed as a crank. It is a pity, because once the extravagant claims have been accounted for, it is possible that these greenhouses have been put together in such a way as to offer a genuine advantage over otherwise similar houses, and that they contain an innovation — his actual invention, which he has patented — that works.

The innovation consists of a simple but effective method for ventilating a greenhouse made in conventional tunnel form from heavy duty polythene sheeting stretched over a rigid metal frame. The advantage of such "plastic tunnel" greenhouses is their low constructional cost. The disadvantage is that ventilation is difficult. Unlike glazed houses, it is not easy to design windows that open conveniently in polythene sheeting. The usual solution is to leave the doors open. This is simple enough, but it opens the way to the major problem of greenhouses: if insect pests or the spores of disease fungi enter, they can wreak havoc in a valuable crop and be very difficult to control.

These houses have ventilators incorporated in the doors at each end. Each one consists of a screen about 2m high and 1m wide, made from three layers of metal mesh,

about 5cm apart and equidistant from one another. The centre layer is of coarse mesh, the two outer layers are of fine mesh. The effect is to present any would-be intruding insect with a formidable maze of holes that must be negotiated and while conventional insect netting would keep insects out just as well, it would not permit the free movement of air, which these meshes do. So, whenever the temperature inside the greenhouse is higher than the temperature outside, there is a flow of air away from the house. Apart from assisting in ventilation, this provides additional protection against infestation. Airborne fungal spores are carried clear of the building and insects can enter the house — or the maze — only by flying into the wind, which many of the more serious pests such as aphids are unable to do.

So the ventilation screens assist hygiene without inhibiting the movement of air, and the standard of hygiene is then increased still further by the regime inside, although this is based on quite orthodox techniques. The ground is covered with black polythene sheeting, through holes in which seedlings are planted in the natural soil. The sheeting prevents weed growth — the usual reason for using it — but it also regulates the movement of water. No matter how hot it may become, no water can evaporate from the soil, and the only water in the air is released by transpiration from the plants. Irrigation is by underground pipes set just below the soil surface. On warm days, with a strong outflow of air, it is difficult for moist air to enter from outside. The result is a very dry atmosphere. Tobacco leaves can be — and are — air cured beside the growing plants from which they were cropped. Even on cool, rainy days there is almost no condensation on the inside of the polythene skin or even on the metal frame. Apart from the obvious economy in the use of water, such dry conditions may deprive many parasitic organisms of the warm, moist conditions they require.

Does it work? It is difficult to tell, but the houses have stood on the same ground for five years without soil sterilisation, and the plants inside them appear to be growing healthily.



What, then, of the other claims? Are there really fairies at the bottom of the garden?

It is true that no fertiliser is used, and the water authority measured the amount of water used and found they could charge, for all five greenhouses, only what they charge for a single lawn sprinkler. However, the houses are located on a hillside. Around them are vegetable gardens and, further up the hill, lush pastures. Almost certainly nutrient and water reaches the houses by natural drainage and leaching from the surrounding land — although evidently both nutrient and water are being used quite efficiently once they do arrive.

There is no mystery, either, about the light. The lack of condensation might permit better light penetration in a general kind of way, but on an overcast day an ordinary, but reliable, photographic light meter could detect no significant difference between the light intensity inside and outside the houses.

The unusual decomposition of plant residues is a result of the very arid conditions which partly dehydrate them. Residues placed in a heap outside decompose in a way characteristic of leafmould, composed mainly of celluloses, rather than of garden compost, with a high content of carbohydrates.

Yields are almost impossible to measure, because the houses are used for complex, and apparently haphazard, multiple cropping, with yields being recorded as the crude

weight cropped from each plant, rather than as the weight per unit area from houses growing single crops. It is not simply that the methods of measurement are different from those used commercially: invariably the yield per plant falls when large stands are grown, so that a few plants grown by themselves will tend to crop heavily. So far comparisons can be made, they suggest that yields are on the low side of what would be accepted commercially. This may not be important, and certainly it does not indicate that normal commercial cropping could not be carried out under this regime. Certainly a wide range of crops — many of them not usually grown under cover — tolerate the environment. The houses grow tobacco, tomatoes, strawberries, raspberries, asparagus, sweetcorn, rhubarb, roses, carnations, Cape gooseberries (*Physalis peruviana*), a vine (that reached a span of about 4.5m in 17 months after planting as a cutting), and even apples grown from pips and an oak grown from an acorn that reached a height of about 60cm within a year.

The results are not magical, then, and it is understandable that the investigators gave up in frustration. Yet the total system is worth a closer look. If it solves the twin problems of high cost and high pest and disease risk, then it might have much to offer in remote places where resources, including capital, are in short supply. Certainly the houses are cheap. The tunnel, its frame, the

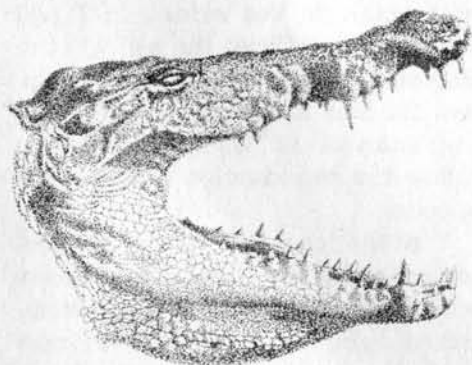
screens, floor covering and the sub-surface irrigation pipes can be erected for around £200. Even when some fertiliser is added — probably to the irrigation water — operating costs must be low. In normal practice it would be unreasonable to expect total pest and disease control, but at least the cost of pesticides would be reduced, perhaps substantially.

What will happen next? As things stand, probably nothing unless the inventor succeeds in selling his ventilator design to a commercial company. Only then will it be possible to evaluate the system under a range of conditions, growing dense stands of conventional crops rather than small numbers of exotics, all mixed up together.

The moral of the story, if there is one, must be directed to would-be inventors: if your expertise lies in one field, do not try to apply it to another field without help from those who will design for you experiments and trials that will show conclusively whether your idea is practical. The alternative is to produce information that is of little use, antagonise those who otherwise might promote your idea, and lose entirely some device or technique that is unlikely to save the world, but that might be very useful to some person, a long way off, who is trying to scrape a desperate living in a hostile environment that you could have made a little more friendly.

## WILDLIFE

### Slaughter in the Name of Science



Crocodilians are in serious danger of disappearing from this planet.

Nobody doubts it. IUCN has a special investigative committee looking into it. Figures showing the devastation to crocodile species the world over have been published, they make sad reading; some species are already extinct; some like the Nile crocodile and the Orinoco crocodile are dwindling fast to the point beyond which they cannot be saved. In Africa and S. America thousands are still shot. Excuses given for contravening the existing laws (which are often unenforceable) range from the claim that they damage essential fish populations,

to protection of antelopes in National Parks and the invidious techniques of 'culling'. But the most unforgivable and horrible excuse for their slaughter comes from the scientists who claim the crocodiles are required for research. Thus in Uganda the stomach contents, sexual maturity and size of 587 crocodiles was analysed and reported in a document published in 1941. Similar data came from Kruger National Park in 1947, from Nigeria in 1948 and from Rhodesia in 1959/60. In spite of all this data scientists are still slaughtering

thousands of crocodiles a year and are selling their skins to finance further research. How many more of this endangered species must be killed to prove what we already know? Are we to see thousands slaughtered annually in order to demonstrate yet again what they ate before they became extinct? Or would we be justified in supposing that some of these projects are allowed because they provide a 'legitimate' source of skins for sale? Do the scientists who engage in this meaningless research perhaps believe that the crocodile has no role to play in the ecosystem?

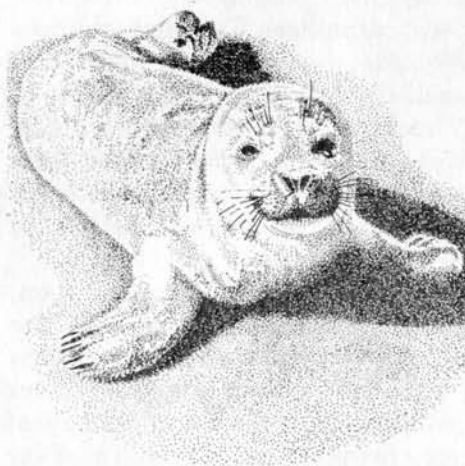
"In recent years" writes Professor Federico Medlam, Chief of the Tropical Biology Station in Villavicencio, Colombia, and a member of the IUCN Crocodile Specialist Group, "information has come to light on the very important function of crocodilians in nature. Fishermen in the Amazon had for some time noticed that wherever caimans disappeared, fishing declined. This decline was rather unexpected, fishes being the main food of the caimans. It seemed to the natives that in the absence of the predators, fish would multiply. It is now clear from research undertaken in Amazonian mouth-lakes that this is the reverse of the truth. Biomass in tropical aquatic systems consists almost exclusively of animals (whereas the fauna represents only a small fraction in rain forests). Limnologist E.J. Fittkau has researched the amounts of nutrients released by caimans in the course of their metabolism and the impact of these nutrients on primary production. Measurements proved that caimans daily add nutrients (mostly of allochthonous origin) in sufficient quantities to effect an increase of primary production and an attendant enlargement of the autochthonous food chain."

"A typical mouth-lake system" Professor Medlam continues "Consists of phytoplankton, aquatic insects or insect larvae, higher crustacea, and vertebrates such as large and small fish, turtles, caimans, otters and dolphins. Phytoplankton, macrophytes, the larvae of insects and snails, etc. all thrive

on the excrements of caimans and other piscivores. Fry and small fishes, in turn, live on zooplankton, benthos, insects and larvae of snails. When caimans cease to be a part of the food chain the amount of nutrients that fry require diminishes; inevitably the size of the fish population is reduced. Thus Fittkau concludes that the more fish-eating caimans there are, the greater the fish population."

From which we may safely conclude that the natural world has greater need of its crocodiles than of its zoologists.

### Who will preserve the Seals?



Conservation of wildlife too often means *management* which is justified by those involved — biologists, zoologists, botanists and ecologists among them — as a means of improving the lot of the animal in the wild, by culling the weak to make sure there is room enough for the strong. Nature, however, knows best how to regulate its own populations. There are plenty of examples of the way in which population control is naturally exercised. In the case of the Canadian timber wolf only the leading male and female breed; the penguins of Antarctica are controlled by the skuas who eat one third of the eggs laid and another third of the chicks hatched; herds of game in Africa do not materially alter in size — even when many are killed off by an overlong drought or a bushfire, because above average numbers of young will survive until the herd makes up its numbers

again. Only where wildlife is under threat through loss of natural territory, or like the whales through over-hunting, is a species in danger. Why then do the conservationists suppose that they should seek to 'manage' the seal populations of the North Atlantic?

A new group SPAG (Seal Preservation Action Group) have deliberately chosen the word *Preservation* in place of conservation to underline their differences with the conservationists, and their distinctive philosophy. Apart from the horrifying and seemingly endless experiments among seals — in one instance a bull seal was subjected to the injection of radioactive tracer into its bloodstream and subsequently was put in a metal respirator while its breathing was monitored — they point out that if the 'managers' have their way they mean to reduce the seal colony of grey seals on the Farne Islands in Northumberland to what they regard as a tidy and convenient number of 1000. If such a reduction occurred it would take only one natural or man made disaster to wipe out the whole colony.

### Welcome Stranger?

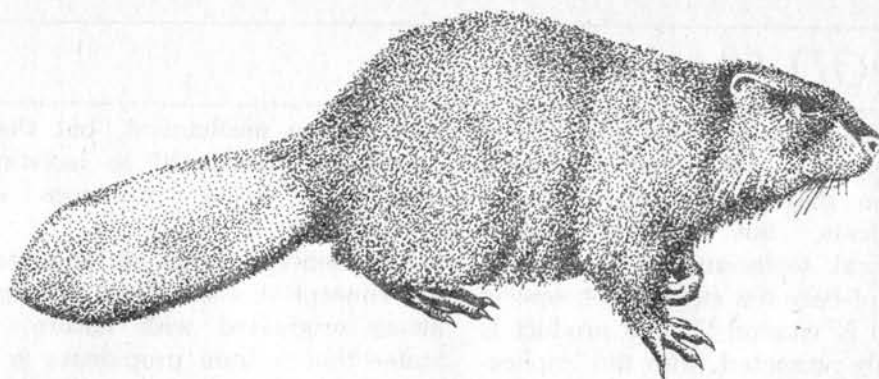
It is good news that at last otters are likely to be added to schedule 1 of the Conservation of Wild Creatures and Wild Plants Act. Meanwhile we hear of schemes afoot to reintroduce the beaver into this country. Beavers have been extinct in Great Britain upwards of six hundred years. Attempts to re-establish them have been made without success in the past. What justification can there be for another try? Anton de Vos writing in *Tiger-paper*, the official organ of the Regional Office for UNEP in Asia and the Far East, gives the following analysis of what is likely to follow the introduction of a foreign species.

"In the case of a vacant ecological niche the introduced species will occupy it, become well established and proliferate. It may become a pest. If the introduced species is more aggressive and successful in competition than a closely related autochthonous



species, the latter is usually reduced or eliminated. The introduction of predatory species threatens the labile predator-prey balance, and modifies this to the detriment of native species . . . The majority of introductions have proved detrimental to man's interests. Introductions usually initiate chain reactions, the consequences of which are completely unpredictable. An exotic species will rarely occupy the niche which its introducer expects it to fill. By and large it seems impossible to introduce animals under 'scientifically controlled' conditions, because of our lack of knowledge of ecological conditions both at home and abroad. There is an obvious need for more detailed research."

Beaver dams, it is said, create reservoirs of calm water which would be ideal for fish breeding. That apart we have yet to hear of a single convincing reason for incurring the risks De Vos refers to. Intelligent and absorbingly interesting beavers certainly are, but they are not at present in danger of



extinction in their natural habitat, and if they were, reintroducing them to our diminishing wild areas would not save them. They are comparatively large, reaching a weight of up to sixty pounds; they live nearly twenty years and produce from two to eight young annually. Above all they are voracious eaters, mainly of waterside trees such as willows and aspen. What they do not eat is likely to be devastated in the search for suitable material for their dams.

In the early seventies a project to introduce a colony as a tourist attraction in one of our National Parks, came to grief when the tight-

ening up of anti-rabies control led to a prohibition on imports. The intention had been to keep them under 'controlled conditions' and to fund the experiment by charging enthusiastic naturalists to observe them from a 'hide'; further revenue was expected to flow back from the sale of pelts. While there is no suggestion that such an operation was a front for a hidden fur trade, it is too near to the scientist and the crocodiles syndrome for comfort. It is hard to understand how such a plan could find favour with any serious conservationist.

*Illustrations by Mike Frost*

## FOOD

### Health Hazards from Processed Foods

Last September, General Foods Inc., of New York, and Toronto, began to publish a series of articles in the form of advertisements in all major women's magazines. "The company did this" said F. Kent Mitchell, vice-president of corporate marketing service, "because the lack of public understanding of the intricate and complex field of food chemistry in general, and food additives in particular, is eroding consumer confidence in the industry." We might ask how consumer confidence could be waning in view of the massive educational campaign already mounted for over a generation by the food industry? On TV there are hundreds of commercials daily, extolling the nutritional glories of industrial food, and these are reinforced by complementary ads in the major women's magazines. None of these educational activities normally conveys substantive information, but in aggregate they convey the impression of a great and benevolent food system producing sensuous tastes at the flick of a box

top. Is this great educational programme so ineffective that the industry feels it must start providing more substantive information about what it does? Obviously General Foods feels that in response to eroding confidence a new public relations tack is the answer, rather than considering whether it is the products that have caused the erosion.

To students of contemporary anthropology the new series of ads provides a rich lore. They reveal much about the attitudes that drive the food industry and much about its attitudes towards human biology. One ad starts out: 'Dear General Foods, what happens when I eat preservative?' The ad answers with the declaration that to most people an orange is an excellent example of an unpreserved food made by trees and not by people. To the food scientist, according to the ad, the orange consists of 225 chemicals, of which one is a preservative called citric acid. The copy goes on to imply that because nature is

permitted to put a chemical preservative into its products we should not complain if the food industry does the same. The industry forgets that food is only one part of a two-part equation, the eaten and the eater. The food industry may have a superb technical grasp of how to preserve packaged food for months on supermarket shelves, but has it a **good grasp of the eater's biology** — or for that matter, any biology?

#### **Life is Just a Bowl of Chemicals?**

Shelves of biochemistry books in my office describe the chemical reactions of living systems, so I was somewhat bemused to read that an orange consists of 225 chemicals. At first glance, I assumed that General Foods' chemist inadvertently dropped a few zeros, but then on reflection I could never remember any biological scientist trying to tally the number of molecular species in a living cell — this is not exactly a Nobel-Prize-seeking objective. The food chemist's preoccupation with numbers reveals his compulsion to reduce biological

complexity to simple lists of chemical components. The food chemist's orange may consist of only 225 chemicals, but General Food's chemical replacement, Tang, consists of only ten substances, one of which is vitamin C. The product is heavily promoted, with the implication that it is the equivalent of orange juice because its vitamin C content is equivalent. An orange has more to offer than vitamin C, but that fact is ignored in the fabrication of Tang and its genre of synthetic fruit drinks. In persuading consumers to buy these products the industry has been successful in getting them to accept the concept that living processes consist of a mix of defined chemicals.

The idea that fruit is preserved by a built-in chemical substance runs counter to the known facts of plant physiology. Fruit continues to breathe after it is picked, and indeed when that process stops, rot sets in. Certain chemical constituents such as citric acid may be part of the total

preservation mechanism, but they cannot be considered in isolation from the living processes of preservation.

The General Foods ad reiterates the concept that chemical preservatives originated with nature. It states that sodium propionate is a chemical produced in Swiss cheese during its making. The industry uses this chemical in baked goods to retard the growth of moulds and yeast. Sodium propionate in mature Swiss cheese is part of a complex of substances that arise from the action of micro-organisms on milk. It is not necessarily part of the normal complexities of baked goods, and there is no reason to expect that its pharmacological effect on the consumer is identical in both cases. The concept that life is a bowl of chemicals, each behaving independently, gives the food industry licence to ignore the context of living processes and to manipulate both the fabrication of human nourishment and the consumer's understanding of what constitutes nourishment.

According to the General Foods ad writer, not all naturally occurring preservatives do the job, so the industry needs to use anti-oxidants such as butylated hydroxyanisole (BHA). The use of this particular synthetic chemical is sanctioned not by nature but by the Food and Drug Administration (FDA) in the United States and by the Health Protection Branch in Ottawa. What criteria do these organisations use in their decision-making? They rely on classical toxicology, a science devised in the past century to assess the poisonous effects of the synthetic chemicals that the newly established chemical industry was then beginning to turn out in profusion. The effects the nineteenth-century toxicologist looked for were those of acute and chronic toxicity, effects that result from massive deterioration of vital tissues. In short, if the chemical didn't make one sick, it was deemed harmless. But of course, people don't get sick immediately from eating fabricated food, so if this is the criteria one might be forgiven for concluding that the food industry and the regu-

latory agencies do a great job in assuring the safety of food additives. But chemicals also have the power to change the state of a single cell, and the amount necessary to do that may be only a few molecules. Single-cell toxicity completely confounds the experimental approaches of classic toxicology, yet a transformed cell becomes a cancer to plague its host years after the toxic event; or it becomes a mutated cell to be passed on to following generations; or it becomes a teratogenic cell causing an irreversible birth defect in a foetus. These events are very hard to predict, and the results obtained by present crude laboratory methods are the subject of vehement argument and varying interpretation.

### All Additives Have a Purpose: Is Nourishment a Purpose?

Another General Foods ad starts out 'Dear General Foods, People are what they eat, so why should I eat propylene glycol monostearate?' The ad offers the answer that oil and vinegar do not mix, and if you wish to avoid the tedium of shaking your salad dressing before using, this emulsifier will resolve a serious challenge of contemporary living. Every additive, according to the ad, has a purpose, and when you begin to examine those purposes you find that additives are used to facilitate the manufacturing processes, to cover up low-quality ingredients, to extend shelf life for years, and generally to serve as cosmetics. In reading these glowing descriptions of how food technology serves the public, one finds much talk about the chemistry of food additives, but practically nothing about their biology. The expression 'Food Additives' is perhaps a misnomer because fabricated food has become just about all synthetic chemicals in one form or another.

The era of fabricated nourishment has imperceptibly crept into the North American life style within a single generation. Western nations have survived handsomely for centuries on diets of natural foods in various combinations and forms. I wonder if we should not be asking what the effects are of switching a whole population to fabricated



Inuit shoppers face an array of processed foods



nourishment. To my knowledge, no organization, government or private, has researched in advance the long-term effects of eating a diet consisting mainly of fabricated foods.

The current series of ads of the General Foods Corporation is part of an annual consumer education budget of \$218 million designed to reassure consumers that their decision to accept fabricated nourishment is wise and correct. I know of many food professionals and nutrition scientists who are quite aware of the limits of knowledge of the sciences of nutrition and toxicology and who are also quite aware of how fabricated foods are really fabricated. In their personal eating patterns they avoid such foods and eat the traditional foods prepared from natural sources. I feel that their collective common sense has a message of far greater significance to the public than the multimillion dollar advertising copy that supposedly reveals the truth about fabricated nourishment.

Ross Hume Hall

Reprinted from *Science Forum* 56.

April 1977

# Conference Report Cont'd from page 3

there is only one answer. The systematic tool for thinking about political social and environmental problems must be Ecology. Ecological principles explain the pattern of growth and overshoot, both in natural and social systems. Taking the example of the oak forest which in the pioneering stage transforms all incoming energy into growth, and in the climax stage into maintenance, he drew an analogy with industrial society. As economic growth continues greater amounts of capital are diverted from production into clearing up the environmental damage and maintaining the sys-



Philip Katz



George Armelagos

tem . . . but paradoxically, ever expanding growth is necessary for adequate maintenance.

Facing such a complex mesh of problems no-one underestimated the difficulty of redirecting ourselves towards a sustainable future. Whether the Atlanta Conference fired the imagination of its own people remains to be seen. The problems appear to be well understood, but the solutions seemed to some observers to remain too much in the realms of hypothesis.

The full texts of papers presented at the Conference were published in *The Ecologist* Vol. 7 No. 7. *The Future of America*.

## This Month's Authors

Shankar Ranganathan . . .

was educated in Madras and at the University of Michigan. He is managing director of an industrial water-treatment company in Bombay. An active conservationist, he has published two booklets on environmental education, *Will India Become Another Sahara?* and *Our Heritage*.

Colin Sweet . . .

is Senior lecturer in Economics at the Polytechnic of the South Bank (London). He gave evidence at the recent Windscale Inquiry.

Peter Bunyard . . .

is an Associate editor of *The Ecologist* and has been involved with it since it began. He is a smallholder and journalist.

Michael Allaby . . . another Associate Editor,

is a well-known writer on environmental subjects with special reference to Agriculture. His recent publications include *The Survival Handbook* (Macmillan 1976), *Inventing Tomorrow* (Macmillan 1976), *Home Farm* (Macmillan 1977), *A Dictionary of the Environment* (Macmillan 1977).

Ross Hume Hall . . .

is a graduate of Cambridge (Mass). He has had extensive experience in cancer research and the biology of growth and development. He is an Associate Editor of *Plant Physiology* and has conducted a research programme at McMaster University to assess the effects of contemporary technology on the duality of nutrition and the resultant effects on health and wellbeing. In 1974 he published *Food for Nought, the decline in nutrition* (Harper and Row).

## REJECTION SLIP — JAPANESE STYLE

*We have read your work with inexpressible pleasure. We swear to you on the sacred memory of our ancestors that we have never before had occasion to read such an admirable masterpiece. If we publish it His Majesty the Emperor will insist on its being a model for us and will not permit us to publish any work inferior to yours. This would make it impossible for us to continue in business until at least ten thousand years have passed. We are therefore constrained to refuse your divine work and to deposit it at your feet, trembling meanwhile at the thought of the severe judgement we shall receive from all future generations for having given way to such a criminal action.*

# ECOPOLITICS



## FRENCH ECOLOGISTS SPLIT

With the general elections only two months away, personality clashes, arguments over election tactics, and ideological differences there split the French Ecology movement into three factions — although there are signs that the wounds will be healed at least superficially before voting takes place.

A main bone of contention is whether ecologists should enter into electoral pacts with their political opponents. Professor Lebreton, head of the Lyon group and founder of *Le Mouvement Ecologique* — the first national movement to have been initiated — is adamant that Ecologists should remain purists. There should be no alliances, no negotiations with other established parties, which in practice means with the Left, since Right wing groups have not as yet made any overtures. In particular he is opposed to Ecologists desisting in favour of left-wing parties after the first round of voting. His concern is understandable: the socialist party (PSU) has been flirting with the Ecologists from the start, realising the political potential of their ideas, and attempting to capitalise on them. Already they have started *Le Front autogestionnaire*, a group pressing for workers' control, which is making use of many of the Ecologists' ideas. Lebreton's main objection is that the PSU have not fully committed themselves to the anti-nuclear lobby: they are still in favour of atomic arms — and this is sufficient reason he says, for Ecologists not to vote for them at the elections. Moreover, he attacks the socialists for wanting only a change of Government in parliament, not a change of society, and feels that the Ecologists' image will be sullied by allying themselves with a party using their ideas just to gain a few extra votes. He has powerful support: Solange Fernex, head of the Alsation movement, *Ecologie et Survie*, one of the oldest of the ecopolitical groups, is firmly behind him, as are several other provincial

movements.

Whilst ideologically in total accord with Lebreton, Brice Lalonde head of *Les Amis de la Terre*, has parted company with him and the rest of the *Mouvement Ecologique* over election tactics. He maintains that ruling out alliances would be foolhardy, and arrogant. At a stormy meeting of Ecology 78 — a group set up by Lebreton to coordinate the ecologist's electoral campaign — Lalonde walked out, partly because his line on tactics was not accepted, but largely because he was attacked viciously for seeking to make himself the centre of a personality cult. Good-looking, articulate, extremely intelligent and very ambitious, he has become the natural spokesman for the movement, much sought after by press and television. Undoubtedly his prominence is a sore point — the provincial parties in particular are peeved that he has been singled out as a figure head, and challenge his authority to speak for them. There is much pointed talk about the dangers of stardom. Yet there is no doubt that the Ecologists have benefited greatly from Lalonde, deriving publicity and credibility from his appearances on television, and it would seem a disastrous move to force him out of Ecology 78 because of his success.

Perhaps a more serious development is the appearance of a new Ecological party, *SOS Environnement*. Started by a teacher of English in Paris, Monsieur de La Rue, the group is more moderate than *Le Mouvement Ecologique*. Their aim is not the radical transformation of society, but rather the conservation of nature: they are environmentalists rather than ecologists. However they are firmly committed to the anti-nuclear lobby, and have been able to come to an agreement with Ecology 78 not to oppose each other in the same constituency. In a sense their joint manifesto, agreed on 12 December 1977 in Paris, gives a minimum definition of an ecological programme; a call to abandon totally nuclear energy and arms; to challenge the present means of production, to seek the decentralisation of power and to arrest the destruction of the human and natural environment.

In many ways the appearance of *SOS* does not constitute a threat to the *Mouvement Ecologique*: it appeals to a different type of voter, and can capitalise upon this at the polls. Whether Brice Lalonde will be drawn back into the fold remains to be seen. But what is certain is that in a tight election, the Ecologists could well find themselves holding the balance between left and right — and that for a fledgling party is a sign of its appeal, and its success.

## 'EUROPE ECOLOGY': A common stand

Representatives of ecological and environmental movements from seven EEC countries agreed at a meeting in Paris last November to campaign in the forthcoming elections for the European parliament, under the banner 'Europe Ecology'.

In keeping with their decentralist principles, the movement will not impose a detailed programme on all the groups, nor form a single international party. Instead a set of basic ideas have been adopted which each national group can develop as it sees fit. Elected members of the new Parliament will, of course, act as a coherent group.

The recently published manifesto of the European Environmental Bureau forms the basic statement from which the groups will campaign. Among its key points are:

- \* a moratorium on nuclear power so that future policy can be based on an informed democratic consensus about all its implications;
- \* the curbing of needless demand for energy;
- \* a reduction in our dependence on all forms of transport, and restraints on the most socially and environmentally destructive modes;
- \* effective pressure for an unpolluted environment;
- \* less emphasis on the volume of goods and throwaway products, and more on individual skill devoted to high quality products and repairs;
- \* urgent measures to involve communities in the understanding and evolution of their environments, including widespread devolution of decision making;
- \* amendment of article 2 of the *Treaty of Rome*, which commits the Community to traditional economic expansion, and a revaluation of the concept of growth.

In some countries, existing parties are expected to adopt 'Europe Ecology' candidates. In others there will be independents from pressure groups, or members of established ecology parties. In Britain, the Ecology Party has stated its intention of putting up candidates.

Fears, however, are being expressed as to the method of elections in Britain. Alone amongst the nine members of the EEC, Britain looks like adopting not only a single majority vote, but also a high deposit which will discourage small parties from standing. To ensure a clear expression of public opinion on the vital issues being raised by Europe Ecology, the prospective candidates have appealed to Parliament to adopt a low deposit and a system of regional-list proportional representation.



## REPORT FROM SPAIN

Interest in ecology is spreading in Spain as the Federation of Ecological Movements, the national society for the protection of the environment, gains press space in its fight against the Suarez Government's energy plans. The Federation was formed in September 1977 in order to represent about fifty smaller societies on a national scale. At present it is seeking legislation as an official organisation, from the Government.

Scattered problems and concern about the danger to the environment from over-industrialisation has caused the creation of many regional societies in the country over the past decade. The main impulse for a more unified voice and the catalyst in the formation of the Federation was the increase of the Nuclear Energy Programme. Spain plans to boost its supply of energy from nuclear reactors from a figure of 2.6 per cent of the total energy requirement in 1976 to 8.2 per cent in 1982 and up to 14.2 per cent in 1987 according to the Energy Plan 1977-87 Bill, being discussed by the Council of Ministers. This will entail the addition of many new reactors to the existing plant and heighten the problem of disposal of radioactive waste which at present is transported to France by rail for reprocessing.

The first task of the new Federation is the organisation of an effective opposition to the Government which has been constructing nuclear installations without open consultation with the people. In the case of one installation — the experimental station in the province of Soria — all opposition was either ignored or crushed by the authorities. This case is serious because the station will equip Spain with all the facilities for constructing nuclear weapons.

The campaign proposed is for widespread publicity of the Federation's policy, supported by the press, and for demonstrations and referenda in the areas affected by the siting of the new nuclear power stations. The Federation will also solicit the opinion of the Deputies in Parliament about the Energy Plan. Already there have been protest marches and organised hikes in Madrid and Barcelona. The three arranged in Madrid met heavy opposition from the authorities and were refused permission to take place. The most recent, over the weekend before Christmas, went ahead despite the lack of permission but provoked several incidents when demonstrators encountered the police who had been reinforced by two hundred of the special anti-riot brigade.

Gregory Starkey

## NEW ZEALAND: NUCLEAR DECISION DEFERRED

Since the French started their merciless testing at Murorroa Atoll, New Zealanders have been extremely conscious of the nuclear issue. Indeed, concern rose to such a pitch that when the last Labour government was elected in 1972, it registered its protest by sending an official New Zealand Navy vessel into the area. A privately owned barque, *The Fri*, also sailed to the Atoll, and was eventually boarded and 'evicted' by the French. Brice Lalond, the French Ecologist leader, was on board.

It was against this background that *Campaign Half Million* was launched. An attempt to get half a million people — one sixth of the total population — to sign a petition against nuclear power, it was by any standards an ambitious effort, involving vast numbers of people. The organisers estimate that 5,000 people actually worked on gathering signatures, and there were even greater numbers who, having signed, gave up some of their time to help.

The problems of canvassing sparsely populated countryside, and the sheer exhaustion of the campaign, brought the petition to a halt after four months. But in that short time, almost a third of a million signatures had been collected, representing one out of every nine citizens in New Zealand.

More important, the campaign forced the government to enter the nuclear debate publicly. Significantly, the day that the campaign was launched, the government announced the formation of a Royal Commission on nuclear power — albeit with the limited brief of reflecting on the consequences of a nuclear programme rather than on whether New Zealand should actually have one. Almost without exception, the submissions to the Commission were against nuclear power — only five were in favour. At the same time, a committee set up by the Labour Party (by now in opposition) to investigate nuclear power, came out with its report. It didn't say much to cheer either side, but neither did it support nuclear power.

Undoubtedly the campaign was helped by the massive protest against the USS *Longbeach*, a nuclear powered ship, entering Auckland Harbour. Scores of small boats, rubber dinghies, and even people on surfboards met the ship, blocking the channel along which she had to sail. Twice the *Longbeach* was stopped dead as she tried to nose her way through the flotilla of demonstrators. Included amongst the protestors were a former Cabinet Minister, clergymen, housewives,

and businessmen — not, in other words, just hard core ecologists.

Spike Milligan also lent his support to the Campaign. He did a series of television advertisements while he was visiting the country, and although the broadcasting networks refused to show them, they went on prime air-time news spots as 'the ads the service wouldn't run'.

Recently, the government announced (even before the Royal Commission published its findings) that the decision on whether New Zealand goes nuclear will be deferred for another twenty years. They stress that this does not mean that they are ruling out nuclear power as an option, but simply that a decision now is no longer crucial — or even necessary. A large measure of the credit for pushing the government this far must, surely, go to the efforts of *Campaign Half Million*.

Raewyn Mackenzie

## UNDERCURRENTS Ltd

### HAVE YOU GOT THE SEVEN YEAR ITCH?

Bored? Listless? Depressed? Too much gloom and doom constipates the mind and paralyzes the will. If ecodisaster isn't just around the corner after all, there's a world to win and what are you going to do about it? It's time for a change of diet, time for something positive, time for you to try *Undercurrents*, the leading English magazine of practical alternatives to the present crisis.

UNDERCURRENTS 26  
February/March 1978

AT & the Portuguese Revolution  
\* Smallholding in Orkney  
\* The Dangers of Extra Low Frequency Radiation  
\* Ham Radio  
\* How to Repair a Boat  
\* Open Letter to the Radical Technology Movement  
\* Grow Your Own Dope  
\* New Age Access \* Luca Aerospace  
\* The Russians Aren't Coming  
\* Ring Rail \* Jungle Stories  
\* Advance Factories & Co-ops  
\* Medallion Electricity and the Insulation Heresy  
\* Cottage Electronics  
Plus News, Reviews, In the Making, What's On, What's What . . . etc.  
48 pp. for only 50p from 12, South St., Uley, Dursley, Glos. or £3 for a sub (UK only; other rates on request). Can you afford to be without it? For a free sample back number, send a 9p stamp to: Dept. EC, Undercurrents, 27 Clerkenwell Close, London EC1.

# GLEANINGS

## PESTICIDE COVER-UP

The US Justice Department has issued indictments against the Chicago based Velsicol Corporation, and six of its employees. The executives, all of whom could face prison terms, are charged with conspiring to conceal from the Environmental Protection Agency, the results of tests that showed that two widely used pesticides may cause cancer in humans. The indictment is the first brought by the EPA against a company, for covering up adverse information about a product.

The pesticides involved are heptachlor and chlordane. Velsicol sells them to other firms which market them under many different names. They have been widely used by both farmers and home owners against termites, fire ants and other insects. Studies of both chemicals were requested by the EPA in 1971, and three independent pathologists reported that mice who had eaten the pesticide developed tumours. According to the indictment the company officials frequently discussed the scientists' findings among themselves but failed to publish them.

In November 1974 the EPA announced that it was drastically reducing use of the chemicals, but they are still being used by professional exterminators. The case was turned over to the Justice Department in 1975 and is likely to be followed by others of a similar kind.

Time 26.12.77

## UNCLE SAM LOSES MATERIAL

On August 9th 1977, federal officials from the US Energy Research and Development Administration told a House subcommittee in a special hearing that they cannot account for 16 tons of weapons-grade material at atomic bomb factories at Oak Ridge, Tennessee and Portsmouth, Ohio. Acting ERDA Administrator Robert Fri added before the House Subcommittee on Energy and Power that the 16 ton figure was only an estimate, and that 'the loss could be higher'.

Sixteen tons of enriched uranium is enough material to construct more than 1000 Hiroshima-type bombs. More disturbing still, *Critical Mass Journal* (October 1977), reports that congressional investigators have 'strong suspicions' that at least part of the missing material, about 400 pounds, was stolen and shipped to Israel in the mid-sixties. There is widespread concern that the CIA may actually have had a hand in the clandestine shipment to Israel on orders from the Johnson Administration. Kenneth Chapman, who was once Director of the Nuclear Regulatory Commission's security office, insists that 'there must have been some very high level involvement in the diversion.'

Although the loss was referred by the Atomic Energy Commission to the FBI, for reasons that are not clear the latter declined to investigate the affair. In 1977, the Department of Justice re-opened the case for review, and the matter now rests with the Attorney General.

*Critical Mass Journal*, vol. 3, no. 7.

which appeared in *The Friend* (October 1977) 'that they are ignorant of the consequences of their actions, such as when they cut down trees for firewood or overgraze. They simply no longer have any choice of action and this is largely the result of past intervention by outside experts, who through improving the situation in the short term, have worsened it in the long term.'

'In the Turkana district of North-West Kenya, for example the solution found to the problem of what to do with people in the relief camps in the early 60s was to get them fishing in the previously unexploited Lake Turkana. What seemed at first to be a success story could now be heading for disaster. The first bad side effect of the fishing was on the land. Far from reducing pressure on the land, the fishing increased it as money earned from fishing was invested in the traditional way — by buying more animals. Now the fishing itself is threatened. Catches are down all along the lake, and it may be fished out in the near future. If the fishermen are forced to return once more to dependence on pastoralism, it could be the trigger for another famine.'

## UNACCEPTABLE UNDESIRABLE AND STILL GROWING

In America the cost of providing 'acceptable' day-care facilities for children is over 3,000 dollars per head and the mis-named 'desirable' day-care facilities 4,000 dollars. The current total cost to the nation of caring for the under sixes in such centres is now about 15 billion dollars (acceptable) and 19 billion dollars (desirable). Another ten billion dollars is spent in caring for children between the ages of six and fourteen.

Day-care has therefore become a massive business providing some three million jobs. The idea that children under institutional care can be looked after as satisfactorily as children at home is now only believed by a lunatic fringe. The fact is, as Bruce Briggs concludes in his article 'Child Care, the Fiscal Time Bomb' (*The Public Interest*, No. 49 Fall 1977), 'The main beneficiaries are the child-care providers, social workers, specialists in early childhood education, teachers, nurses, dieticians and public sector entrepreneurs and administrators.'

In a world where the practical steps towards a saner future are so difficult to locate, a campaign to get the toddlers back where they belong looks appealing. What nation would not be grateful for a policy that turned a million potential misfits into a million well-balanced citizens?

## MAN MADE DISASTER IN HAITI

A common sight in the streets of Port-au-Prince, capital of Haiti, and other towns there, is the charcoal vendor's cart. Why charcoal? Because it is the only form of fuel that the Haitians can afford. Their search for it, however, together with the increased demand for arable land, is bringing them close to disaster. Haiti's once lush tropical forests are being systematically destroyed. Only twenty years ago eighty per cent of the island was forested, today it is down to about nine per cent of which half is probably second-growth scrub.

Removal of the forest cover sharply increases the amount of sunlight that strikes the ground. As a result the land gets hotter and becomes less water-retentive. The loss of forest means less mass evapotranspiration to form rain clouds. The land receives less rain

and what falls on the eroded surface tends to run off into the sea.

For four consecutive years Haiti has been hit by severe droughts, which officials from USAID believe were materially exacerbated by the destruction of the forest. Last year Haiti received only 68 per cent of its normal rainfall and the land that was once covered in rich tropical forest is fast becoming semi-arid desert.

*Environmental Science & Technology*

## ... AND ANOTHER IN W. KENYA

Most governments, conference delegates and 'experts' have a tendency to forget that those most capable of making a living from arid and semi-arid areas are the people who have lived there for hundreds of years. 'It is just not true' writes Jonathan Barby in a report on the U.N. Conference on Desertification





## Books

### Spaghetti Functions

**TRANSPORT POLITICS AND THE ENVIRONMENT.** Available from SERA, Tidy's Cottage, School Lane, West Kingsdown, Sevenoaks, Kent. Price 17p.

Campaigns against the transport policies of national and local governments were one of the first signs of popular misgivings about the consequences, for society and the environment, of unlimited growth in Gross Domestic Product, narrowly-defined. At first much effort was dissipated on diverting new roads from one route to another or on trying to prevent the closure of branch railways which should probably never have been built. In the last few years, however, deeper analysis has suggested that it is the basic objectives of transport policy which need challenging. Transport is perceived as essentially a social phenomenon, not a mere technical system, and its problems are therefore primarily political. Yet this idea, now generally accepted in the ecological movement, is only slowly filtering into the transport industry.

This discussion pamphlet from SERA is a useful summary of that analysis which one would like to see widely read by the professionals. It opens with the assertion that efficiency is to be measured in the meeting of people's needs, not by technical statistics. It points out that private vehicles cannot be used rationally while external costs such as pollution are not borne by users and while exhaustible resources are seriously underpriced (it might have asked more bluntly why a pattern of use with such illegitimate foundations is treated so reverentially by planners). The technocratic

obscurities of cost/benefit analysis are sensibly challenged, and safety is given a more central place than in the recent White Paper.

The statement of alternatives is more carefully argued than is sometimes the case with the transport/environment lobby, though it does demonstrate the need for more hard thinking on precisely what a post-industrial society may require. For example, to talk of 'a minimum level of service . . . basic facilities . . . reached by everyone easily' does not much help even the most socially-conscious planner or operator. Similarly, who said that long distance trips '*should* be made in comfort and . . . speed' (my italics)? What are the determining criteria — competition (as now), energy consumption, planners' targets or the communal will? And how are we to ensure that the necessary campaign against the extensive distribution of standardised products from over-centralised factories will not lead to more limited distribution without changing the products — and leave us without either the pseudo-choice we have now or the extensive choice which modern marketing has destroyed?

One remains unsure about what sort of social system SERA envisage. They imply a patchwork of local, more self-sufficient communities, but the pamphlet is hazy on just how short resources are expected to be and still proposes nationalisation when communalisation might be more appropriate. But that said, this is a thoughtful pamphlet avoiding waffle and packed with valuable facts to shatter conventional wisdom.

Jonathan Tyler

### Future Imperfect

**THE STUDY OF THE FUTURE — An Introduction to the Art and Science of Understanding and Shaping the 'Tomorrows' World,** by Edward Cornish with members and staff of the World Future Society, Washington, D.C.,

The future can only be predicted with confidence if the mechanisms which determine it are understood and the starting point accurately known. Such is the situation with numerical weather forecasting. The atmosphere obeys the established laws of classical physics and mech-

anics rather well, and there are many hundreds of reporting stations which twice or more times daily report the condition of the air. Nevertheless within 3 days or so the details of the forecast are beginning to be seriously wrong, and after a week or two it is difficult to say anything by way of prognostication other than that the weather will vary in much the same way as it always has. Alone among all natural phenomena the courses of the planets and their moons can be predicted for centuries with precision and that is because they represent an essentially simple system.

It is not surprising therefore to find that until little more than a century ago, when life began to change significantly, predictions about life in the future were little more than elaborations of the mixture as before, with a few inventions thrown in to entertain the imagination.

At first increasing change was regarded as progress, but around the turn of the century the rate of change and our inability to believe that change for the better can continue much longer, has generated a considerable pessimism. Edward Cornish's book, in spite of its title, is a study of the past — of what people have said in the past about their future. It reviews the methods we may use to consider the future, but it does not clearly distinguish the objectives of trying to create it and trying hard to make the best of what may be inevitable by knowing it in advance.

It can be recommended as very entertaining and anecdotal for the first half of the book, which gives as good a summary as might be hoped for, in the space available, of the whole spectrum of views about the future that have been promulgated by various writers and active groups. It provides much useful historical material to think about, and plenty of theses to argue about while it remains itself rather undogmatic.

When it warms to its own subject of the newest methods of the study of the future it becomes decidedly less convincing, and rather boring as a consequence. This is probably because it becomes less personal as it loses the anecdotal style and attempts to develop a method, which cannot possibly fulfil the require-

ments of a prognostic tool, without which futurology must be a mere branch of history. It has nothing much for us as individuals today; indeed it is rather frightening in its view that a single universal civilisation may, and probably will, become dominant and that this may, and probably will, be good. The idea of one future seems to have taken charge: what a pity, when there used to be so many!

R.S. Scorer

### The Language of Need

**DISABLING PROFESSIONS** by Ivan Illich *et al.* Marion Boyars, £1.95.

Within the last generation, a new vocabulary of service has passed into common usage. As Ivan Illich notes, "When I learned to speak, *problems* existed only in mathematics or chess; *solutions* were saline or legal; and *need* was used mainly as a verb. The expressions, 'I have a problem', and 'I have a need', both sounded silly."

Acceptance of the vocabulary of need has accompanied the growth of the service professions. Professions claim the authority to define a person as a client, to determine his needs, and to prescribe the appropriate remedy. They define their own areas of competence, they select their own members, and they set the standards by which their own performance is to be judged. In the words of Everett Hughes, "Not merely do the practitioners, by virtue of gaining admission to a charmed circle of colleagues, individually exercise the licence to do things others do not, but collectively they presume to tell society what is good and right for the individual and for society at large in some aspect of life. Indeed they set the very terms in which people may think about this aspect of life."

In the best of the five essays in this book, John McKnight points out that professional services now constitute a large portion of the GNP (and a source of income for a significant proportion of the population) and, unlike other economic activities, would seem capable of unlimited growth. Accordingly, the expansion of professional services should be attributed not to an increase in the real needs of clients

but to the real need of professionals for an increasing number of clients to serve.

When the individual comes to regard himself not as a citizen but as a passive client, and accepts that he has the needs imputed to him by specialists, he is disabled: it becomes increasingly difficult for him to identify his wants on the basis of his own experience. As specialist professions proliferate, they impute to him ever more fragmented needs and specify the corresponding remedies; his inability to integrate these partial solutions into a satisfying whole opens the door to yet another army of professional helpers. The political consequences of the transformation from citizen to client are considered by Irving Zola in an essay on medicine as a form of social control.

Harley Shaiken shows the particular stupidity of professional solutions applied to job satisfaction. Dissatisfaction arises through the compartmentalisation of work, which reduces the worker to a machine-tender while reserving the planning and coordination to management. The remedy is to restore to the worker some control over what he does. Job-enrichment plans, however, "assume that, when a worker puts in a dozen different kinds of bolts rather than the same one twelve times, the work is inherently more satisfying."

Jonathan Caplan examines the legal profession and notes, among other things, "the great difference between a lawyer and a tin of peas" (we do not always know whether we need a lawyer).

These essays present the case for a radical re-evaluation of professional services. It is especially chastening to realise that professionals are taking up and subverting ecological ideas, as illustrated by Illich's story of the MIT professor who was shown the ingenious garbage housing developed by the poor in the slums of Mexico and returned home with rolls of photographs. Within a year he had despatched specialists in community architecture back to Mexico, to teach the slum dwellers their problems, needs and solutions: self-help has been professionalised.

Bernard Gilbert

### Other Books Received

**START YOUR OWN ORGANIC GARDEN OR ALLOTMENT.** 'Whole Earth' pamphlet No. 1, 25p from 11, George Street, Brighton, Sussex BN2 1RH.

A primer for absolute beginners, aimed at helping them to avoid the most obvious pitfalls. Explains the meaning of "organic", tells you how to dig and how to make compost. Very brief but good value at the price.

**SELF-SUFFICIENCY.** John and Sally Seymour. Faber Paperbacks £1.50.

The paperback edition of this well-known handbook for the back-to-the-land brigade. A must for the beginner and the innovator. Full of information well presented.

**THE BIG RED DIARY 1978.** The Politics of Food. Pluto Press £1.50.

A diary of biting, witty, pithy and devastating comments on the sources, manufacturers, processes and costs of our food. Full of good stuff in tiny print.

**SENSIBLE SLUDGE.** A new look at wasted resources. Jerome Goldstein. Rodale Press \$5.95.

The editor of *Organic Gardening and Farming* is a well-known authority on turning waste into a valuable resource. This book contains lots of information with which to bombard your local council and those responsible for waste-conversion both rural and urban.

**ALTERNATIVE LIFE STYLES.** Herb Seal M.A. Distributed by Prism Press £3.95.

Sub-titled "A study of communes, intentional communities, group marriages and other types of non-nuclear families" it is a highly personal review of communal living containing a good deal of information that communards may well feel misses the point.

**ECOSCIENCE.** Population Resource and Environment. Paul R. Ehrlich, Anne H. Ehrlich, John P. Holdren. W.H. Freeman & Co. Hardback £28.40 (\$39.95). Paperback £12.90 (\$19.95).

Covers energy problems, geophysical and climatological aspects of the environment; social, political and economic trends. A reference book of enormous value to all concerned with the environment.

**DICTIONARY OF THE ENVIRONMENT.** Michael Allaby. Macmillan Press £12.00.

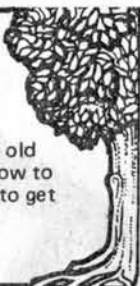
Defines and explains all those terms now used in the literature of environmental studies, including a wide range of associated disciplines. A useful addition to the reference library of anyone teaching, writing and researching in this field.



## THE GARDENER'S FOLKLORE

MARGARET BAKER  
17 illustrations £4.50

This extensive collection of old customs and beliefs shows how to use the traditional practices to get the best from your garden.



## PENNY PINCHERS

coming in April at 99p each!

- BAKING BREADS
  - EASY VEGETABLE GROWING
  - FOOD FROM THE WILD
  - HOME RANGE POULTRY KEEPING
  - KEEPING HONEYBEES
  - MAKING YOUR CHILDREN'S CLOTHES
  - NATURAL AND HERBAL BEAUTY
  - PRESERVING AND PICKLING
- DAVID & CHARLES  
NEWTON ABBOT · DEVON

## NOT JUST A LOAD OF OLD LENTILS

Rose Elliot's famous vegetarian cook-book is now back in a durable, spongeable stay-flat binding . . . with 400 superb dishes inside!

£3.25 (by post £3.55)

**THE OXFAM VEGETABLE COOKBOOK**  
Twenty-five vegetables — but a hundred ideas from Rose Elliot!

Oxfam publication. 75p (by post 85p)

## BEANFEAST

Great ideas for beans, cereals, seeds and fruits make this Rose Elliot's most up-to-date cookbook of all.

85p (by post 95p)

From health stores or from

THE WHITE EAGLE PUBLISHING TRUST  
New Lands : Rake : Liss : Hampshire

## ECOLOGY TODAY

Elizabeth Billington

For young people, the scientific study of the relationships of living and non-living things to each other and to their environment. Some beautiful animal photographs are included.

£2.25.

Kaye & Ward,  
21 New Street,  
London EC2

## TRACT



### EDITORIAL:

ON SIX YEARS OF INDEPENDENT PUBLISHING

CAN WE THINK OUTSIDE TECHNOLOGY?

George Grant

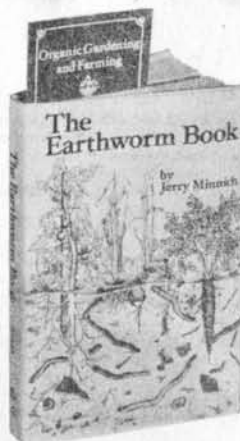
REASON, EMOTION AND ART IN THE PHILOSOPHY OF JOHN MACMURRAY

Philip Conford

LETTERS ON: WHAT IS PSYCHOTHERAPY? ON MASS CULTURE AND MIMESIS ON ECOLOGICAL HUMANISM

No. 24

£1.00



## THE EARTHWORM BOOK

How to Raise and Use Earthworms for your Farm and Garden.

by Jerry Minnich.

£4.75 H.B.

ISBN 0-87857-193-0

Further information and Catalogues from  
Josie Holton,  
Rodale Press Inc.,  
Potten End,  
Berkhamsted,  
Herts.  
Tel: 71471/2



LAWRENCE D. HILLS

## Grow Your Own Fruit and Vegetables



FABER & FABER £3.50

Available from The Ecologist  
73 Molesworth St, Wadebridge.  
Price £3.50 + 60p p&p

## Conservation and Agriculture

Edited by  
JOAN DAVIDSON  
RICHARD LLOYD



John Wiley

## CONSERVATION BOOKS

Books advertised or reviewed in The Ecologist — and any others — supplied.

- \* Many special offers.
- \* Diana Wylie filmstrips/slides/cassettes.
- \* Books ordered from stock sent by return.
- \* Free postage and packing on UK orders of value over £10.
- \* Please send a large SAE for our latest classified stock lists, terms, and order form.

Conservation Books (E), 228 London Road, Reading, Berkshire, RG6 1AH, England. Tel: Reading (0734) 663281.

## A GUIDE FOR THE PERPLEXED

by  
E. F. Schumacher

Jonathan Cape £3.95.

Dear Sir,

In November 1976 your magazine published an Editorial — "Ecology the new political force" — which prompted us last year to start the new Conservative Ecology Group, whose purpose is to encourage the Conservative Party to begin thinking in more realistic and holistic terms. Since then our membership has grown and we have made a number of very useful contacts within our party at all levels.

Your readers may be interested to know that we have been greatly encouraged by the receptive attitude of many of our fellow Conservatives. It would be idle to pretend that any dramatic ecological great leap forward is likely with-in the foreseeable future but I am convinced that much can be done within the main political parties to promote a more enlightened attitude to the central issue of economic growth.

It seems to me at least, that only a pluralistic strategy will work. We need ecologists within all the main parties as well as the non-political pressure groups. We need to stop talking only to each other and preaching to the converted. Above all we need a more realistic attitude to politics itself.

A political party can only win power if it has money, mass support, experience and above all, credibility — not only in its ideas but also in its ability to win so that those who support it do not feel they are wasting their votes in an empty quixotic gesture. I wish the Ecology Party well but there is no point in pretending that it yet has any of these essential pre-requisites. I therefore believe that environmentalists would be foolish to put all their eggs in its insubstantial basket. In politics, unfortunately, small may be beautiful but it has yet to be seen whether it can ever be effective. I therefore urge all readers of your magazine who are interested in promoting ecological reform instead of merely talking about it, to consider operating within the main parties. My own experience over the last few months has convinced me that the conventional growthist wisdom can be changed and that the notion, popular amongst ecologists, that the politicians who already hold power are beyond all hope of rational persuasion is quite false.

Anybody from your readership who would like to join our Group will receive a warm welcome.

Yours faithfully,  
Richard Williams  
Secretary Conservative Ecology Group  
11 Church Road  
Portsmouth  
Hants. PO1 1QA.

#### Chasing Two Hares

Dear Sir,

I understand that the decision to split The Ecologist has been taken, but not without qualms in certain quarters. I confess that I thought of Stalin's remark that Hitler was chasing after two hares when he divided his southern army in order to attack the Caucasus and Stalingrad at the same time. But that thought was one of those uncontrolled demi-thoughts that flit through the consciousness and have no serious backing.

**STOP WINDSCALE  
DEMONSTRATE  
MARCH 19 TRAFALGAR  
SQUARE**

Assemble 12.30  
Speakers Corner Hyde Park

For further information  
contact:

#### Supported by:

Concern, Conservation Society, Conservative Ecology Group,  
Green Ban Action Committee, Greenpeace, Greenpeace (London),  
Irish Conservation Society, Manx Conservation Council,  
National Peace Council, Nuclear Action Group,  
Network for Nuclear Concern, People for a Non Nuclear World,  
Political Ecology Research Group, SCRAM,  
Socialist Environment and Resources Association,  
United Nations Association Youth Council,  
Wexford Nuclear Society Association, Windscale Appeal,  
Young Liberal Movement, Youth Environmental Action,

Czech Conroy, 9 Poland Street, London W1. 01-434 1684 Friends of the Earth

## THE ECOLOGY PARTY

Thinking people are now urgently seeking an alternative to the selfish, irresponsible and growth orientated policies of this country's major political parties. The Ecology Party offers an alternative which is sane, realistic and humane.

**JOIN NOW — and help build the ecologists' only political platform.**

For further information contact: *The Membership Secretary, 2 The Old Vicarage, 26 Main Road, Kempsey, Worcs.*

Certainly the decision to split The Ecologist is logical from the point of view of conventional publishing. I think one of the reasons I have liked The Ecologist so much is that it put intelligence before genre in a way that very few magazines do today. For instance, my article which you kindly and beautifully produced in January 1977 would have satisfied very few other journals. It was too specialized for half of

them and too general for the other half! The variety of readers makes for great difficulties for you and the staff, I'm sure. But it also makes for an ecologically stable ecosystem of readers.

With best wishes to you all,  
Tom Merriam,  
Basingstoke,  
Hants.



# Classified advertisements

## SOIL ASSOCIATION 5-DAY EASTER COURSE ON ORGANIC HUSBANDRY

We are delighted to announce that, with the co-operation of the Principal, Mr. R.D. Park, and his staff, the Spring Organic Husbandry Course will again take place at the Shropshire Farm Institute, Walford, Baschurch, Shrewsbury from Sunday, 19th March to Thursday 23rd March inclusive. The course fee of £28 will cover accommodation, tuition and meals. Booking forms are available from the Shropshire Farm Institute and the Soil Association. Please include a S.A.E. with your request (address see below).

The programme will include a simple scientific introduction to soil structure and plant nutrition, followed by the practical application of organic methods in agriculture and horticulture. The course will also include a visit to Lea Hall, Mr. Sam Mayall's organic farm, and the market garden at Weston Park, Lord Bradford's estate, run by organic methods. Lecturers are Dr. T.L.V. Ulbricht of the Agricultural Research Council, Lady Eve Balfour, Mr. Sam Mayall, Dr. Victor Stewart and Mr. Jack Temple.

A similar 5-day course in organic husbandry will be held in July 1978 in Surrey. Full details and booking forms later from the Soil Association, Walnut Tree Manor, Haughley, Stowmarket, Suffolk, IP14 3RS, Tel: Haughley 235/6.

## MISCELLANEOUS

CROPS providing FOOD AND FUEL for all our needs could be grown on land now used for livestock. Send 25p for details and Handbook with recipes - Vegan Society Dept. R, 47 Highlands Road, Leatherhead, Surrey.

C.O.M.E.T. (Combined Organic Movement for Education and Training) Comet is now entering its second active year. The original group, con-

sisting of Alternative Society, the Good Gardeners Association, the Henry Doubleday Association, the Soil Association, and Working Weekends on Organic Farms, has now been joined by the National Centre for Alternative Technology and the Country College. The prospect of some long-term courses starting later in the year is now becoming distinctly hopeful. In the meantime we shall be organising a number of short courses during 1978 and details of these and of all other courses known to us, can be obtained free by sending a 9" x 4" s.a.e. to Comet, Lower Shaw Farmhouse, Shaw, Swindon, Wilts.

## BOOKS AND PUBLICATIONS

THE CORNISH BANNER. Giving comprehensive coverage of the life of this important national minority in the U.K., with reports on the situation of other ethnic struggles in different parts of the world, The Cornish Banner is now widely read among intellectual circles. The situation of Cornwall and the Cornish people is one example of an ethnic and cultural struggle and their past history, present circumstances, future progress is of interest to all concerned about the human condition and the future of humanity generally.

Annual subscription (four issues) within the U.K. £2.00; overseas £2.50. From C.N.P. Publications, Trelispen, Gorran, St. Austell, Kernow/Cornwall, U.K.

Cut fuel bills with the WOODBURNING BOOK. Illustrated details of over 100 woodheaters, cookers, boilers in the U.K. Finding, preparing and storing wood. £1.10 from Small Scale Supplies, Department EC, Widdington, Saffron Walden, Essex.

EGIS (Environmental Information Service) Our latest package entitled "World Food Prospects" is now available. It aims to act as a guide to the subject for the general public and for use in schools.

THE CONTENTS OF THIS PACKAGE covers the History of Food Habits, Nutrition, Malnutrition, Agriculture, Fishing, Forestry, Food and Population, Food and Economics, Vegetarianism, Other Food Sources, Organic Farming, Food Processing, together with an Introduction,

Further Reading and a Glossary. Also included are maps and work charts on World Fisheries, World Farming Types, World Diets and World Population.

Further information from Fiona Murray, Marketing Officer, North Lode, Elswick Road Cemetery, Newcastle upon Tyne, NE4 8DL Tel: 632-30074 (24 hr.)

## HOLIDAY ACCOMMODATION

EXMOOR NATIONAL PARK. Holiday on nature reserve. Self-sufficiency orientated small-holding, house cow, organic produce. Seven camouflaged caravans. Modern toilets. Sea 3 miles. From £21 week. SAE, brochure, Cowley Wood Conservation Centre, Parracombe, N. Devon. Parracombe 200.

DEVON - TO LET furnished for month of August. Secluded Bungalow sleep 6 (Caravan incl.) £70 per week. Panoramic views of Axe Valley. For details phone Lyme Regis 2624 or s.a.e. Mrs. Holmes, Hartgrove, Goyle, Trinity Hill, Axminster EA3 6TB.

## SITUATIONS WANTED

EXPERIENCED DP MAN (IBM 370) disenchanted with current abuse of and over-reliance on computers, seeks position where his expertise can help create a society which does not depend on people like him. Salary less important than social acceptability of work. Part-time considered. Box No. 124.

GRADUATE BIOLOGIST, 27, disillusioned with approach of conventional science, seeks meaningful work in ecological setting. Experience in research and teaching. Wide academic background. Enjoy writing. eter Horsfield, 6 Hills Avenue, Cambridge CB1 4XA.

GARDENING FOR SELF-SUFFICIENCY. A week's course in Wales. Resurgence magazine is organizing a gardening for self-sufficiency course from 7 to 13 April. £25 for board, lodging and course fee. John Seymour, Ken Harding and Katie Thear will guide the course. For further details write to Resurgence, Pentre Ifan, Felindre Farchog, Crymych, Dyfed. Phone: Newport, Dyfed 820317.

## CLASSIFIED ADVERTISEMENTS MUST BE PREPAID.

To: The Ecologist Advertisement Dept., 73 Molesworth Street, Wadebridge, Cornwall.

Please insert the following advertisement in the next ..... issues.

Cheque/P.O. to *The Ecologist* enclosed.

[Word rate 10p per word. Box No. 50p. Minimum charge £3.00].


Name: (Block letters please) .....

Address: .....

Date: ..... Signed: .....

# DON'T FORGET TO ORDER

# THE DOOMSDAY FUN BOOK

Down with Environmentalism

The festive season is upon us, peace on earth, good will to all men, and time for some terminological reform.

To begin with we must repudiate the term 'environmental'. It is too far gone to be rescued, now that the Department of the Environment has decided to build a proposed airport at Luton.

environmentalists are probably the only people who have not yet noticed that the Department of the Environment has decided to build a proposed airport at Luton. Both on the one hand and on the other, an 'unimpaired' should do better than a 'more'.

How do we enlighten? Plan is a good idea, but it is a good idea to have two corporate universities. A description of the ring to the have court. Foulness by is to disappear.

Haackel, it as 'the animal organism' animals with environmental relationships direct or indirect or indirect.

Ecology tells a bludge of academic a single system systems which behavioural problems themselves. eco approach, prefer the laboratory or the simple men 'ecologists' choose rather than their because they feel physicists.

However, Haackel gracefully as we have of scientific accuracy shift. Those approach to ecology ecologists. Those who

ecologists but who content themselves with the simple measurement of artificially isolated relationships should call themselves economists. And those who the moment call themselves ecologists.

## THE DOOMSDAY FUN BOOK

£2.40



Edited by  
**EDWARD GOLDSMITH**  
with cartoons by  
**RICHARD WILLSON**



"They must be trying to create some sort of sanctuary for lame ducks."

Price £2.40

**7 YEARS OF SATIRICAL COMMENT FROM THE ECOLOGIST EDITED BY  
EDWARD GOLDSMITH WITH 42 CARTOONS BY RICHARD WILLSON**

NAME ..... ADDRESS .....

Please send me ..... copies of The Domesday Fun Book at £2.40 each.

I enclose Cheque/Postal Order for £

Cheques etc. should be crossed and made payable to *THE ECOLOGIST*. Send your order to: The Ecologist, 73 Molesworth St., Wadebridge, Cornwall, England.

(If you do not want to cut your copy of *The Ecologist* write to us on your own paper).