

- Taiwan's Polluted
- The German Greens and Industrialism
- Logging Old-Growth in the US
- Polluted Fish and Scientific Secrecy
- Twenty Years of Green Books



Man and the environment
The Quality of life
Pollution
Conservation

Vol.1 No.1

July 1970

4s (20p)

Population control for Britain? • Is there a peaceful atom?

Bringing order to chaos • Can we avoid a world famine?



Twenty Years On: Still Sinking

Gaia and Evolution Proceedings of the Second Annual Camelford Conference on the Implications of the Gaia Thesis.

This volume contains the following papers:

The Gaia Controversy:

Gaia and Generation

Understanding Evolution Gaia and Organisms: A Structuralist View of Nature

Earth and Life evolve together: The Lessons of Panbiogeography

A New Empiricism in Biogeography

The Global Patterns of Life:

Evolution in Action and Action in Evolution

The Evolution of a Complex Dynamical System

Gaia and the Evolution of Planetary Regulation

Towards a Post-Darwinian Concept of Evolution

Analysis of some Evolutionary Concepts

The Changing Face of Natural Selection

A case for the Earth as Living Planet

Gaia and Evolution

Edward Goldsmith: Mae-Wan Ho: Søren Løvtrup: Sidney Fox: Elisabet Sahtouris:

Pierre Lehmann: David Lambert & Richard Newcomb: Peter Saunders: Brian Goodwin: Giuseppe Sermonti:

Ron Brady:

James Lovelock: General Discussion:

Published by the **Wadebridge Ecological Centre**, the proceedings are available from Worthyvale Manor, Camelford, Cornwall, PL32 9TT. **Price**: £25; students and Third World Groups £15.

Also available at £18 (£12 students and Third World Groups) Gaia: The Thesis, the Mechanisms and the Implications. Please add £2 for postage and packing to your order

Proceedings of the First Annual Camelford Conference on the Implications of the Gaia Hypothesis.

Notice to Subscribers

Subscriptions to The Ecologist outside North America are now handled by RED Computing, 29A High Street, New Malden, Surrey, KT3 4BY, England. Tel 040 378 2644 Fax 081 942 9385.

Back issues of The Ecologist and books distributed by the Wadebridge Ecological Centre are available from: WEC Publications, Worthyvale Manor, Camelford, Cornwall, PL32 9TT, England. Tel 0840 212711.

Our special £15 Third World rate is only available through RED Computing and not through subscription agents outside England.

The Ecologist

Published by Ecosystems Ltd.

Editorial Office: Corner House, Station Road, Sturminster Newton, Dorset, DT10 1BB, England. Tel 0258 73476 Fax 0258 73748 E-Mail gn:ecologist. Office Manager: Diane Platt-Higgins.

Subscriptions: RED Computing, 29A High Street, New Malden, Surrey, KT3 4BY, UK. Tel 040 378 2644 Fax 081 942 9385.

Books and Back Issues: WEC Publications, Worthyvale Manor, Camelford, Cornwall, PL32 9TT, UK. Tel (0840) 212711.

Annual Subscription Rates

£18 (US\$30) for individuals and schools; **£36** (US\$60) for institutions;

£15 (US\$25) for students and Third World citizens and groups. Reduced price only available direct from RED Computing and not through subscription agents outside England.

Air mail £9 (US\$15) extra.

The rates above are for six issues including postage and annual index.

The Ecologist is published bi-monthly.

Subscriptions outside N. America payable to The Ecologist and sent to: **RED Computing** Limited, 29A High Street, New Malden, Surrey, KT3 4BY, UK. Tel 040 378 2644 Fax 081 942 9385.

We welcome subscriptions with sterling or US dollar cheque or eurocheque, banker's draft payable through an English bank, international money order, postal order or banker's order. N. American subscriptions payable by check drawn on US banks in US funds to: MIT Press Journals, 55 Hayward Street, Cambridge, MA 02142, USA. Tel (617) 253-2889.

Advertising

Display Rates:

Full Colour Outside Back Cover:	£440
Full Page (265x185mm):	£275
Half Page (130x185mm/265x88mm):	£140
Quarter Page (64x185mm/122x88mm):	£85
Third Page	
(265x58mm/85x185mm/175x120mm):	£100
Sixth Page (86x58mm/43x120mm):	£70
Eighth Page (65x88mm):	- £45
15% VAT to be added to above rates. Typesetting charge 20% of advertising rate	

Inserts:

Up to 265x185mm and not more than 10g.each: £40 per thousand plus 15% VAT.

Classifieds:

See inside back cover.

Further information and full rate card from Diane Platt-Higgins at the Editorial Department (address above). Tel 0258 73476.

Contributions

The Editors welcome contributions, which should be typed, double spaced, on one side of the paper only. Two copies should be sent with original. Word processed contributions should be on a 3.5 inch disk (MS-DOS or Macintosh) in text file (ASCII) format. Illustrations (B/W or colour prints or transparencies, line drawings, tables, maps etc.) should be included where appropriate.

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

The Ecologist International Serial Number is: ISSN 0261-3131.

Printed by Penwell Ltd., Parkwood, Dupath, Callington, Cornwall, PL17 8AD. Tel 0579 50522.

Computer output and equipment supplied by Windsorgraphics, Kings House, Kings Arms Lane, Ringwood, Hampshire, BH1 1AH. Tel 0425 474936.

© The Ecologist 1990

The Ecologist is available on Microfilm from University Microfilms Int., Ann Arbor, MI, USA.

Editors

EDWARD GOLDSMITH NICHOLAS HILDYARD PATRICK McCULLY PETER BUNYARD

Associate Editors

PATRICIA ADAMS Probe International (Canada)

MARCUS COLCHESTER World Rainforest Movement (England)

RAYMOND DASMANN University of California, Santa Cruz (USA)

SAMUEL S. EPSTEIN University of Illinois (USA)

LAWRENCE HILLS Henry Doubleday Research Association (England)

> SANDY IRVINE The Green Party (England)

MICK KELLY University of East Anglia (England)

MARTIN KHOR KOK PENG Consumers Association of Penang (Malaysia)

> SMITHU KOTHARI Lokayan Social Action Group (India)

SIGMUND KVALOY University of Oslo (Norway)

LARRY LOHMANN (USA)

> JOHN MILTON (USA)

JIMOH OMO-FADAKA African Environmental Network (Kenya)

JOHN PAPWORTH Fourth World Review (England)

JOHN SEED Rainforest Information Centre (Australia)

VANDANA SHIVA Research Centre for Science and Ecology (India)

HENRYK SKOLIMOWSKI University of Michigan (USA)

> ROBERT WALLER Soil Association (England)

RICHARD WILLSON (England)

DONALD WORSTER University of Kansas (USA)

EDITORIAL OFFICE, CORNER HOUSE, STATION ROAD, STURMINSTER NEWTON, DORSET, DT10 1BB, UK. TEL +44-258-73476 FAX +44-258-73748 E-MAIL GN:ECOLOGIST

Ecologist

Volume 20, No. 4, July/August 1990

133

Editorial

Feature Articles

Walden Bello and Stephanie Rosenfeld

Taiwan's much heralded economic 'success' has only been possible at the cost of the exploitation of its indigenous peoples and the contamination of its soils, air and water. A growing environmental movement is now challenging the island's Kuomintang rulers with their policy of growth at any cost.

The Balbina Disaster: The Need to Ask Why?

Rogério Gribel

The Balbina dam in the Brazilian state of Amazonas has been an unmitigated social and environmental disaster. Even its original supporters now admit that this is the case, yet there has been no inquiry to find out why the warnings from the dam's critics went unheeded or why those who conceived and promoted the project are allowed to continue planning other dams in Amazonia.

Science and the Control of Information: An Australian Case Study 136

Sharon Beder

Politicians and scientists in Sydney have tried to control both the release and the interpretation by the media and the public of studies showing that fish caught near the city's sewage outfalls were contaminated with organochlorine pesticides. The case serves as an example to show how those in power manipulate scientific data to further their own interests.

The US Forest Service's Old-Growth Logging Myths 141

Richard E. Rice

The US Forest Service is set to drastically expand logging in virgin or 'oldgrowth' areas of the national forests. The timber from these forests is regularly sold below cost, with losses to the US taxpayer justified by false claims that logging provides 'benefits' in the form of improved recreation, biodiversity and forest management.

A Third World View of the West German Green Movement 14

Saral Sarkar

In the late 1970s it was the predominant view in the West German ecological movement that Western economies would have to shrink to become sustainable. Over the last decade, however, the orthodox view within the movement has changed and high material standards of living are now thought to be compatible with an ecological society.

Feature Book Review

The Essence of	^f Ecological	Thinking:	Twenty	Books F	rom	Twenty	Years	 153
Sandy Irvine								

Books	155
Book Digest	157
Letters	158

The Ecologist is printed on recycled paper whitened with hydrogen peroxide.

Twenty Years On: The Message Remains the Same

This is our twentieth anniversary issue. Now may be the time to look back and take stock.

I suppose my first reaction is one of amazement that The Ecologist should have lasted so long. Among other things, we never thought that it would have to. Everything we said in our first issue — a rather dilapidated example of which lies here in front of me - seemed so utterly obvious; even at the time it was almost embarrassing to have to say it. What was far less obvious to us though, was why everyone else did not see it the same way. Whatever the reason, and many were suggested, we felt sure that a few good issues of The Ecologist would soon put that right. Once our politicians came to realize that our modern industrial society was an aberration - and that all the strategies they proposed for solving the problems that confronted us could only exacerbate them, it seemed clear that they would reconsider their assumptions, develop a less aberrant society and work out and implement a very much more realistic set of strategies. There would then be no need for The Ecologist or other similar periodicals, and we could return to our previous occupations. It is astonishing how naive we were at the time.

My second reaction is a mixed one. I suppose that my colleagues and I experience today some measure of satisfaction at the thought that what we said 20 years ago appears very much more credible now than it did at the time. But this feeling of satisfaction is tempered by several considerations.

Common Sense

The first is that our views were not particularly original. They were based on information that was available to anyone — and the conclusions we drew were no more than sheer common sense.

In our first issue, Jean Liedloff, one of the founders of *The Ecologist* (but better known for her remarkable book *The Continuum Concept*) noted that the carbon dioxide content of the atmosphere had been increasing by 0.2 per cent per annum since the beginning of the industrial era and that, should CO_2 emissions continue unabated, this would eventually lead to the melting of the polar icecaps and the flooding of coastal areas. The thesis was not new. It was first proposed by the Swedish chemist Svante Arrhenius in 1896, and in 1957 the Scripps

20 years on... Small is still beautiful

Best wishes from *Appropriate Technology*, the magazine for news of environmentally-sound technologies from around the world. £12 for one year subscription (4 issues).

> Appropriate Technology, I.T. Publications Ltd. 103-105 Southampton Row, London WC1B 4HH

Institute of Oceanography in California showed that about half of the CO₂ emissions from humanity's activities were being trapped in the atmosphere. Humanity, the authors of the study noted, was "engaged in a great geophysical experiment".

Also in our first issue, Peter Bunyard, another founder of *The Ecologist*, warned of the inevitability, of a Chernobyl-like nuclear accident:

"The chances are that sometime, somewhere, a nuclear reactor and its container structure will be breached by an explosion; or that a sealed tank full of seething radioactive waste to be entombed far from man's dwelling places will get ruptured. The consequences in either case could be a radioactive cloud several hundreds of times more lethal than that which settled upon Hiroshima or Nagasaki."

The radioactive fall-out from Chernobyl was about 50 times greater than that of Hiroshima - and only about 3 per cent of the crippled reactor's radioactive contents were released. Again, Peter Bunyard's opinion was based upon the best available information. He knew of the Windscale fire of 1957 which itself "vented more radioactive waste than had fallen on Hiroshima after the bomb." He had read the writings of such people as Dr John F. Gofman and Dr Arthur G. Tamplin who had worked for the United States Energy Authority's Lawrence Livermore Radiation Laboratory before becoming disenchanted and leaving to publicize their concerns over nuclear energy. He knew of the systematic campaign of disinformation that had and still is being undertaken by the nuclear industry worldwide. He knew too that it is impossible to build any sort of machine that cannot go wrong, and that if that machine happens to be a nuclear installation, it can make vast areas uninhabitable and increase the incidence of cancer and infant mortality among large numbers of people, as the Chernobyl accident will clearly do.

Sound Husbandry

In the same first issue, another founder, Michael Allaby, argued very convincingly that the Indicative World Plan drawn up by the United Nations Food and Agricultural Organization could not serve its stated goal of feeding the world. The plan involved applying the 'Green Revolution' in order to replace traditional varieties of wheat and rice with high-yielding varieties. The latter required enormous inputs of fertilizers and if the new varieties were to succeed, Allaby noted, we would "have to find ways of increasing fertilizer availability throughout the entire developing world so that each farmer has access to up to 27 times the fertilizer he uses at present." Where was this fertilizer to come from, and how would it be paid for, he asked. Of course, it had to be imported, and India, where the Green Revolution is said to have been most successfully applied, now has to spend more money on importing fertilizers than it previously spent on importing grain. Allaby stated how "repeated applications of heavy fertilizer doses will damage the structure (of the soil) so reducing the effectiveness of the fertilizer itself and undermining the fertility of the soil". This is precisely what has happened.

He noted too, that the high-yielding varieties were particularly vulnerable to pests, and that therefore massive amounts of pesticides would also have to be imported. "It is inevitable", he wrote, "that there will be great problems from pollution. There are likely to be serious pest, weed and disease outbreaks because of the disturbance of delicate ecological balances, and as resistance to the chemicals develops, as we know it will, there will be an almost irresistible temptation to move on to other, more sophisticated, more toxic compounds, which will further aggravate the situation." Again his warning has proved entirely accurate.

Allaby argued that there was only one possible solution to the world food crisis: to get away "from intensive and industrialized agriculture and back to sound husbandry" which would entail a return to small farms. These are very much more productive than the large farms that alone can afford the expensive inputs required by modern industrial agriculture.

Piecemeal Treatment

Such a strategy is required in any case in order to protect public health. As Professor R. Lindsay Robb pointed out in our first issue: "The most important single factor in health is nutrition (which) is largely dependent on good quality food of pleasing flavour." However, "almost everywhere in the world today, agricultural policy is based on production of the largest quantity in the shortest time at the smallest cost and highest cash profit. There is virtually no regard for quality - nutritive value - or the future of the land." If he were alive today he would only need to point to salmonella in eggs, listeria in cheese and Mad Cow Disease to prove his point, not to mention the massive increase in the 'diseases of civilization' - cancer, diabetes, heart disease, diverticulitus, peptic ulcer and tooth-decay. All of these, as is noted in our first issue in Alan Maryon-Davis's review of Diabetes, Coronary Thrombosis and the Saccharine Diseaseby T.L. Cleave, are clearly associated with the abominable diet of modern industrial men and women.

"In tackling the problem of illness in man or beast", Lindsay Robb wrote, " a common approach is to seek specific remedies for specific diseases through drugs, injections, antibiotics and so forth, to protect crops by using specific pesticides to kill specific pests and by engineering works to save the soil from being blown or washed away. This failure to recognize fundamental relationships, coupled with the piecemeal treatment of symptoms, is likely to result in a race between the emergence of new forms of sickness and the discovery of new materials to combat them. If so, man will be fighting a losing battle."

This surely must be clear to all of us today. In spite of the massive arsenal of chemical weapons that we have built up, the incidence of infectious diseases such as malaria, schistosomiasis, filiariasis, dengue fever and gonorrhoea is increasing, while we are now faced with a new pandemic — Aids — which is already threatening to kill huge numbers of people in Africa and could soon affect other parts of the world in a similar manner. It is truly amazing that we do not yet see just how far conventional wisdom has got it wrong.

Moreover, it is not our national health service that can assure the health of our population. As Lindsay Robb wrote, it is "no more than a running repair service to cure recurrent sickness". Indeed, "our survival and continued existence on this planet depends not so much on the discovery of wonder drugs and pest killing sprays as on being able to maintain a high level of soil fertility."

All this is clearly true. It was obvious to a number of Lindsay Robb's contemporaries and predecessors and indeed to countless generations of traditional farmers all over the world. However, in the aberrant society in which we live, we have lost sight of the obvious.

Another factor which tempers any satisfaction that we at *The Ecologist* might experience in being proved correct is the horrendous nature of the problems that confront us today. Indeed, if we allow global warming, the thinning of the ozone layer, the contamination of air, seas, rivers and groundwater with ever larger amounts of increasingly toxic chemicals, the destruction of for-

WELL DONE!

Congratulations on reaching your third decade. *The Ecologist* is a badly needed voice of sanity seeking to prevail amid an unsavoury cornucopia of most unsacramental mass material affluence. May you help us to win through to a polity of regard for the wonders of this beautiful world; a polity where your readers may then be able to give fuller attention to the problems of the human scale and the efforts of the FOURTH WORLD *REVIEW* to resolve them.

With love, greetings and gratitude from all of us of THE FOURTH WORLD, 24 Abercorn Place, London NW8.

COURAGEOUS

From a Gaian perspective, 20 years is but the merest moment. But it's a long time in magazine publishing! And what a wealth of intellectual rigour it's produced, of uncompromising probity, of stimulation, irritation, and purest delectation. Through thick and thin, whether 'green' be out or in, *The Ecologist* holds us all to a courageous straight but *never* narrow.

> Jonathon Porritt Ex-Director Friends of the Earth UK

SOULMATE

The Ecologist is the soulmate of Resurgence. If you enjoy reading The Ecologist, you will certainly like to see a sample copy of Resurgence magazine which you can obtain by writing to :Jeanette Gill, Subscription Manager, Salem Cottage, TRELILL, Bodmin, Cornwall PL30 3HZ.

Congratulations to The Ecologist for pioneering a new worldview and for being at the leading edge of the green movement.

ests, the erosion, desertification and salinization of agricultural land, the extinction of species of mammals, birds, reptiles, insects and plants and the continued runaway growth of the human population to continue unimpeded for another few decades, our planet will simply cease to be habitable, and the extinction of our species will become almost inevitable. This is something that few people are willing to face; fewer still seem willing to advocate those changes that must be brought to our society, our economy and our lifestyle if we are to reverse current trends and create a future for our children.

Consider global warming. Just to stabilize the concentrations in the atmosphere of carbon dioxide. CFCs and nitrous oxide at their present levels (and therefore slow down but not halt climate change), the United Nations Intergovernmental Panel on Climate Change warns that we must cut the emissions of these greenhouse gases by over 60 per cent immediately. However, even the governments which are considered the most progressive in these matters have committed themselves to no more than pegging emissions to their present levels by 2000. The British Government says it will not bring emissions back to their present levels until 2005, and the US refuses to accept even this pathetically inadequate target. Meanwhile the oil industry is now trying to dissuade governments from taking any action at all, citing a largely discredited study from a right-wing American policy institute which claims that we can expect a cooling early in the next century due to decreased solar activity.

Creating a Better Society

But it is neither fear of ecological catastrophe nor resentment of those who refuse to accept the need for change that will ultimately lead us to take the necessary action - rather it should be the desire to create a better society, and one that can satisfy the biological, social, spiritual and aesthetic needs of its citizens. This our modern industrial society cannot do without annihilating the natural world upon which we depend for our sustenance and our inspiration. We need to realize that modern industrial society is but a passing aberration. We made the same point in our first issue. In a review of the proceedings of an anthropological conference entitled Man the Hunter, Robert Prescott-Allen (who with his wife Christine went on to write the World Conservation Strategy for the International Union for the Conservation of Nature) noted that "of the estimated 80 billion people who have ever lived out a life span on earth, over 90 per cent have lived as hunters and gatherers; about six per cent have lived by agriculture and the remaining few per cent (and that in spite of the current population explosion) have lived in industrial societies."

Hunter gatherers are seen by us as being the most miserable of people and we insist on seeing their lives as "nasty, brutish and short" to use Thomas Hobbes's consecrated phrase. But, as the participants at this conference demonstrated, nothing is further from the truth. Hunter-gatherers had plenty of food at their disposal and they did not suffer from malnutrition or famine. As Colin Turnbull, one of the participants, writes of the Mbuti Pygmies of Zaire: "Famine or anything approaching it is utterly unknown to the Mbuti who have the axiom that 'the only hungry Mbuti is a lazy Mbuti'." James Woodburn said much the same of the Hadza of Tanzania: "For a Hadza to die of hunger, or even to fail to satisfy his hunger for more than a day or two is inconceivable." On the whole, they were very healthy people, showing no signs of the kwashiorkor, rickets, infantile scurvy or vitamin B deficiency which are often found among the malnourished of the tropics. They were also long lived. Out of one group of 466 bushmen, 46 were over 60 years old, "which compares favourably with the proportion of elderly in industrialized societies."

Nor were they 'poor' if we use this term in a sensible way. As Marshall Sahlins noted at the conference: "Our assumption that the hunter-gatherer's lot must be hard is based on the theory behind all market economies — that man's wants are infinite and can with difficulty be satisfied. The enviably short working hours and freedom from anxiety of the hunter-gatherer must be based on a contrary philosophy — that man's wants are few and easily satisfied. The immense sophistication of our technology serves not to satisfy our needs but to increase them. The simple technology of the hunter-gatherer is perfectly adequate while he lacks the burden of our bourgeois impulses. It also has a much less radical effect on the environment."

Inspiration and Knowledge

I am not suggesting that we all return to being hunters and gatherers. What I would insist on, and what *The Ecologist* has tried to show again and again over the last 20 years, is that there are various alternatives to our modern industrial society, alternatives, moreover, that are truly sustainable and that provide its members with a very much more fulfilling lifestyle. From them, as well as from the more suitable knowledge built up during the industrial era, we can derive the inspiration to develop the sustainable societies of our post-industrial future.

To make whatever contribution we can to the development of such societies must be our goal for the next 20 years, and, let us hope, it is also the goal of tens of millions of other people throughout the world. It is that prospect that today gives us the only cause for celebration.

Edward Goldsmith

BESHARA

A PERSPECTIVE OF UNITY IN THE CONTEMPORARY WORLD

BESHARA congratulates THE ECOLOGIST, Teddy and the Editorial team on 20 years of publication.

The findings of modern science, the environmental crisis and changes in the world's economic and political order are bringing about a new awareness of the underlying unity in all things. BESHARA magazine gives expression to this awareness as it arises, in fields as diverse as science, the arts, economics, current affairs, and the spiritual traditions. BESHARA reflects the desire for a renewed sense of value and spiritual understanding in the contemporary world. From cosmology to quantum physics, from 'deep' ecology to sacred art, BESHARA provides a forum for a perspective of unity.

EACH ISSUE INCLUDES:

 feature articles by leading scientific and philosophical thinkers

- book and arts reviews
 - interviews
 - news
- reports on conferencesevents listings

CONTRIBUTORS

Rupert Sheldrake, Ilya Prigogine, Kathleen Raine, Keith Critchlow, Mae Wan Ho, John Barrow, Paul Ekins, Willis Harman, Gebrge Pattison

ARTICLES

The Club of Rome, Faith and Ecology, the Architecture of Sinan, Essays on Muhyiddin 'Ibn Arabi, WB Yeats, Reviews of CJ Jung, Joseph Campbell

INTERVIEWS

with philosopher Raimundo Pannikar, mathematician Roger Penrose, dancer Shobana Jeyasingh, painter Simon Blackwood

FREE TRIAL OFFER: Subscribe and receive the current issue of BESHARA completely free. For details please write to: BESHARA magazine, Frilford Grange, Frilford, Nr. Abingdon, Oxon OX13 5NX

High-Speed Industrialization and Environmental Devastation in Taiwan

by

Walden Bello and Stephanie Rosenfeld

Orthodox development economists point to Taiwan as a model of economic growth for the Third World. But the island also provides a clear model of the inevitable environmental devastation wrought by the quest for rapid economic development. This devastation has led to the emergence of an increasingly successful grassroots environmental movement which is challenging the technocratic and undemocratic policies of Taiwan's ruling élite.

By conventional economic measures, Taiwan's success is undeniable: at \$7000, Taiwan's per capita income has overtaken that of some members of the European Community, and is closing in on New Zealand's. The economic growth rate has averaged close to nine per cent per year over the last 30 years, outpacing everything but the speed of environmental destruction. The ruling Kuomintang (KMT) Party, which installed itself in exile from the Chinese mainland in 1948 following its defeat in the civil war, has tried to buy legitimacy among the Taiwanese with high growth rates. In the mid-1960s, the KMT embarked on an export-orientated development strategy using the seemingly limitless US market as the engine of growth, at a time when the US was still committed to open markets worldwide. Now, however, more and more Taiwanese are wondering if the material benefits of high-speed growth are not, in fact, outweighed by its costs.

Taiwan shares the same basic pattern of export-driven economic growth as South Korea, Hong Kong and Singapore — collectively known as the 'newly industrializing countries', or NICs. But the NIC model may have run its course, despite the fact that export-orientated growth is the World Bank's standard prescription for debt-ridden Third World countries. Externally, the world economic conditions which allowed the NICs to grow are no longer encouraging. The United States, with its gaping trade and budget deficits, is moving rapidly towards protectionism. Indeed, the US has declared economic hostilities on the NICs, with a senior Treasury official issuing what was tantamount to a declaration of war in October 1987:

"Although the NICs may be regarded as tigers because they are strong, ferocious traders, the analogy has a darker side. Tigers live in the jungle, and by the law of the jungle. They are a shrinking population."

The US has eliminated trade preferences for many Taiwanese exports and tightened up already existing restrictions on garment and textile exports. It has also forced Taiwan to appreciate its currency by 40 per cent between 1986 and 1989, in an effort to make Taiwan's goods more expensive to US consumers. Moreover, it is increasingly apparent that the price Taiwan must pay for continued access to the US consumer market for its manufactured products is the ruin of its agricultural economy, as the US demands wide-open access to Taiwan's highly protected meat and produce markets.

Like the external climate, domestic conditions have turned hostile to the traditional growth model. The people of Taiwan are increasingly refusing to tolerate two of the basic ingredients in the recipe for high-speed growth: low wages and environmental degradation. The rapid increase in labour disputes in the last three years shows that workers are discontented with their share of the economic 'miracle'. With wages increasing dramatically, Taiwan's cheap labour is no longer cheap enough. For comparison, in 1989, the average wage of a Taiwanese textile operator was over 13 times that of his or her counterpart in Sri Lanka.

Taiwan's neighbourhood environmental activists totally reject the construction of new industries on the island if they are known to be highly polluting. More important, their increasing influence among all sectors of Taiwanese society now poses a potent challenge to the technocrats' ideology of the primacy of growth. Taiwan's landscape is as enchantingly green now as it was to the Portuguese seamen who christened it 'Formosa', or 'Beautiful Island'. But beneath the greenery is poisoned soil. Beside the greenery flows polluted water. And, increasingly, the green itself is toxic grain.

Deforestation

As industrial and residential developments encroach on fertile rice fields, the Government has encouraged the clearing of forested land for agriculture. The virgin broadleaf forests which once covered the entire eastern coast have been almost completely destroyed, and the second-growth broadleaf forests which replaced them have decreased by 20 per cent between 1956 and 1977.¹ These shrinking forests have served as the natural habitat for many endangered species, including the clouded leopard, which may still exist but has not been sighted in the wild for years.

Much of what passes for forest conservation has, in fact, been the conversion of hardwood forests into profitable monocultural plantations of fast-growing conifers, such as *Cruptomeria japon*-

Walden Bello is chairperson of the Research and Analysis Department of Food First, the Institute for Food and Development Policy, 145 Ninth Street, San Francisco, CA 94103, USA. Stephanie Rosenfeld is a research associate of Food First's Newly Industrializing Countries (NICs) project.

ica, which are considered more profitable. Not surprisingly, the replacement of what the Forestry Bureau disdainfully calls 'messy vegetation' with more economically valuable trees has vastly simplified what were once diverse natural habitats.² Such forest monocultures have been found to support only 15 per cent of the birds found in adjacent natural forests.3

A vast network of 'industrial roads' has been built to open up the forests to logging, agriculture and development. A predictable result has been serious soil erosion. Two-thirds of Taiwan slopes by 10 per cent or more, with about half of the island sloping more than 40 per cent, making erosion from the destruction of mountain forests a nationwide problem. Whole slopes of bare soil are reported to have slid away.4 To slow the filling of water reservoirs by erosion, about 1,385 check dams have been built, but, not surprisingly, these dams have themselves created ecological problems. The comprehensive Taiwan 2000 report prepared by a prestigious group of academics and environmentalists notes that: "The design of these check dams rarely considered the needs of the fish that live in these streams. The habitat for all the freshwater fish has been seriously damaged already, and many species are isolated in small sections of a river."5

The Aborigines: An Endangered Species

Another species endangered by the lowlanders' assault on the mountain fastnesses of the island is Taiwan's aboriginal people, who make up two per cent of the population. Confined to mountain reserves under Japanese colonial rule and then under the KMT, the Aboriginals' traditional economies and culture have been undermined by pollution, logging and roadbuilding,

Every Garden Counts:



We are the presenters of the Channel 4 TV series about organic gardening called All Muck and Magic?

We know that it is entirely possible, indeed easy, to garden naturally, without using harmful chemicals. This is what we set out to show, when we created Ryton Gardens at the National Centre for Organic Gardening. We all work at the centre for the Henry Doubleday Research Association, the largest organic gardeing organisation in Britain

Gardening is a serious business - eighteen million gardeners in Britain cultivate a total of a million acres of land. Each year £20 million are spent on chemicals.

4

If every gardener stopped using pesticides, it would create a conservation area the size of Somerset.

- You can play your part too.
 - Become an organic gardener!
 - Join the HDRA! 4 4 Visit Ryton Gardens!
- Buy from our Mail Order Catalogue! 4 Send a donation!
- Want to know more?

Write to Jackie Gear, HDRA, National Centre for Organic Gardening, Ryton-on-Dunsmore, Coventry CV8 3LG. Tel. Coventry (0203) 303517



Figure1: Trends in fertilizer use in Taiwan 1952-1981 (Graph: Phillip Macnaghten. Source: Martellaro, J., 'The Post-War Development of Taiwanese Agriculture', Asian Economies 45, 1983, p.31)

which have caused declining crop yields, a scarcity of game animals and the disappearance of fish from many rivers.

Much aboriginal land was taken over by government monopolies, including the powerful Taiwan Sugar Corporation. In addition, the KMT changed the reserve policy in 1987 to allow private development companies to buy tribal land "in order to fully utilize the land's potential."6 The entry of developers has not only seriously destabilized the Aborigines' economic life but has also disrupted their cultural mores. For instance, in March 1987, the Nantou county government gave the go-ahead for the construction of a hotel within the Bunan Tribal Reservation, without obtaining the permission of the tribal people. The hotel was sited on a tribal cemetery, and "without consulting the villagers, the county government began digging up bodies, in violation of Bunan cultural taboos."7 This provoked angry protests from the Aborigines.

With their economic base swiftly eroding, there has been a great exodus of young Aborigines to the coastal cities, many of them enticed to leave by labour recruiters with promises of good jobs and a better life. Instead, they are tracked into the lowest paying jobs with the most dangerous and degrading working conditions. The majority of Taiwan's deep sea fishermen are Aborigines, and thousands of them have been detained in foreign ports - often for as long as six months or even years - for following their captain's orders to stray into foreign territorial waters.8 Young Aborigines have also been herded into prostitution in Taiwan's capital, Taipei, and other major cities. A recent study revealed that a third of young Aborigine women have worked as prostitutes.⁹ The trafficking in girls as young as 13 is very profitable; the girls sell for around \$5000. The youngest girls are given breast implants and hormone shots so that their bodies mature faster. To prevent escapes, women are told that if they try to leave, their sisters will be kidnapped to replace them.¹⁰

Toxic Grain

High rates of agricultural production in the lowlands have been achieved through dependence on liberal applications of chemical fertilizers and pesticides. The use of fertilizers in Taiwan tripled between 1952 and 1980, from 458,000 to 1,360,000 tonnes (see Figure 1), although the area cultivated increased by only about three and a half per cent during this period - from 876,100 to 907,353 hectares.¹¹ Currently, Taiwan is among the top users of



Rice paddies push right to the edge of Taipei. The intensive use of Taiwan's farmland, aggressive lobbying by the agrochemical industry and the lack of government regulation combine to make Taiwan's soil among the most chemically battered in the world. (Photo: Associated Press)

chemical fertilizers in the world.¹² The heavy use of nitrogen and other chemical fertilizers contributes to soil acidification, zinc losses and a decline in soil fertility. Nitrogen and phosphorous run-off stimulates the growth of algae on rivers, lakes and streams and contaminates groundwater, the source of the public drinking water supply for most Taiwanese. Pesticides are another major source of contamination of Taiwan's freshwater resources. The island's farmers apply an average of four kilos per hectare and now use up nearly one per cent of the world's pesticide production.¹³ Agricultural specialist, Michael Hsiao asserts, "there are many cases of sudden death among farmers, and this is often attributed to pesticides."¹⁴ Spraying of fruit orchards is also said to have produced high doses of arsenic poisoning.¹⁵

Pesticide abuse is encouraged by the aggressive marketing tactics of private companies and the absence of any effective government regulation of the trade. With some 280 brands available, even some government bureaucrats are provoked to exasperation.¹⁶ According to Yu-Kang Mao, director of the Land Reform Training Institute: "There are so many different brand names that farmers get confused. To make sure they have the proper dosage, they often end up overspraying."¹⁷ When overspraying is combined with the multicropping practised to take advantage of Taiwan's lush climate, then inch-for-inch, Taiwan's land is perhaps more chemically battered than the US's monocrop agricultural land.

Though government and the agro-input businesses have hooked them into a chemical dependency, Taiwan's farmers are intensely aware of the limits and dangers of fertilizers and pesticides. For instance, Wang and Apthorpe were told by the farmers of Fu Kuei village that: "Chemical fertilizer . . . is like western medicine which is efficient and quick but not enduring. Farmyard manure is like Chinese medicine, slow but sure and enriching."¹⁸ One way that farmers cope with pesticides is described by Hsiao: "Many farmers don't eat what they sell on the market. They grow another crop without using pesticides and that's what they consume."¹⁹ Consumers see insects and insect bites in vegetables as a sign that they are 'clean'.²⁰

The fear of pesticides has altered the production process in some farming communities, as Wang and Apthorpe's detailed account of farming practices in Fue Kuei village makes clear:²¹

"Insecticide is considered to be a very dangerous material. It has been known to be used for suicide in rural Taiwan. Some villagers would not like to spray insecticides themselves, though they have their own handdusters. They hire labourers to do it. Three professional sprayers, a wage-earning class, in the village, are described as more or less 'no good' men."

One of Fu Kuei's sprayers was crippled, and his account of his work provides a graphic example of how agriculture in Taiwan has evolved into a hazardous occupation:²²

"Because people are afraid of being poisoned, they ask me to spray their farms. This is so-called 'paying money and let others die'. I can only work four or five hours a day. Otherwise, I would be poisoned. If I have a headache, I stop spraying immediately and go to the clinic for an injection. The antidote is provided free of charge by the insecticide shop. Once I was almost going to die. At six o'clock I felt unwell. I went to the clinic. The doctor was unwilling to wake up because he received only five NT\$ each time. He looked at me askance and started to rinse his mouth slowly. I couldn't bear it. I walked back home. When I arrived there I collapsed. My wife sent me to Changhua Christian Hospital. They saved me from death. The sprayers in the neighbouring village are considered useless men too. One of them liked money so much that finally he was poisoned and died in the field."

Fear of pesticides is one of the reasons for the increasing agitation for medical insurance by farmers and their families — this was one of the main demands of the May 20, 1988 farmers' demonstration that exploded into a riot.

Industrialization and Toxification

To prevent the concentration of industries in a few urban areas and spread employment opportunities, in the 1960s Taiwan's planners launched an aggressive policy of encouraging manufacturers to set up in the countryside. The result was a substantial number of the island's 90,000 firms locating on ricefields, along waterways and beside residential areas. To check the helterskelter character of the process, the government in 1981 enacted token zoning legislation barring firms from setting up in agricultural fields. This legislation, however, has remained largely unenforced: of new firms established in 1984, only 2,568 out of 4,259 (around 60 per cent) were located in the correct zone.²³ Thus, jobs may have been spread out a bit more equitably, but at the price of exposing rural communities and ecosystems to uncontrolled airborne and waterborne pollution.

With their profits dependent on reducing costs as much as possible, supercompetitive small and medium-sized establishments have largely disregarded the government's weak waste disposal regulations and dumped industrial waste in the nearest body of water.²⁴ Twenty per cent of farm land, the government admits, is now polluted by industrial waste water.²⁵ According to Dr. Edgar Lin, one of Taiwan's leading environmentalists, 30 per cent of the rice grown in Taiwan is contaminated with heavy

metals, including mercury, arsenic and cadmium.²⁶ Tracking and isolating such poisoned stocks of grain has become a near impossible task, a fact underlined by the disappearance in the market of 20 tonnes of cadmium-contaminated rice in 1988.²⁷

The poisoning of waterways through the unregulated dumping of industrial waste has been compounded by the dumping of human waste, only one per cent of which receives even primary treatment.²⁸ Untreated sewage entering the food chain is likely to be responsible for the fact that Taiwan has the highest rate of hepatitis infection in the world.^{29,30}

Industrial poison and human sewage have severely polluted the lower reaches of virtually all of Taiwan's major rivers, many of which, like the Keelung River in the north of the island, are little more than flowing cesspools, devoid of fish, almost completely dead.³¹ One writer, with a penchant for understatement, describes the Er-Jen River as "no longer scenic". One sees "carcasses of pigs instead of fish, black oily water and yellow foul-smelling smoke rising from the stream."³² In addition, the river is known to be contaminated with mercury and copper.³³ In Hou Jin, a small town outside the city of Kaohsiung, 40 years of pollution by the Taiwan Petroleum Company has made the water not only unfit to drink but also combustible.³⁴

The water pollution situation is extremely serious, yet its real magnitude will be unknown for decades. There are almost no records of the types and quantities of toxic effluents dumped into waterways during the last 30 years. Testing for contamination is difficult, as there are hundreds of possible toxic substances, some of which are dangerous to human health at minute levels. Dioxin, for example, is considered carcinogenic in parts per trillion; there are no labs in Taiwan which can measure such small quantities. Yet it can safely be assumed that the volume of toxic chemicals dumped into waterways is high, considering the prevalence of heavily-polluting industrial plants in Taiwan, such as leather tanneries, petroleum refineries, and plastic, chemical and pesti-

> Coming from Food First Books in August 1990

Dragons in Distress

Asia's Miracle Economies in Crisis

by Walden Bello and Stephanie Rosenfeld

"... systematically destroys the elaborate mythology ... that Ronald Reagan and the World Bank have sold to the public for decades ... unveils in devastating detail how the destruction of democracy, ecology and workers rights is undermining these countries' economic success. This book is destined to become a classic in the development literature."

> Professor Robin Broad American University

\$11.95 paperback. Add \$1.50 for p&p. Add 7.25% for CA residents sales tax. Visa and Mastercard accepted. To order call toll free 24 hours 800-888-3314. Or mail cheque or money order to:

FOOD FIRST/INSTITUTE FOR FOOD AND DEVELOPMENT POLICY, 145 Ninth Street, San Francisco, CA, USA 94103. Tel. (415) 864 8555 cide works. There was a total lack even of discussion of the need for the regulation of disposal practices until the 1980s, and the Environmental Protection Agency did not come into being until 1983. Surveying the situation, Dr. Shih Shin-Minh, a noted ecologist, raised the possibility that efforts to save the environment "may be too late".³⁵

Aquaculture: Polluter and Polluted

Aquaculture provides a tragic example of the self-destructive logic of unrestrained export-oriented growth. Hailed as "the success story which every country in the business is scrambling to emulate," Taiwanese aquaculture has achieved fantastic growth rates, with prawn production, for example, increasing 45 times in just 10 years.³⁶ Like other industries in Taiwan, aquaculture is made up of thousands of small specialized producers dispersed throughout the country, most of them in coastal areas. These producers are precariously dependent on rivers and wells for clean fresh water, something which is fast becoming a scarce commodity. Thus, mass deaths of shrimps and fish regularly occur as a result of toxic chemical waste from upstream industries.

According to the *Taiwan 2000* report: "Many incidents of contamination that caused large-scale death of fish, shrimps and oysters had been reported in 1986 and 1987. Even the lives of some consumers were threatened in some of the cases."³⁷ In the infamous 'green oysters' incident, millions of dollars worth of cultivated oysters had to be destroyed after they turned green. Local newspapers traced the contamination to upstream scrap cable and wire processing factories which apparently did not have wastewater treatment equipment.³⁸

But aquaculture is both a victim and a victimizer. Intensive exploitation of groundwater has already caused severe land subsidence. Rice farmers from Tungkang complain that salt water seepage into their lands from nearby aquaculture farms (which mix sea water and fresh water) reduces their yields, while other farmers complain that there is just not enough water left for their crops.³⁹

Choking on Air

Taipei's air is contaminated by high levels of sulphur dioxide and nitrogen oxides and is considered harmful 17 per cent of the year by lenient Taiwanese standards.⁴⁰ While a Pollution Standard Index (PSI) level of 140-150 is considered harmful by US standards — and a cause of warnings to stay indoors — the permissible level in Taiwan is PSI 170. Readings of 200 and even 300 are common, and only a reading over 400 rates as 'hazardous'.⁴¹

Sixty to eighty per cent of Taipei's pollution comes from cars and motorcycles. In June 1989 alone, 34,000 new cars and 153,000 new motorbikes came onto Taiwan's roads.⁴² Yet the Government does not plan to make mandatory the fitting of catalytic converters to filter emissions until 1994.⁴³ The ubiquitous motorcyclist with a surgical mask weaving in and out of Taipei's gridlock is becoming emblematic of the quality of life in one of the more prosperous NICs, in much the same fashion as the soldier with the gas mask symbolized life on the Western Front during the First World War.

Taiwan's air is also contaminated by the thousands of industrial enterprises. One writer notes that: "In certain industrial zones the air is so toxic that nearby residents have grown used to living with frequent headaches, vomiting and the other painful side-effects of breathing contaminated air. No one wants to contemplate the long-term effects."⁴⁴

Nuclear Power

Undoubtedly the greatest potential threat to the environment in Taiwan is nuclear power. Taiwan now has three nuclear plants; if the technocrats had had their way, the island would have been inflicted with a plan to build 20 by the year 2000. Rising public opposition, however, has stymied government plans to build a fourth plant, and the growing space for democratic discussion has pushed the public into taking a more critical view of the whole nuclear power programme.

The nuclear power programme may not serve the interests of the Taiwanese people, but it does serve several powerful foreign and domestic interests:

The Foreign Vendors

Taiwan proved to be a lifesaver for a US nuclear industry that was threatened with extinction as a result of the loss of its domestic market in the late 1970s and 1980s. With tight repression by the KMT curbing anti-nuclear sentiment, the nuclear monopolies were able to carve up the Taiwanese energy market. This 'gentlemen's agreement' is clear from the pattern of contracts: General Electric supplied the reactors for plants Nos. 1 and 2 — the Shihmin Hsiang and Kuosheng sites outside Taipei — and the generators for plant No. 3 at Maanshan. Competitor Westinghouse, meanwhile, provided the reactor for plant No. 3 and the generators for Nos. 1 and 2. San Francisco-based Bechtel Corporation provided the architectural and engineering services for plants Nos. 2 and $3.^{45}$

The KMT-Business Elite

Realpolitik entered Taiwan's nuclear equation in the fallout of the US decision to cut off diplomatic relations with Taiwan and recognize the People's Republic of China. Seeking to replace severed diplomatic ties with tighter economic ones, the KMTbusiness élite saw nuclear energy development as a way to induce prestigious US corporations to increase their economic interests in Taiwan. With the nuclear vendors and other US firms securely anchored on the island, the KMT correctly reasoned, the US Government would hesitate to cut off all military and political ties.

The Technocrats

Nuclear power plants provide an opportunity for centralized bureaucratic control unmatched by any other energy technology: already, just three nuclear plants supply over 53 per cent of the energy generated on the island. Thus Taiwan's technocrats are a natural constituency for nuclear power. The centralization of Taiwan's energy supply is conducive to the technocrats' visions of state-guided high-speed growth. And centralized power production concentrates more economic and political power in their hands.

The Military

The opportunity to reprocess spent fuel from reactors to make weapons-grade plutonium has made Taiwan's military a natural ally of the nuclear energy programme. The military's active pursuit of the nuclear weapons option is one of the more dangerous elements of the hostility between the KMT Government and the communist Government on the mainland. Two controversial incidents have highlighted the link between the 'peaceful' nuclear power programme and nuclear weapons. The most recent was the defection to the United States in 1988 of a Taiwanese colonel, Chang Hsien-Yi, who served as deputy director of the Nuclear Energy Research Institute (NERI) of the Chungshan Institute of Science and Technology, the top military research centre and part of the Defense Ministry.⁴⁶ Identified as a CIA informant, Chang is said to have divulged information that led to US pressure to demand the demolition of a secret nuclear research facility in 1987.⁴⁷ A similar incident occurred ten years earlier, when NERI was forced to 'destroy' its nuclear-waste programme after a researcher provided documents to the US.⁴⁸

Towards a Taiwanese Chernobyl?

Safety issues are of special concern to Taiwan which is one of the most densely populated countries in the world. Taiwanese nuclear power experts argue that the greatest threat to nuclear safety in Taiwan is not human error — the cause of both the Three Mile Island and Chernobyl disasters — but external events such as earthquakes and typhoons.⁴⁹ Even if one were to accept this assessment at face value, there are strong grounds for questioning the soundness of the nuclear energy programme, since Taiwan is regularly battered by typhoons and lies along the so-called 'Pacific Fire Belt', a ring of intense tectonic and volcanic activity. Indeed, the Shihmin Hsiang and Kuosheng power plants, just 12 miles from Taipei, are said to be situated at the edge of the active Ta-Tun volcano group and amid a maze of earthquake fault lines.⁵⁰

But typhoons and earthquakes are not the only problems. The arrogant insistence by Taipower, the state energy monopoly, that



"The anti-nuclear movement is just one prong of a broader environmental movement. Aside from forcing the suspension of the fourth nuclear power plant, this decentralized but increasingly powerful movement has stopped Dupont constructing a titanium dioxide plant and forced the closure of a major petrochemical plant owned by ICI."

no problems ever have or ever will exist at any of its plants, contrasts sharply with widely published accounts of radiation leakages, accidents and cover-ups. In July 1985, a fire at nuclear power plant No. 3 forced the suspension of operations for 15 months and caused damage valued at \$300 million.⁵¹ So alarmed were local residents that they organized meetings and rallies to demand safer emergency and evacuation plans and compensation for surrounding communities. Another fire broke out at the same plant in August 1987.⁵² According to one report, Taipower tried to cover up a major radiation leak at plant No. 1 in January 1986, apparently the second accident at the plant within a year.⁵³ As one caustic account noted:⁵⁴

"Over 1985 and 1986, Taipower's No. 1 nuclear plant set a world record for continuous operation, 418 days without a shutdown . . . In March of this year local newspapers accused No. 1 plant of setting another world record, 56 days of continuous radiation leakage outside the plant — from September 3 to October 28, 1985. Taipower denied the charge, but Taipower's credibility is at a low ebb right now."

In February 1988, a generator at the No. 1 plant shut down automatically for unknown reasons, later discovered to be a computer error.55 Two fuel pellets were stolen from the No. 3 plant, then found a few days later.56 Plant repair logs are sometimes incomplete or missing altogether.57 Perhaps not unrelated to these mishaps is the inadequate training of plant personnel. While many of the best trained nuclear operators are creamed off by US firms and transferred to the US, 40 per cent of the skilled workers in Taipower's nuclear plants are underqualified for the tasks they perform.58 Most reports of plant safety violations are reported by nuclear plant workers who are upset by their dangerous working conditions. In May 1988, 200 maintenance workers at plant No. 1 walked through a puddle of radioactive water the plant manager knew was there.59 One Taipower engineer filed a lawsuit charging that exposure to radiation made him ill, but lost the case because pertinent records were found to be missing.60

Mismanaging Waste Disposal

There is a surreal quality to Taipower's record and plans in the area of radioactive waste disposal. Children in Taoyuan, near Taipei, had been playing for weeks on a pile of scrap metal near their elementary school before it was discovered to be radioactive.⁶¹ Old parts of nuclear power plants exposed to intense radiation were said to have been sold as scrap metal, then recycled into metal for new buildings.⁶² An underground low-level waste depository which Taipower built on Lan Yu, or Orchid Island, 40 miles from Taiwan's southeast tip, lies on an earthquake fault line. Despite protests by the Yami aborigines

who inhabit Lan Yu, Taipower plans to build a second low-level waste dump on the lush nine-square-mile island — plus a 247-acre national park above the dump, including a hall with exhibits extolling the virtues of nuclear energy.⁶³

Spent fuel is currently stored at the reactor sites. But this is only temporary; a location must be found which can hold the materials for the hundreds of thousands of years that they are radioactive. No viable solution, except perhaps shipping the waste out of Taiwan, may ever be found:⁶⁴

"Taiwan is an extremely densely populated island. It is virtually impossible to find a site which would be remote enough that a long-lived radionuclide can be isolated from the human environment. In addition, because Taiwan is a small island, marine life is a vital human resource. Therefore, the ocean surrounding Taiwan and all the nearby small islands are virtually an integral part of the human environment. In other words, small islands outside of Taiwan, no matter how small their present population, cannot be considered 'remote' ... (D)ue to its extremely active tectonics, Taiwan has a very complex geology. It is difficult to find a basaltic or shale formation that is continuous, homogeneous, stable and big enough to accommodate high-level wastes. Last, but not least, Taiwan's subtropical weather conditions call for special attention on studying hydrological (both surface and underground) problems."

The Growth of the Environmental Movement

Taiwan's technocrats' stubborn effort to ram through the building of more nuclear plants despite Chernobyl and Three Mile Island has spawned a strong anti-nuclear movement. A key event was a well-publicized seminar sponsored by the Consumers' Foundation in April 1985, which brought together a number of scholars and intellectuals opposed to the building of the fourth nuclear power plant. The fledgling anti-nuclear sentiment sparked by this meeting was boosted shortly thereafter by the July 1985 fire at plant No. 3 and the Chernobyl meltdown in April 1986. A grassroots anti-nuclear movement was born, evolving much along the decentralized pattern of anti-nuclear movements in the advanced industrial countries. This network of 'antinuclear self-help associations' has so far successfully stymied the construction of plant No. 4, leading a frustrated Taipower to hire the British public relations firm Ogilvy and Mather to promote nuclear power to an increasingly sceptical public.

The anti-nuclear movement, however, is just one prong of a broader environmental movement. Aside from forcing the suspension of the fourth nuclear power plant, this decentralized but increasingly powerful movement has stopped Dupont Corporation constructing a \$160 million titanium dioxide plant and



General Chiang Kai-Shek (1888-1975), leader of the Chinese Nationalist Kuomintang. After its defeat by the communists on the Chinese mainland in 1948, the Kuomintang retreated to Taiwan which they have ruled ever since. They still insist that the island is a temporary stop and that they will return to the mainland after the fall of the communists. (Photo: Hulton-Deutsch Collection)

forced the closure of a major petrochemical plant owned by the British transnational ICI, which fishermen had accused of dumping acid waste in their fishing grounds.⁶⁵ Averaging one anti-pollution demonstration a day during 1987-88, the movement represents the rejection on the part of increasing numbers of Taiwanese of the KMT's reckless pursuit of growth.⁶⁶ The main outlet for public outrage has been demonstrations and civil disobedience, as the Government has no institutional framework for citizen participation in economic planning and decisionmaking. Even the formation of special interest groups was effectively outlawed by the 1949 martial law decree which included the formidably named 'Law Governing the Organization of Civic Bodies During the Extraordinary Period'. This ban was not lifted until January 20, 1989.⁶⁷

Hemmed in by tough political restrictions, it is not surprising that the environmental movement began in the early 1980s as a conservation movement stressing the preservation of wilderness areas and beautiful or spectacular natural sites. A loose alliance of concerned scholars, journalists and government officials, the conservation movement was able to stir public consciousness through the press, which reported on its activities with more freedom than it did on explicitly anti-government political events.⁶⁸ Surprisingly, victories were achieved, like halting a planned cross-highland highway which would have opened up one of Taiwan's few remaining wilderness areas, and stopping the planned damming of Toroko Gorge, "a geological wonder of world class proportions."⁶⁹

Even before the lifting of martial law, however, the movement was moving from conservation to confrontation. In 1986, citizens in Taichung spontaneously formed a committee to shut down a chemical plant polluting the county. They succeeded, providing the inspiration for the citizens of neighbouring Changhua County, who stopped a stronger foe, Dupont, from building a titanium dioxide plant which would have been the single largest foreign investment venture in Taiwan's history, and which enjoyed the full backing of the KMT Government.⁷⁰

Since the lifting of martial law in July 1987, neighbourhood anti-pollution committees have proliferated. Targeting mainly the pollution-intensive petrochemical industry, grassroots environmentalists have employed confrontational tactics and direct action, with notable success. For instance, when negotiations failed to stop the dumping of hazardous waste that was killing their fishing industry, 2000 residents of villages near the Linyuan Petrochemical Industrial Zone occupied the complex, shutting down all 18 factories. Faced with losses of NT\$800 million a day, management agreed to the residents' demands that they clean up their act and pay compensation.⁷¹ As Michael Hsiao notes:⁷²

"People in Taiwan have learned that protesting brings results... (They have forced) polluting factories... to make immediate improvement of the conditions or pay compensation to the victims. Some factories (have been) forced to shut down or move to another location. A few preventive actions have even succeeded in forcing prospective plants to withdraw from their planned construction."

Radical Transformation

This decentralized, multiclass, grassroots movement has thus evolved as the most effective challenger to the model of growth espoused by the KMT and the business élite. And, while spontaneous in its origins, many environmental groups are allied with the opposition Democratic Progressive Party (DPP), which chose green as its party colour, linking the issues of democracy and environment. Lately, this cleavage has been expressed most sharply in the controversy over the construction of petrochemical plants, particularly the fifth and sixth naptha crackers, which would provide petrochemical feedstocks to 30,000 downstream factories.73 Government and business propaganda painted the factories as essential to meet a 10 per cent shortfall in petrochemical raw materials in the near term, which could increase to 30 per cent if one of the plants is not built according to schedule. Relocating the naptha crackers abroad, went the official line, would reduce Taiwan's economic growth by one per cent a year, with many midstream petrochemical processors forced to move overseas.74 Such arguments were beginning to sound less and less credible to citizens. A 1985 survey showed that 59 per cent of respondents favoured environmental protection over economic growth.75 Stymied by the continuing citizen protests, the petrochemical companies have begun to locate elsewhere: Formosa Plastics is considering China as the site for its naptha cracker; USI Far East has chosen the Philippines; and Dupont is setting up its titanium dioxide plant in South Korea after some strongarming of the Seoul Government by Washington.

Through its militant mass actions, the environmental movement is bringing home the message that a radical transformation of Taiwan's priorities is in order. Such token measures as the establishment of a 900-person Environmental Protection Agency are no longer sufficient, say the critics. The growth rate must be radically lowered. The controversial *Taiwan 2000* report asserts that even if the annual rate of Taiwan's GNP growth were cut to 6.5 per cent, the stress on Taiwan's already fragile environment would double by the year 2000.76

Will this perilous prospect prove ultimately persuasive to the KMT technocrats? Some Taiwanese environmentalists are sceptical, for they feel that there is more to the conflict than the clash of contrasting visions of Taiwan's future between the largely Taiwanese environmentalists and the Mainlander-dominated KMT élite. According to Hsu Shen-Shu, founder of the New Housewives Association, which has forged links between the emerging feminist and environmentalist movements:⁷⁷

"Current policy makers do not love this place as their home since they still operate under the myth of returning to the Mainland and have not changed their basic opinion of Taiwan as a temporary stop, a hotel of sorts. After benefiting from the exploitation of the island, they send their children to the States because it's too polluted here in Taiwan."

The feelings expressed by Hsu are widespread, and they indicate that the day may not be far off when the KMT, with its policy of export-orientated growth at any cost, is finally evicted by the people of Taiwan.

This article is taken from the authors' *Dragons in Distress: Crisis and Conflict in Asia's Miracle Economies*, to be published in the summer of 1990 by the Institute for Food and Development Policy (Food First). Hardcover price is \$19.95; softcover is \$11.95. To order the book, please write to: Marketing Division, Food First, 145 Ninth St., San Francisco, CA. 94103, USA.

References

1. Taiwan 2000: Balancing Economic Growth and Environmental Protection, Academia Sinica, Taipei, 1989, p.81.

- 2. Forestry Bureau, quoted in Taiwan 2000, p.94.
- 3. Ibid, p.120.
- 4. Ibid, p.86.
- 5. Ibid, p.91.

6. 'Another Roadside Attraction', Occasional Bulletin: Taiwan Church News 4, 1, 1987, p.10.

7. Cohen, M., *Taiwan at the Crossroads*, Asia Resource Center, Washington, DC, 1989, p.121.

- 8. 'Fishermen's Service Center Reports Details of Detainment', Occasional Bulletin: Taiwan Church News 4, 2, 1987, p.5.
- 9. 'Concern About the Plight of Tribal Aborigines', Occasional Bulletin: Taiwan Church News 3, 1, 1986, p.11.

10. 'Demonstration Against Prostitution in Taipei', Occasional Bulletin: Taiwan Church News 4, 2, 1987, p.3; 'The Rainbow Project's Report on Prostitution', Occasional Bulletin: Taiwan Church News 5, 3, p.5.

11. Statistics from Chen Hsing-Yiu, 'Development of Agriculture and Agricultural Trade in the Republic of China on Taiwan', *Industry of Free China* 14, 2, 1985, p.9.

'Are You Really Going to Eat That?', Bang (Taipei), March 1988, p.13.
 Ibid.

14. Personal interview with Michael Hsiao, Taipei, May 12, 1988.

15. Kagan, R., 'The "Miracle" of Taiwan', unpublished manuscript, Institute

for Food and Development Policy, San Francisco, 1982, p.39.

16. Ibid, p.38.

17. Personal interview with Mao Yu-Kang, Taipei, May 10, 1988.

18. Wang Sung-Hsing and Raymond Apthorpe, Rice Farming in Taiwan:

Three Village Studies, Academia Sinica, Taipei, 1974, p.168.

19. Personal interview with Michael Hsiao, Taipei, May 12, 1988.

20. Ibid.

21. Wang and Apthorpe, op. cit., supra 19.

22. Ibid, pp.169-170.

23. Taiwan 2000, op. cit., supra 1, p.298.

24. Goldstein, C., 'Cash from Trash', Far Eastern Economic Review, Sept. 21, 1989, p.80.

25. Kuo, G., 'Not by Rice Alone: Hunger for Justice in Taiwan', Food Symposium 88 Newsletter, Tokyo, 1988, p.11

26. Rudge, N., 'Edgar Lin', Bang, March 1988, p.12.

27. Kuo, op. cit., supra 25.

28. Maitland, A., 'Anger Grows Over Taiwan's Polluted Success Story',

Financial Times, Oct. 13, 1989.

29. Taiwan 2000, op. cit., supra 1, p.IV.

30. Wu, S., 'Control of Communicable Diseases in Taiwan', *Bang*, Feb. 1989, p.42.

31. Taiwan 2000, op. cit., supra 1, p.23.

32. 'College Students Study Environmental Pollution', Occasional Bulletin: Taiwan Church News 4, 1, 1987, p.10.

33. Taiwan 2000, op. cit., supra 1, p.150.

34. Rudge, op. cit., supra 26.

35. Interview with Shih Shin-Minh, Taipei, May 12, 1988.

36. 'Quality in Quantity', Far Eastern Economic Review, Aug. 20, 1987, p.64.

37. Taiwan 2000, op. cit., supra 1, p.318.

38. Ibid.

39. Nassir, A., 'Pollution Leaves Bitter Taste', Far Eastern Economic Review, Aug. 20, 1987, p.64.

40. 'Taiwan Survey', Economist, March 5, 1988.

41. Wu, S., 'How is the Government Helping You to Stay Healthy: Public Health in an Industrializing Nation', *Bang*, Feb. 1989, p.39; Welton, Y., 'What's a PSI Anyway?', *Bang*, Feb. 1989, p.5.

42. Maitland, A., 'Green Factor Enters Center Stage in Run-Up to Election', *Financial Times*, Oct. 10, 1989, Section III, p.6.

43. Rudge, op. cit., supra 26, p.13.

44. 'The Church Faces Taiwan's Environmental Problems', Occasional Bulletin: Taiwan Church News 3, 1, 1986, p.2.

45. Lien San-Lang, 'On Decommissioning Nuclear Power Plants', Table 4, North American Taiwanese Professors' Association Bulletin 7, 1, Feb. 1988, p.46.

46. 'Nuclear Scientists Reportedly Left With US Help', Agence France Presse, March 24, 1988, reproduced in FBIS Daily Report: China, March 24, 1988, p.85.

47. 'Paper Speculates on CIA Role', Agence France Presse, March 12, 1988, reproduced in FBIS Daily Report: China, March 14, 1988, p.57.

48. Ibid, p.58.

49. NATPA Task Force on Taiwan Nuclear Power Plants, 'A Review of Probabilistic Risk Assessment and Reactor Safety in Taiwan, *NATPA Bulletin* 7, 1, Feb. 1988, p.16.

50. 'US Has Ok'd Six Nuclear Reactors on Seismic and Volcanic Taiwan Sites', *Export Monitor* (Center for Development Policy), reproduced in *Asian Issues*, Taiwan National Report 2, 2, Sept. 1980, p.65.

51. Sen Lee, T., 'An Economic Review of Taipower Nuclear Program Electricity and Policy', *NATPA Bulletin* 7, 1, Feb. 1988, p.50.

52. 'Fire Reported at Nuclear Power Plant', *Agence France Presse*, Aug. 29, 1987, reproduced in *FBIS Daily Report: China*, Aug. 31, 1987, pp.27-28.

53. Sprague, J., 'Hot Plants Cool Fears', Bang, July 1988, p.8.

54. Ibid, p.7.

55. Ibid, p.8.

56. Ibid.

57. Ibid.

58. Ibid. Transfer to US of best operators stated in interview with Linda Arrigo, March 20, 1990.

59. Ibid.

60. Ibid.

61. Ibid.

62. Interview with Edgar Lin, Taichung, May 14, 1988.

63. Cohen, op. cit., supra 7, p.356.

64. Wunan, L., 'Managing Nuclear Wastes in Taiwan', *NATPA Bulletin* 7, 1, Feb. 1988, p.38.

65. Elliot, J., 'ICI Closes Taiwan Chemical Plant After Protests', *Financial Times*, Sept. 25, 1989.

66. Cohen, op. cit., supra 7, p.103.

67. Severinghaus, S., 'The Emergence of an Environmental Consciousness in Taiwan', paper prepared for the 1989 Annual Meeting of the Association for Asian Studies, Washington, DC, March 17-19, 1989, p.13.

68. Personal interview with Sheldon Severinghaus, Asia Foundation, San Francisco, Sept. 18, 1989.

69. Severinghaus, op. cit., supra 67, p.11.

70. Cohen, op. cit., supra 7, p.358.

71. 'Pollution in Taiwan: Filthy Rich', *The Economist*, July 15, 1989, p.67; 'Premier Yu on Environmental Protection, Protests', China News Agency, Oct. 15, 1988, reproduced in *FBIS Daily Report: China*, Oct. 18, 1988, p.70; 'Linyuan Waste: People Fighting for a Cleaner Environment', *Bang*, Dec. 1988, p.35.

72. Hsiao, M. and Milbrath, L., 'The Environmental Movement in Taiwan', paper prepared for the Sino-US Binational Conference on Environmental Protection and Social Development, Taipei, August 20-25, 1989.

73. China News Agency, op. cit., supra 71.

74. 'Build Naptha Crackers Here or Suffer Decline in Industry, Top Planner Says', *China News* (Taipei), Aug. 6, 1988.

75. 'Most People Here Put Environmental Protection Before Economic Growth', *China News* (Taipei), May 5, 1985. See also Hsiao and Milbrath, op. cit., supra 72, table 7, p.23.

76. Taiwan 2000, op. cit., supra 1, p.34.

77. Quoted in Simpson, L. A., 'Hsu Shen Shu of the NEHA', *Bang*, March 1988, p.10.



Central Brasilia. The engineers and bureaucrats who conceived and promoted the Balbina Dam and ignored its numerous critics are still working in offices in Brazil's capital, planning more hydroelectric projects and therefore more social and environmental destruction. (Photo: Manchete)

The Balbina Disaster: The Need to Ask Why?

by Rogério Gribel

The Balbina dam cost nearly a billion dollars of public money, destroyed 236,000 hectares of primary forest, formed a gigantic lake of shallow stagnant water, killed millions of wild animals, flooded indigenous lands, is causing hunger and illness to riverine people — all for just 80 megawatts of electricity. Even those responsible for the dam now admit that it is a disaster, yet similar projects are still being built and no investigation has been carried out to discover why, in the face of clear scientific warnings, Balbina was ever constructed.

On October 1st, 1987, the last flood gate of the Balbina hydroelectric station was closed, damming the river Uatumã and creating a giant lake in the heart of Brazilian Amazonia. The most remarkable aspect of the project, however, is not its huge environmental, social and financial costs, but rather that these costs result from a planned and consciously executed process lasting over a decade, which occurred despite strong criticism from scientists and organizations within Brazil and abroad.

Rogério Gribel is a forest engineer and ecologist at the National Institute for Research in the Amazon (INPA), CP 478, 69.011 Manaus, Amazonas, Brazil. The Brazilian state-owned electricity utility, Eletronorte, claim that Balbina cost US\$750 million, excluding the cost of the 170 km Balbina-Manaus transmission line. Unofficial sources speculate that the costs are over US\$1 billion. Five turbines of 50 megawatts each were installed in Balbina, costing approximately US\$3,000 for every kilowatt installed, a figure nearly double the maximum permitted by the Brazilian electricity sector for other hydroelectric schemes. According to Eletronorte technicians, when the five turbines are working Balbina will supply about 80 megawatts of power — just 32 per cent of the installed capacity. This compares with 50-65 per cent for the majority of power stations in Brazil. The cost per megawatt/hour of electricity is an incredible US\$108 — quadruple the amount considered reasonable by the Brazilian electricity sector for competitive hydroelectric power, double that permitted for the electricity generated by thermal plants (the construction of Balbina was justified as a substitution for these), and approximately the same cost as solar energy using presently-available technologies. The huge area flooded by Balbina means that it produces 25 times less energy per square mile flooded than the Tucuruí Dam on the river Tocantins in eastern Amazonia, and 35 times less than Itaipú on the Paraná.

Wasted Timber

Balbina flooded 236,000 hectares of tropical forest. A forest inventory of the river Uatumã basin, carried out in 1986 by the Department of Tropical Silviculture of the National Institute for Research in the Amazon (INPA), showed that there was about 248 cubic metres of wood per hectare in this area. If this figure is extrapolated to take in the whole area of the reservoir, about 58.5 million cubic metres of wood were flooded. The INPA study also estimated that there were 39-51 cubic metres of wood per hectare available for sawmilling, totalling 9.2-12 million cubic metres for the total flooded area. The remaining wood could have been used for firewood or charcoal. Using a conservative estimate for the value of the timber available for sawmilling of US\$15 per cubic metre (excluding the cost of surveying and transport), about US\$138-180 million was lost by not exploiting this timber. If the wood which was not exploited for fuel is included, the losses come to US\$400 million. These losses were not taken into account when evaluating the cost of the project: if they had been, it would have more than doubled the already exorbitant cost of the electricity generated by Balbina.

Eletronorte argues in public that no lumber company was prepared to exploit this wood. They omit to point out, however, that through their own inability to plan ahead the tender for this work was only put out in December 1984, just two years before the flooding of the reservoir. Eletronorte is presently contemplating the possibility of exploiting the dead trees emerging from the water, as the reservoir is on average only seven metres deep, while the trees in the region grow to heights of 30-40 metres. However there are grave doubts as to the viability of this project. Nothing of the kind has been attempted before and those working on such a project would run a high risk of accidents.

Genetic Losses

An assessment of the costs of Balbina should also consider the pharmacological, genetic and aesthetic losses which occur when hundreds of thousands of hectares of one of the most diverse forests on the "Those who visit the affected area and manage to leave the 'official route' are profoundly shocked by the prevalent scenes of suffering and hunger."

planet are turned into a lake of stagnant water. The decomposition of the forest biomass in the shallow reservoir and the length of time that is needed for the water in the reservoir to be renewed, have created a labyrinth of thousands of islands and peninsulas separated by bays and inlets of fetid, acidic and oxygen-deprived waters, from which emerge millions of skeletons of dead trees.

The numbers of animals affected can be assessed from the operation carried out to save mammals from the rising floodwaters of the Tucuruí dam. Operation Curupira rescued from an area similar to that flooded by Balbina about 280,000 animals, including: 28,700 three-toed sloths, 11,900 two-toed sloths, 9,700 armadillos, 9,300 porcupines, 5,800 cotias, 3,700 arboreal anteaters, 19,500 howler monkeys, 2,500 capuchin monkeys, 48,600 tortoises and 20,900 iguanas. It is likely that these represent only a small proportion of the mammals present in the forest flooded by Tucuruí. The losses of non-mammal species are incalculable. In the case of Balbina, the number of animals captured in the rescue operation was 10 times less than than at Tucuruí, not because there were necessarily fewer animals, but because the difficulties of moving about by boat in a lake like Balbina were enormous.

It must also be emphasized that there is no evidence, either in theory or in practice, that these rescue operations are effective for anything other than satisfying the feelings of a small number of uninformed people. The rescued animals are set free (many of them in a distressed or ill condition) in areas where there are already resident animals of the same species, therefore greatly increasing the pressure on available resources. 'Saved' or not, all the animals from the flooded area should be considered dead, and should therefore be included as costs on the cost/benefit analysis of the enterprise.

The Death of the Uatumã

Eletronorte and their consultants, together with the press, have repeatedly tried to play down the environmental and social problems which have resulted from the creation of the lake, and in much of their propaganda even give the impression that Balbina is a benefit to the environment. However, for the river-dwellers of the area, many of whom have lived for decades along the edge of the Uatumã, the project has brought misery and despair. Those who visit the affected area and manage to leave the 'official route' are profoundly shocked by the prevalent scenes of suffering and hunger.

The shallow, stagnant lake covered with surface vegetation, forms a perfect environment for the proliferation of the various vectors which transmit tropical diseases. The rural population in the municipality of Presidente Figueiredo have already complained of clouds of mosquitoes which are beginning to occur on their lands. Moreover, the small farmers who have had land flooded by the dam have received no compensation whatsoever.

On Easter Sunday, 1989, in the small town of São Sebastião do Uatumã, about 300 km downstream from the dam, a public demonstration was held against Balbina. Hundreds of riverside dwellers protested because the river water, previously pure and clean, now causes itchy skin and diarrhoea when used for washing and drinking, and because the fish in the river and nearby streams and lakes, the local people's most important source of protein, are dying and rotting in their millions. The River Uatumã is dead.

Social Disruption

The 'social assistance' supplied to these people - basically a well with a manual pump, a crude bathroom and advice that they avoid contact with river water - is utterly insufficient. Even this meagre help has only been provided to around 110 families living within the first 180 km downstream from the dam - well under half of the riverine population who are directly affected. Eletronorte apparently do not recognize their responsibility for the deep social disruption they have caused in the area. They do not understand that the way of life of these families is dependent upon the availability of water and fish from the river. As the Balbina project cost nearly a billion dollars, at least a small percentage of this figure should be allocated for the provision of substantial and direct assistance to the afflicted people downstream from the dam. This responsibility lies with Eletronorte which has taken

advantage of public money to maximize its profits and to exploit the small Amazonian communities which have a limited capacity to mobilize resistance against the power of big corporations and the state.

Upstream from the dam, a third of the remaining Waimiri Atroari Indians have been displaced as the lake flooded two of their largest villages and meant they could no longer fish in the headwaters of the Uatumã. At the beginning of this century the Waimiri Atroari numbered 6,000; this number was halved by 1972; in 1982 only 571 survived and now their population is down to 374. In spite of the presence of an immense mining company on their lands (Paranaparema), in spite of the fact that their land is now cut in half by a road (the BR 174 from Manaus to Caracaraí), the remaining Waimiri Atroari refuse to move from their lands. They are further threatened by a plan to divert the river Alalaú into Balbina lake, in order to let more water pass through the turbines. If this happens, it will have a catastrophic effect upon the Indians, who depend upon the Alalaú both physically and culturally (especially since the Uatumã was dammed). The final blow will come with the invasion of their land by thousands of workmen, dozens of heavy machines and the alcohol, prostitutes and violence which always accompany such operations. Some Eletronorte technicians have publicly stated that the diversion of the Alalaú is the 'technical solution' for the problems of the Balbina hydroelectric station, although others emphatically deny this. Whatever the truth, there are already

"In a colour comic distributed to thousands of schoolchildren in Manaus and other towns in the region, a likeable parrot explained that an 'important thing about Balbina, is its concern for the environment!""

various documents and maps relating to the diversion of the Alalaú.

Public Relations Disinformation

During the months leading up to and immediately after the flooding of the reservoir, when popular debate about the dam was at its most intense, advertisements about the beneficial effects of Balbina were put out during peak television and radio time and in mass-circulation newspapers and magazines. In nearly all the Eletronorte propaganda it was stated that Balbina would generate 250 megawatts a blatant falsehood. In some adverts a forceful voice announced: "Whoever is against Balbina is against you!" In others, the voice of Curupira, a mythological figure among Amazon people, was used to promote the project, saying "... if Balbina wasn't good for the animals and the forest I would not let it be built. . . " Expressions

THE TRUMPETER Journal of Ecosophy

ISSN 0832-6193

A quarterly, transdisciplinary journal, in its seventh year, dedicated to exploration of, and contributions to, a new ecological consciousness, and to practices which involve ecosophy (ecological wisdom and harmony). Reviewed or praised in articles in, New Options, Rain, Earth First!, Mother Jones, The Canadian Field-Naturalist, Environmental Ethics, and elsewhere. Some of the Authors Published: Wendell Berry, Wes Jackson, John Livingston, Gary Snyder, Arne Naess, John Miles, Jay Vest, Joseph Needham, Weyland Drew, Stuart Hill, Michael W. Fox, Bill Devall, George Sessions, Dolores LaChapelle, Monika Langer, Starhawk, Patsy Hallen, Margaret Merrill, Jean Pearson, Francoise Dagenais, Maryanne Owens. Some Topics and Focuses: ecoagriculture; wildemess; deep ecology; love, sex and embodiment; new visions of reality; ecopoetry; ecofeminism; ecopolitics; sustainable development; alternative technology practices; animals and humans; magic & nature religions; ecoforestry; worldviews; war and peace. Also Included: Book reviews, occasional film and music

reviews, poetry and illustrations. The Trumpeter carries no paid adsvertising; most material is contributed by network members. Subscription Rates: Individual/Non-profit for Canada or foreign \$15; Library or Public Agency in Canada or foreign \$30; Sample copies: \$4.00. Vol.1 presents basic ecophilosophical concepts and reading lists; Vol. 2 features a three issue focus on ecoagriculture; Vol. 3 has a three issue focus on wildemess; Vol. 4 features articles on love, sex, ecology of self, ecofeminism, magic, animals, place and ancient ecology; Vol. 5 has articles on parks, deep ecology, bioexuberance, sustainable development, technology, sense of place, Wittgenstein, and paganism; Vol. 6 has papers on forests and forestry, sustainable culture, wild love, nature as self, mountains, technology and worldviews. (State topic issue you want, or we will send the current issue.) Price for back issues: \$12 each for volumes 1 & 2, \$14 each for volumes 3, 4 & 5, \$16 for Vol 6. (4 issues per volume.) Order From: LightStar Press, P.O. Box 5853, Stn B, Victoria, B.C., Canada V8R 6S8.

like "by defending Balbina, you are defending life" and "Balbina is life", were common in public advertisements.

Not even children escaped from Eletronorte's wave of disinformation. In a colour comic distributed to thousands of schoolchildren in Manaus and other towns in the region, a likeable parrot explained that an "important thing about Balbina, is its concern for the environment!""Balbina is going to form a lake of 1,589 square kilometres similar to the lakes of our region!"; "it will have hundreds of islands which will enable animals and plants to live!"; "Manatees and other aquatic mammals will be used to control the plants which will grow on the lake's surface!": "... the lake's water will have lots of oxygen and will provide food for the fish and other species there!" And so on.

Today, authorities such as the Minister of the Interior, the Governor of Amazonas state and even Eletronorte's president have publicly admitted that, in retrospect, Balbina was 'a mistake', 'a disaster', and 'a sin'. But those who conceived and promoted the project are still working in offices in Brasilia, planning other hydroelectric stations for the Amazon. Meanwhile, work on Balbina's 'sister' projects is continuing.

Leaving aside the incompetent use of public money and the abuse of Brazil's environmental heritage, it would be more than justifiable for the public authorities to conduct an inquiry into the project. How much did it really cost the country? Were there political and/or economic interests which concocted the need for this work, or was it just a technical error? Why were the scientists who denounced the absurdity of Balbina not listened to? Based on what environmental impact assessments did CODEAMA (the state body responsible for environmental affairs) authorize an operating licence for the dam? Is the social assistance given to the people affected by the dam appropriate? And, perhaps most importantly: would it be viable, even now, from an economic, social and ecological point of view, to deactivate the power station and empty the reservoir?

Translated by Fiona Watson of the Royal Geographical Society.

Science and the Control of Information: An Australian Case Study

bv

Sharon Beder

Commissioned scientific studies generally have political and social implications and various groups have an interest in how such studies are reported. These groups prefer to avoid presenting raw data which people can judge for themselves, and dislike journalists drawing their own conclusions or seeking opinions from outside experts. A recent case concerning the contamination of fish caught near Sydney, Australia, illustrates the ways in which governments and their officials and scientists attempt to control both the release of environmental data into the public arena and the way in which that data is interpreted.

When, in early 1989, the media reported that fish caught near Sydney were massively contaminated with organochlorine pesticides, fish sales declined dramatically, costing the industry an estimated \$500,000 each week. Many people assumed that the scientific studies had been sensationalized and distorted in order to sell newspapers and improve ratings. The Director of the Southern California Coastal Water Research Project who was visiting Sydney at the time advised Government scientists and engineers:

> "The recent events in Sydney indicate a route of communication to the public from the scientists should be developed. This may reduce the 'scare' from the press and shield the fishing industry from impacts produced by false or inaccurate media reporting."¹

However the two studies that were the basis for the media stories were reported accurately and did not overstate the results. The first, the 1987 Malabar Bioaccumulation Study, was leaked to the *Sydney Morning Herald* in January 1989 and reported as follows:²

FISH OFF SYDNEY BEACHES POLLUTED

Secret tests on fish caught near Sydney's main sewage outfall at Malabar have found dangerous levels of pesticides, up to 120 times above the recommended safety limits. The red morwong had average concentrations of BHC of 1.22 parts per million, with the blue groper showing 0.20 parts per million. For HPTE, the red morwong showed average levels of 2.60 parts per million, with the blue groper 0.25 parts per million.

There were also traces of dieldrin in both fish, with the red morwong being slightly over the recommended maximum levels.

In fact the levels of BHC (benzene hexachloride) were on average 122 times the National Health and Medical Research Council (NH&MRC) maximum residue limits and the worst fish had much higher levels — 250 times NH&MRC limits. The *Herald* did not even mention the heavy metal contamination found in the fish. What the scientists and engineers involved objected to was more their loss of control over this information than the accuracy of the reporting.

Restricting the Flow of Information

The two bioaccumulation studies were at the centre of a wider controversy over sewage pollution. The 1987 Malabar Bioaccumulation Study was commissioned by the New South Wales State Pollution Control Commission (SPCC) with the stated aim of determining the concentrations of organochlorines and metals in rocky reef aquatic organisms near the Malabar sewage outfall.³ At the same time, the shoreline ocean outfall was being extended almost four kilometres into deeper water and there was some public debate over whether this was enough to prevent pollution problems.⁴ Sydney Water Board engineers and their consultants argued that toxic waste did not accumulate in the sediments off Sydney's coastline and that the deepwater outfalls would provide sufficient dilution and dispersion to ensure toxic waste would not be a problem.⁵ The Water Board believed that the data obtained from the Malabar study would help them evaluate the beneficial effects of diverting the effluent into deeper water.⁶

In December 1987, the results of the study (*see* Tables 1 and 2) were presented to the SPCC Clean Waters Advisory Committee.⁷ The study found large amounts of organochlorines in red morwong (*Cheil-odactylus fuscus*) and blue groper (*Acho-erodus viridis*) caught near the outfall, and although the levels of metals in the fish were mostly below National Health and Medical Research Council limits, the Committee was told that this indicated that a negative correlation between organochlorines and trace metals in fish was likely.⁸

The results were potentially very damaging to the Water Board, indicating a failure of its Trade Waste Policy and suggesting that toxic waste had in fact been accumulating in the seabed sediments. They also cast some doubts on the competence of the SPCC which was supposed to be regulating what the Board was putting into the ocean. At a meeting between senior officers of the Water Board and the SPCC held in May 1988, it was recognized that "spearfishermen consuming red morwong caught at Malabar could be at some health risk."⁹ The "question of public responsibility and the desirability of releas-

Dr Sharon Beder is the Environmental Education Co-ordinator at Sydney University, Australia 2006. She is author of **Toxic Fish and Sewer Surfing** (Allen and Unwin, 1989).

TA	BL	E	1

	ORGANO Avera	CHLORI ge [†] conce	NES I	N FIS	H 198 ^{kg}	7	
SPECIES	LOCATION	TISSUE	BHC	HPTE	DDT (total)	Dieldrin	TOTAL OCs
Red Morwong	Malaba Pt Hacking	muscle liver muscle liver	1.22 0.16 0.01	2.60 0.32 0.06 0.03	0.30 — 0.02 —	0.105 — — —	4.23 0.48 0.10 0.03
Blue Groper	Malabar Pt Hacking	muscle liver muscle liver	0.20 0.08	0.25 0.10	0.02	0.02	0.50 0.22 —
Rock Cale	Malabar Pt Hacking	muscle liver muscle liver	1.121	0.02 0.03 0.01 0.01		0.005 — — —	0.05 0.03 0.01 0.01
NH&MRC maxi	NH&MRC maximum levels 0.01 0.05 1.0 0.1						

BHC = Benzene Hexachloride HPTE = Heptachlor Epoxide TOTAL OCs = Sum of all organchlorines detected [†]Average of 8 fish

Source: Information supplied in SPCC, Bioaccumulation in Nearshore Organisms, 1 March 1989.

TABLE 2

HEAVY METALS IN MARINE LIFE 1987 Average [†] concentration in mg/kg								
SPECIES	LOCATION	Cu	Zn	Pb	Cd	As	Se	Hg
Red Morwong muscle	Malabar Pt Hacking Terrigal	0.28 0.26 0.62	4.6 4.0 4.6	0.26 0.18 0.07		2.0 2.0 3.0	0.10 0.18 0.18	0.36 0.28 0.31
liver	Malabar	6	32	8.4	1.3	3.2	3.0	1.1
	Pt Hacking	17	46	3.8	5.0	4.2	2.8	0.84
	Terrigal	17	54	2.2	8.2	7	4.1	1.0
Blue Groper muscle	Malabar Pt Hacking Terrigal	0.29 0.22 0.54	4.1 4.6 6.4	0.04 — 0.15	0.01	0.8 0.8 1.3	0.23 0.03 0.25	0.55 0.26 0.30
liver	Malabar	3	34	2.8	1.4	1.8	1.0	1.45
	Pt Hacking	6	38	2.8	3.2	3.0	1.4	0.46
	Terrigal	6	44	1.8	4.4	3.8	2.2	0.54
Rock Cale muscle	Malabar Pt Hacking Terrigal	0.27 0.58 0.55	8.4 8.4 12	0.04 0.04 0.10		0.5 0.4 1.0	0.05	0.04 0.03 0.06
liver	Malabar	520	60	0.5	1.0	1.7	5.4	0.32
	Pt Hacking	620	104	0.2	2.2	2.7	11.4	0.12
	Terrigal	600	98	0.1	3.2	6.2	11.4	0.24
Red Bait Crab	Malabar	32	25	0.38	0.04	6.1	0.84	0.06
	Pt Hacking	23	26	0.45	0.06	13	0.78	0.07
	Terrigal	26	28	0.02	0.08	8.1	0.68	0.05
NH&MRC	FISH	10	150	1.5	0.2	1.0	1.0	0.5
GUIDELINES	SHELLFISH	70	1000	2.5	0.2	1.0	1.0	0.5

Cu = Copper Zn = Zinc Pb = Lead Cd = Cadmium As = Arsenic Se = Selenium Hg = Mercury

[†]Average of 8 organisms

Source: Information supplied in SPCC, Bioaccumulation in Nearshore Marine Organisms, 1 March, 1989.

ing the data" were discussed at length at the meeting, and the SPCC officers said that they thought the information indicated "potential health consequences". However the study was not released as the Water Board argued that it was not conclusive. The Board's planning manager later told the magazine Engineers Australia:

"The criticism that by withholding the study results the board was potentially putting public health at risk had to be weighed up against the risk of causing unwarranted public concern and panic."10

Public Revelations

The public first heard of the study in September 1988 when the Herald received a tip-off and published a very small item reporting that two fish species off the coast of Malabar had been found to have traces of organochlorine pesticides in them. W. Forrest, the Deputy Director of the SPCC, was reported as saying that "the concentration of the chemical BHC in the species was low and not a cause for concern".11 (As stated above it was on average 122 times the NH&MRC limit.) He went on to claim that:

"The point I would emphasize is that the levels are higher than we would like to see but only in a small number of samples taken. But we have been troubled by the detection of the chemicals in some of the samples, the very fact they are there is troubling us."12

The Australian Underwater Federation immediately wrote to the SPCC to get the results of the study explaining that at spearfishing competitions the competitors have found that certain species caught near outfalls have mushy, tainted flesh and that the worst species is the red morwong which they now refuse to eat.13 Despite the concerns of the SPCC officers about public responsibility, the Federation was not informed of the results of the study which was mentioned in the SPCC annual report but, due to pressure from Tim Moore, the State Minister for the Environment, no indication was given of any contamination.14 It was not until the Herald published the leaked results on 7 January 1989, that the spearfishermen and the many other recreational fishermen who fish near the Sydney outfalls learnt of the real extent of the contamination. In response to the outcry over the newspaper report, a ban on fishing within 500 metres of the sewage outfalls was announced on the 24th February by the Minister for Agriculture, Ian Armstrong, and the fines for selling fish on the black market were increased. The *Herald* reported that Armstrong still maintained that there was "conflicting evidence" on the level of contamination near sewage outfalls and that the ban was temporary whilst more evidence was being collected.¹⁵

One person who was particularly concerned about the lack of public information was a woman whose husband had become a keen amateur fisherman. He had caught fish between North Head (site of Sydney's second largest outfall) and Long Reef and they had eaten fish three times a week for about three years until they read the Herald reports. The previous year her daughter had been born with severe and very rare abnormalities that were thought by two specialists to be genetically based, possibly a mutation caused by chemicals. In a letter to all Water Board and SPCC members and various politicians, the woman expressed her concerns:

"Because so few pregnant women in Sydney have eaten as much local fish as I did, it is impossible to establish whether there is an epidemiological link. Cases such as my daughter's highlight the value of open public discussion and access to information. Had I known that Sydney's industrial waste went directly through the sewage system, or that there was evidence of toxins in fish caught in Sydney, I never would have eaten them. If I had not eaten them, the doubts about my daughter's abnormalities, however slight these may be, would not exist. If I had not eaten them, the concerns about the possible long term affects on my family's health would not exist."16

Manipulating the Media

The Government, which had suffered politically from accusations of secrecy, was constantly pestered by reporters for the results of the second bioaccumulation study which was eventually released in March 1989 at a press conference given by Tim Moore. The second study (*see* Table 3), which had involved taking eight samples of red morwong at varying distances from the three major Sydney outfalls, also showed high levels of organochlorines. The pesticide chlordane was found to be on average 12 times the

TABLE 3

ORGANOCHLORINES IN RED MORWONG 1988 Average ⁺ concentrations in mg/kg						
DISTANCE F	ROM OUTFALL	CHLORDANE	DDT	DIELDRIN	HCBs	PCBs
1024	3.5 km N	0.03	0.02	0.01	0	0
10.6	2.5 km N	0.03	0	0.01	0	0
	1.5 km N	0.12	0.02	0.01	0	0
NORTH	0.5 km N	0.11	0.01	0.02	0	0.01
HEAD	0.5 km S	0.38	0.11	0.05	0.02	0.23
OUTFALL	1.5 km S	0.06	0.01	0	0	0
	2.5 km S	0.26	0.08	0.03	0.02	0
22.0	3.5 km S	0.07	0.02	0.01	0	0
BONDI	3.5 km N	0.02	0.01	0	0	0
	2.5 km N	0 07	0.04	0	0	0.01
	1.5 km N	0	0	0	0	0
	0.5 km N	0.12	0.02	0.03	0.01	0.10
OUTFALL	0.5 km S	0.10	0.02	0.01	0.01	0.04
10.0	1.5 km S	0.01	0	0	0	0
	2.5 km S	0.03	0	0.01	0.02	0
	3.5 km S	0.06	0	0.01	0.03	0.01
a second a second a second	3.5 km N	0.10	0.03	0.01	0.03	0.03
	2.5 km N	0.12	0.05	0.01	0.04	0
	1.5 km N	0.23	0.36	0.05	0.11	0.04
MALABAR	0.5 km N	0.63	0.46	0.08	0.29	0.30
OUTFALL	0.5 km S	0.40	0.17	0.08	0.29	0.15
	1.5 km S	0.25	0.24	0.03	0.11	0.10
	2.5 km S	0.20	0.11	0.03	0.10	0.03
	3.5 km S	0.25	0.12	0.03	0.08	0.04
NH&I maximun	MRC n levels	0.05	1.0	0.1	0.1	NPF

HCB = Hexachlorobenzene PCBs = Polychlorinated Biphenyls NPF = not permitted in food Source: Information in SPCC, Bioaccumulation in Nearshore Marine Organisms II, March 1989.

*Average of 8 fish

NH&MRC maximum limits for fish caught within 3.5km of Malabar and hexachlorobenzene (HCB), an intractable waste produced by the ICI chemical plant at Botany, was found to be on average three times the NH&MRC limit within 3.5km of Malabar. An interim report on the levels of heavy metals in the red morwong released at the same time showed that the average levels of mercury in fish caught at each site were consistently above NH&MRC maximum limits except around the Bondi outfall.¹⁷ The finding on the mercury levels went largely unnoticed, however, as it was overshadowed by the large amounts of organochlorines in the same fish.

The organochlorine report contained a couple of pages on the implications of the results written by a senior Health Department scientist who described a major outbreak of HCB poisoning in Turkey which occurred after people had eaten contaminated grain. It was estimated that these people had consumed 50-100 milligrams of HCB per day for a prolonged period. On

this basis, it was argued that fish would have to be far more contaminated than the NH&MRC limits to cause acute symptoms in humans: "The concentration of HCB and chlordane found in red morwong could not be expected to produce acute toxic effects and the effect of long term consumption is unknown."18 The media, however, failed to report this 'reassurance' and instead only reported how many times the concentrations of organochlorines in fish exceeded the NH&MRC limits. This was later cited by the authorities as an example of the irresponsibility of the media, which had failed to ensure that official interpretations of the information were transmitted to the public.19

Different tactics were therefore adopted when it came to the release of the finalized heavy metals report which was released in July at a press conference held by Moore.²⁰ This time the Environment Minister had an expert, Professor Cairncross, present to ensure the correct interpretations were conveyed to the media. Despite the fact

that most of the fish sampled were over NH&MRC limits for mercury, Moore claimed that the study showed there was no toxicological threat to humans from heavy metals discharged in effluent from ocean outfalls.²¹ Cairncross compared average levels of mercury in the Sydney fish to the highest levels found in fish from Minamata Bay in Japan where more than a hundred people died and hundreds more were sick from mercury poisoning after eating contaminated fish. He concluded that "treated sewage as presently discharged does not constitute a hazard in terms of heavy metal accumulation,"22 and he stated that one would have to eat 50kg of red morwong a week continually "to get any real trouble".23

The media left the press conference with the impression that the report gave the fish a clean bill of health. On television that night, Armstrong, the Minister for Agriculture, said he thought the ban on fishing at the outfalls should be lifted. Moore was even reported in the Herald the next day as saying that the "study proved that the effluent which was being discharged from treatment plants at Malabar, Bondi and North Head was not deemed to be a health hazard for the fish".24 What the public was not told was that these red morwong were the very same fish that had been analyzed for organochlorines a few months earlier, and that far from being safe to eat or proving that the sewage effluent was not a health hazard for fish, had been the cause of the fishing ban being imposed in the first place. The Government would have succeeded in controlling the interpretation of the study but for the environmentalists who realized the deception the following day and pointed it out to the media. Cairncross then backed away from the statements he had made about the fish being safe to eat:

"I didn't mention the organochlorines because it was not in my brief and I wouldn't talk about them anyway . . . I made my comments on the basis that if there was no other contaminating factor, then the fish would be all right to eat ... Obviously if there are organochlorines I think anyone who ate fish from there would be very foolish."²⁵

Disputes Over Interpretation

The SPCC officers themselves were critical of the heavy metals report, which had been released without them having a chance to review it. In an internal report by the manager of their chemistry laboratory, it was argued that the final metals report was poorly structured and should not have included the Cairncross review because he was ignorant of the organochlorine data available from the same fish samples. Because he did not examine "possible complex interactions between the bioaccumulation of different pollutants", the SPCC report claimed that Cairncross was in no position to make recommendations concerning the threat to human health from eating fish caught at the outfalls.26 The SPCC report also criticized the heavy metals report for only including mean levels of metals in fish caught at each site, since the mean could mask a large range and it argued that the fish livers should have been analyzed as metals tend to be stored firstly in the livers as a detoxifying mechanism.

Needless Damage

Armstrong wrote to Moore after the studies had been released to express his concern about the continuing publicity being given to the contamination of fish. He argued that very small errors in technique or measurement could seriously affect the results when measuring minute amounts of chemicals and that both studies were potentially erroneous because they

'It helps to keep me in contact with the Earth and all its people'

Read the NI and see the world through fresh eyes. The NI takes one subject each month – world food, Mozambique, debt or the Middle East. It cuts through the information overload and gives you clear analysis. The ideas, facts and arguments are neatly distilled into 32 pages of clear charts, readable articles, vivid graphics and photos.

JONATHON PORRITT

magazine

The NI is an instant monthly briefing, putting you quickly on top of a subject for just £18.40 a year.

THE NEW INTERNATIONALIST

You can try it **FREE** for three months. Fill in the box below and we will send you three issues *plus a full colour world map*, all yours to keep whether or not you subscribe. So you have nothing to lose and – we believe – a lot to gain.

	ATIONALIST V 2283, Mitcham CR4 9AR
YES Please send m to continue al within 10 days of recei anything If I do wish t direct debit will be paid charge to my account a now \$18.40	he my free issues of NI and map. If I don't wish ter these three issues I will write and tell you ving my third magazine and will not owe you to go on receiving NI I need do nothing. The on the 1st of the following month, and you will nnually until cancelled the NI subscription proc
DIRECT DEBIT INSTRU- direct debits from my ac amounts are variable and change them after giving wish to cancel this instruc- which breaks the terms of	CTION to my bank manager. I instruct you to pay count at the request of New Internationalist. The f may be debited on various dates but NI may only me prior notice. I will inform the bank in writing if tion and I understand that if any direct debit is pair the instruction the bank will make a refund.
Date	Signed
Date Bank's name and address (BLOCK LETTERS please	Signed S Your name and address e) (BLOCK LETTERS please)
Date Bank's name and address (BLOCK LETTERS please	Signed
Date Bank's name and address (BLOCK LETTERS please	Signed
Date Bank's name and address (BLOCK LETTERS please	Signeds Your name and address s Your name and address (BLOCK LETTERS please)
Date Bank's name and address (BLOCK LETTERS please	Signed
Date Bank s name and address (BLOCK LETTERS please Bank account in the name	Signed

had not been refereed "in the standard scientific manner".

> "I would appreciate it if you would ensure that media reporters are fully aware that these reports do not have the scientific standing that is being attributed to them . . . we should take all possible action to prevent the continuation of the unsubstantiated reporting which is doing so much needless damage to one of our State's most important industries."27

The NH&MRC maximum residue limits also came under attack as they enabled the media to interpret the concentrations of organochlorines in fish as 'dangerous'. When the red morwong in the second study were found to contain mercury above NH&MRC maximum limits, the Fisheries Division of the Department of Agriculture argued that background levels of mercury were naturally high in Sydney waters and the Health Department representative on the Water Board's environmental monitoring steering committee argued that the NH&MRC limits should not be interpreted as health limits.

Dietary Habits

The NH&MRC maximum residue limits are based on Australian dietary habits and what little is known about the toxicology of the substances in question. For example, for mercury, it has been estimated that an 'average' human of 70kg (which implies an average adult male) can consume 0.3mg of mercury each day and just be on the borderline of showing clinical symptoms of toxicity. It is assumed that such a person would eat no more than 59g of fish a day or 410g per week. From these assumptions the theoretical blood levels are calculated. A safety factor of ten is applied (these safety factors vary for each toxic substance) and the maximum residue limit for mercury in fish is thereby worked out.28 The safety factor is necessary because many people, particularly children, weigh a lot less than 70kg, because people may eat more than 410g of fish per week, because some people may be more sensitive than others and because little is known about the long-term effects of eating mercury contaminated fish. The larger safety factors for organochlorines (sometimes more than 100) have been used to argue that the fish sampled in the bioaccumulation studies were not particularly contaminated. An SPCC information bulletin reassured the public:

"The Department of Health considers that very large quantities of contaminated fish (e.g. a tonne) would have to be eaten before a person suffered pesticide poisoning. However the long-term effect of consuming fish and invertebrates containing organochlorines is not known."29

In answering the letter from the woman whose daughter had been born with abnormalities, Moore's senior policy advisor used similar reasoning to argue that the NH&MRC limits, "if just exceeded", were unlikely to produce symptoms in humans if ingested because of safety factors of at least 100. Many thousands of kilograms of fish that reached NH&MRC contamination limits would have to be consumed in order to acquire a lethal dose.30 This was of no comfort to the woman who was concerned about subtle reproductive effects, not immediate toxic symptoms, and who knew that the NH&MRC limits had been grossly exceeded, in some cases by many more than 100 times.

The letter also included other 'reassurances' such as: chlordane has "not been shown" to be teratogenic in humans; hexachlorobenzene has "never been proven" to be a teratogenic compound (no mention was given as to whether BHC or heptachlor epoxide were teratogenic); traces of pesticides occur in other foodstuffs; and the discharge of hexachlorobenzene into the sewerage system "is strictly controlled".31

Clearly, the various participants in the debate over whether Sydney fish are dangerously contaminated chose to interpret the two bioaccumulation studies according to their own interests and to further those interests by restricting (or increasing) the flow of information. The participants implicitly acknowledged that the truth did not automatically emerge from the data obtained in the studies but was up for grabs to whoever could successfully get their own interpretation accepted as the 'truth'. Science is a resource in the political arena and those who have the best access to it and most control over it will try and determine how it is interpreted. Criticisms of the media for false, inaccurate or distorted reporting are often made by disgruntled players who have lost their control over its interpretation.

Postscript: In October 1989, Armstrong quietly lifted the bans on recreational fishing at the ocean outfalls. The media found out about this some six months later and questioned him about it. He responded that the fish caught at the outfalls were slimy on the outside and black on

the inside and if people wanted to catch them and eat them then that was their look out.

Notes and References

Anderson, J., Overview of the Planned Envi-1. ronmental Monitoring Programme, 1989. 2

Sydney Morning Herald, January 7, 1989.

3 The State Pollution Control Commission, SPCC, is the regulatory agency for all pollution matters in the State of New South Wales. The Federal Government in Canberra has few powers to protect the environment.

For the full story see Beder, S., Toxic Fish and 4 Sewer Surfing, Allen and Unwin, Sydney, 1989.

The Water Board is responsible for the provi-5. sion of water and sewerage to the Sydney region. It is regulated by the SPCC.

Clean Waters Advisory Committee Meeting, 6. Business Papers, September 10, 1987.

Clean Waters Advisory Committee Meeting, Business Papers, December 10, 1987, Various State Government departments and statutory boards are represented on the Clean Waters Advisory Committee including the Sydney Water Board, the Department of Health, the Department of Agriculture and Fisheries and the Department of Planning and Environment. 8.

Ibid.

SPCC, Bioaccumulation of Organochlorine 9. Pesticides Near the Malabar Ocean Outfall, Meeting Notes, May 18, 1988.

Georg, D., 'Engineers Criticised for not Going Public on Pollution', Engineers Australia 16, January 26, 1990.

Sydney Morning Herald, September 27, 1988. 11. 12. Ibid.

13. Australian Underwater Federation, letter to W. Forrest, Deputy Director, SPCC.

SPCC, Annual Report 1987-88, p.30. 14

15. Sydney Morning Herald, February 24, 1989.

16. Personal correspondence, March 6, 1989.

Scientific Services, Water Board, Interim 17. Report, The Concentration of Heavy Metals in Red Morwong, February 27, 1989.

18 SPCC, Bioaccumulation in Nearshore Marine Organisms II, March 1989, p.40.

19 Water Board Environmental Monitoring Steering Committee Meeting, April 5, 1989.

20. Mclean, C., Miskiewicz, A. and Roberts, E., Water Board, Final Report, The Concentration of

Heavy Metals in Red Morwong, June 1989. Minister for the Environment, Tim Moore, 21. Press Release, July 3, 1989.

Mclean et al., op. cit., supra 20. 22

23. Evening news, all channels, July 3, 1989.

Sydney Morning Herald, July 4, 1989. 24.

25. Sydney Morning Herald, July 6, 1989.

26. SPCC, Comments on Water Board Report,

The Concentration of Heavy Metals in Red Morwong, July 17, 1989.

27. Minister for Agriculture and Rural Affairs, Ian Armstrong, letter to Minister for the Environment, Tim Moore, July 13, 1989. An independent referees report subsequently procured generally approved of the studies saying that the "basic nature of the problem has been adequately identified and evaluated." (Letter from D.W. Connell, Griffith University to Peter Fagan, Water Board, 4th September, 1989). Another review was made by the Director of the Southern California Coastal Water Research Project who agreed that both studies showed that red morwong were contaminated near the outfalls.

28. SPCC, Toxic Chemicals, September 1979, p.10.

29. SPCC, 'Bioaccumulation in Nearshore Marine Organisms', Information Bulletin, November 1989.

30. Letter from Senior Policy Advisor to Tim Moore, Minister for the Environment, undated. 31 Ibid.



The devastating effects of clearcutting. Timber interests in the US defend the practice of subsidizing the logging of complex virgin or 'old-growth' forests on the grounds of 'non-timber benefits'.

Old-Growth Logging Myths: The Ecological Impact of the US Forest Service's Management Policies

by

Richard E. Rice

US law stipulates that forests which are uneconomic for logging should be removed from the inventory of suitable timber lands. Although this would include almost all the country's old-growth forests, the US Forest Service continues to log such areas, insisting that its losses are justified by the 'benefits' logging supposedly provides in terms of recreation, biodiversity and better management. Close scrutiny not only reveals many of these claimed benefits to be fraudulent but also shows that current management practices are a major cause of forest degradation.

The Superior National Forest in northeastern Minnesota between Canada and Lake Superior, shares with many US national forests an abundance of wildlife and recreation opportunities not generally found on surrounding private lands. The Superior offers some of the finest wilderness canoeing in the US, as well as the largest group of natural lake trout waters in the lower 48 states. In addition, its 2.1 million acres provide one of the last remaining refuges for the grey wolf, whose habitat is rapidly disappearing from lands that are not protected by the Federal Government.

The Superior is more than a preserve for wildlife and recreation, however: roughly

80 million board feet of timber are logged on the forest each year. Under a recently adopted long-range management plan, this figure is projected to increase by more than 60 per cent over the next 30 years.¹ Ironically, much of this increased logging is expected to yield far less in receipts than the government will spend to produce it. In fact, timber receipts on the Superior regularly fall millions of dollars short of timber expenditures each year.²

Such losses are common on most national forests in the United States. According to a study by the World Resources Institute, 73 of 120 national forests consistently lose money on their timber sales.³ Studies by such disparate interests as the Congressional Research Service, the General Accounting Office, The Wilderness Society, and the Forest Service itself confirm the widespread nature of these losses (*see* Figure 1).⁴ However, management plans released over the past several years show that the US Department of Agriculture Forest Service expects to increase logging substantially on the national forests — a decision that is likely to increase the number of below-cost timber sales. According to estimates prepared by The Wilderness Society, losses from these sales could reach \$2 billion over the next ten years alone.⁵

Although the 1976 National Forest Management Act states that land found to be uneconomic for logging should be removed from the inventory of suitable timberlands, the Forest Service has consistently maintained that below-cost timber sales are justified by the benefits they provide to other forest resources. Among the benefits cited are visual diversity, water for irrigation, jobs and income to

Richard E. Rice is a resource economist with The Wilderness Society, 1400 Eye Street, NW, Washington, DC 20005, USA.







(Adapted from Alverson, W.S., Waller, D.M. and Solheim, S.L., 'Forests too Deer: Edge Effects in Northern Wisconsin', Conservation Biology 2, 1989, pp.348-358; Wilcove, D.S., 'Forest Fragmentation as a Wildlife Management Issue in the Eastern United States', in Proceedings of the Society of American Foresters 1988 Convention, Society of American Foresters, Rochester, New York, 1988.)

local communities, access for recreation, increased wildlife diversity and the control of insects, fire and disease. Many of these claimed benefits are either misplaced or based on questionable data: yet, all too often, they remain unchallenged. Indeed, citing 'non-timber benefits' as its justification, the Forest Service now plans to expand logging on virtually every forest in the US, including those where past logging has been subsidized.

Water

One of the primary benefits claimed for timber production in the West is increased water flow. Indeed, were it not for the value of the water 'produced' by timber harvests, there would be little economic justification for logging on many national forests in the western United States.

Logging has long been known to increase the flow of water in streams and rivers. The value of increased flows, however, is subject to dispute. With little evidence to support its position, the Forest Service claims tremendous 'off-site' values for the water produced from logging by assuming that all increased flows will be used for irrigation. Yet, based on recent computer simulations of the entire Colorado River basin, Forest Service researchers conclude that only a small fraction of the increased flow is used for irrigation.6 This is because the impact of logging on streamflow is greatest during wet years and in the springtime when the supply of water is naturally high and the demand for water is low. Moreover, while storage on the Colorado River is enormous, reservoirs are intentionally filled to capacity in anticipation of an extended period of drought. As a result, most of the added water from logging simply evaporates or is spilled in the springtime to flow into Mexico.

Biodiversity and Forest Planning

Nearly all forest plans still claim that logging benefits wildlife and forest diversity. In effect, these claims shift the debate over biological diversity from one of conservation to one of numbers. Logging is often said to benefit diversity if it leads to an increase in the number of species inhabiting a given forest — even if the added species are not in need of protection and if their presence in the forest signals a decrease in habitat for species that are.

Traditional wildlife management holds that logging can promote wildlife abundance by creating 'forest edge', which provides a complex habitat preferred by many animals, particularly hunted species such as deer, rabbit and quail. Yet, even game animals do not always benefit from logging. While forest openings do provide extra forage for big game animals like elk, these also require heavily forested areas for shelter from predators and temperature extremes, and for food when forage in openings is unavailable because of snow depth or competition from domestic livestock.7 National forests in the West tend to be restricted to higher elevations where additional forage is of little benefit to deer and elk, as their populations in this region are mainly limited by winter forage at lower elevations.8 Elk are also extremely sensitive to disturbance from logging and road construction. A road density of one mile per square mile has been shown to result in a 25 per cent reduction in habitat

The Importance of Old-Growth for Biodiversity

The national forests encompass alpine tundra, wetlands, deserts, grasslands, tropical rainforests, and the majority of the temperate zone forest types found in North America. They cover 191 million acres in 42 states, the US Virgin Islands, and Puerto Rico — more than twice the acreage of the national parks and 15 times the acreage of the national wildlife refuge system outside Alaska. They are home to a third of all federally listed threatened and endangered species.

The disruption and elimination of forest habitats has had a major impact on diversity in the United States. Since the early 1600s, 20 to 40 per cent of the original forest cover has been lost and much of what remains has been substantially altered as a result of past logging.1 In the Southeast, vast expanses of natural pine forests have been replaced by even-aged industrial plantations. Roughly 80 per cent of eastern lowland hardwood forests have been cleared for agriculture.² And virtually all of the old-growth forests on private lands in the Pacific Northwest have been logged or burned.3 The red-cockaded woodpecker, once widespread on pine forests throughout the Southeast, is now largely dependent on national

use by elk. At two miles per square mile, use can fall to half the level of an unroaded area.

In the Cherokee National Forest in Tennessee, diversity is one of a number of benefits claimed for timber production. According to agency planners, diversity is maximized on the forest by providing a "well dispersed network of clearcuts among older forest stands".9 Planners fail, however, to distinguish between species that benefit from this approach and those that do not. The Cherokee contains the largest area of unroaded forest in the southern Appalachians. Since songbird predators are attracted to the forest edges created by roads and logging, placing "a well dispersed network of clearcuts among older forest stands" will likely exacerbate the decline of songbird populations in the East (see Figure 2).

The Cherokee has more species of fresh water fish than any other national forest in the country. Cold water fisheries, such as those found on the Cherokee, are particularly sensitive to increased sedimentation, an unavoidable by-product of road building and timber harvests, and to increased forests due to logging on private and industrial timberlands.⁴ Similarly, in the Pacific Northwest, nearly 70 per cent of the remaining habitat for the northern spotted owl is found in national forests.⁵

National forests are also frequently located adjacent to national parks and other protected areas. In the Greater Yellowstone region, seven national forests in conjunction with two national parks and three wildlife refuges form an area of seven million acres of nearly contiguous roadless land. Similar large blocks of adjacent public lands are found in Colorado, Montana, Idaho, the Upper Great Lakes, the Pacific Northwest, and the central and southern Appalachians. By providing additional habitat and acting as a buffer against encroaching development, national forests in these areas make an important contribution to the survival of a number of rare and endangered species. Wide-ranging species such as the grizzly bear would probably not have survived in parks and refuges without the habitat available in adjacent national forests.

In addition, the national forests are important to certain species even when they provide only a portion of their habitat. Forests in the East serve as nesting grounds for songbirds that winter in the American tropics and migrate northward during the spring. While nesting also occurs on small, privately owned woodlots, large unbroken forests found only on public lands are particularly important to the continued survival of these birds.

References

1. Clawson, M., 'Forests in the Long Sweep of History', *Science* 204, 1979, pp.1168-1174.

2. Barton, K., 'Federal Wetlands Protection Programs', *in* R. Di Silvestro (ed.), *Audubon Wildlife Report 1987*, The National Audubon Society, New York, 1987, pp.373-411.

3. Morrison, P.H., *Old Growth in the Pacific Northwest: A Status Report*, The Wilderness Society, Washington, DC, November, 1988; Spies, T.A. and Franklin, J.F., 'Old Growth and Forest Dynamics in the Douglas-Fir Region of Western Oregon and Washington', *Natural Areas Journal* 8, 1988, pp.190-201.

4. Jackson, J.A., 'Biopolitics: Management of Federal Lands and the Conservation of the Red-Cockaded Woodpecker', *American Birds* 40, 1986, pp.1162-1168.

5. USDA-Forest Service, 'Final Supplement to the Environmental Impact Statement for an Amendment to the Pacific Northwest Regional Guide, Volume 1, Spotted Owl Guidelines', 1988, p.24.

water temperatures resulting from the removal of streamside vegetation. In addition, increased runoff from clearcuts can remove natural debris dams that create pools important to fish reproduction.¹⁰

Black bears also find needed habitat on the Cherokee. Once common, the black bear is now confined to five to ten per cent of its original range in the southeastern United States. The bear:

> "... continues to survive in the Southeast primarily due to federally owned lands containing designated or *de facto* wilderness. Whether (these) scattered pockets or publicly owned refugia ... are large enough to sustain bear populations is unknown."¹¹

The primary threats to the black bear on the Cherokee include a reduction of forest mast due to the logging of mature hardwoods (mast, the seed of the beech, is an important source of food prior to hibernation), displacement due to human intrusion, poaching and isolation from bear populations on adjacent public and private lands. The forest plan for the Cherokee is likely to exacerbate all four problems. In contrast, prominent among species that will benefit from logging are various game animals including white-tailed deer, bobwhite quail, cottontail rabbit, grey squirrel and wild turkey.¹² All of these species thrive on the type of disturbance found on private forest lands throughout the eastern United States. Providing additional habitat for these species on the national forests adds little to the existing diversity of eastern wildlife. By doing so at the expense of species most in need of protection, logging is actively working to lower diversity.

Increased logging on the forests in the East may also threaten the diversity of the region's native plant communities. Weedy, exotic plants such as kudzu, buckthorn and honeysuckle, whose dense growth can smother native vegetation, have invaded areas disturbed by logging in many eastern forests.¹³ Once established in openings, these plants become difficult or impossible to eradicate and often spread to forest interiors. Logging in the East has also affected native plant communities by promoting an increased abundance of white-tailed deer. Studies in the Great Smoky Mountains National Park show that areas subject to intensive deer browsing near openings have lost as much as a quarter of their total species richness.¹⁴

Logging Vs. Natural Openings

In defending its policies, the Forest Service often points to the similarities between logging and natural disturbance. In an unmanaged forest, openings are created by a variety of forces, including wind, fire, insects, disease and aging. In the absence of interference from man, these forces combine to create a complex mosaic of trees and openings that is an essential element of forest diversity. Professional foresters, however, regard these forces as wasteful because they destroy 'valuable' timber. Logging, in their view, not only mimics nature by creating openings, but improves on nature by eliminating waste. This view ignores a number of important differences between natural and manmade disturbance.

Natural openings are not connected by roads. Roads add to the fragmentation caused by logging, provide access for poachers, and allow plants and animals that would seldom be found in natural openings to penetrate deep into otherwise unbroken forest - often at the expense of species living in the forest interior. Logging, road building and the intentional creation of openings for game have transformed many formerly continuous expanses of natural forest into relatively small and increasingly isolated patches. This, in turn, has given rise to a host of problems that, for many species, will eventually lead to extinction.15 Ironically, the checkerboard pattern of clearcuts commonly used on the national forests to minimize the visual impacts of logging has probably maximized the amount of road construction and habitat fragmentation.

Roads also have a major impact on forest hydrology. By concentrating surface flows, roads increase erosion and the loss of nutrients from forest soils. Megahan and Kidd found that erosion from logging roads in Idaho was 220 times greater than erosion from undisturbed sites.¹⁶ Roads can also affect the flow of subsurface water. Subsurface runoff helps to maintain flow in stream channels during both wet and dry periods. This regulatory mechanism is disrupted when water flowing beneath the soil is intercepted by roads and converted to surface flow. Bormann and Likens report that this conversion of sub-

Old-Growth Logging and Global Warming

Proponents of the logging industry in North America have recently attempted to use the greenhouse effect as a justification for clearcutting old-growth forests. They claim that replacing slowly growing 'decadent' forests by faster growing, younger plantations helps to reduce the carbon content of the atmosphere and thus slow global warming. However a recent paper by Harmon, Ferrell and Franklin in the journal *Science* shows that in fact the opposite is the case.¹

Harmon et al. point out that although younger forests have a higher net productivity than old-growth forests - that is they grow faster and therefore take in more carbon each year - the critical factor with regard to the greenhouse effect is the total amount of carbon stored within a forest, not the annual uptake. Harmon et al. estimate that the conversion of five million hectares of old-growth forests to plantations in western Oregon and Washington has added 5.5-6.7 billion tonnes of carbon dioxide to the atmosphere during the last century. This is approximately equivalent to a guarter of the total global emissions of CO_2 from fossil fuel burning in 1989.

Nearly 60 per cent of the old-growth timber harvested in the Pacific Northwest is either burnt or decomposes within five years, thus releasing its carbon content to the atmosphere. Approximately two-thirds of the timber enters long-term storage in the form of building materials, but most of the rest of the wood fibre is used for fuel or paper. Even with recycling paper production results in a loss of CO, to the atmosphere as only around half of the recovered paper is used as fibre, most of the residue being burned as fuel. An even higher proportion of the carbon in the plantations is quickly lost to the atmosphere when they are harvested after 60 years, as the younger trees produce less board and plywood.

Patrick McCully

Reference

1. Harmon, M.E., Ferrell, W.K. and Franklin, J.F., 'Effects on Carbon Storage of Conversion of Old-Growth Forests to Young Forests', *Science*, Vol. 247, 9 February, 1990. surface to surface flow may have significant adverse effects on downslope vegetation and aquatic life.¹⁷

Natural openings also differ from manmade openings in terms of the amount of biomass, or living and dead vegetation, that they contain. Logging removes biomass from forest openings that would otherwise serve as habitat for a wide variety of plants and animals, including many of the natural predators of forest pests. Standing dead trees (snags) in a natural opening provide particularly important wildlife habitats and also help to buffer the surrounding forest from the damage caused by wind. In addition, the nutrients stored in dead and downed material are eventually returned to the soil through decomposition. Removing this vegetation reduces soil fertility directly as well as indirectly by eliminating sites for nitrogen fixation and by encouraging the loss of additional nutrients through increased soil erosion.18 The use of herbicides to eliminate competing vegetation following harvesting may have a similar effect on erosion and may also lower soil fertility by eliminating nitrogen-fixing plants. In addition, this vegetation is often an important source of food for wildlife.

Complexity

The size of openings can also affect the diversity of trees in a given area. Tree diversity is in part a reflection of the pattern of natural disturbance to which an area has been subjected. For most forests in the temperate zone, this pattern includes both large and small-scale disturbance.¹⁹ Since species adapted to small openings do not reproduce well in clearcuts and vice versa, management regimes that alter this pattern can have a significant influence on the species composition of the forest.

There is generally far more age and structural diversity in an unmanaged forest than a forest dominated by man-made openings. Structural diversity refers to the various layers of vegetation that develop in an unmanaged forest. In old-growth forests, in which structural diversity reaches its peak, the canopy or upper layer of forest is formed by trees that range in age from 200 to 1,000 years or more depending on the region of the country. Older trees tend to be more widely spaced and their crowns less dense than younger trees. This allows light to pass to the forest floor and gives rise to an understory of saplings and a layer of groundcover composed of shrubs, mosses, lichens and flowers.

Clearcutting and other forms of evenaged management tend to simplify or homogenize the structure of a forest.²⁰ Even-aged harvests, for example, produce blocks of forest of various ages rather than the mixed-age stands found in an oldgrowth forest. Under management, regular thinnings hasten the development of mature forest, remove standing and fallen dead wood, and shorten or eliminate early successional stages. The dense canopy of younger and mature stands, in turn, prevents the sunlight needed for the growth of understory vegetation from reaching the forest floor. Finally, management truncates succession well before old-growth characteristics begin to redevelop.21 As a result, large old trees, large standing dead trees, large downed logs, and all the species that depend on them will be missing in a managed forest.22

Forest Protection

Protecting forests from insects, fire and disease has long been used to justify investments on the national forests. In fact, each year vast sums are spent to protect worthless timber from fire and pests. While the removal of dead and dying trees may appear to promote the health of forests, it is seldom of benefit to nature. In fact the 'damage' caused by insects, fire and disease is in many ways essential to the health of forest ecosystems.²³

Fire, for example, has been called the dominant fact of forest history. Virtually all forests in North America have been burned repeatedly for thousands of years, and many are dependent on fire for their continued dominance over competing forest types. Frequent natural burning in pine forests on the southern coastal plain prevents flammable debris from accumulating on the forest floor, thus sparing most mature trees from destruction.²⁴ Other pines require destructive fires to melt the resin that seals their cones, thus ensuring successful reproduction.

Insects and disease perform a similar role in promoting the health and diversity of forests. Outbreaks of different intensities can create a patchwork of natural forest openings, break up stands of a uniform age or species and increase the growth and vigour of the remaining trees. Insect 'pests' are an important source of food for birds, mammals and other insects, which in turn help to control pest populations. The trees killed by pests, as well as those destroyed by fire and disease, provide habitat important to a variety of plants and "As with fire, the damage caused by insects and disease is often exacerbated by logging and other silvicultural practices, particularly those that lower the diversity of forest ecosystems."

animals. Moreover, efforts to eliminate these forces may actually add to the mortality from fire and pests. Total fire suppression is a prime example of a forest protection policy that is now seen as counterproductive. By allowing fuels to accumulate, this policy is credited with having made many recent fires far more damaging and costly to control. In addition, the access provided by logging roads greatly increases the risk of human-caused fires after logging operations have ceased. Roads are in fact the primary reason that humans now rival lightning as the most important cause of fires in the national forests. Overall, nearly half of all fires in the national forests are caused by humans, and in some areas, nearly all fires are caused by humans.25

As with fire, the damage caused by insects and disease is often exacerbated by logging and other silvicultural practices, particularly those that lower the diversity of forest ecosystems. The incidence of fusiform rust in the pine plantations of the Southeast is a case in point. During presettlement times, forests in this region consisted of shortleaf, loblolly, slash and longleaf pines intermingled with several species of hardwoods. Beginning in the 1930s, large areas of the South were converted to even-age pine plantations, often with huge acreages planted to a single species. The faster growing and more easily cultivated loblolly, slash and shortleaf pines were favoured in plantations and gradually replaced the more rust-resistant longleaf pine. Prior to 1930, the incidence of fusiform rust was rare, but it is now considered the most costly disease in southern forestry and is estimated to cause the loss of about 100 million cubic feet of growing stock each year.26 This rapid elevation from obscurity has resulted from a combination of long-term fire suppression and the creation of a nearly unlimited supply of the favoured food base for the rust fungus.27 As a part of its complex life cycle, the fusiform rust must spend several weeks on the leaves of oaks before returning to pines, which are its primary host.

Prior to routine fire suppression, periodic ground fires limited the density of oaks and other hardwoods in the understory of southern pine forests.²⁸ Now, pine plantations often contain a uniform and well developed understory of oaks which greatly enhances the spread of the fungus. As a result, infection percentages in planted loblolly pine stands can be almost twice as high as in natural stands.²⁹

To complicate matters, trees stressed by fusiform rust infection are more susceptible to attack by the southern pine beetle. Like that of fusiform rust, damage from the southern pine beetle has only recently achieved epidemic proportions in the South — and for many of the same reasons, including large monoculture plantations, the exclusion of fire, and the replacement of longleaf pine with more susceptible species.³⁰ The practice of 'off-site planting' — growing pines in areas where they would not normally be found — has also contributed to the damage caused by the southern pine beetle.³¹

Insect Predators

Many scientists believe that the natural enemies of insects play an important role in ending insect epidemics and in lengthening the periods between insect outbreaks.32 In this regard, Torgersen and others recommend avoiding activities that lower forest diversity and instead suggest management regimes that more closely approximate natural disturbance and that promote the habitat diversity found in an unmanaged forest.33 Large-diameter downed logs, stumps, and snags, for example, provide habitats important to a variety of insect predators. So too do mixed-aged stands with multiple crown heights and lush understory vegetation. Large clearcuts and herbicides, in contrast, promote single-species stands with little variation in canopy height and with sparse understories - all factors that favour insect outbreaks and eliminate habitat for insect predators. Torgersen also stresses the need to limit ground disturbance by heavy equipment to protect established ant colonies and to prevent damage to potential sites for new colonies.34 Large, established colonies are long-lived, easily disturbed, and can take up to 30 years to redevelop.35

Finally, scientists caution that insecticides used to control insect epidemics often affect not only the target insect pest but many beneficial insects, spiders and other non-target organisms. Lindane, for ex-

ample, the most common chemical used for control of the western pine beetle has been shown to be more effective in killing pine-beetle predators than in killing the pine beetle itself.36 Continued use of chemicals in this case may actually lead to increased tree mortality by prolonging the insect outbreak.

Effective conservation on the national forests will also require a substantial reduction in present harvest levels. In addition to phasing out subsidized logging, some timber sales that fully recover costs should also be foregone to protect biological diversity and other resource values. Current harvest methods should also be altered to reduce the amount of habitat fragmentation and ecological disruption caused by logging. In particular, the Forest Service's near exclusive reliance on clearcutting should be lessened to avoid long-term changes in the species composition of forests managed for timber.

This article is a shortened and edited version of 'The Uncounted Costs of Logging', by Richard E. Rice, Volume 5 of National Forests: Policies for the Future, a five-volume series on important US forest issues published by The Wilderness Society, 1400 Eye Street, NW, Washington, DC.

Notes and References

USDA-Forest Service, Final Environmental 1. Impact Statement, Land and Resource Management Plan, Superior National Forest, Washington, DC, 1986, pp.4-24.

2 USDA-Forest Service, Timber Sale Program Annual Report, Fiscal Year 1988 Test, Forest Level Information, Washington, DC, 1988.

Repetto, R. and Gillis, M., Public Policies 3. and the Misuse of Forest Resources, Cambridge University Press, 1988.

4. US General Accounting Office (GAO), Congress Needs Better Information on Forest Service's Below-Cost Timber Sales, Washington, DC, June 1984; Sample, V. Alaric, Below-Cost Timber Sales on the National Forests, The Wilderness Society, Washington, DC, July, 1984; Wolf, R.E., State-by-State Estimate of Situation Where Timber Will be Sold by the Forest Service at a Loss or a Profit, Congressional Research Service, Library of Congress, Washington, DC, June, 1984; Beuter, J.H., Federal Timber Sales, Congressional Research Service, Library of Congress, Washington, DC, 1985; USDA-Forest Service, Timber Sale Program Annual Report, Fiscal Year 1987 Test, Forest Level Information, Washington, DC, 1988; USDA-Forest Service, 'Decision Notice in Administrative Appeal of the Superior National Forest Land and Resource Management Plan', Washington, DC, June 8, 1989.

The Wilderness Society, Forests of the Fu-5. ture?, Washington, DC, 1987.

Brown, T.C. and Harding, B.L., 'A Prelimi-6. nary Economic Assessment of Timber and Water Production in Subalpine Forests', in USDA-Forest Service Research Paper RM-149, Management of Subalpine Forests: Building on 50 Years of Research, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado, 1987; Brown, H.E., Baker, M.B., Jr., Rogers, J.J., Clary, W.P., Kovner, J.L., Larson, F.R., Avery, C.C. and Campbell, R.E., Opportunities for Increasing Water Yields and Other Multiple Use Values on Ponderosa Pine Forest Lands, USDA-Forest Service Research Paper RM-129, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado, 1974; Brown, T.C., Harding, B.L. and Lord, W.B., 'Marginal Economic Value of Streamflow from Upland Watersheds in the Colorado River Basin', draft manuscript, May 1989.

Thomas, J.W. and Bryant, L.D., 'The Elk', in R. Di Silvestro (ed.), Audubon Wildlife Report 1987, The National Audubon Society, New York, 1987.

Crouch, G.L, 'Big Game Habitat Research in Subalpine Forests in the Central Rocky Mountains', in Management of Subalpine Forests, op. cit., supra

9. USDA-Forest Service, op. cit., supra 1, E-30. 10. USDA-Forest Service, op. cit., supra 1, E-31. Pelton, M.R., 'The Black Bear', in R. Di 11. Silvestro (ed.), op. cit., supra 7, p.525.

USDA-Forest Service, op. cit., supra 1, E-30. 12 Even these species may not be benefiting from current management practices on the Cherokee. According to a recent study by the University of Georgia and the North Carolina Wildlife Resources Commission, for example, logging may actually be more harmful than beneficial to forest deer (Johnson, A.S., Hale, P.E., Wentworth, J.M. and Osborne, J.S., 'Are We Really Managing Deer Populations?', in Proceedings of the 9th Annual Meeting of the Northeast Deer Study Group, 1986).

Barnes, W.J. and Cottam, G., 'Some Au-13 toecological Studies of the Lonicera x bella Complex', Ecology 55, 1974, pp.40-50; Barnes, B.V. and Wagner, W.H., Michigan Trees: A Guide to the Trees of Michigan and the Great Lakes Region, The University of Michigan Press, Ann Arbor, 1981; Craver, G.C., Multiresource Inventories - A Technique for Determining the Distribution and Extent of Honevsuckle on Commercial Forest Land in South Carolina, USDA-Forest Service, Research Note SE-317, Southeastern Forest and Range Experiment Station, Ashville, North Carolina, 1982; Alverson, W.S., Waller, D.M. and Solheim, S.L., 'Forests too Deer: Edge Effects in Northern Wisconsin', Conservation Biology 2, 1989, pp.348-358.

Bratton, S.P., 'Impacts of White-tailed Deer 14. on the Vegetation of Cades Cove, Great Smoky Mountains National Park', Proceedings of the Annual Conference of the Southeastern Association of Fish and Wildlife Agencies 33, 1979, pp.305-312.

Janzen, D.H., 'The Eternal External Threat', 15. in M. Soulé (ed.), Conservation Biology: The Science of Scarcity and Diversity, Sinauer Associates, Sunderland, Massachusetts, 1986; Wilcove, D.S., 'From Fragmentation to Extinction', Natural Areas Journal 7, 1987, pp.23-29

Megahan, W.F. and Kidd, W.J., 'Effects of 16. Logging and Logging Roads on Erosion and Sediment Deposition from Steep Terrain', Journal of Forestry 70, 1972, 136-141.

17. Bormann, F.H. and Likens, G.E., Pattern and Process in a Forested Ecosystem, Springer-Verlag, New York, 1981.

Ibid. 18.

Runkle, J.R., 'Disturbance Regimes in Tem-19. perate Forests', in S.T.A. Picket and P.S. White (eds.), The Ecology of Natural Disturbance and Patch Dynamics, Academic Press, Orlando, Florida, 1985.

20. Ohmann, J.L., 'Status and Trends of Coniferous Forest Habitats in the Western United States', in Proceedings of the Western Raptor Management Symposium, The National Wildlife Federation, Boise, Idaho, in press.

Spies, T.A. and Franklin, J.F., 'Old-Growth 21. and Forest Dynamics in the Douglas-Fir Region of Western Oregon and Washington', Natural Areas Journal 8, 1988, pp.190-201.

Norse, E.A., Ancient Forests of the Pacific Northwest: Preserving Biological Diversity and Timber Production in a Changing World, Washington, DC, Island Press, in press.

23. Romme, W.H., 'Fire and Landscape Diversity in Forests of Yellowstone National Park', Ecological Monographs 52, 1982, pp.199-221; Romme, W.H. and Knight, D.H., 'Landscape Diversity: The Concept Applied to Yellowstone National Park', Bioscience 32, 1982, pp.664-670.

Chapman, H.H., 'Is the Longleaf Type a 24. Climax?', Ecology 13, 1932, pp.328-334; Chapman, H.H., 'Some Further Relations of Fire to Longleaf Pine', Journal of Forestry 30, 1932, pp.602-604; Chapman, H.H., 'Lightning in the Longleaf', American Forests 56, 1950, pp.10-11; Chapman, H.H., 'Longleaf Pine Owes its Existence to Fire', Coastal Cattleman 16, pp.10-13, Heyward, F., 'The Effect of Frequent Fires on Profile Development of Longleaf Pine Soils', Journal of Forestry 35, 1937, pp.23-27; Heyward, F., 'The Relation of Fire to Stand Composition of Longleaf Pine Forests', Ecology 20, 1939, pp.287-304; Clewell, A.F., Natural Setting and Vegetation of Panhandle Florida, US Army Corps of Engineers Contract DACWOI-77-C-0104, Mobile, Alabama, 1981; Christensen, N.L., 'Fire Regimes in Southeastern Ecosystems', in H.A. Mooney, T.M. Bonnicksen, N.L. Christensen, J.E. Lotan and W.A. Reiners (eds.), Fire Regimes and Ecosystem Properties, USDA-Forest Service General Technical Report, WO-26, Washington, DC, 1981; Christensen, N.L., 'The Vegetation of the Coastal Plain of the Southeastern United States', in M.G. Barbour and W.D. Billings (eds.), Vegetation of North America, Cambridge University Press, 1987.

USDA-Forest Service, Report of the Forest Service: Fiscal Year 1987, Washington, DC, 1987. 26. Dinas, R.J., 'Knowledge About Natural Ecosystems as a Guide to Disease Control in Managed Forests', Proceedings of the American Phytopathological Society 1, 1974, pp.184-190; Powers, H.R., McClure, J.P., Knight, H.A. and Dutrow, G.F., Fusiform Rust, Forest Survey Incidence Data and Financial Impact in the South, USDA-Forest Service Research Paper SE-127, Southeastern Forest Experiment Station, Asheville, North Carolina, 1975; USDA-Forest Service, Forest Health Through Silviculture and Integrated Pest Management, Supporting Appendices, Washington, DC, 1988. 27. USDA-Forest Service, ibid.

Komarek, E.V., 'Lightning Fires as Ecologi-28. cal Forces', Proceedings of the Tall Timbers Fire Ecology Conference 8, 1968, pp.169-197. 29.

Powers et al., op. cit., supra 26.

Lawson, T., 'Pine Monoculture Leads to Pine 30. Beetles', Forest Watch 7, 2, 1986, pp.15-17; USDA-Forest Service, op. cit., supra 26.

31. Lawson, ibid.

Dahlsten, D.L., Cameron, E.A. and Cooper, 32. W.A., 'Distribution and Parasitization of Cocoons of Douglas Fir Tussock Moth Hemerocampa pseudotsugata (Lepidoptera: Lymantriidae) in an Isolated Infestation', The Canadian Entomologist 102, 1970, pp.175-181; Hagen, K.S., van den Bosch, R. and Dahlsten, D.L., 'The Importance of Naturally Occurring Biological Control in the Western United States', in C.B. Huffaker (ed.), Biological Control, New York, Plenum Press, 1971; Campbell, R.W. and Torgersen, T.R., 'Some Effects of Predaceous Ants on Western Spruce Budworm Pupae in Northcentral Washington', Environmental Entomology 11, 1982, pp.111-114.

Langelier, L.A. and Garton, E.O., Manage-33. ment Guidelines for Increasing Populations of Birds that Feed on Western Spruce Budworm, USDA-Forest Service, Cooperative State Research Service Agriculture Handbook No. 653, 1986; Torgersen, T.R., 'The Role of Natural Enemies in Forest Insect Regulation', Blue Mountains Renewable Resources Newsletter 5, 1, 1987, pp.8-9.

34. Torgersen, ibid.

35. Frear, S.T., 'Ants and Birds are Major Predators of Western Spruce Budworm', Forestry Research West, September 1-4, 1982.

36. Swezey, S.L. and Dahlsten, D.L., 'Effects of Remedial Application of Lindane on Emergence of Natural Enemies of the Western Pine Beetle, Dendroctonus brevicomis (Coleoptera: Scolytidae)', Environmental Entomology 12, 1983, pp.210-214.

Accommodating Industrialism: A Third World View of the West German Ecological Movement

by

Saral Sarkar

When it first emerged, the ecological movement in West Germany argued forcefully that economic growth was incompatible with ecological survival and that the West's high material standards of living were only possible at the expense of the Third World and future generations. Western economies would thus have to shrink in order to ensure ecological and social justice. Over the past decade, however, the prevalent political and socio-economic philosophy within the movement has changed; it is now claimed that an ecological society is possible with the same material standard of living as in the present day Federal Republic. The demands of the ecological movement have been watered down and it is now seeking an alternative within, rather than an alternative to, industrialism.

The success of the ecological movement in the First World is of vital importance to the movement in the Third.¹ The industrialized societies have always provided the dominant global development model, and unless the paradigm of industrialism is rejected in the First World, there is little chance of the Third World turning back from the ecologically disastrous path of industrial development. If the ecological movement of the North is serious about the 'solidarity' it expresses with the South, it is vital that it succeeds, not only in halting the juggernaut of industrial growth, but in actually forcing it back.

However in the last decade the ecological or 'green-alternative' movement in West Germany has moved away from an antigrowth and anti-industrial perspective. This cannot be conclusively proven: the movement as a whole has no central committee resolutions and no definitive programme. But in the mass of books, papers, articles, statements, resolutions and programmes produced by the many persons and groups belonging to the movement, the change can clearly be seen.

Decreasing Production

In *Ways Out of the Affluence Trap*, published in 1977, Binswanger, Geissberger and Ginsburg advocated a short term policy of 'qualitative growth', intended to gradually stabilize the consumption of non-renewable resources. They were also aware that:

"... qualitative growth cannot be continued for an unlimited period, since even a constant rate of exploitation of non-renewable resources would in course of time exhaust the deposits ... It is necessary only because of the time we gain. It will make it possible for a society facing this challenge to develop and apply *new* forms of economic and social life that would guarantee security and the survival of future generations."²

The Ecologist, Vol. 20, No. 4, July/August 1990

So in the long term they sought a 'survival community' and a "return to the use of renewable resources only."³ As preparation for a 'soft transition' to the 'survival community', Binswanger *et al.* proposed 'small networks' consisting of 'enlarged family-communities'. These small networks should provide decentralized 'basic services', thus reducing the "dependence on the welfare services of the state" and alleviating the "condition of being at the mercy of an economy based on the division of labour."⁴

The views put forward at a 1978 conference of ecological activists were summarized by Hartmut Bossel in *Citizens' Initiatives Design the Future*. On the distribution of resources Bossel wrote:

"The right to fair distribution . . . will also be recognized internationally. In that way the development will come to an end, in which the rich nations become ever richer at the cost of the poor nations and the latter become ever poorer. Resources, goods and services will flow primarily to places where poverty and underdevelopment are the greatest."⁵

The activists assumed that the total volume of production would decrease and "goods that are generally used only occasionally by individuals will be used in common or on a borrowing basis."⁶ It was also hoped "to reduce energy requirements so much that they can be largely covered by renewable technologies."⁷ The ecology party *Grüne Aktion Zukunft* (Green Future Action), founded in 1978, expressed similar views in its manifesto. It advocated a 'balanced economy' and 'cyclical technologies'. It believed that the dependence of the West German economy on the world market should be reduced and agriculture should have the vital task of providing the people with "food largely *from the country's own land.*" It demanded that decentralization and *labour-intensive handicrafts* should be promoted. And that:

"Everything must become simpler: human beings, administration, technology, traffic. *Only then* shall we get *more freedom*, suffer less from compulsion to consume and less from terror of failing to perform, and

Saral Sarkar was a German lecturer in India until he moved to West Germany in 1982. He was active in the Green Party until 1989. His address is Blumenstraße 9, 5-Köln-1, West Germany.

along with that suffer less stress, neuroses and other forms of distress."8

The Subsistence Perspective

In the second half of the 1970s, the radical thinking apparent from the above quotations (in West Germany now termed the 'subsistence perspective') was dominant in the ecological movement. In the 1980s, however, the insistence on a truly radical alternative gave way to a belief that the environmental crisis could be solved through new technologies and an ecological restructuring of industrial society. In Ecology's Lost Innocence, Joseph Huber, an influential publicist and theoretician of the alternative movement, proclaimed "the alliance of industry and ecology", which he welcomed as 'practical' if not 'holy':9 "If ecology has a future, then it is in industrial form, and industry can only have a future if it becomes ecological."10 Huber claimed that "the surface of the earth is, of course, limited, but . . . man and ecology are in reality open systems that can be developed."11 The limits to tolerable pollution, Huber declared, could not be objectively ascertained, and he concluded:

"Obviously, for a long time to come neither environmental pollution nor the few million more deaths it will cause will constitute an objective limit for the industrial system ... The ecological destruction must be stopped, not because it will become unbearable from a scientific and technological point of view, but because it is unbearable from the human point of view."¹²

The purpose of this fine but absurd differentiation was, it appears, to resurrect faith in the industrial system and thus to

> Careful and creative investments to help build a better world

An opportunity to invest directly in alternative production and marketing for Third World communities. Please write or phone for our information sheet: **One Village**, Charlbury, Oxford OX7 3SQ Phone 0993 812866

At **one village** you can find cotton durries from India, bamboo lampshades from the Philippines, pure silk cushions from Bangladesh. Come and see what else you can find.



ON THE A34 IN WOODSTOCK- OXFORD & REGENT ARCADE CHELTENHAM ONLY FROM CO-OPS & COMMUNITY ENTERPRISES WORLDWIDE enhance the acceptance of a technological approach to the ecological crisis. In fact, Huber concluded that actually there was no ecological crisis, but only an economic one.¹³ The old industrial era based on oil, coal and steel was coming to an end and the new industries based on microelectronics, genetic and biological engineering, and solar and other ecological technologies would soon bring about a superindustrial breakthrough. Industry would require fewer raw materials and be less polluting, its energy and raw materials being supplied by inexhaustible sources of sunshine and biomass. The contradiction between ecology and industrialism would thus be overcome. In Huber's opinion, "there are alternatives in industrial society, but not to it".¹⁴

Huber realized that soon there would be a brutal struggle over the distribution of the resources of the earth and he stated:

"It is clear who would be the losers: the have-nots. They do not have the money to buy the costly things, be they the excluded in this country or the pariahs in the Third World... In no case would there be a new *belle épôque* of the purposive optimist Herman Kahn. Or there would be one as before — a *belle épôque* for the well-to-do, but not for the have-nots."¹⁵

Yet, astonishingly, he was optimistic about the prospects of the Third World. He predicted the coming of a new era, which "would be completed when the peoples of the Third World overcome their proletarian status and the whole world becomes thoroughly industrialized following the new psychological, biological and ecological principles."¹⁶ Huber did not however address the issues of how the Third World would be industrialized, of who would benefit and who would lose through industrialization, or of what would happen to the peasants whose land would inevitably be taken over to supply industry's resources.

An Alternative Within the System

Ecology's Lost Innocence has been extensively quoted from because it contains in a systematic form many of the ideas that have been circulating in the ecological movement since the early 1980s. In 1980, the Federation of Citizens' Initiatives for the Protection of Ecology (BBU), an umbrella organization of 300-400 ecological groups, published a Catalogue Of Demands For An Ecological Plan In the FRG. This clearly stated that "the goal of an ecological economy cannot be attained by means of isolated measures in the area of technological ecological protection, but only if the requirements of ecology become the foundation of the whole economic and social policy."17 But it went on to claim that "an ecologically orientated economy must by no means be based on zero growth. Only the socially destructive growth of pollutants must be reversed."18 The BBU demanded "investments of several hundred billion Marks" to reduce water, air and noise pollution but failed to mention that these huge amounts would have to be earned by means of destructive industrial activities, or that this is not a policy of preventing pollution at source, but a policy of first letting pollution be caused and then intercepting it. The BBU canvassed for its Catalogue of Demands with the argument that if adopted they would create several hundred thousand jobs.19

In 1982, the year in which *Ecology's Lost Innocence* was published, the official unemployment figure in West Germany passed two million and the ecology movement began to see solving unemployment as one of its main tasks. In 1982, a greenleftist congress was held entitled 'The Future of Work: ways out of mass unemployment and ecological destruction', and the fol... a programme that refuses to commit itself to a policy of zero economic growth even on balance, a programme that seeks to defend the present income and purchasing power of the great majority of the people of the richest nation in Europe, cannot be called an ecological programme."

lowing January the Green Party adopted the economic programme put forward in a document, *Meaningful Work, Living in Solidarity: programme against unemployment and the dismantlement of the welfare state*, commonly known as the 'Sindelfingen Programme'. The solutions proposed both at the Future of Work congress and in the Sindelfingen Programme were firmly based within the framework of the existing industrial system. The ecological crisis was seen as secondary to the unemployment problem which would be solved through a massive programme of investment in environmental regeneration to create new jobs.

The Entry into Political Power

In 1985, Joe Leinen, who had played a leading role in the antinuclear movement, became Ecology Minister in the Social Democratic Government of the state of Saarland and Joschka Fischer, a leading member of the Green Party, was appointed Ecology Minister in the Social Democrat-Green coalition Government of Hessen. However the entry of Green activists into positions of political power made little difference to their states' policies, and both Leinen and Fischer ended up having to find new dumping grounds in West Germany and abroad for the rubbish and hazardous wastes of Hessen and the Saarland. Disillusioned with the increasing readiness of the Green Party to enter into coalitions and to endorse the mainstream political process, Rudolf Bahro, one of the country's leading ecological thinkers, left the Party in 1985 along with many of his political colleagues. In his resignation statement, Bahro claimed that the Green Party no longer had a basic ecological position.

As if to prove Bahro right, the following year the Green Party adopted a detailed short-term programme: *Restructuring Industrial Society: a programme for overcoming unemployment, poverty and ecological destruction.* This so-called '*Umbauprogramm*' made it clear that the Green Party was seeking an alternative within industrial society. However, some aspects of the Party's economic philosophy are left unclear. In its 1983 'Sindelfingen Programme' the party could still state unambiguously:

"The Green Party is convinced that in the Federal Republic of Germany as also in the other industrial nations there is not too little industrial production, but too much: too much energy- and raw materials-consuming mass production, too much production of poisonous pollutants, too much plastic and too much concrete".²⁰

But the Umbauprogramm states:

"... ecological economic policy makes itself independent of the goal of overall economic growth — without committing itself dogmatically to a policy of zero growth, not to speak of a policy of general economic shrinkage and opting out of industrial society . . . Whereas some branches of the economy must shrink, growth of other branches is desirable."²¹

The Umbauprogramm also equivocates over income and purchasing power, claiming on the one hand that "a restructuring will not be possible without changes in consumption and lifestyle", and on the other that "ecological restructuring will be accepted only if it is guaranteed that it is possible without any loss in job-security and income."²² The programme also states: "The effects of ecological restructuring on the purchasing power of the low and middle income groups should at least be compensated for by raising their available incomes."²³

Seen in isolation, many of the proposals in the Umbauprogramm appear to make ecological sense. But a programme that refuses to commit itself to a policy of zero economic growth even on balance, a programme that seeks to defend the present income and purchasing power of the great majority of the people of the richest nation in Europe, cannot be called an ecological programme. The Greens want the impossible: an ecological economy at zero cost. The talk of an ecological economy that does not destroy nature and does not exploit the peoples of the Third World and future generations is simply bluff. The Greens propose to finance the restructuring of industrial society in West Germany by redistributing the present GNP, ignoring the fact that this massive sum is, and can in future only be, available if the destruction of nature and the exploitation of the Third World and future generations continues.

The Consumerist Citizen

The *Realo* or 'realist' faction, which probably represents around 40 per cent of Green Party members, has led the way in realigning the movement. Two *Realo* theoreticians have written that the Green Party should represent the interests of the 'new middle classes' to which about 40 per cent of voters belong.²⁴ In February 1988, with several theoraticians advocating an 'ecological market economy', one of the chief spokespersons of the *Realos* said that the goal of the Green Party should be 'ecological capitalism'.²⁵ A few months later the *Realos* presented a 'draft manifesto of Green Realpolitik' which declared that Green politics should be aimed at:

"... the urban, liberal, consumerist citizen, who is primarily orientated towards his individual plans for life, who, however, at the same time not only protests against atomic energy and ecological madness, but also feels solidarity with the minorities who are poor and excluded from society".²⁶

Whereas in the second half of the 1970s the movement emphasized satisfying basic needs, since the middle of the 1980s the

emphasis has shifted to overcoming the ecological crisis without having to reduce standards of living. Thus, Joschka Fischer, when Ecology Minister of Hessen, put an advertisement in a national daily in which he stated that opting out of atomic energy was possible "without having to forgo the comforts one is used to."27 In the debates that took place after the Chernobyl disaster, speakers from the ecology movement sought to show that the total need for electricity in West Germany at that time could be covered even if all the atomic power plants were shut down namely by using thermal power to full capacity. It was conveniently ignored that if this was done on a global scale it would increase air pollution and CO, emissions and inflate oil prices, thus adversely affecting Third World countries. Energy savings were discussed, but these were to be achieved, not by means of reducing consumption, but by a state subsidized programme of replacing old equipment with new, more energy-efficient technologies. The final step in this process of accommodating industrialism was reached in a book by Joschka Fischer published in 1989 in which he argues that the West German economy must boom so that it can afford the gigantic sums of money necessary to pay for protecting the environment.28

The Need for Popular Policies

Not everyone in the movement has abandoned the subsistence perspective, but it is clear that, on the whole, the movement has changed its goals. The rapidity of the change is astonishing, but not the change itself. The subsistence perspective calls upon the citizens of industrial societies to be prepared to sacrifice much of their present-day affluence and privileges. That is difficult and unpopular. But this unpopularity was no problem for the ecological movement as long as it was purely extra-parliamentary. Those in the movement who sincerely wanted to think through the crisis could not avoid coming to the subsistence perspective, and had no reason to hesitate in expressing their convictions. But this parliamentary innocence came to an end around 1980 when the Green Party was formed. With the Party trying to win votes, the pressure to jettison unpopular policies increased, and once more popular policies were endorsed by the Party the subsistence perspective lost ground in the wider movement.

Another obvious reason for the change in perspective was the dominant role played by the large number of leftists in the movement. Their faith in technological progress, their belief that material affluence and high productivity are preconditions for a socialist/communist society and their faith in the working class as the basis of revolution or at least of socio-economic change, were shaken by the realization of ecological limits. But the immediate possibility of an ecological restructuring of industrial society and the somewhat distant prospect of an eco-friendly superindustrial breakthrough appeared to solve their dilemma.

Legitimate Needs and Ecological Limits

But to understand fully the reasons for the change in perspective it is necessary to go a little deeper. The ecological movement has challenged the thesis that human needs are unlimited. But most of the people in the movement are guided by an arbitrary and purely *subjective* definition of legitimate needs. An *objective* definition can only be based on what and how much we can take from the earth without jeopardizing the prospects of future generations. The definition of legitimate needs will therefore

The Earth needs all the friends it can get. And it needs them now.



For thousands upon thousands of years our planet has sustained a rich diversity of life. Now, one single species humankind - is putting the Earth at risk.

People the world over are suffering the effects of pollution, deforestation and radiation. Species are disappearing at a terrifying rate. The warming of the atmosphere threatens us all with devastating changes in climate and food production.

But it needn't be like this - we know enough to reverse the damage, and to manage the Earth's wealth more fairly and sustainably.

But the political will to bring about such a transformation is still lacking.

And that's exactly where Friends of the Earth comes in.

IT'S TIME YOU JOINED US

I'd like to join Friends of the magazine, Earth Matters. I (12) individual (256)	e Earth. Please send me your quarterly enclose :
I'd like to donate $f_{50} \square f$	$35 \Box \pounds 15 \Box \text{ Other } \pounds$
I enclose a cheque / PO for tota	l of \mathcal{L}
payable to Friends of the Eart	h or debit my Access/Visa No :
Amotoritimore street	Hatawa shoe of the second point the
Card Expiry date :	
Signature	Date
Send to: Membership Departme House, 668 Hitchin Road, Stop FULL NAME ADDRESS	ent, Friends of the Earth, FREEPOST, Barratt sley, Luton LU7 7BR.
POSTC	ODE Friends of the Earth
Phone 081 200	0200 to join/donate anytime
cionatoro istante	F81 LACE

"Post-materialistic values were simply added to the list of needs once material prosperity had been achieved. The prosperity itself was not questioned."

vary according to the resources and ecological circumstances of a given region. This should not prove a problem, for "the needs that must by all means be satisfied so that a person can survive are few in number and low in level. They are limited to food and loving attention from other people."²⁴ The scope for satisfying these needs is therefore wide. Yet most of those in the movement apply other yardsticks. When, for example, the low wages earned in alternative economic enterprises are discussed, it is not considered that these appear to be low only because they are compared with the wage rates of firms like Siemens, Krupp or Bayer firms which can only pay high wages because of their environmentally-destructive, exploitative and therefore 'efficient' mode of production.

In the second half of the 1970s, many committed activists believed that a change in values was taking place in the movement, and through it in Western society as a whole. Binswanger *et al.* hoped that "a far-reaching change in our political consciousness and values . . . (would) . . . change our social relationships and affect our economic system."³⁰ Bossel also saw a change in values, which he expected would "exert strong social pressure" in the direction he advocated.³¹ The American researcher Ronald Inglehart even spoke of a 'silent revolution'.³² Karl-Werner Brand summarized the thesis of Inglehart as follows:

"Basing himself on Maslow's theory of hierarchy of needs, Inglehart believes that when material...interests have been taken care of, 'non-material' values like selfrealization, participation, aesthetic needs etc. come to the fore. For the population group favoured with a middle-class origin and education, and whose childhood and youth was moulded by the economic prosper*ity* of the post-war years, post-materialistic values are therefore of primary importance."³³

This finding rings true but it implies neither a *change* in values nor a *revolution*. Post-materialistic values were simply *added* to the list of needs once material prosperity had been achieved. The prosperity itself was not questioned. In retrospect it appears that the ecological consciousness of the people as well as of the activists in the movement was overestimated. It was visibly widespread, but lacking in depth.

Democracy, Freedom and Emancipation

In the 1970s some writers predicted that the ecological crisis would cause conflicts and civil disorder, and that a dictatorship would be necessary to maintain order, although, as Johano Strasser argued, the prospects for democracy within an economy committed to continued growth were also dim.³⁴ Maintaining the levels of affluence reached in the advanced industrial economies, if not further economic growth, was thus taken as necessary in order to protect freedom and democracy.³⁵ In 1984, a leftist Green congress, 'Ecology Between Self-Limitation and Emancipation', discussed the question:

"Is nature so constituted that it allows us a process of emancipation and development, or rather so that it allows, on pain of destruction, only adaptation to its iron laws, so that ecological politics could only be one of imposing limitations and frugality and dedevelopment of society?"³⁶

If, despite the ecological crisis and the finitude of our rawmaterial resources, humanity continues to live or strives to attain the 'American way of life', then the pessimists will be proved right. If emancipation needs such a high level of affluence then it can only remain the privilege of a few. The rest of humanity must then be excluded from it by force. But, as Sahlins writes, " ... there are two possible courses to affluence. Wants may be easily satisfied either by producing much or by desiring little."³² Adopting that second course is surely the way out of the dillema.

We should be seeking freedom in work, not freedom from work; and self-realization and emancipation within and not

Will the social and environmental impacts of The Ecologist help overcome the social and environmental impacts of large dams?

Absolutely.

International Rivers Network publishers of World Rivers Review 301 Broadway, San Francisco CA 94133 USA Tel (415) 986 4694 Fax (415) 398 2732 An affiliate of Friends of the Earth International



outside everyday life. Happiness should no longer be a matter of individual material affluence, but of social conditions and the relationships of human beings to each other. That cannot be a dedevelopment of society. On the contrary, it would be a true development of society.

All emphases are added. All translations from German originals are by the author.

Notes and References

1. The term 'ecological movement' is used here to refer to the broad range of ecological, anti-nuclear, peace, feminist, leftist and alternative lifestyle groups, parties and individuals known in West Germany as the 'green-alternative movement'.

2. Binswanger, H.C., Geissberger, W. and Ginsburg, T., Wege aus der Wohlstandsfalle: Der NAWU-Report, Fischer, Frankfurt, 1979, p.123.

3. Ibid., p.119.

4. Ibid., p.231

5. Bossel, H., Bürgerinitiativen Entwerfen die Zukunft, Fischer, Frankfurt, 1978, p.158.

6. Ibid., p.98.

7. Ibid., p.86.

8. 'Das Grüne Manifest — Programm der Partei 'Grüne Aktion Zukunft' (GAZ), *in* Rudolf Brun (ed.), *Der Grüne Protest*, Fischer, Frankfurt, 1978, p.117ff.

9. Huber, Joseph, *Die Verlorene Unschuld der Ökologie*, Fischer, Frankfurt, 1982, p.13.

10. Ibid., pp.12, 13.

- 11. Ibid., p.143.
- 12. Ibid., p.148.
- 13. Ibid., p.189.
- 14. Ibid., p.10.
- 15. Ibid., pp.144, 163.
- 16. Ibid., p.163.

17. Bundesverband Bürgerinitiativen Umweltschutz, Umweltwissenschaftliches Institut e.V., Forderungskatalog für ein Öko-Konzept in der BRD, Karlsruhe, 1980, p.3.

18. Ibid., p.5.

- 19. Ibid.
- 20. Die Grünen, Sinnvoll arbeiten solidarisch leben, Bonn, 1983, p.3.
- 21. Die Grünen, Umbau der Industriegesellschaft, Bonn, 1986, p.9.
- 22. Ibid.
- 23. Ibid., p.105.

24. Stryck, T. and Wiesenthal, H., 'Zwischen Identität und Modernität: Die Grünen in der Klemme', in *Kommune* 9, 1987, p.39 ff.

25. Hubert Kleinert said this in an interview he gave to the weekly magazine *Stern*, quoted in, Ebermann, T. and Trampert, R., 'Yuppie ayeah!', in *Konkret* 7, 1988.

26. Quoted in ibid.

27. Frankfurter Rundschau, 24 May, 1986.

28. Fischer, J., Der Umbau der Industriegesellschaft, Eichborn, Frankfurt, 1989, p.110.

29. Ullrich, O., Weltniveau: In der Sackgasse des Industriesystems, Rotbuch, W. Berlin, 1979, p.102.

30. Binswanger et al., op. cit., supra 1, p.214.

31. Bossel, op. cit., supra 4, p.19.

32. Inglehart, R., The Silent Revolution: Changing Values and Political Styles among Western Publics, Princeton, 1977.

33. Brand, K.-W., Neue Soziale Bewegungen, Westdeutscher Verlag, Opladen, 1982, pp.65-66.

Cf. Strasser, J., Die Zukunft der Demokratie, Rowohlt, Reinbek, 1977,
 p.58 ff; Harich, W., Kommunismus ohne Wachstum?, Rowohlt, Reinbeck, 1975.
 Strasser, ibid.

 Bildungswerk f
ür Demokratie und Umweltschutz e.V., announcement for the congress, 'Ökologie zwischen Selbstbeschhr
änkung und Emanzipation', 1984.

37. Sahlins, M., Stone Age Economics, Tavistock, London, 1974, pp.1-2.

International Science and Technology Course

Wildlife economics and management; policy and practice

2 - 21 April 1991, Canterbury and Jersey

The future prosperity of many countries depends on their wildlife and countryside but economic development and social change can have a negative impact on the flora, fauna and their environment. This course responds to the conflict by examining the most effective modern methods by which wildlife can be successfully managed as a renewable resource, to yield a sustainable economic return. There will be lectures, seminars, demonstration sessions, panel discussions and workshops on specific themes. Opportunity will also exist for course members to present short accounts of promising relevant schemes and developments in their own countries. Topics to be covered will include: the social and economic value of wildlife to a country; methods of assessing the natural account; defining objectives; developing a policy and future strategy; implementation; work-force management, management plans, finance, politics, education, training and monitoring; sharing the workload by getting the best from staff; feedback and policy flexibility; viable populations; national or international dependence?; cash cropping, tourism and hunting; the role and aims of captive breeding; how to avoid captive animals becoming a drain on finances and resources; re-stocking, stocking, re-introduction, introduction, farming, ranching and multi-species systems; wildlife and environmental law; working with others: international and co-operative programmes and local and national initiatives.

The Director of Studies will be **Dr Ian Swingland**, Director of the Durrell Institute of Conservation and Ecology, University of Kent, and **Dr David Waugh**, Training Officer of the Jersey Wildlife Preservation Trust (JWPT).

The course is designed for experienced policy-makers and senior administrative staff concerned with the commercial and scientific management of wildlife, including executive representatives of the appropriate wildlife and planning sectors of ministries, departments and agencies covering agriculture, the environment, forestry and water resources, national parks, education, urban municipalities and disease control. Personnel in economic planning, treasury and finance ministries, in universities and research institutes, and non-governmental organizations will also find this course valuable.

There are vacancies for 30 participants.

Course fee: £1,060; accommodation charge: £700; total fee: £1,760.

All sessions will take place in the University of Kent at Canterbury during the first two weeks and at the JWPT Training Centre in Jersey in the last week. Participants will be accommodated in the new University Conference Centre in Eliot College at the University, and a centrally situated hotel in Jersey. Accommodation will be in single rooms with bathroom or shower.



Further information and application forms are available from British Council Representatives overseas or from Courses Department, The British Council, 65 Davies Street, London WIY 2AA.



The Essence of Ecological Thinking: 20 Gems From 20 Years

Since The Ecologist first appeared, the spate of green books has turned into a flood. Unfortunately, increased quantity seems to have been bought at the cost of a marked decline in quality. Many are repetitive variations of what is often a superficial theme. Few manage to give a real insight into the whole picture, no matter how well they might illuminate individual issues. Few capture the breadth and depth of the crisis facing humanity or the forces driving us down the road to destruction. Few go beyond vague rhetoric about human needs, community spirit, environment-friendliness or harmony with nature. Indeed, many see the problem as little more than a matter of fine-tuning an otherwise healthy engine, whose only defects are a bit of dirt in the petrol and a lack of information on the part of the driver.

Nevertheless, the past 20 years have produced some real gems. What follows is a thoroughly biased selection of the top 20. Chosen from works in English, it is based upon books whose contents really do advance our understanding of what is wrong and how it can be put right. Many will be well known but some might not be so familiar. Yet, together, they will take their readers beyond the more shallow shades of environmentalism and deep into the essence of ecological thinking. At a time when many people are using radical buzz words such as sustainability to camouflage otherwise unchanged values and goals, these books spell out the real green alternative

EARTH, by Anne and Paul Ehrlich, Thames Methuen, 1987.

This is easily the best overview of the whole tangled web of problems facing

20 OF THE BEST 1970-1990

humanity. It captures the dynamics of exploitation and destruction, making the links between social and environmental issues. It is a model of how to present a complex message in an accessible way, without compromising its meaning.

ECOLOGY AND THE POLITICS OF SCARCITY, by William Ophuls, Freeman, 1977.

This contains the best single presentation of the green critique of expansionism, based on "all-embracing concept that encompasses all the various limits to growth or costs attached to continued growth". Ophuls explanation of the 'tragedy of the commons' is excellent and should be read by all those who simply blame everything upon 'them', be they crooked capitalists or other demons.

THE ENTROPY LAW AND THE ECO-NOMIC PROCESS, by Nicholas Georgescu-Roegen, Harvard University Press, 1971.

Many books have claimed to be revolutionary: this one really is. It demolishes the edifice upon which rest schools of economics ranging from monetarism to Marxism. It develops the critique with an unrelenting vigour which makes me think that perhaps it should be passed in a brown paper envelope from one consenting adult to another.

THE POPULATION EXPLOSION, by Anne and Paul Ehrlich, Hutchinson 1990.

A thoroughly documented and cogently argued demonstration that human numbers do count. They show that the population time-bomb is ticking faster and why it is the most serious threat to the future of humans and non-humans alike. The Ehrlichs make it clear that overpopulation is far from being the only factor in the equation of social and environmental ruin but, whatever the cause, it is a lost one without a stabilization and then reduction by socially acceptable means of the weight of human numbers pressing on a wilting planet.

ABANDON AFFLUENCE, by F.E. Trainer, Zed, 1985.

Ted Trainer has pulled together the evidence that shows why the bubble of economic expansionism must burst, as resource and pollution barriers build up. Western-style consumption, he shows, cannot be generalized to the rest of the world without bankrupting the biosphere. Trainer spares no illusions. He demonstrates, for example, that a switch from conventional energy sources to those favoured by alternative energy buffs could not underwrite 'business as usual'. QUESTIONING TECHNOLOGY, edited by John Zerman and Alice Carnes, Freedom Press, 1988.

This superbly edited anthology, as the introduction says, "presents one side — the other side", bringing together articles by outstanding critics of contemporary technology including Jacques Ellul, Lewis Mumford and Eugene Schwartz. The authors destroy the myth of neutral technology and show how technologies both embody social values and priorities as well as shape society around their own characteristics.

HUMAN SCALE, by Kirkpatrick Sale, Secker and Warburg, 1980.

At a time of German reunification and the formation of the 'Single European Market', the message of 'think shrink' could not be more relevant. Sale has always acknowledged his debt to Fritz Schumacher but I think that *Human Scale* is far better than *Small is Beautiful*, a woolly and much overrated book which is long overdue for a rigorous green critique.

THE CASSANDRA CONFERENCE, edited by Paul Ehrlich and John Holdren, Texas A&M University Press, 1987.

No, I have not got shares in Ehrlich enterprises. I have picked this book partly for the excellence of its contents and partly as a means of recognizing our debt to people like George Woodwell and Earl Cook who contributed characteristically useful essays. All the contributors are prepared to ask that great green question all other shades of thinking avoid, namely 'how much is enough'.

DECLARATIONS OF A HERETIC, by Jeremy Rifkin, RKP, 1985.

The symptoms of social malaise and environmental destruction have deep roots in human culture and character. Apart from his outstanding work as a campaigner, Rifkin's writings are very effective at diagnosing what is wrong in the ways we think about and value things. In particular, he dissects two of the great technological dreams of our time — nuclear fusion and recombinant genetic engineering — and uncovers how they attempt to cure the patient with more of the disease.

ARROGANCE OF HUMANISM, by David Ehrenfeld, Oxford, 1981.

Eherenfeld is particularly good at capturing the logic of the technocratic mind and he shows how it has invaded both the natural and the social sciences. What really marks out this book for any top 20 is the discussion of the fallacies of utilitarianism as the basis for nature conservation programmes. Other species have a right to exist . . . because they exist.

WHERE THE WASTELAND ENDS/ CULT OF INFORMATION, by Theodore Roszak, Doubleday, 1973, and Paladin, 1988.

I have cheated here by following the practices of Dr. Frankenstein. My new creation comprises the first part of the oldie *Where the Wasteland Ends* followed by the highlights of Roszak's latest work. The *Wasteland* is a great book which analyses the reductionist and mechanistic 'disenchantment' of the world about us. Roszak shows how industrial growth society is as alienating as it is destructive. His critique of the computer provides the perfect case study to illustrate his general thesis.

NAKED EMPERORS, by Garrett Hardin, Kaufmann, 1982.

If the green movement suffers from too much woolly thinking, then Garrett Hardin provides the shears. Hardin has been reviled even more than Paul Ehrlich but, having read most of his work, I can only report as I have found - a man concerned about the human condition but wanting to avoid pseudo-solutions based on softheaded thinking. His argument about 'lifeboat ethics' does deserve the criticism it attracted, as it is based on a very narrow analysis and he does not ask the question of his answer which he asks of everyone else, namely 'what next?' (that is, what results would it produce in practice). Nevertheless, Hardin's work is an indispensable contribution to green thinking.

DEEP ECOLOGY, by Bill Devall and George Sessions, Peregrine Books, 1985.

This is more a collection of essays rather than a coherent book. Yet it provides an excellent benchmark of the green alternative to the dominant worldview. In particular, it traces a lineage of 'deep ecology' thinking from which we can fashion values and understandings that are not simply the more familiar philosophies from the last 300 years with a bit of environmental concern tacked on. The book's attack on 'resource managerialism' is very valuable at a time when the perspectives of the Brundtland and Pearce reports are providing a rallying point for a more sophisticated domination and manipulation of non-human nature.

SAND COUNTY ALMANAC, by Aldo Leopold, OUP, 1987.

I cheat again here since this edition is of course a commemorative one of a work first published in 1949. I include it because I think that Leopold got to the heart of what it is to 'go green'. I also believe that his famous 'land ethic' is central to the development of green thought from within our own culture and history. BLUEPRINT FOR SURVIVAL, by Edward Goldsmith, Robert Allen, Michael Allaby, John Davoll and Sam Lawrence, Penguin, 1972.

Now that we have got our heads and hearts together, it is time to turn to books about the nuts and bolts of the green reformation. The Blueprint still contains the best general programme for action - a sad reflection on the subsequent failure of greens to put flesh on this skeleton. Indeed, documents like the programme of Die Grünen in Germany are veritable dogs' dinners, hashes of demands from just about every disaffected group in society. There is also a lot of talk about 'living' economics, for example, but it does not seem to have come up with anything significantly better than the old Blueprint. Perhaps future conferences and seminars of the Green Party and similar organizations might do better if they took it as a starting point rather than keeping on reinventing inferior wheels.

STEADY-STATE ECONOMICS, by Herman Daly, Freeman, 1977.

The concept of the steady-state (or dynamic equilibrium) is much misunderstood yet it represents the essence of the green alternative to expansionism. Daly explains what it is, why we need it and puts forward challenging ideas about how to institutionalize it (which again, have not been bettered in more recent books). His focus on the throughput of energy and raw materials in the economy helps dispel a lot of the fog that vaguer terms like 'growth' and 'development' create about the issues at stake. In the light of so many left wing attacks on Greens with regard to social equality, it is worth noting that Daly's argument is based on redistributive mechanisms. Daly anticipated the pollution charge policies that economists such as David Pearce are advocating, and explained why they were an inadequate tool applied to the wrong end of the production and consumption process.

ENERGY UNBOUND, by Amory and L. Hunter Lovins, Sierra, 1986.

No-one has shed more light on the social and environmental impacts of energy supply and use than the Lovinses. The 'soft energy path' concept is a vital tool in developing alternatives. For the sake of variety, I have chosen a work of fiction from their voluminous output. It is no great work of literature but the exchanges between a newly appointed minister and her radical adviser are very illuminating. The Lovins have been particularly good at showing that alternative does not always mean appropriate.

PERMACULTURE: A DESIGNER'S MANUAL, by Bill Mollison, Tagari, 1988.

What is really exciting about Mollison is

the way he has developed design philosophies for land uses that supply human needs while retaining the self-sustaining, self-repairing and self-regulating characteristics of unmodified ecological systems. The book is wide-ranging and packed full of stimulating drawings and photos covering architecture and community planning as well as water, food and timber production. This book combines vision with a strong practical orientation.

SEEING GREEN, by Jonathon Porritt, Blackwell, 1984.

Many people in Britain, myself included, will have been helped to see green by the writing, public speaking engagements and media appearances of Jonathon Porritt. He puts the green case with an eloquence and incisiveness that few can match. This book reflects those qualities. It shows that green politics is not anarchism, it is not socialism, it is not conservatism or any other 'ism'. Of course it draws from many traditions, yet its core is a distinctive politics of ecology.

LIVING IN THE ENVIRONMENT, by G. Tyler Miller, Wadsworth, 1985.

Last but certainly not least, this is easily the best textbook of the last 20 years. It is an outstanding primer, which also covers many topical issues. It has excellent diagrams and Miller's style of writing is particularly clear. There are useful study questions and a lengthy bibliography. Many organizations, not just the publishers, are touting their educational wares to teachers and lecturers. A set of this book is worth the whole lot put together.

There are a number of striking things about the above list. Many predate the recent boom in green publishing and few come from the lists of the sprouting 'green' publishers, be they independent ventures or the autonomous imprints some publishers have tacked onto their empires. The dominance of American authors makes me wonder whether European intellectual traditions are stifling creative and relevant thinking. The list is also male-dominated. A different time span would of course have included the great Rachel Carson. However, the bias partly reflects the concentration of some female writers on more specific issues (for example Susan George on the debt crisis; feminist critiques of mainstream medicine) which this short selection had to ignore. My files also contain some treasured articles by writers like Dolores LaChappelle and Carolyn Merchant which either came from magazines or were buried in collections.

Sandy Irvine

Sandy Irvine is a lecturer and co-author of A Green Manifesto (Optima, 1989). He is an Associate Editor of The Ecologist.

Let's Do Development

DOING DEVELOPMENT: Government, NGOs and the Rural Poor in Asia, edited by Richard Holloway, Earthscan/Canadian University Service Overseas (CUSO), London, 1989, £6.95 (pb), 233pp. RENEWING THE EARTH: Development for a Sustainable Future, by Seamus Cleary, Catholic Fund for Overseas Development (CAFOD), London, 1989, £3.00 (pb), 147pp.

In the last few decades, thousands of small local organizations working with the rural downtrodden have sprung up in the Third World. Often operating without official sanction and uneasily dependent on First World funding sources, they are typically staffed by young intellectuals who have rejected more prestigious and secure careers in business or national bureaucracies. Although they pursue a bewildering variety of interests, ranging from debt, women's rights and community health to appropriate technology and ecological agriculture, such groups tend to have at least one thing in common: they take a critical view of mainstream development, as a process which undermines the wellbeing and integrity of the people with whom they work.

Few such organizations can spare much time to explain their intensely local and dauntingly complex battles to outsiders. International bankers, journalists and First World environmentalists alike remain ignorant of their work and thought. Yet the sorts of struggle these groups take up are arguably of more immediate concern to a



greater proportion of humanity than any others. It is encouraging, then, to see CUSO and CAFOD, two progressive Western agencies who support such organizations, make the effort to bring some of their experiences before a First World audience.

CUSO's Doing Development tries as much as possible to use the words of local organizers themselves in giving the flavour of rural exploitation and drawing theoretical conclusions. Joe Madiath, for example, describes how one Indian tribal lost more than 1000 rupees while slogging over 200 kilometres during a struggle with bankers, bureaucrats and development workers to secure a loan to buy two bullocks and a cart. Rafael S. Espiritu tells how villagers have tackled problems of land tenure and coral reef destruction in the Philippines. M. Zainuddin recounts his attempt with Javanese villagers to transform the traditional "relief and charitable approach to the rural poor" into a people's movement which stresses local leadership and independence through the formation of cooperatives. Other Third World activists take on issues of community- based technology and self-reliance among the handicapped.

Particularly notable are sensitive and wide-ranging contributions by Janet Durno on women's actions and integrated farming in India and Thailand. Her stories show, rather than simply state, how Asian villagers are attempting, creatively and in accord with their own imperatives and history, to build new kinds of rights and self-sufficiency in irrevocably changed environmental and social circumstances. Not the least merit of her writing is that it gives a sense of why social movements proceed so differently in different places - in particular, why grassroots politics along what might be called the Latin America-India-Philippines axis looks more confrontational than that in countries such as Thailand. Rounding out the volume are more abstract meditations on participation by Sri Lankan activist Ponna Wignaraja, and on the relationship between voluntary organizations and the state in India and Indonesia, by Rajesh Tandon and Holloway.

Even *Doing Development*'s horrendous title, which suggests at first sight an unsavoury collusion between World Bank strategists and Los Angeles ('let's do lunch') advertising moguls, reflects an important truth about local organizations working against the mainstream in Asia: namely, that for reasons of safety and public acceptance, many of them have to pay at least lip service to the goal of 'development' whether or not they agree with the technocratic ideals of promoting economic growth and Western-style industrialization. This tendency to pull punches is also evident in editor Richard Holloway's



tactful claim that government development planners, despite their manifest failures, mean well and have achieved many good things, and in his politely optimistic suggestion that they might someday get together with grassroots organizations to serve the poor.

Seamus Cleary's Renewing the Earth offers more of a bird's-eye critique of mainstream development than the CUSO volume, and concentrates more on international agencies and environmental concerns. The book finds that, despite various policy shifts over the past 40 years, development agencies' continuing pursuit of growth, export production, and the idea of 'trickle-down' has exacerbated poverty and cultural degradation among the poorest, while placing unbearable burdens on fragile ecosystems. Citing indicators whose significance polemicists such as Ivan Illich would question (life expectancy, availability of medical services and schools), Cleary does accept the development establishment's line that the "majority of people have seen an improvement, albeit small, in the quality of their lives". But he contends that the huge costs of following conventional development theory now makes it necessary to restructure the economic system and redefine development to bring environmental and local concerns to the fore.

Cleary backs up this contention with numerous telling examples — of Filipinos struggling against industrial pollution, Indians fighting irrigation projects, Sahelians succumbing to devastation resulting from misguided water schemes, Malaysians battling logging, Brazilians clashing with oil prospectors, and so on. Despite its theoretical emphasis, the book, like its CUSO counterpart, is valuable more for its reports from the field than for its analytical excursions. Although Cleary is lucid on the history of development theory and practice, too often, in the critical sections of the book, he simply mechanically strings together conclusions lifted from other writers, among them Khor Kok Peng, Richard Higgott, Vandana Shiva, Michael Redclift, Jonathon Porritt and John Elkington.

The book's occasional attempts to digest or criticize these conclusions, moreover, do not really carry the debate forward. Cleary's criticism of Redclift and Porritt for their supposed hostility to economic growth is one example. "Some level of economic growth" would be necessary even after a hypothetical "redistribution of the world's resources", Cleary insists, if only to maintain 'standards of living' among a growing population. However he does not offer the sustained analysis that would be necessary to support this statement, which he himself undermines one paragraph later by noting that consumerism is a more immediate threat to the environment, and thus to people's livelihoods, than population growth. Cleary's proposed redefinition of development, moreover, involving better cost accounting and greater attention to local areas and scale, remains too sketchy to be compelling.

The CUSO volume has its conceptual shortcomings as well, but these are of a more instructive variety. The most interesting centre on the notion of 'participatory action research' (PAR), which is a recurring theme of the book. Deriving largely from the work of the Brazilian educator Paolo Freire and his intellectual forebears, PAR is a rich and subtle methodology through which exploited groups, catalyzed by outside intellectuals, are supposed to bring themselves out of a 'culture of silence' in which they 'internalize the image of the oppressor'. Ideally, it is intended to promote people's own critical investigations and awareness of history, tradition and the economic reality which oppresses them and to counter the 'banking' concept of education according to which unschooled people are passive vessels awaiting to be filled by élite instructors, 'Conscientization' is the name often used to describe this process.

PAR and 'conscientization' have become staples of the activist and development vocabulary. Yet many who use the words do not seem to have spent much time with Freire's writings. Whether this is also true of the PAR advocates who wrote Doing Development is not clear, but the book's failure to mention his works even once is suspicious. This in itself may not be important. Ideas are where you find them, whether or not they are associated with names and books. What is worrying is the fact that by not becoming thoroughly acquainted with what lies behind PAR, organizations promoting social change are running the risk of letting the notion be

cheapened, and, ultimately, stolen from them. Already some European and Asian groups are talking about how people can be 'conscientized' by listening to lectures, reading newsletters, or looking at slide shows — a laughable misuse of the original concept. Before long, undoubtedly, governments too will be 'conscientizing' us through schools and the media.

A more serious worry about PAR is that it may be hardening into a new orthodoxy among many organizations just at a time when the centrality of 'conscientizing' in social change is increasingly being called into question. Recent events in the Philippines, Burma, Romania and elsewhere have reinforced suspicions that awareness among the exploited may be less in need of raising than sometimes appears to practitioners of PAR. The growing number of battles now being articulately waged by the underprivileged in the Third World to defend the environmental sources of their livelihood also raise doubts about the significance of Freireian 'pedagogy' in popular movements. Finally, scholars of 'everyday resistance' such as James C. Scott have painstakingly compiled evidence from Southeast Asia and elsewhere which undermines the Gramscian idea that the poor are ideologically dominated by their oppressors.

All this suggests that Freire's 'culture of silence' has been muttering to itself all along. As Noam Chomsky has observed, it is not the downtrodden but rather college professors and technocrats who are most susceptible to being taken in by élite notions of development or anything else. This is not to deny, of course, that there are processes of opposition and reflection that can get off the ground only when ordinary people start shouting. But that is less a matter of 'conscientizing' than of looking out for strategic opportunities to join together to force change.

One weakness of Doing Development is that the authors do not seem to be aware of the need, in the light of such considerations, to try to assess what is living and what is dead in PAR. Ponna Wignaraja, for example, talks about PAR as a 'new' methodology which not only dissolves the divide between knowledge and action and experts and ordinary people but also promotes "critical awareness of the socioeconomic environment" and 'retrieves' or 'recovers' people's knowledge from its eclipse by élite ideology. If Scott is right, this knowledge has never ceased to evolve and this 'awareness' is already there. What may be more necessary now is to seek new openings and alliances to apply it.

Larry Lohmann

Larry Lohmann is an Associate Editor of The Ecologist. He worked for six years with Thai NGOs.

References

Freire, P., Pedagogy of the Oppressed, Penguin, Middlesex, 1972.

Illich, I., Gender, Pantheon, New York, 1982. Redclift, M. and Porritt, J., Why Bankrupt the Earth? An Exploration into International Economics and the Environment, The Other Economic Summit, 1986. Scott, J.C., Weapons of the Weak, Yale, London, 1985.

Social Ecology and the Lablab Bean

AGROFORESTRY IN DRYLAND AF-RICA, by Dianne Rocheleau, Fred Weber and Alison Field-Juma, illustrated by Terry Hirst, International Council for Research in Agroforestry (ICRAF), Nairobi, 1989, \$12 (pb).

I was introduced to the work of ICRAF when interviewing the director of a large tropical timber importing company. We disagreed on many issues, but before the conversation became too heated, my interlocutor enthusiastically produced a copy of *The Wasted Lands*, ICRAF's initial manifesto, published in 1978. The proposals in this slim pamphlet seemed as sensible to me as they did to him; and we eventually concluded the meeting over a meal, on altogether more amicable terms.

It is difficult to imagine anyone objecting to the aims and principles of agroforestry. The intensification of existing agricultural methods by the integration of tree species that are both productive and soil enhancing, offers real hope against the fight against famine and desertification; while the small scale 'bottom-up' approach that agroforestry favours ensures that the inevitable failures will be local and non-catastrophic. There is everything to gain, and very little to lose. Yet in 1978, when ICRAF started, agroforestry was still unrecognized as a formal college discipline throughout the world.

Agroforestry in Dryland Africa is one of a series of textbooks written primarily for agroforestry field workers and researchers. For the non-specialist this might have proved rather boring, but happily the necessarily dry text is liberally intercropped with over 150 drawings, cartoons and diagrams by Terry Hirst. The Chagga home gardens on Mount Kilimanjaro, the cattleproof sisal hedges, the alley-crops, microcatchments, bunds and beams are all lovingly brought to life by these charming and concise illustrations, as are the characters who tend them. By the time I had read through the many different agroforestry techniques, I had acquired a passable knowledge of the landscape, and a distant affection for some of the more useful plants, such as Egyptian rattle pod and the

Lablab bean. Though easily readable, the book does not skimp on facts. Among the numerous lists and tables in the appendix is the most visually daunting wall-chart I have seen with 161 African trees graded according to 55 different criteria, such as suitability for fodder or thatch, soil preference and termite resistance — a total of 8855 different figures.

But the crux of the book, and what distinguishes agroforestry as a viable solution, lies in Chapter Two, 'Participatory Planning'. The authors are emphatic that what makes or breaks a project is the level of consultation with the local people, who have to live with it - and live off it. The 'experts' and 'specialists' are not the development workers and researchers from university - these are simply facilitators with good connections; the experts are those who have lived in the area for years, and who know how the local plants react to extremes of climate, how high the river rose in the last flood, and who has a right to graze animals on which water course.

The field worker is expected to conduct an exhaustive series of interviews with local people of every age, sex and class to uncover the answers to a bewildering array of questions. I was only astonished that the authors considered that this could be achieved in a month. I would have thought that it needed more like a year, to gain the confidence of the locals and to observe the full seasonal cycle. But as the authors point out, "development workers are often simply in too much of a hurry"; they have their M.Sc.s and Ph.D.s to think about.

In a sense, the key element of agroforestry is not trees: it is ecology itself, the mutual interdependence of all forms of life. A sustainable environment requires a balance of plant, animal and human life, where every element is 'multi-purpose'; and integral to this balance are fragile social relations that have been painstakingly established over generations. An insensitive large-scale monocultural project may upset not only the agricultural ecology of a region, but the social ecology as well. The emphasis in agroforestry only happens to be on trees, because trees are the most multi-purpose of all life forms, the mothers of the global household.

The success of this book will depend on its acceptance by colleges, by field workers and ultimately by African villagers. But it is also written "for all those with an interest in sustainable development in Africa". Well, like it or not, we all have a stake in that; and even for those of us who cannot tell an Egyptian rattle pod from a Lablab bean, this is an optimistic and encouraging book.

Simon Fairlie

Simon Fairlie is a stonemason, freelance writer and local rainforest activist based in Salisbury, England.

BOOKS DIGEST

Books which are covered in the digest may be given full-length reviews in forthcoming issues.

 ENVIRONMENTAL POLITICS AND POLICY: Theories and Evidence, edited by James P. Lester, Duke University Press, Durham (North Carolina) and London, 1989, 405pp.

A collection of academic essays which describe the role of public opinion, interest groups, political parties, Congress, the Executive, the courts and élites in influencing US environmental policy over the last two decades. The final essay briefly summarizes the possibilities for environmental policies in the future and concludes that the prospect of "a dystopia of ecological collapse . . . seems more remote today than in the early 1970s when models of doom were both popular and plausible."

 INTERNATIONAL WILDLIFE TRADE: Whose Business Is It?, by Sarah Fitzgerald, World Wildlife Fund, Washington, DC, 1989, \$25 (pb), \$40 (hb), 459pp.

The international trade in wildlife is worth at least \$5 billion a year and is increasing rapidly. In this comprehensive overview of the trade, Fitzgerald explains the successes and failures of the international treaties that attempt to control it and describes the many endangered species of animals and plants involved and how 'sustainable wildlife management' schemes could ensure the survival both of the species and of the trade. She concludes with notable understatement that: "Wildlife trade is clearly a business with severe problems".

 FLOOD IN BANGLADESH, edited by Mohiuddin Ahmad, Community Development Library, House 39, Road 14 A, Dhanmondi R/A, Dhaka 1209, Bangladesh, 1989, 276pp.

Papers from a seminar of water resource experts and development activists held in the wake of the disastrous floods of 1988. Many aspects of the Bangladesh floods are covered including the hydrology and morphology of the Ganges-Brahmaputra-Meghna delta, the underlying causes of the floods and the methods by which they may be predicted and their impact alleviated.

 HOW SAFE IS SAFE: Radiation Controversies Explained, by Dr Barrie Lambert, Unwin Hyman, London, 1990, £7.99 (pb), 284pp.

Dr Lambert discusses in relatively non-technical language what radiation is and the risks from natural, medical and industrial sources of radiation. He shows the many gaps in our knowledge on this subject and criticizes the incoherent response from public authorities and the nuclear industry to public concern over radioactive contamination of the environment.

 APARTHEID'S ENVIRONMENTAL TOLL, by Alan B. Durning, Worldwatch Paper 95, Worldwatch Institute, Washington, DC, May 1990, \$4/£2.50, 50pp. Available in the UK from Worthyvale Manor, Camelford, Cornwall, PL32 9TT.

Durning shows how environmental problems are magnified by the institutional racism of South Africa. The 'homelands' where half the black population is forced to live are being turned into "ecological wastelands", with horrendous problems of soil erosion and deforestation. The mining industry is poorly regulated and the black miners work in highly dangerous conditions and live in townships with contaminated water and air. "Apartheid, as an extreme form of the social injustices found so pervasively around the world, reveals with exceptional clarity the way unfairness within the human estate extends its damage into the natural estate as well."

 THE SILENT REVOLUTION IN AFRICA: Debt, Development and Democracy, by Fantu Cheru, Zed Books, London and New Jersey/Anvil Press, Harare, 1989, £26.95 (hb), £7.95 (pb), 189pp.

Cheru analyses the African crisis and with the help of several country case studies shows how its origins lie in the application of export-led development strategies to the continent. He dismisses the 'solutions' touted both by the World Bank and the Organization of African Unity and concludes: "Wholesale acceptance of establishment solutions, be they African or European in origin, can lead only to permanent bondage. Africa shall be free!" Cheru's 'silent revolution' is the movement of ordinary Africans out of the formal market and into a parallel barter economy, out of reach of the whims of their rulers and the IMF.

Patrick McCully



Oil Exploration Holocaust

Dear Sir,

As a reader of *The Ecologist* since its inception and an active member of the ecology movement in Ecuador — although I live part of the year in Mérida, Venezuela, where I am a retired professor of Ecology at the Universidad de Los Andes — I am sending you the enclosed letter concerning the situation in the Ecuadorean Amazon. I have known these rainforests for over 50 years, and am at present engaged in the struggle to save their aborigine populations from extinction.

The letter was sent by the campaign coordinators of 'Campaña Amazonia: Por la Vida' to Mr Delmar Blasco of IUCN's Tropical Forest Programme Newsletter with reference to an article. 'Amazon Basin Initiative', which could well have been written by an oil company representative. Practically the whole of Ecuador's Oriente rainforest region between the Andes and the Peruvian border is slated for oil exploitation. This began some 20 years ago, and according to recent estimates will last for at least another 15 years. The Cuyabeno Nature Reserve and the Yasuni National Park, inhabited by aborigines, are situated within lands controlled by the oil companies. Oil exploitation is accompanied by timber extraction, which sometimes degrades 60 per cent or more of primary forest. Both activities go together with more or less chaotic 'colonization' by poor landless people from the Andes and the coast, and the invasion of land speculators including Government officials and the military. As in other Latin American countries, the Government

is in no position to carry out land reform, and latifundism prevails while the population expands rapidly.

Given the unsustainability of agriculture and stock-raising on the poor forest soils, the whole region will soon be degraded to the point where neither the settlers nor the indigenous peoples will be able to survive. This was dramatically demonstrated when a recent earthquake which destroyed roads and oil lines in the Oriente made it necessary to fly in food to save the colonists from starving.

Yours faithfully, A. Eichler Mérida Venezuela

Mr. Delmar Blasco

International Relations Division IUCN — Tropical Forest Programme 219 C Huntingdon Road Cambridge CB3 0DL UK

March 27, 1990.

Dear Mr Blasco,

After having read the article 'Amazon Basin Initiative' in Tropical Forest Programme Newsletter, No.5, September 1989, we must protest due to its complete lack of truth.

We would especially like to make reference to the following parts of the article:

1. "... and Flavio Coello Hinojosa from Ecuador, described the already extensive protected area systems in (his country) and the problems involved in securing effective management of them".

• The Ley Forestal de Areas Naturales y Vida Silvestre (Forestry Law for Natural Habitats and Wilderness Areas) provides in a small part of its content proposals for the protection of certain wilderness areas. Unfortunately, the same department where Mr Coello works has permitted, for example, the destruction of the Cuyabeno Nature Reserve as well as the devastation of the Yasuni National Park, the latter being one of the world's richest regions of biodiversity. 2. Under the heading 'Conservation and Colonization' we find the following: "Sayer and Imbach made an extensive tour of conservation sites in Ecuadorean Amazonia and also examined the impact of oil exploration, road construction and colonization on the area's forest resources. The mission was impressed by the care taken by oil companies - as requested by the Ecuadorean authorities - to minimize the environmental impacts of their activities. Surveys and extraction only require disturbing a minimal forest area. The greatest danger lies in spontaneous colonization along oil extraction roads".

· We are sorry to inform you that nothing can be further from the truth. We prefer to think that Mr Saver and Mr Imbach, if they came to Ecuador, never went beyond the city of Quito, since if they had it would be unthinkable and unacceptable for them to assert what they say they witnessed. We find it hard to believe that such an organization as Fundacion Natura, under the direction of Mrs Yolanda Kakabadse, would entertain such assertions stated in this article. unless they were supporting other interests. The problems caused by oil development in our country are among the worst that the Ecuadorean people have ever witnessed. Oil development is the cause of: Usurpation of indigenous territories: massive colonization: complete destruction of primary forests; poisoning of waterways and water supplies for human consumption with the subsequent extermination of hundreds of species of fish; massive extermination of wildlife and contamination of the atmosphere.

Ecologically speaking, this can not be called anything but a 'holocaust'. For the harm that the article published in your magazine can inflict on us, we find it imperative to make public this letter with the only goal of safeguarding and saving our Amazon Basin.

Marcia Valarezo and Esperanza Martinez

Campaign Coordinators Campaña Amazonia: Por la Vida Quito, Ecuador

Too Late Not to Compromise?

Dear Sir,

Larry Lohmann's editorial ('Whose Common Future?', Vol. 20, No. 3, May/ June, 1990) argues that it is 'questionable' whether environmentalists should join the "new global alliance" being forged in the wake of the Brundtland report. The implication is that environmentalists might be better off by pursuing alternative strategies rather than engaging in the round table processes pursued vigorously at the Vancouver conference Lohmann describes and which seem likely to form the basis for NGO participation in the UN Conference on Environment and Development in Brazil in 1992.

Any concerted avoidance of such processes by environment NGOs carries with it serious implications for the future and credibility of the environment movement. The relative advantages and disadvantages need to be weighed very carefully.

There are other strategies for the promotion of environmental concerns. In particular there is the option of promoting grassroots action, both of a political and practical nature. By such means, political will might be created directly and speedily, without the compromises which are likely to be involved in the proposed 'round table' dialogues. Recent events in Eastern Europe may provide new hope for those who believe that direct community action can forge fundamental political and social change.

But even given the urgency of many environmental problems, is there a realistic hope that either industrialized or developing countries' political systems will respond rapidly to such strategies in the near future? And, just as importantly, should environmentalists rely entirely on alternative political strategies for fear that they will be irretrievably compromised if they join in round table negotiations? It should be possible to combine both approaches at the same time.

To some extent, resolving this dilemma depends upon defining properly the terms and conditions upon which environmentalists might engage in the relevant negotiation processes. If environmentalists participate in efforts to secure a broader consensus amongst governments, industry, indigenous peoples, trade unions, youth groups, women's groups and educators in relation to environmental policies, they do not have to accept the outcomes, should these prove to be unsatisfactory. Any meaningful negotiation, as the alternative dispute resolution experts will quickly point out, requires the participating parties to clearly state their position, or their agenda, at the outset.

Environmentalists cannot stay aloof from the rest of society in this respect if they wish to convince governments and to represent the views of society. By having their own terms of reference and conditions for participation clearly defined at the outset, environmentalists can participate in such a broader dialogue without compromising their integrity, or the substance of their viewpoint. At the end of the day, it is far better to have environmentalists inside the meeting rooms, pursuing the argument for ecologically sustainable development, than to have them running around outside hoping that the rest of the world will understand.

Yours faithfully, **Robert J. Fowler** Senior Lecturer in Law University of Adelaide Law School GPO Box 498 Adelaide South Australia

Marxism and Growth

Dear Sir.

The ecological defence of Marxism offered by David Pratt's letter (Vol. 20, No. 1, January/February 1990) misses the mark.

Marx's dialectical approach with its emphasis on interrelatedness and dynamic change did not arise from nor bring about any ecological appreciation in Marx or Engels. Their anthropocentrism produced a vision of interrelatedness equivalent to master and slave. This is reflected in the metaphor of the earth as the 'inorganic body' of humanity which appears repeatedly from the *Economic and Philosophical Manuscripts of 1844* and the *Grundrisse* of the 1850s to *Capital*. The fol-

lowing passage from Volume I of Capital is typical of Marx's attitude: "Thus Nature becomes one of the organs of his activity, one that he annexes to his own bodily organs, adding stature to himself in spite of the Bible." Marx and Marxism explicitly reject the fundamental proposition of a sustainable economy: "minimization of resource throughput and the increase in global net entropy." (William E Rees, 'The Ecology of Sustainable Development', The Ecologist, Vol. 20, No. 1, January/ February 1990.) In economic discourse, the recognition of the requirements of ecological sustainability and of the limits to growth is historically expressed as the need for or inevitability of a 'stationary state economy'. Marx would have none of this. For him the inevitable fate of humanity was to "wrestle with Nature to satisfy ... wants (required) to maintain and reproduce life . . . in all social formations and under all possible modes of productions." (Capital, Vol. III) This leads to the unending expansion of wants and of the productive means to satisfy them.

For Marx and Marxists historically, the good news about capitalism is its built-in drive for endless capital accumulation and economic growth. The 'bad' news is that the capitalist economy cannot do this forever; internal contradictions (for example a falling average rate of profit) eventually bring growth to a halt and in the process the workers revolt and introduce socialism. The good news about socialism, for Marxists, is its ability to increase the rate of economic growth. For example, Ernest Mandel has said that socialism would double the average rates of growth in the United States and Europe. (Marxist Economic Theory, Vol. II, Monthly Review Press, New York, 1962.)

If these generalities are not sufficiently clear or convincing, then one should read Marx's critique of Ricardo in Volume II of *Theories of Surplus Value* (written during 1862-63) and in Volume III of *Capital*. David Ricardo had developed a theory of land rent and a law of capitalist evolution that recognized inherent limits to the economic exploitation of the earth. As a result, he saw that the average rate of profit would tend to fall over time as natural limits were approached; at some low level of profit expectation, investors would refuse to invest, capital accumulation would grind to a halt, and the inevitable stationary state economy would become the general rule. Marx on the other hand, consistent with his anthropocentrism and vision of endless material growth as human destiny, chastized Ricardo for his political narrowness: "Those economists, therefore, who like Ricardo, regard the capitalist mode of production as absolute, feel . . . that it creates a barrier itself, and for this reason attribute the barrier to Nature (in the theory of rent), not to production." For Marx the barrier is located in the contradictions of capitalism, not nature: "...this particular barrier testifies to the limitations and to the merely historical transitory character of the capitalist mode of production." (Capital, Vol. III).

Thus, the 'early' Marxists did not simply make 'mistakes' as David Pratt would have it. From this perspective it can also be seen that the tragic state of the environment in the Soviet Union and Eastern Europe follows from antiecological flaws fundamental to Marxism and cannot simply be blamed on Stalinism, as some would have it. We have entered an era in which any ideology or economic system based on limitless material expansion must fail. This necessarily includes both capitalism and Marxism. We must hope that in the popular struggles and campaigns David Pratt mentions, new understandings and ways of organizing economic life will evolve. This process will not be facilitated by clinging uncritically to failed ideologies.

Yours faithfully, John Hardesty 3483 Olive Street San Diego CA 92104 USA

Pioneers and Communicators

Dear Sir,

I welcome the new distribution and promotion arrangement in North America between The MIT Press and *The Ecologist.*

Edward Goldsmith, I believe, as well as anyone, perhaps better than anyone, understands what is happening to the world around us. I am happy that The Ecologist also prints interpretations by professional communicators. Goldsmith needs interpreters, because like more than one pioneer thinker, he is more interested in communicating with his inner mind than with the public in general.

In *The Ecologist*, Vol, 17, No. 1, Sandy Irvine, a communicator, states: "I happen to think that the greatest illumination comes from the kind of model that has been put forward by Edward Goldsmith. Put simply, the overexpansion of of the human-made world, the technosphere and people and their artefacts, necessarily takes place at the expense of the life-supporting, self-renewing and self-regulating ecosphere." Goldsmith greatly elaborates this concept and it is good to have someone put it simply.

If the world does not succeed in saving itself, it will not be your fault.

Yours faithfully, Francis Barton #307, 116 Norfolk Street Cambridge MA 02139 USA

india international centre QUARTERILY

Speaks of issues across disciplines

The India International Centre **Quarterly** publishes articles on a wide range of subjects reflecting serious thinking on contemporary concerns — national, regional and global.

A special double issue on **Futures** is a selection of essays projecting the present trends into the future, questioning the price and direction of change and focussing attention on the struggles for a common future.

Contributions include those by:

VIVAN SUNDARAM/Monument at camp site: KATHLEEN RAINE/Words; MARC NERFIN/Is global civilization coming?; HANS W. SINGER/ When pursuit of surplus ends; JAYANT V. NARLIKAR/Creativity, society and science: NARINDAR SINGH/ The present of the future; KARAN SINGH/ Crisis of the split psyche; PRATAP CHANDRA/Ascent to humanism: IGOR BESTUZHEV-LADA/Socialism in the 21st century; PAUL GREGORIOS/ Continuity in change; INGA THORSSON/ The sword still hangs; JASJIT SINGH/From conquest to annihilation; M.N. BUCH/Rise of predator cities; NATHAN GLAZER/A view from the first world; ARTHUR E. IMHOF/ Gaining years, losing touch; HENRYK SKOLIMOWSKI/ World-views and values for the future; IGNACY SACHS/Inventing a humane future; P.M. BHARGAVA/Social implications of modern biology; KAMLA CHOWDHRY/Growth or survival?; SIMA SHARMA/A silence of meaning; DANIEL WEISSBORT/Future sparks in yesterday's embers.

> Annual Subscription : Inland : Rs. 60.00 Overseas: \$ 18 or £ 10 (air mail) \$ 11.50 or £ 6 (surface mail)

Cheques drawn in favour of India International Centre and all correspondence may be sent to:



Publication Division India International Centre 40, Max Mueller Marg, New Delhi - 110 003.

Classified

MISCELLANEOUS

The IWA (Inland Waterways Association) needs used postage stamps of all denominations, Green Shield, Pink, Look, Premier Gold, Co-op and Blue Chip stamps, Texaco, BP. Shell, Esso, Gulf, Fina etc petrol vouchers. Please send to WRG/IWA Stamp Bank, 114 Regent's Park Road, London NW1 8UQ. This is a permanent request and the used stamps are turned into cash or goods for sale to help restore and run Britain's Inland Waterways.

ITALY—room in friendly farmhouse amidst beautiful Umbrian hills. £30 per week per person. Spring and autumn. Please write: Pratale, Scritto, Perugia.

RECYCLING: "Fashionable Waste—The Make-Up of a Recycler." New study into attitudes to recycling. Contains important messages to central government, industry, supermarkets and local authorities. Essential reading. £4.95 post free. SWAP, (EC1), PO BOX 19, Leeds LS1 6TF.

REQUEST FOR NEW OR USED BOOKS, fictional and non-fictional, for our library in local hospital. Especially welcome literature on geography, history and school books. Please send to: S. Paran, 13, Jalan Tenteram, 76200 Melaka, Malaysia.

CALL FOR PAPERS

TURBOMACHINES. Condition diagnosis, Fault early detection, Service life monitoring. 21st/22nd March 1991, Aachen, W. Germany. Experts who would like to present the latest results from their fields of work are requested to send a written proposal for a paper containing both personal information and details of the contents on max. type-written A4 page. Please send proposals by end of July 1990 to VDI-Gesellschaft Energietechnik, Postfach 11 39,D-4000 Dusseldorf 1, W. Germany. Tel. 211/6214 363.

FOR SALE

ORKNEY. Crofters Cottage. Carefully restored, on the remote and beautiful island of Sanday. Phone 08575-430. Price £40,000.

DIARY DATES

WATER PRIVATISATION—One Year On. This seminar will be held on 14th November 1990 at the Institution of Civil Engineers, 1-7 Great George St. Westminster, London SW1P 3AA. For further information please write to the Conference Office at the above address.

ENVIRONMENTAL POLICY AND MAN-AGEMENT. An International Forum organised by The British Council, 7th-14th November 1990 at Alfriston, East Sussex. Topics include: Environment and Economics, Environmental Law, Training Needs in Environmental Policy and Management; and Discussions on Our Common Future (Brundtland Commission Report.) Applications to British Council Office, 65 Davies Street, London W1Y 2AA (Tel. 071-389 7817)

MAN'S INFLUENCE ON THE CLIMATE II. Present level of knowledge, Feasible energy technologies and strategies. VDI-GET Conference, 28th/29th November 1990 in Neuss, W. Germany. This conference is aimed at those interested from all fields relating to Energy and Climate research, Energy technology, Power Industry and Energy Policy. Details from VDI-Gesellschaft Energietechnik, Postfach 11 39,D-4000 Dusseldorf 1, W. Germany (Tel. 211 6214 363)

THE RAINFORESTS OF THE WORLD. A very special weekend with Robin Hanbury-Tenison (Explorer) and Nigel Windser (Deputy Director of the Royal Geographical Society). Dates: 11th to 14th October. Venue: Beautifully restored medieval Manor house complex at Worthyvale. The numbers will be limited to twenty people and the cost of three days will be in the region of £500. Part of the proceeds will go to the Brunei Research Fund for the protection of the rainforests. For further details please write to: The Secretary, Worthyvale Manor, Camelford, Cornwall, PL32 9TT.

FULL CONFERENCE FACILITIES

available at Worthyvale Manor Conference Centre, Camelford, Cornwall PL32 9TT. Please write for prospectus.

THE 1990 SCHUMACHER LECTURES

Saturday 20th October 10.30am to 6.30pm. The Students Union, University of Bristol, Queens Road, Clifton, Bristol.

FROM INSPIRATION TO ACTION. Three pioneers at the leading edge of the Green Movement will describe how they have bridged the gap between the practical and the spiritual.

ANITA RODDICK. The Founder of The Body Shop.

'Business and Values'

SARA PARKIN. International Secretary of The Green Party. 'The Politics beyond Power'.

ANDY GOLDSWORTHY. Sculptor. 'Art in Nature'.

Tickets: £12.00 (including tea and biscuits) from The Schumacher Society, Ford House, Hartland, Bideford, Devon ED39 6EE. Tel: 0237 441621. Please make your cheques payable to 'The Schumacher Society'.



THE WORLDWATCH PAPER SERIES

The following Papers have recently been published in this very important Series by The Worldwatch Institute, USA:

Slowing Global Warming: A Worldwide Strategy (No 91)

Poverty and the Environment: Reversing the Downward Spiral (No 92)

Water for Agriculture: Facing the Limits (No 93) Clearing the Air: A Global Agenda (No 94) Apartheid's Environmental Toll (No 95)

Available from: The Wadebridge Ecological Centre Book Service, Worthyvale Manor, Camelford, PL32 9TT.

Price per copy £2.75 plus 50p for P+P. Please make cheques payable to Ecosystems Ltd. List of previous Papers available on request.

Classified Advertisements in *The Ecologist* are 25p per word, minimum charge $\pounds 5.00$ (Box No $\pounds 1.00$ extra). Display $\pounds 3.00$ per sccm, minimum 3 sccm. Please add 15% VAT to your payment and send together with your text and cheque (made payable to *The Ecologist*) to: The Classified Advertisement Department, Worthyvale Manor, Camelford, Cornwall, PL32 9TT, UK.

"We are made wise not by the recollections of our past but by the responsibility for our future!"

I ake an active part in building tomorrow today by joining the World Future Society. Our world changes so quickly that it has become increasingly difficult to keep up with new developments-much less understand their implications to society. Since 1966, the World Future Society has worked hard to share information on new developments, pos-

sibilities, forecasts, trends, and scenarios.

No one knows exactly what will happen in the future. But by studying the many possible things that might happen, people can more rationally decide on the sort of future that would be most desirable and then work to achieve it. As a nonprofit organization, the World Future Society is independent and offers no official view of what the future should be like. Rather, it acts as neutral clearinghouse that a strives to give you the unbiased information you need about the most important subject there isyour future!

For only \$30 a year, you can become a member of the World Future Society. In addition, as a special offer to new members, you will receive a copy of Careers Tomorrow: The Outlook for Work in a Changing World, a 160-page volume on work and careers in the

future, as your free gift for joining. Your membership entitles you to these exclusive benefits to help you learn about tomorrow, while keeping abreast with today:

THE FUTURIST

The Society's bimonthly magazine of forecasts,



"All of us are taking a long journey into the future that will last every day of our lives. What will we be seeing and doing? How will we live? It is to the answers that may be found to these questions that the World Future Society is dedicated." -Isaac Asimov

> The World Future Society can make a major contribution to making a better future for all mankind. Join with us today, and start to shape your futureand don't forget you'll receive Careers Tomorrow: The Outlook for Work in a Changing World, as our free

Membership Application

Yes! I want to take part in building tomorrow . . . today. Enclosed is my \$30 check or money order for the first year's dues. Please send my free copy of Careers Tomorrow: The Outlook for Work in a Changing World immediately. I understand I'll receive a one-year (six bimonthly issues) subscription to THE FUTURIST, discounts from the Futurist Bookstore, and special invitations to General Assemblies and other meeting sponsored by the Society.

□ Please charge \$30 annual dues to my □ MasterCard □ Visa □ American Express

Acct.#

_ Sig. Exp. Date _

-George Bernard Shaw

trends, and ideas about the future. THE FUTURIST will keep you informed and enlightened with the latest developments, scenarios, and trends in such areas as lifestyles, business, science, education, the environment, and space. In addition to feature articles, THE FUTURIST contains special sections such as World Trends & Forecasts, Tomorrow in

> Brief, Future View (essays by distinguished futurists), and Book Reviews. This bellwether of futurist thinking has featured articles by or interviews with Alvin Toffler, B.F. Skinner, Albert Gore, Carl Sagan, John Naisbitt, and Gene Roddenberry.

CONFERENCES

You can attend the World Future Society's conferences and seminars at special members' rates. WFS conferences bring together leaders from many fields and many nations to share ideas and forecasts, to view exciting new technologies, and to establish avenues for networking.

THE FUTURIST BOOKSTORE

The World Future Society's Bookstore stocks over 250 futures-relevant books, plus videotapes and other materials. Members receive both The Futurist Bookstore Catalog and discounts

on books and other products.

gift to you for joining.

Name		1.12	_
Organization		ter	
Address			
City	State	_ ZIP	8074
	Mail to: World Future Society 4916 Saint Elmo Avenue Bethesda, Maryland 20814		