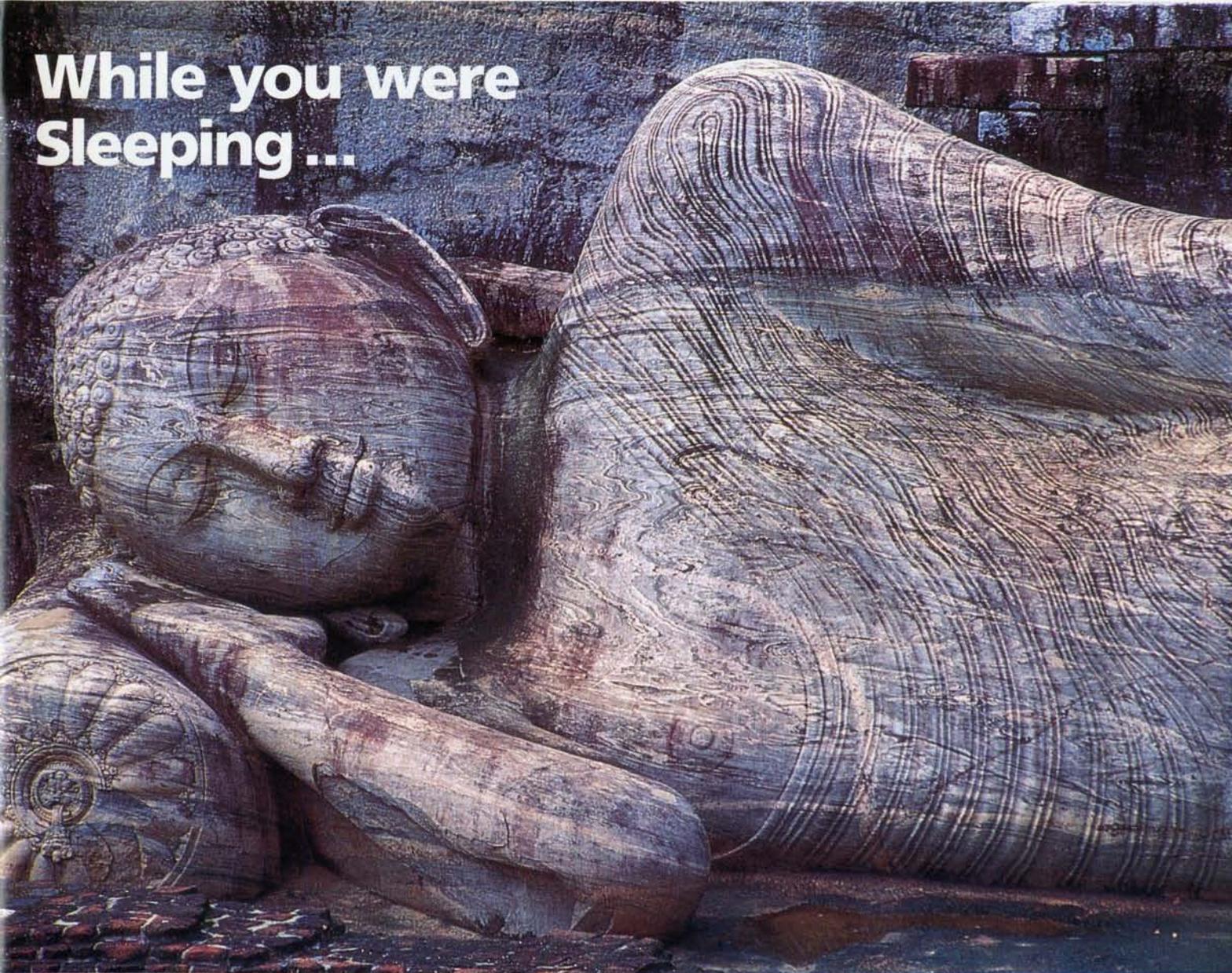


The Ecologist

Rethinking Basic Assumptions

Vol 28 No 1 Jan/Feb 1998 £4.00 (US \$8)

**While you were
Sleeping ...**



**South-east Asia's
Crumbling
'Miracles'**

*The Return of India's Native Seeds: a Reversal of the Green Revolution
The Media, the Environment and False Interpretations • The Selfish Gene:
a Crude and Naïve Fabrication • 'Edible' Toxic Waste and Random Murder
Unocal to be Tried for Involvement in Ecological and Human Rights Atrocities*

POSTER OFFER

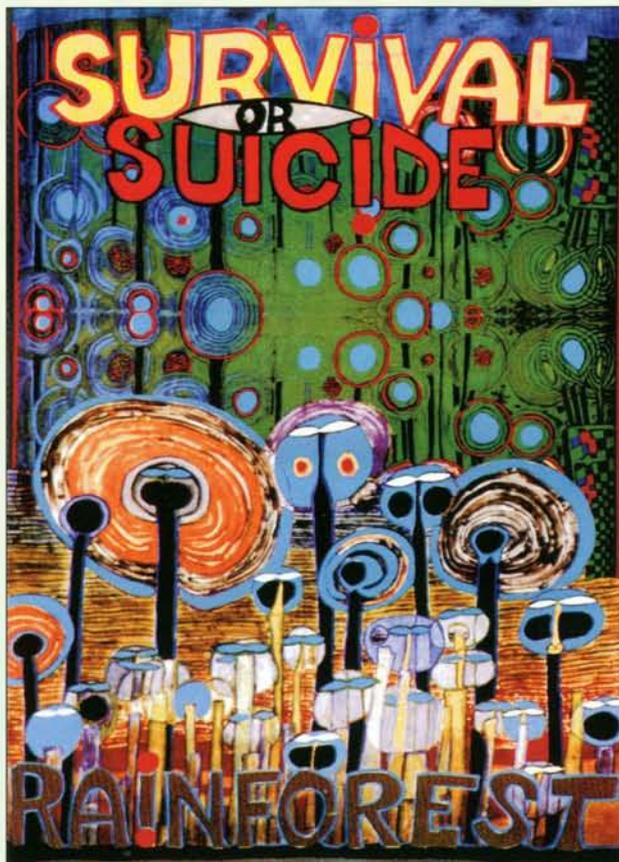
Purchase a poster by the renowned Austrian artist Friedrich Hundertwasser and sponsor an annual subscription to *The Ecologist* for a group in Eastern Europe or the Third World.

Metal embossing on the poster is either in gold, silver, green or red depending on availability.

Cost is £20/US\$35 including postage.

Available from *The Ecologist's* editorial office, Agriculture House, Bath Road, Sturminster Newton, Dorset, DT10 1DU.

We welcome payment by UK£ cheque drawn on UK bank, US\$ check drawn on US bank, Eurocheque written in UK£, banker's draft payable through a British bank, UK or international postal order, made payable to *The Ecologist*.



The Ecologist is published by Ecosystems Ltd.

Editorial Office and Back Issues: Agriculture House, Bath Road, Sturminster Newton, Dorset, DT10 1DU, UK. Tel/Fax: (01258) 473476, E-Mail <ecologist@gn.apc.org> Full list of back issues available

Subscriptions: The Ecologist, c/o Cissbury House, Furze View, Five Oaks Road, Slinfold, W. Sussex RH13 7RH, UK. Tel/Fax: (01403) 782644

Retail Distribution: Central Books, 99 Wallis Road, London E9 5LN, United Kingdom. Tel: (0181) 986 4854, Fax: (0181) 533 5821

Annual Subscription Rates

£24 (US\$35) for individuals and schools;

£50 (US\$94) for institutions;

£18 (US\$28) concessionary rate (subscribers in the Third World and Eastern Europe; unwaged-ID required).

Air mail £11 (US\$19) extra.

Concessionary rate only available from RED Computing and The MIT Press and not through other subscription agents.

The Ecologist is published bi-monthly. The rates above are for six issues, including postage and annual index.

Subscriptions outside North America payable to *The Ecologist* and sent to the Subscriptions address above. We welcome payment by UK£ cheque drawn on UK bank, US\$ check drawn on US bank, eurocheque written in UK£, banker's draft payable through a British bank, UK or international postal order, Access, Visa or MasterCard.

North American subscriptions payable by check drawn on US banks in US funds to: MIT Press Journals, Five Cambridge Centre, 4th Fl, Cambridge, MA 02142-1493. Fax: (617) 258-6779; E-mail: journals-orders@mit.edu

Advertising

For information, rates and booking, contact the Editorial Office (contact details above)

Inserts

Up to 265x185mm, not more than 10g each; £45 per thousand, full run, plus VAT; £60 per thousand, part run (minimum 4,000), plus VAT. Further information from the Editorial Office.

Classified

See inside back cover

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 Microsoft Word or text file (ASCII) format. Illustrations (B/W or colour prints or transparencies, line drawings, tables, maps, etc.) should be included where appropriate. Detailed guidelines for contributors are available on request. Manuscripts should be addressed to the editors and sent to the Editorial Office.

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.

Typeset by Encore Graphic Design, Bournemouth. Tel: (01202) 551909

Printed by Penwell Ltd, Station Road, Kelly Bray, Callington, Cornwall, PL17 8ER, UK. Tel: (01579) 383777

Copyright: *The Ecologist* 1997

The Ecologist is a member of the Independent News Collective (INK)

The Ecologist is available on microfilm from University Microfilms International, 300 North Zeeb St., Ann Arbor, MI, USA

Editorial

EDWARD GOLDSMITH
ZAC GOLDSMITH

Editorial Board

STEVEN GORELICK
HELENA NORBERG-HODGE
JOHN PAGE

Editorial Assistant

SALLY SNOW

Associate Editors

PATRICIA ADAMS
Probe International
(Canada)

PETER BUNYARD
(UK)

MARCUS COLCHESTER
World Rainforest Movement
(UK)

SAMUEL S. EPSTEIN
University of Illinois
(USA)

SIMON FAIRLIE
(UK)

ROSS HUME HALL
McMaster University,
Canada, now Vermont, USA

SANDY IRVINE
(UK)

MICK KELLY
University of East Anglia
(UK)

MARTIN KHOR KOK PENG
Director, Third World Network
(Malaysia)

SMITU KOTHARI
Lokayan Social Action Group
(India)

SIGMUND KVALØY
Ecopolitical Ring of Co-operation
(Norway)

JERRY MANDER
International Forum on
Globalization
(USA)

PATRICK MCCULLY
International Rivers Network
(USA)

JOHN MILTON
(USA)

JOHN PAPWORTH
Fourth World Review (UK)

ROBERT PRESCOTT-ALLEN
PADATA
(Canada)

JOHN SEED
Rainforest Information Centre
(Australia)

VANDANA SHIVA
Research Centre for Science
and Ecology (India)

ROBERT WALLER
Commonwealth Human
Ecology Centre
(UK)

RICHARD WILLSON
The Times (UK)

TRACY WORCESTER
ISEC (UK)

DONALD WORSTER
University of Kansas (USA)

EDITORIAL OFFICE,
AGRICULTURE HOUSE,
BATH ROAD,
STURMINSTER NEWTON,
DORSET DT10 1DU
TEL./FAX +44(0)1258-473476
E-MAIL ecologist@gn.apc.org

Editorials

Legalized, Random Genocide 2

Zac Goldsmith

Can Science 'Manage' Nature? 7

David Suzuki

Why are the Forests Burning? 8

Bruno Manser-Fonds

Feature Articles

The Rise and Fall of South-east Asia's Economy 9

Waldon Bello

The current economic collapse in South-east Asia was inevitable, as the author, a noted Philippine economist currently involved in an in-depth study of the Thai economy, explains. In his famous book, *Dragons in Distress*, he described in great detail the horrific social and economic costs of the South-east Asian economic 'miracle', which he showed could only be of very short duration.

Can We Learn the Truth about the Environment from the Media? 18

David Edwards

Made up of corporations, themselves part of a larger network of corporations, the mass-media system lies very much at the heart of the establishment, with which it must therefore necessarily share the same basic assumptions and the same commitment to justifying the direction our society is taking. The media are unlikely, even structurally incapable, as the author explains, of offering root-cause analyses of the problems we face today.

The Selfish Gene: a Crude and Naïve Fabrication 23

Neil Broom

In isolation from the genome, and the organism of which it is a differentiated part, the gene can do nothing, and just as the human organism for instance is a freak when isolated from the family, the community, the ecosystem and the cosmos, neither is the organism itself the unit of evolution. Richard Dawkins' Neo-Darwinism is merely a reflection of the extreme reductionism and mechanomorphism of the aberrant, atomized, and totally materialistic society we have created.

Return of the Native Seeds 29

by Rahul and Jacob Nellithanam, Sarvodaya Shikshan Samiti

A radical counter-movement in central India is challenging the fraudulent claims of the proponents of the Green Revolution by developing practical on-farm solutions to the problems resulting from its failure. Farmers and activists, in successfully cultivating unirrigated wheat varieties by traditional methods, have shown that to survive environmentally, socially and economically India must set about reversing the Green Revolution.

US Petroleum Giant to Stand Trial Over Burma Atrocities 34

Jed Greer

US-based petroleum giant Unocal may, following an unprecedented ruling by a US Federal Court judge, face trial and potentially be held liable for its alleged complicity with Burma's famously harsh military junta, (SLORC), in ecological and human rights atrocities carried out to its advantage in Burma over the building of a controversial natural gas pipeline and drilling stations in that country. A ruling in favour of the plaintiffs would have vast repercussions and could set in motion new legal mechanisms for achieving corporate accountability.

Reviews 39

Mad Cow U.S.A. by J. Stauber and S. Rampton – Miyoko Sakashita

The Ecocriticism Reader by C. Glotfelty and H. Fromm – David Rothenberg

Our Stolen Future by T. Colborn, D. Dumanoski and J. P. Myers – Gard Ellwyn Binney

Degrees of Freedom by A. Rayner – Christian Taylor

Building a Community Controlled Economy by P. Wilkinson and J. Quarter – Richard Douthwaite

Letter Forum 45

Vyvyan Howard responds to criticism from BP Chemicals Ltd's Dr Nigel Moore

Campaigns and News Centre Pages

Editorials

Legalized, Random Genocide

Outrageous is no longer an adequate term for the sheer recklessness with which those in power are driving our society down a path to disaster. Almost daily we hear of a new project or policy decision whose sheer lunacy beggars belief. One is left to wonder: do those responsible have children, are they even human? If so, what future, if any, can they possibly imagine they are leaving to future generations?

Any one of a number of recent decisions could stand alone as evidence of the criminal irresponsibility of our decision-making fraternity and of the aberrant nature of the society that could conceivably tolerate it.

Take, for example, Chris Busby's exposé of the Euratom 96/29 Directive; European Community Law as of March 16th, 1996. (See *The Ecologist*, 27/4) Radioactive waste from nuclear power plants will, as soon as this directive has been translated into British law, be systematically recycled into the environment through consumer products. This means that we will soon be writing on radioactive paper, using radioactive packaging, writing with radioactive pens and pencils, building our houses with radioactive bricks and driving our cars — themselves largely radioactive — over radioactive motorways.

Professor John Goffmann refers to this as "random murder", which is clearly what it is, though this in itself does not give an indication of the true extent of the crime. For the nuclear industry, of course, it is a bonanza. It can now dispose of an enormous build-up of otherwise indisposable waste that is just accumulating at each nuclear installation. It is a bonanza too for another reason. It solves the industry's problem of dissimulating the massive cancer clusters around just about every nuclear installation in the UK. For, as Joy Pagano has commented, "cancer clusters will now emerge in every classroom in every school", in fact just about everywhere. Cancer, which already afflicts one woman out of three and one man out of two, will, if this directive is applied, become generalized.

Steven Gorelick's editorial on

NASA's controversial Cassini project is another example (*The Ecologist*, 27/6). In it he points out that "it is difficult to imagine any single event that compares for sheer recklessness with NASA's project. This one spacecraft represents a throw of the dice which could cost millions of lives and render large portions of the planet uninhabitable." The list could continue indefinitely.

So how has this been allowed to happen? Who, or what, is responsible? Surely

crimes so obvious and so great must be preventable, or at least punishable? Sadly not. For, as Greer and Bruno have pointed out in their book *Greenwash*, the greatest criminals of all happen also to be the most important players in the global economy, and as such wield the greatest power politically. Fragile systems, legal structures and customs, in region after region are being bulldozed and reshaped to accommodate the policies that best suit the interests of these powerful corpora-



"Now Mr Lampsprocket, what did I say about leaving the window open?"

tions. Of course they're still desperate to quote their Green credentials so long of course as it does not interfere in any way with their own immediate interests. As Greer and Bruno note, "A corporate leader in ozone destruction takes credit for being a leader in ozone protection. A giant oil transnational embraces the 'precautionary approach' to global warming. A major agrochemical manufacturer trades in a pesticide so hazardous it has been banned in many countries, while implying that it is helping to feed the hungry. A petrochemical firm uses the waste from one polluting process as a raw material for another, and boasts this is an important recycling initiative. A logging company cuts timber from a natural rainforest, replaces it with plantations of a single exotic species, and calls the project 'sustainable forest development'. These corporations, with the help of their business associations and public relations firms help set the agenda for global negotiations on the crises of environment and development ... Welcome to the world of *Greenwash*," they conclude.

And so ICI is able to disseminate brochures claiming that their famously toxic herbicide, *Paraquat*, works "in perfect harmony" with nature, and that its impact on water, land and wildlife, has been "environmentally friendly", even though experiments have shown that the chemical "is fatal to frogs and tadpoles at the lowest dose tested ... kills honeybees at doses lower than those used for weed control ... is extremely toxic to hares ..." and that "horses allowed to graze on pastures recently sprayed with *Paraquat* developed lesions in the mouth and suffered from increased mucous secretions." Even the WHO has recommended that "all domestic animals should be kept far from freshly sprayed areas."

But now comes a new outrage – one whose sheer cynicism simply defies the imagination. The fifteen billion dollar-a-year US fertilizer industry has succeeded in making it perfectly legal and acceptable to the powers that be to mix toxic waste with otherwise normal fertilizer and have it routinely applied by farmers over our agricultural land.

Radioactive waste, toxic chemicals, and heavy metals that we once went to great lengths to separate – albeit never very successfully – from the living world, are now all of a sudden made out by government authorities and their scientific advisers, to be safe to eat, so long of course as they are served to us in "scientific doses". "Recycle and Re-use,

that's our national strategy," explains the Department of Agriculture's Rufus Chaney. Of course, what alternative is there, since, "It costs so much more to put it in a landfill"?

Needless to say, the nuclear industry and the chemical industry are wasting no time in taking advantage of this shameful situation. Duff Wilson of the *Seattle Times*, for instance, reports that "In Gore, Oklahoma, a uranium processing plant is disposing of low-level radioactive waste by licensing it as a liquid fertilizer, and spraying it over 9,000 acres of grazing land," and in Nebraska, Frit Industries has attached a fertilizer factory to their Nucor steel mill to convert, or "recycle", the hazardous waste it produces into "fer-

try failing to take advantage of the situation. According to Peter Montague, it is furiously lobbying the Environmental Protection Agency (EPA) for permission to spread radioactively contaminated phosphogypsum, a waste product of phosphate mining, onto road beds or to use it as a fertilizer. The waste, of which he tells us there would be some 30.7 billion cubic feet awaiting disposal by the year 2000, contains 30 picoCuries of radium per gram, which has a half life of 1,600 years.

If the industry gets its way, the equivalent of one fifth of all the roadways under US Federal and State control will be covered with this poisonous mixture, potentially leading, according to radioactive waste consultant Marvin Resnikoff, to cancers by the thousands.

Nor is the sewage treatment industry to be outdone. Over 5.3 million metric tons of sewage sludge are produced in the US every year. The sewage treatment industry, like others in the waste business, has discovered, not surprisingly, that the cheapest means of disposing of this yearly mountain is to spread it over nearby fields.

They tend to do this on a pretty big scale, judging by the fact that the Federation of Sewage Works Association has now become the "Water Environmental Federation (WEF)" and the sewage sludge that it produces is now referred to euphemistically as biosolids. In the late eighties it even set about convincing people that the "poorly understood mixture of nutrients and industrial poisons" that is sewage sludge, was in fact not only harmless to consume, but actually beneficial to people's health.

The principle of systematically covering our agricultural land with chemicals and radioactive poisons is now accepted by our scientists.

tizer". To add insult to injury Karl Shauble, Executive Vice-President of the company, insists that this is "an intelligent and safe and reasonable thing to do with the material." He even goes further and says "I feel that the fertilizer industry has done a real service being able to utilize some of these by-products."

Of course, if it is indeed safe, then why have farmers not been informed of the exact contents of the fertilizers that are now being sold to them? Perhaps they are too ignorant to understand the "scientific benefits" of spraying their precious land with toxic substances that will poison their families and give cancer to their children.

Nor is the phosphate fertilizer indus-



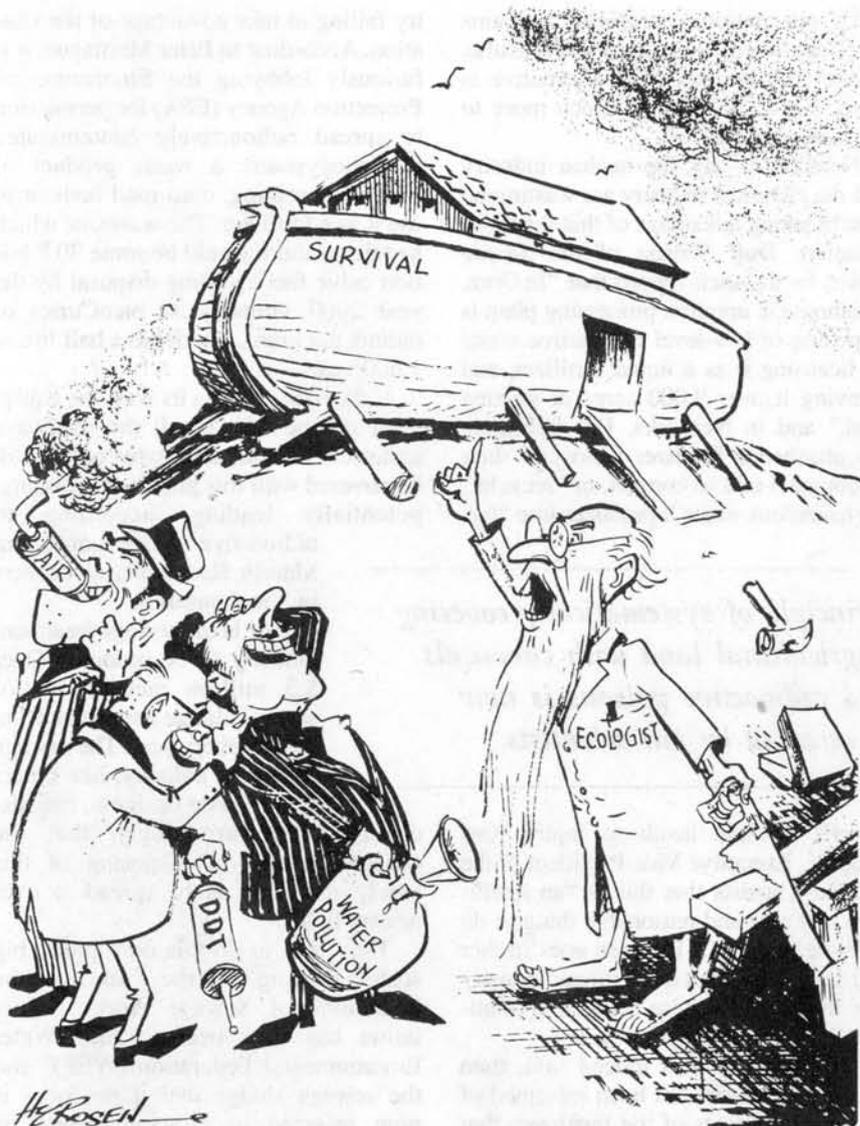
*the*TRUMPETER
Journal of Ecosophy

Where Philosophy and Culture Meet the Earth

A Quarterly Devoted to Ecophilosophy

Lightstar, Box 5853 Stn. B,
Victoria BC Canada V8R 6S8

Hy Rosen, Albany Times-Union, N.Y.



and the Lord said, "Thou shalt not pollute!"

Of course, even in our modern society such activities need to be regulated "scientifically" if people are to be satisfied that they are safe, let alone beneficial to our health. This means that standards have to be set by scientists working for respected government agencies. This the Environment Protection Agency (EPA) agreed to do in 1990. "The Agency will continue to enthusiastically promote and encourage the reuse of sludge," the EPA scientists wrote, "whenever its safe environmental use is possible," and according to Montague, the "EPA went out of its way to assure the public that almost any sewage sludge poured on crops is safe." To do this and still maintain its reputation as an objective government agency serving the American people was not easy and required "exceptionally creative use of risk assessment." There are

about 70,000 chemicals in regular use by industry, each of which will clearly have to be examined very carefully over a long period of time and in different combinations with each other. This is of course a massive task that the EPA could not even conceivably undertake (see Vyvyan

Radioactive waste, toxic chemicals and heavy metals are now all of a sudden made out by government authorities and their scientific advisers to be safe to eat.

Howard, *The Ecologist* 27/5). However, it could have examined a fairly representative sample. Instead it chose to investigate only 409 chemicals – and of those it was decreed that only 10 required regulation. In other words, everything and anything is now more or less acceptable, and to

make matters worse, the Department of Agriculture has refused to enact a law which would require at the very least that fertilizers containing these poisons had to be fully labelled.

How can this be justified? Richard Camp, President of Bay Zinc of Moxee City, Yakima County, explains that "There are only so many square inches that we can print things on ... There will not be enough space to print all the things we would have to" – a preposterous excuse. However, anyone who complains is viciously attacked. Thus, popular Mayor Patty Martin, who is described by the *Seattle Times* as "the woman who helped bring national attention to hazardous waste in fertilizers", was so slandered by the local newspapers that she failed re-election after being taken on by two fertilizer industry-backed candidates.

To add further insult to injury, opponents of the new laws are referred to as "special interest groups" – in other words, people interested purely in serving their own petty interests, whereas the chemical and nuclear industry have only the interest of humanity at heart. "Recycling hazardous waste into fertilizer is good for America and Americans ... It is irresponsible to create unnecessary limits that cost a hell of a lot of money," affirmed the philanthropic Mr Chaney.

Those who complain therefore are simply ignorant people, totally devoid of the scientific knowledge required to contest decisions taken by corporate scientists. We should base our decision, we are told by the industry, on the outcome of scientific research conducted by scientifically trained corporate experts. This scientific research of course has established that adding toxic waste to the soil "helps the crops by raising PH levels." As for labelling the contaminated fertilizer in order to distinguish it from clean fertilizer, "we should look at the science before we start doing a whole lot of labelling," Vincent Snyder Jr. of Scott Company, admonishes us. But at last, so be it, there is good news. We were told on the 30th October that the nation's fertilizer's marketers have agreed "to promote limits" on toxic ingredients. A labelling taskforce made up of seven industry leaders and six State regulators have put together a plan for setting "scientifically sound standards for the maximum cumulative addition to the soil of substances not specifically and generally recognized as plant nutrients." In other words, the principle of

systematically covering our agricultural land with chemicals and radioactive poisons is now accepted by our scientists. The only remaining issue is at what rate it can be allowed to take place – how quickly in fact is the population of the United States to be poisoned.

There seems to be no limit to what length modern industrialists will go to cut costs and polish the bottom line. If that means exterminating whole species, feeding nuclear waste to children, maligning and often physically assaulting, even murdering, as Shell has done in Nigeria, those who oppose their immediate short-term interests, so be it.

What is more, to reject, or even question a system which strives to maintain and which accepts a state of not-quite-collapse, as opposed to one of general health and stability (as was the case in every society before the notion of “progress” caught on), is fast being made a non-option. With the new Strategic Law Suits Against Public Participation (SLAPP)s, with the new US Food Disparagement laws (see *The Ecologist*, 27/6, R. Cummins, ‘Food Slander: the Criminalization of Dissent in the U.S.’) and with the well-known “criminal justice” acts in the UK, what

option is being left to those who believe in alternatives, but to rebel? Not only are we expected to accept what is thrown at us without question, but even access to information is being denied us, as is illustrated by Monsanto’s campaign to prevent the labelling of dairy products containing the Bovine Growth Hormone (BGH) and of genetically manipulated soya beans. For the sake of political stability, it must be fair to suggest that those in power are treading on thin ice.

Is it surprising, that over a million US

What would have been ridiculed as alarmist propaganda no more than ten or twenty years ago has since become comfortably status quo.

citizens, and growing numbers in the UK, now adhere to a grand conspiracy theory of one sort or another? Indeed, are even the more far-fetched of these theories so unbelievable, when, in reality, what we know to be the truth is already beyond belief, and what would have been ridiculed as alarmist propaganda no more than ten or twenty years ago, has since become comfortably status quo?

In this respect, one key question springs to mind. Both in the US and the UK we maintain a powerful standing army and spend hundreds of billions of pounds on weapons of mass destruction. What for, we might ask? What more could whoever we feel might invade this country do to us than systematically set out to cover our land with radioactive waste, toxic chemicals, and heavy metals? Ironically, those who do this, rather than being seen to be the enemies of humanity, which is indeed what they are, are often instead the most highly respected citizens, who during the course of their iniquitous careers will be feted by heads of state, honoured with all sorts of distinctions, and universally acclaimed as public benefactors.

All this is clearly unacceptable, and we call on responsible people to rise up against them and the utterly dishonest scientists who seek to rationalize and hence legitimize their heinous activities. Quite obviously, it is not the hobby of a mere ‘special interest’ group, but rather the basic survival of the planet which is at stake.

Zac Goldsmith

Healthy People Healthy Communities Healthy Planet

Annual Liverpool Schumacher Lectures



Saturday 21st March 1998 St George's Hall All welcome

International Guest Speakers will provide the inspiration for this ground-breaking initiative to develop theory, policy and practice related to the environment and sustainability in the northern regions of the UK.

This environmental gathering brings together three prominent spokespersons for the environment, economics, science and spirituality who have made distinguished contributions towards a healthier society.

- Vandana Shiva ~ Indian physicist, philosopher and feminist interested in **Sustainable Development**
- James Robertson ~ Consultant on alternative futures, and social change interested in **New Economics**
- Danah Zohar ~ International management consultant and author interested in **Science & Spirituality**

More information from the
**Institute for Health,
 Liverpool John Moores University
 0151 231 4056.**



Liverpool John Moores University

WITHOUT MOVING FROM YOUR HOME COMMUNITY...

EARN YOUR MASTER'S DEGREE THROUGH OUR PROGRAM ON

Environment & Community.



Antioch University, a pioneer in public-interest education, now offers an M.A. developed for professional interested in the interdependence of environmental and social issues. This two-year program includes three two-week, on-campus sessions, with all other study and work done at home.

Focusing on the interfaces between values, ideas and constructive change, the program works to foster environmental stewardship and accountability in and across communities, organizations and institutions, combining coursework and case studies with individualized research projects and practica. The program is designed for environmental and social advocates, professionals and educators in all sectors.

The next class enrolls January 1999. Please contact us for more information and an application.

Individualized M.A. Program



ANTIOCH SEATTLE

(206) 441-5352 ext. 5702

2326 Sixth Ave., Seattle WA 98121

Antioch University is accredited by the Commission on Institutions of Higher Education of the North Central Association of Colleges and Schools.



Drawing by Richard Willison

"Can you imagine, in 1997 they actually believed in Progress."

Can Science 'Manage' Nature?

In science as in other areas of human endeavour, scientists are attracted to 'sexy' areas which are determined by grant money. Overall, there has been a woeful lack of funding to areas like taxonomy and forestry in sharp contrast to the area of my own work – *Drosophila* genetics. Now that is a sexy area. The fruitfly, *Drosophila melanogaster*, has been a favourite of geneticists for some nine decades. At least seven Nobel prizes have been earned by *Drosophila* geneticists, including three in Medicine and Physiology only two years ago. Billions of dollars and tens of thousands of person-years of research must have been spent studying *Drosophila* around the world. So it's not surprising that we have acquired profound insights into and enormous manipulative powers over that one species. For example, in my own lab (which is one small lab among hundreds) we can grow flies with 12 legs instead of six (can't walk very well but sure looks spectacular), four wings instead of two (can't fly but looks like a Boeing 747), a leg in place of a proboscis or a wing growing out of an eye. That's the kind of control one acquires with such research effort.

How can we be so arrogant as to assume that we can manage the likes of wild fish, whole communities of organisms, underground aquifers or atmospheric layers?

But, to this day, we have no idea how the fruitfly survives in the winters of Canada. We still don't know how an egg is transformed into a larva, how the larva becomes a pupa or how the pupa is turned into an adult. Another species of fruitfly, *D. simulans*, is so closely related to *D. melanogaster* that only a few scientists can tell them apart; yet

both fly species readily distinguish each other, and they don't have PhDs. And *Drosophila melanogaster* is just one of thousands of *Drosophila* species! If we still have tremendous problems to solve with a sexy creature like *D. melanogaster*, how can we be so arro-

*Billions of dollars and tens of thousands of person-years of research must have been spent studying *Drosophila* around the world. But, to this day, we have no idea how the fruitfly survives in the winters of Canada, how an egg is transformed into a larva, how the larva becomes a pupa or how the pupa is turned into an adult.*

gant as to assume that we can manage the likes of wild fish, whole communities of organisms, underground aquifers or atmospheric layers? I say this not to denigrate the astounding progress and discoveries that have been made by scientists; only to suggest that we temper our enthusiasm with some humility about how far we have come.

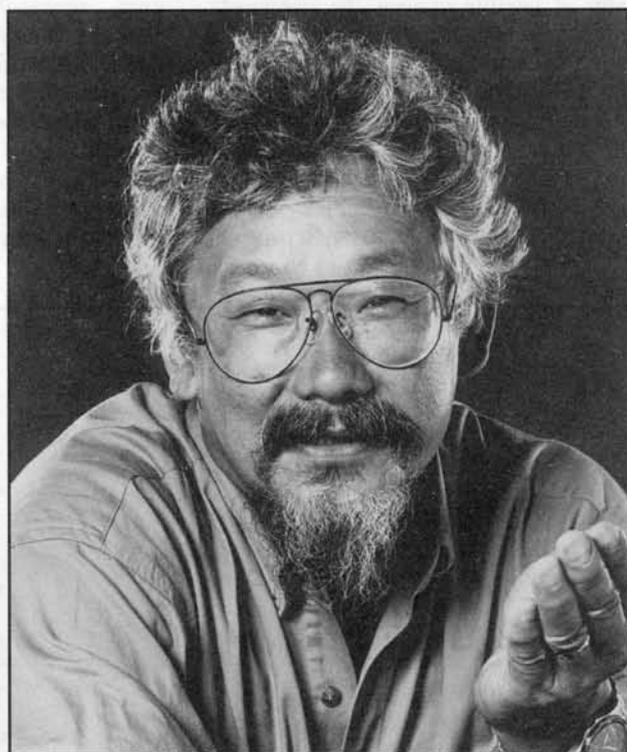
In our exuberance over the rapid growth of the scientific community and the consequent explosion of information, we forget how fragmentary and incomplete this knowledge base is. We often mistake our latest ideas for absolute truth, and I can say that from personal experience.

I graduated as a fully licensed geneticist in 1961 and thought I was hot! I figured I knew everything there was to know about genetics and would set the world on fire. For 25

years, research in genetics was my obsession and greatest joy. Today, when I tell students the hottest ideas we had in 1961 about chromosome structure and genetic regulation, they gasp or laugh in disbelief. In 1997, most of the best ideas of 1961 can be seen for what they are – wrong, irrelevant or unimportant. Indeed, that is the way science progresses, by proving most current ideas are incorrect or wide of the mark. It brings students to attention when I suggest that, when they have been professors for twenty years and tell their students what the hottest notions were in 1997, those students will laugh pretty hard too. So what is our hurry in biotechnology to patent ideas and rush products to market when the chances are overwhelmingly that their theoretical rationale will be wrong? The

very process of scientific advance repudiates current knowledge as the solid "truth" so many perceive it to be.

David Suzuki



David Suzuki (above) is the Chairman of the David Suzuki Foundation, Vancouver, Canada.

Why are the Forests Burning?

For many weeks now rainforests have been burning in Indonesia. Not only have 8,000 sq. km. been devastated in Borneo and Sumatra, but rampant fires have also broken out in Sulawesi and Java as well. A south-east wind has blown large clouds of smoky haze to Malaysia and more than 10,000 victims were hospitalized for respiratory complications in the first three weeks of September alone. Sarawak's capital Kuching measured a record Air Pollutant Index (API) of 839 (between 100 and 200 is considered unhealthy and anything between 300 and 500 extremely hazardous). With such an alarming situation, the government has been forced to think seriously about evacuating inhabitants.

But how, we should ask, is it possible for a wet rainforest to be ruined by fire? Primal rainforests *can* resist very small-scale deforestation and occasional fires because of their high humidity and frequent showers. Traditionally, indigenous tribes would clear and burn limited plots of land in rotation and plant rice in the warm ashes shortly thereafter. However, with the help of satellite images, the Indonesian government has shown that, far from it being the small tribes wreaking havoc in the area, some 176 companies involved in logging and large-scale plantations are the main contributors to mass destruction of the rainforests in South-east Asia.

Mainly involved in rubber and oil palm plantations, some reaching as

much as 240 sq. km. in size, they prepare their vast monocultures by logging an area and clearing it with fire. The companies who cannot prove their innocence in this wide-scale destruction have been threatened with having their licences revoked by the government, and among those suspected of negligence are 43 Malaysian, one American and five Singaporean companies. No fewer than 19 companies have been using deforestation as a means to induce migration from Java to Borneo – a project from

Far from it being the small tribes wreaking havoc in the area, some 176 companies involved in logging and large-scale plantations are the main contributors to mass destruction.

which even the World Bank withdrew for environmental and humanitarian reasons. In the meantime, 154 companies have lost their licences to utilize wood, and lawsuits have been filed.

Due to reckless and irresponsible logging, regional climates have been critically altered. With even less rainfall, periods of drought naturally occur, leading to the further drying out of what is in effect a tinderbox of bulldozed logs and wood shavings. Primal rainforests clearly not only deserve our swift attention as climate stabilizers of global warming, but also as natural fire-fighters.

Those companies responsible for importing tropical hardwood, rubber and palm oil must stand prepared to bear the blame for this dramatic environmental devastation. Mitsubishi and Marubeni from Japan, HIAG from Switzerland, Pirelli, Nestlé, among others, are called upon to take responsibility for what has happened in the name of 'development', as are consumers called upon to buy local resources instead of the above-mentioned products.

Of course, the blame has been placed upon the shoulders of those indigenous peoples marginalized on *that* march to 'progress' – not surprisingly – since to see them as destroyers of the forest legitimizes their further displacement to make way for the process which is really leading to environmental destruction – namely cost-cutting and domination, or so-called 'management' of 'natural resources' by unscrupulous, centralized and unprecedentedly powerful corporations. What is essential therefore is that the forests be returned to their natural inhabitants: those with long-term interests and with the experiential knowledge needed to maintain their health. This is an unfashionable view, since it automatically undermines the existence of the vast plantations, but it is nevertheless one which the media should acknowledge if disasters of this sort are to be avoided in the future.

Bruno Manser-Fonds



Tanjo Bangun, Still Pictures

The Rise and Fall of South-east Asia's Economy

by Walden Bello

The author is a noted Philippine economist at present involved in an in-depth study of the Thai economy. In his famous book, Dragons in Distress (1990), he described in great detail the horrific social and economic costs of the South-east Asian economic 'miracle', which he showed could only be of very short duration. In this article – a shortened and edited version of a much wider analysis – he shows just how the current economic collapse in South-east Asia was inevitable.*

The environmental community was presented with an early Christmas gift in August when plans were suspended to construct the \$5 billion Bakun Dam, a mega-project that would have accelerated ecological destruction in the state of Sarawak, and inflicted tremendous dislocation on the area's indigenous peoples.

What years of protest and lobbying efforts could not do was accomplished by the one thing that mega-builders understand: no more dollars. The Bakun fell victim to the financial and currency crisis now sweeping South-east Asia. The fast-moving events in the region took the world by surprise, especially since the so-called East Asian Tigers have been canonized as the model of the development establishment. "Tigers" they certainly no longer are.

Since the *de facto* devaluation of the Thai baht on July 2, 1997, by early October, the Philippine peso had lost nearly 35 per cent of its dollar value, the Thai baht about 42 per cent, the Malaysian ringgit 22 per cent, and the Indonesian rupiah 43 per cent. The freefall continued in the succeeding months, and the collapse of the region's currencies was paralleled by the collapse of its stockmarkets.

"Moron" versus "Menace"

Mahathir Mohamad angrily attributed the debauching of the region's currencies to speculators, singling out George Soros, whom he described as a "moron". At the World Bank-IMF annual meeting in September, Mahathir demanded that currency trading be criminalized, and advocated capital controls. Soros in turn called Mahathir a "menace" to his own country, asserting that Malaysia's currency problems were of its own making. The speculative activities of Soros vis-à-vis the Thai baht are well known, and there is evidence that his traders also targeted the Philippine peso.¹ However, as *The Nation* points out, "to blame Soros for the crises sweeping through the currency markets of South-east Asia is not addressing the real issue."² And the real issue is that, when South-east Asia jumped on the global bandwagon, it should have prepared for the downs as well as the ups. Instead, many have allowed the region's spectacular economic growth to lull them into a false sense of invincibility.

Dr. Walden Bello is professor of sociology and public administration at the University of the Philippines, co-director of Focus on the Global South, a programme of policy research of Chulalongkorn University in Bangkok. He is the co-author of *Dragons in Distress: Asia's Miracle Economies in Crisis* (London: Penguin Books, 1991) and several other books on Asian economic and political developments.

By pegging its currencies, South-east Asia's economies have ensured a certain degree of stability to help lure foreign funds. But such easy money is too often splurged on non-productive property markets and wasteful mega-projects. To add to the woes, billions are squandered through unmitigated corruption. Such excesses are now being ruthlessly punished by the currency market.

Crisis of a Model

The crisis is particularly serious in that it marks the unraveling of a model of development that carried within it the seeds of its own downfall. This model was one of high-speed growth, fuelled, not principally by domestic savings and investment, as in the case of Taiwan and Korea, but mainly by huge infusions of foreign capital. The mechanism to achieve this was to liberalize the capital account as fully as possible, achieving very considerable integration between the domestic financial market and global financial markets. The object was to "leapfrog the normally long and arduous course to advanced country status simply by maximizing their access to foreign capital inflows."³

This model "worked" for a time because it promoted the interests of three very influential actors: foreign direct investors seeking low-wage production sites; portfolio investors seeking high yields on their investment with a quick turnaround time; and technocratic and economic élites in South-east Asia that saw in high-speed growth or "fast-track capitalism a strategy that brought about the happy union of prosperity for them, development for all."

The First Wave: Japanese Direct Investment

The South-east Asian version of the East Asian "economic miracle" had its origins in the mid-eighties. At that time, the conjunction of high levels of foreign debt, record low prices of commodity exports and the skyrocketing price of oil threatened to drag the South-east Asian countries toward the same dire fate as that which was engulfing other highly indebted countries of the South.

All the key countries in the region were undergoing structural adjustment. Thailand and Indonesia were under World Bank and International Monetary Fund (IMF)-imposed programmes, while Malaysia chose to manage its own austerity programme.

* The original document, which is nearly twice as long, can be made available to interested readers (cost £3.50 including postage).

By the late eighties, however, a surge of prosperity was sweeping the region and structural adjustment had stalled in Malaysia, Indonesia and Thailand. In these countries, economic technocrats worked with the Bank and the Fund to bring about a greater export orientation and to liberalize substantially the capital account and financial sector, but they resisted the greater liberalization of trade, deregulation, and privatization of state enterprises demanded by the Bretton Woods institutions.

What retrieved the region from recession and spun it into albeit artificial prosperity – and enabled a number of governments to limit structural adjustment – was the massive inflow of Japanese direct investment. And the trigger of this momentous movement of capital was the Plaza Accord of 1985, which forced the Japanese government to allow the value of the yen drastically to appreciate relative to the dollar in order to relieve the US trade deficit with Japan by “cheapening” US exports to that country and making imports from Japan more expensive in dollar terms to American consumers.

With production costs in Japan rendered prohibitive by the yen revaluation, Japanese firms moved the more labour-intensive phases of their production processes to cheap-labour sites in East Asia, and especially South-east Asia.

What occurred was one of the largest and swiftest movements of capital to the developing world in recent history. Between 1985 and 1990, some \$15 billion worth of Japanese direct investment flowed into South-east Asia.⁴ That which flowed into Thailand in 1987 exceeded the cumulative Japanese investment for the preceding 20 years.⁵

By 1996, about \$48 billion worth of Japanese direct investment was concentrated in the core ASEAN countries of Indonesia, Singapore, Malaysia, Thailand and the Philippines.⁶ In 1995, the ASEAN countries received 10.6 per cent of Japan's total foreign direct investment, in contrast to only 7 per cent in FY 1990.⁷ This led to an ancillary flow of billions of dollars from Taiwan, Hong Kong and South Korea which at times outstripped Japanese investment.

Formerly focussed mainly on raw material extraction, Japanese investment in the late eighties and early nineties was aimed at reshaping ASEAN countries into an integrated production base for Japanese conglomerates that assembled manufactures for export to the US, Europe, and Japan itself. And as economic growth spawned a middle class in the ASEAN countries, the region itself became an important consumer of Japanese products.

The critical importance of Japanese investment to ASEAN was underlined in a recent report of the Japan Economic Institute. By virtually any measure, it noted,

“corporate Japan's presence in South-east Asia is massive. Japanese affiliates employed an estimated 800,000 people across ASEAN economies in 1994 ... Japanese manufacturers currently control about 90 per cent of the automotive market in most ASEAN countries.”⁸

The ambivalence of South-east Asian technocrats toward Japanese investment was heightened in the early 1990s, when direct foreign investment inflows into some countries in the region began to level off. For instance, in the case of Thailand, Japanese direct investment dropped by over 50 per cent, from \$2.4 billion in 1990 to \$578 million in 1993. While total foreign direct investment inflows into Malaysia continued to rise, Japanese direct investment fell from \$880 million in 1991 to \$742 million in 1994.⁹

The Second Wave: Finance Capital

By the early nineties, in fact, the financial technocrats were eyeing new sources of capital to sustain growth. These were the vast amounts of personal savings, pension funds, government funds, corporate savings, and other funds that were deposited in mutual funds and in other investment mechanisms that were designed to maximize their value. In the early 1990s, noted an Asian Development Bank report, “the declining returns in the stock markets of industrial countries and the low real interest rates compelled investors to seek higher returns on their capital elsewhere.”¹⁰

But beyond differentials in yields, the global economy had undergone major structural changes by the early 1990s which drove these funds to scout “emerging markets” like South-east Asia, where

“the globalization of world markets has prompted portfolio investors, like corporations, to seek to capture growth in developing economies.”¹¹

The Magic Bullet

To attract these funds to their markets, financial managers in the different South-east Asian countries evolved strategies that had essentially the same three key elements:

- Maintaining high interest rates to suck in foreign capital was a technique that the Asians learned quickly from other countries in the early 1990s, when interest rates in New York and other Northern financial centres were comparatively low. Mexico's technocrats had discovered the efficacy of this technique fairly early, and US investors responded quite eagerly. As William Greider has noted:

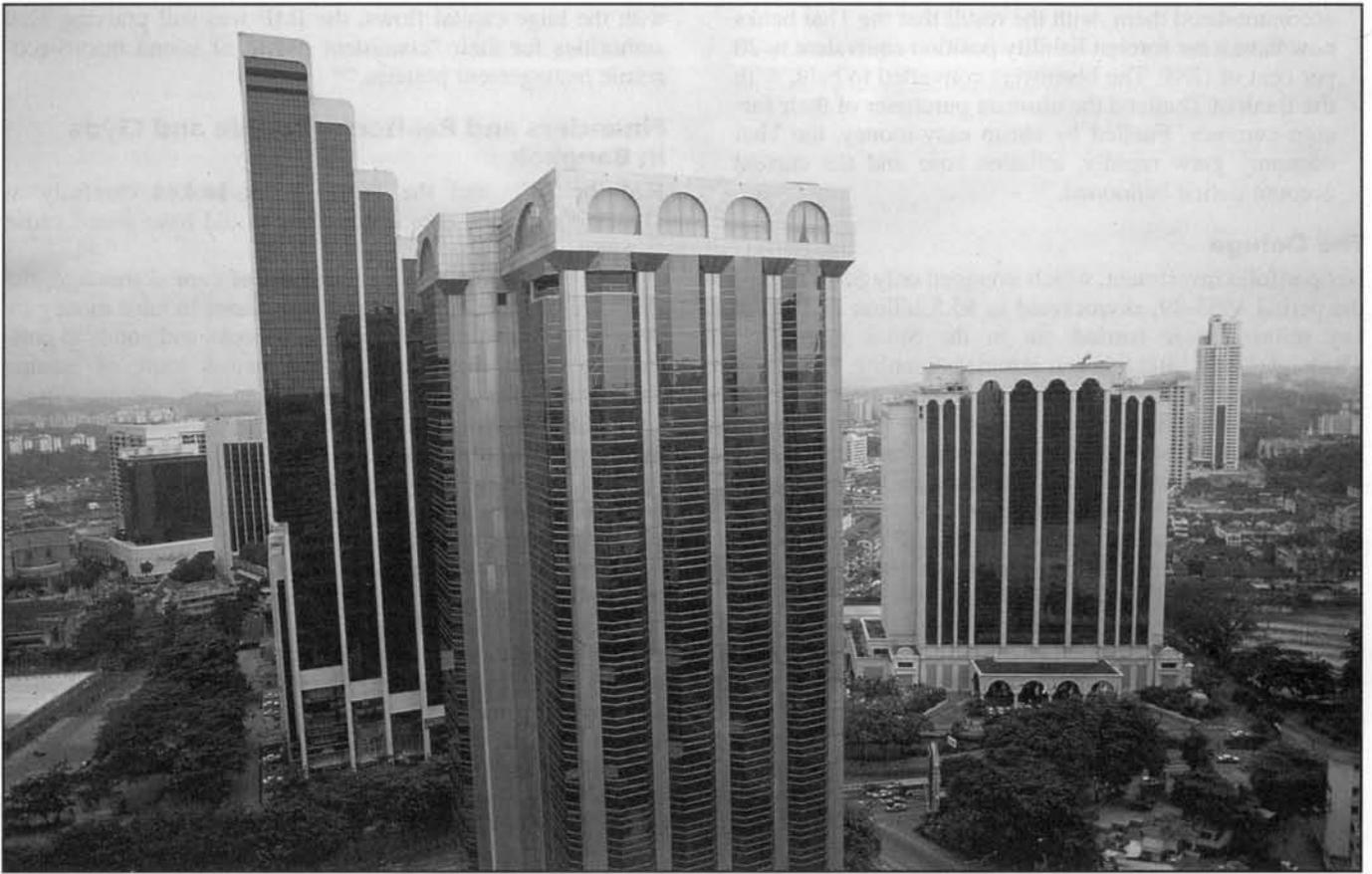
“By borrowing in New York's money market where interest rates were then comparatively low, an investor could buy Mexican stocks or short-term government notes and capture the spread between returns of 5 to 6 per cent in America and 12 to 14 per cent in Mexico.”¹²

Imitating the Mexicans, who in the early 1990s were impressing the world with their ability to draw portfolio investments in spite of low economic growth, central banks in South-east Asia manipulated a variety of policy tools to maintain relatively high interest rates to provide high yields on speculative capital.

- Fixing the rate of exchange between the local currency and the dollar was the second element of the strategy to bring in dollars. The idea was to eliminate or reduce risks for foreign investors stemming from fluctuations in the value of “soft currencies”, and was not simply a clever one of Asian financial technocrats; it was often demanded by key foreign investors as a condition for their coming in.

A pegged exchange rate was, of course, also needed by local banks and corporations raising money in global capital markets: they needed assurance that they would not be blindsided by devaluations which would significantly raise the costs of repaying dollar-denominated loans. Fixing the rate was not formal policy, but one that was done through “market friendly” means. This was the so-called “dirty float”, wherein the local currency was allowed to float within a narrow band, say, \$1: 25.25 - 25.75 baht; movement beyond the upper and lower limits would be countered by the central bank selling or buying dollars to keep the exchange rate within the band.

*In Malaysia, Indonesia and Thailand,
economic technocrats worked with the
Bank and the Fund to bring about
a greater export orientation.*



Downtown Kuala Lumpur, the heart of Mahathir's plans to industrialize and modernize Malaysia by the year 2000, with so-called 'top priority' mega-projects like the KL international airport and the 88-storey Petronas building.

- Financial liberalization was the third key element of the strategy. Among these measures was the elimination of foreign exchange and other restrictions on the inflow and outflow of capital, opening up stock exchanges to foreign portfolio investors, allowing banks to participate fully or partly in domestic banking operations, and opening up other financial sectors, like the insurance industry, to some foreign participation. At the same time, the South-east Asian countries began to deregulate their financial markets.

Early Warning Ignored

This three-pronged strategy was wildly successful in attracting a new infusion of foreign capital, not from Japan and the NICs as before, but mainly from the USA, which may have contributed more than 50 per cent of net foreign equity investments in Asia-Pacific.¹³ To South-east Asia's financial managers, this was positive as it helped them lessen their heavy dependence on Japanese capital inflows.

There were, however, voices of caution who warned that, unlike Japanese direct investment, which had a "strategic" quality to it, portfolio capital could just as easily flow out as flow in, and a mad stampede to leave could not be underestimated, given foreign investors' volatile moods. Lending credence to these fears was the Mexican financial crisis in December 1994, which was largely created by massive capital flight from an "emerging market" that had been highly rated

by portfolio investors. But while this event did dampen stock-market activity and bring down stock prices in South-east Asia, the markets soon recovered and lending and investment flows to the region reached even higher levels after the brief scare. From early 1995 to late 1996, foreign capital came into the region at a dizzying pace, before it began to flow out, at an equally rapid pace, early in 1997.

Of course, the mix of financial liberalization, interest rate policy and exchange rate policy was different in the different governments, but the thrust in the manipulation of these policy tools was in the same general direction.

A close look at the interaction of foreign capital, government policy and domestic economic interests in the different countries reveals the superficial successes and very real perils of a model of economic development driven by foreign capital.

The Case of Thailand

A close look at the interaction of foreign capital, government policy and domestic economic interests in the different countries reveals the superficial successes and very real perils of a model of economic development driven by foreign capital.

Thailand was, initially, the country that most successfully attracted other forms of capital inflow aside from foreign direct investment.

"Since 1987 the Thai authorities have kept their currency locked to the US dollar in a band of B[ah]t25-26 while maintaining domestic rates 400-500 basis points higher than US rates and keeping their borders open to capital flows. Thai borrowers naturally gravitated towards US dollar borrowings and the commercial banks

accommodated them, with the result that the Thai banks now have a net foreign liability position equivalent to 20 per cent of GNP. The borrowers converted to baht, with the Bank of Thailand the ultimate purchaser of their foreign currency. Fuelled by cheap easy money, the Thai economy grew rapidly, inflation rose and the current account deficit ballooned."¹⁴

The Deluge

Net portfolio investment, which averaged only \$646 million in the period 1985-89, skyrocketed to \$5.5 billion in 1993 after key reforms were carried out in the Stock Exchange of Thailand (SET).¹⁵ But this was just the beginning. Foreign portfolio investors arrived in force beginning in 1994, influenced by the continuing high growth rates and the World Bank's and Bank of Thailand's optimistic projections that the economy in the coming years would barrel along the path of high growth, low inflation, and financial and monetary stability. By 1995, foreign investors had become net buyers and Thai investors net sellers of equities at the SET, with the former snapping up 427 billion baht while selling off 379 billion baht.

Issues of stocks and bonds by private entities were, however, not the primary channel of capital flowing into Thailand. Loans to Thai private financial institutions were gladly advanced by international banks. The country's external debt more than doubled, from \$21 billion in 1988 to \$55 billion in 1994, with private debt climbing from 14 per cent of the total to over 25 per cent.¹⁶ With the establishment in 1993 of the Bangkok International Banking Facility (BIBF), a system which allowed foreign banks to establish subsidiaries to engage in dollar-denominated loans to local entities, the already significant flow of funds escalated, with loans channelled through it coming to about \$50 billion in just three years' time.¹⁷ This frenzied activity made Bangkok a debtors' instead of creditors' market, and the foreign debt rose by over 60 per cent in just three years to \$89 billion, with private debt making up \$66.2 billion of this figure.

The Myth of a Worried IMF

Contrary to recent reports, the onrush of portfolio investment and private loans did not alarm the World Bank and the IMF, though short-term debt came to about \$41 billion of Thailand's \$83 billion foreign debt by 1995. In fact, the Bank and Fund were not greatly bothered by the conjunction of skyrocketing foreign debt and a burgeoning current account deficit, which came to 6-8 per cent of GDP in the mid-1990s.

While other countries, marked by massive capital inflows, large current account deficits and a virtually fixed exchange rate, would have received stern admonitions, Thailand elicited praise and hardly any urgent warnings from the World Bank, even when its current account deficit hit a high of 11.4 per cent in the period July 1990-January 1991. As late as 1994, the official line on Thailand from the Bank was:

"Thailand provides an excellent example of the dividends to be obtained through outward orientation, receptivity to foreign investment, and a market-friendly philosophy backed up by conservative macro-economic management and cautious external borrowing policies."¹⁸

Indeed, as late as 1996, while expressing some concern

with the huge capital flows, the IMF was still praising Thai authorities for their "consistent record of sound macro-economic management policies."¹⁹

Financiers and Realtors - Bonnie and Clyde in Bangkok

Had the IMF and the World Bank looked carefully at Thailand's finance companies, they would have found cause to worry.

Traditionally plagued by problems of capital shortage, the finance companies found that it was easier to raise money by borrowing from abroad or by selling stocks and bonds to portfolio investors than through their usual route of issuing promissory notes to Thai investors. In fact, the creditors' market that Bangkok was in the early 1990s facilitated this, since, as one account put it, as a result of the stiff competition [to lend to Thai institutions], pricing levels in some cases are not premised entirely on the financial fundamentals of the borrowers. Many banks in Asia are anxious to develop good relations with their Thai counterparts, and are increasingly willing to lend to build relationships rather than to make money.²⁰

Taking advantage of the enormous spreads between the relatively low rates at which they borrowed dollars from foreign and big Thai banks and the relatively high local interest rates, finance companies re-lent money in baht to local enterprises and individuals, with the expectation of huge profits. The foreign banks and big Thai banks were not unhappy: raising dollars in the major financial centres where interest rates were at a low 6-8 per cent, the Thai banks and finance companies

captured the enormous spread between those rates and the 14 to 20 per cent interest rates which they charged clients for real estate and consumer-financing or for loans in the local market.

Flush with cash, the finance companies and banks channelled their borrowed money to activities that would be

moneymakers in the short term, such as real estate which offered in the early 1990s the prospect of high profits with a quick turnaround time.

In fact, the finance companies not only lent to property developers, but they themselves, like the high-flying Finance One, diversified into real estate speculation, as did many of the country's manufacturers.

Highrise after highrise rose in Bangkok and its environs. They were the pre-eminent sign of the great Thai boom. And boom the real estate sector did, "with property development in all its aspects - construction, building materials, mortgages, loans, legal fees and all manner of other financial services - [contributing] 30 to 50 per cent of annual GDP growth."²¹ Property-related investment, according to some calculations, came to 50 per cent of total investment,²² which made official Bank of Thailand figures, that real estate loans came to only 10 per cent of the exposure of Thai banks and 20 per cent of that of finance companies, gross underestimates.

In any event, by 1995, runaway construction had resulted in a glut of residential and commercial units, with the stock of vacant units in Bangkok coming to an estimated \$20 billion. By the beginning of 1997, half the loans made to property developers were "non-performing", with the total value of these loans estimated at between \$3.1 billion and \$3.8 billion. But the finance companies and banks could not afford to declare their real estate borrowers insolvent since their own

A massive debt crisis was in the offing but, unlike the Third World debt crisis in the 1980s, this one was brought about by "government commitment to neo-liberal market-friendly policies".



Tokyo, Japan.

financial standing could be seriously damaged.

Thus a game of pretend ensued. Finance companies and banks did not press their borrowers too hard on regular debt servicing, instead employing creative accounting techniques to hide the latter's actual financial status. Reality hit home however in early 1997 when two prominent institutions that were heavily dependent on foreign loans, Finance One, the country's premier finance company, and Somprasong Land Company, one of its largest developers, both defaulted on interest payments to foreign borrowers.

Après Moi...

With the bust in the real estate market, the national accounts for 1996 that came out early in 1997 were now seen as extremely worrisome. The foreign debt stood at \$89 billion, almost 80 per cent of which was private debt and slightly under half of which was short-term debt. The net foreign liabilities of Thailand's banks now came to 20 per cent of GNP. A massive debt crisis was in the offing, but unlike the Third World debt crisis in the 1980s, this one was brought about not by government borrowing but by private borrowing that "governments have ceased to try and direct because of their commitment to neo-liberal market-friendly policies."²³

The current account balance was a particular focus of foreign investors and creditors, since it indicates if a country will be able to earn the foreign exchange that will enable it to service its debt over the long term. Thailand's high current account deficit now looked worrisome, and many investment analysts reminded their clients that its ratio to the GDP was the same as Mexico's when the latter experienced economic meltdown in December 1994. It was especially worrying when the vaunted Thai export machine came to a standstill, registering zero growth in 1996, compared with the 21 per cent and 24 per cent growth respectively in 1994 and 1995. This was not unrelated

to the centrality of the property sector in driving the Thai economy. In the pithy words of a prominent investment specialist, "in the normal course of events", manufacturers would have

"gradually moved upmarket to more sophisticated products. In Thailand for the last several years many of them have put their manufacturing businesses on the backburner and devoted all the money into property instead. Now they are starting to come back to manufacturing but the pots and pans shop is still a pots and pans shop and the money it needs has vanished into property."²⁴

Looking at the worrisome figures, many investors figured it was time to go. By the end of 1996, it was estimated that there was around \$24 billion of "hot money" sloshing around in Bangkok in portfolio inflows and non-resident deposits that might try to move out.²⁵ And move it did. Stocks plunged to record lows as foreign portfolio investors stampeded to sell off their investments, with share prices plunging in late May 1997 by 65 per cent from their value during the balmy days of early 1994. The rush to convert baht into dollars and move out created tremendous pressure to devalue the baht. This placed the Bank of Thailand, the country's central financial manager, in an unenviable dilemma that was aptly captured by the following report:

"The central bank has little latitude in these uncomfortable circumstances ... The baht is under pressure, and the Bank of Thailand legally has to keep it in a narrow band. The central bank can't raise interest rates to support the currency without triggering further damage to its wounded property and finance firms. And, if it cuts interest rates to ease the burden of repayment, it would trigger even worse capital flight."²⁶

Speculators then moved in, betting on the eventual devaluation, intent on making a killing on well-timed purchases and sales of the dollar and baht. With some \$39 billion in reserves

at the beginning of 1997, the Bank of Thailand tried to defend the value of the baht. The Bank's sale of massive quantities of dollars stabilized the baht in two spectacular battles with speculators in late January and in early May, when other South-east Asian banks came to its rescue. However, the cost was high, with the Bank's reserves dropping by \$9 billion in seven months.²⁷ By the time of a renewed attack in late June, the Bank threw in the towel and allowed the baht to "float" beyond the margins of the narrow band in which it had tried to restrict its fluctuations in value relative to the dollar.

The baht went on to lose close to 20 per cent of its value in just a few days. The Thai finance minister flew to Japan, reportedly to ask for a \$20 billion loan. The Japanese government officials told him to go to the IMF first, and in early August, the Fund announced a \$17.2 billion emergency loan for Bangkok. The quid pro quo was the closing down of 58 of the country's 92 financial companies, a rise in the value-added tax from 7 to 10 per cent, significant cuts in government spending, a balanced budget, and an increase in utility prices. Fear gripped Bangkok, with panic withdrawals hitting many smaller banks and the finance companies and people muttering that soon they might be left with no choice but to keep their savings under their mattresses.

In early September, the finance minister announced that as many as one million Thais would lose their jobs in three months' time. For many Thais, who had little memory of the years of recession in the mid-eighties, before the spectacular 11-year boom, a world had come to an end.

The prime minister, however, assured foreign creditors that the loans they had made to the bankrupt finance companies, local banks and local enterprises would be guaranteed by the government, on the grounds that not compensating the creditors would provoke more capital flight and further reduce Thailand's attractiveness as an investment site. This was, as the logicians would say, the *reductio ad absurdum* of the thinking that had dominated Thai economic policy-making for more than a decade. In any event, the IMF loan to Thailand would go towards repaying the Thai private sector's foreign creditors, who refused to take the market penalties for investments which had gone bad.

... Meanwhile, in Malaysia

A detailed analysis of the unfolding of the crisis in Indonesia and the Philippines will not be attempted, but a few words of comparison with Malaysia are in order. In the last few years, foreign direct investment flows into Malaysia and Indonesia have outstripped those into Thailand, and speculative and other foreign capital flows have been equally dynamic. In Indonesia the capital account was substantially liberalized back in the 1970s, and in the late 1980s a package of reforms eliminated remaining substantial obstacles between the domestic financial market and global markets.

By 1995, Malaysia was rated the number one pick of Asia's economies by key investment houses, with Standard and Poor's giving it a sovereign credit rating of AA+ – above Thailand (A+) and Indonesia (BBB).²⁸ Indeed, Prime Minister Mahathir's anti-Western rhetoric notwithstanding, Kuala Lumpur was so sold on globalization that it built up South-east Asia's largest and best performing stock-market, and launched a big drive to make Kuala Lumpur a regional financial centre rivalling Singapore and Hong Kong.

The same formula of financial liberalization, high interest rates, and elimination of foreign currency risk via a stable exchange rate that marked macro-economic policy in Thailand and the Philippines was also broadly followed by the central banks of Malaysia.

Determined to maintain an economic growth rate of 8 per cent plus per year, Malaysia attracted a massive net inflow of private capital that reached \$11.9 billion in 1995. Much of this flow went into unproductive activities like stock-market speculation, financing of consumer spending, and, most worrisome, property development. While it was mainly domestic funding that drove the real estate boom, foreign funding played a significant role. With property loans growing faster than the overall loan growth rate, real estate loans made up, by 1997, about 25 per cent of the total exposure of both banks and finance companies.²⁹ By 1997, Malaysia had the highest property loan exposure in the region³⁰ – that is, if Bank of Thailand statistics on the real estate loan exposure of Thai financial institutions were to be taken at face value. With about 2 million square metres of office space scheduled to go on the market in 1997, vacancy rates were expected to shoot up, in some estimates by 15 per cent.³¹ A ruling early in 1997 to limit the banks' exposure to real estate lending to not more than 20 per cent of their loan portfolio came a little too late to ward off the developing glut.

Foreign capital was assiduously courted to finance the mega-projects that Mahathir labelled as top priority in line with his drive to make Malaysia a developed country by the year 2000. These projects included the 88-storey Petronas Towers, the world's tallest building, the completion of which was pushed through in spite of the softening of the property market and

In early September, the finance minister announced that as many as one million Thais would lose their jobs in three months' time.

widespread fears about the emergence of chronic oversupply in office space.³² Other big ticket items included the controversial Bakun Hydroelectric Dam in Sarawak (expected cost: \$5 billion), the Multimedia Super Corridor that would house more than 300 high-tech and information technology companies (\$6.8 billion), the new Kuala Lumpur International Airport (\$3 billion), and the 2 km-long "Linear City" that Malaysian planners envisioned as the world's longest building.

All this led to a \$5.6 billion current account deficit that came to 5.5 per cent of GNP in 1996 and, more worrisome, zero export growth. Worried about a real estate bust, the cooling down of an overheated economy, and the capacity of the country to earn foreign exchange to service its growing foreign debt, investors started to move out, leading to the downspin of the stock-market. As in Thailand, this movement outwards attracted foreign exchange speculators to bet on the devaluation of the ringgit.

The currency was finally forced to float freely early in August, but its freefall and that of the stockmarket had apparently just begun. Capital flight and further depreciation of the ringgit were exacerbated by Mahathir's bitter denunciations of currency traders as "immoral". Moves to restrict the activities of foreign investors in the stock-market, like preventing them from short-selling, accelerated its downspin, leading to a loss of 40 per cent of its market capitalization in about six months – a sum of M\$ 250 billion (or twice the size of the domestic product in 1996).³³

By mid-September, the most promising tiger before the currency crisis was being rated as the one in the worst shape

next to Thailand, and Mahathir had been forced to suspend, owing to lack of prospective funders, some of his cherished mega-projects, including the Bakun Dam and the Linear City.

Glitch or Prolonged Recession?

The collapse of South-east Asia's economies was followed in November by the implosion of Korea, the classic tiger economy. What happens next in a region that is now strewn with the wrecks of so-called economic miracles?

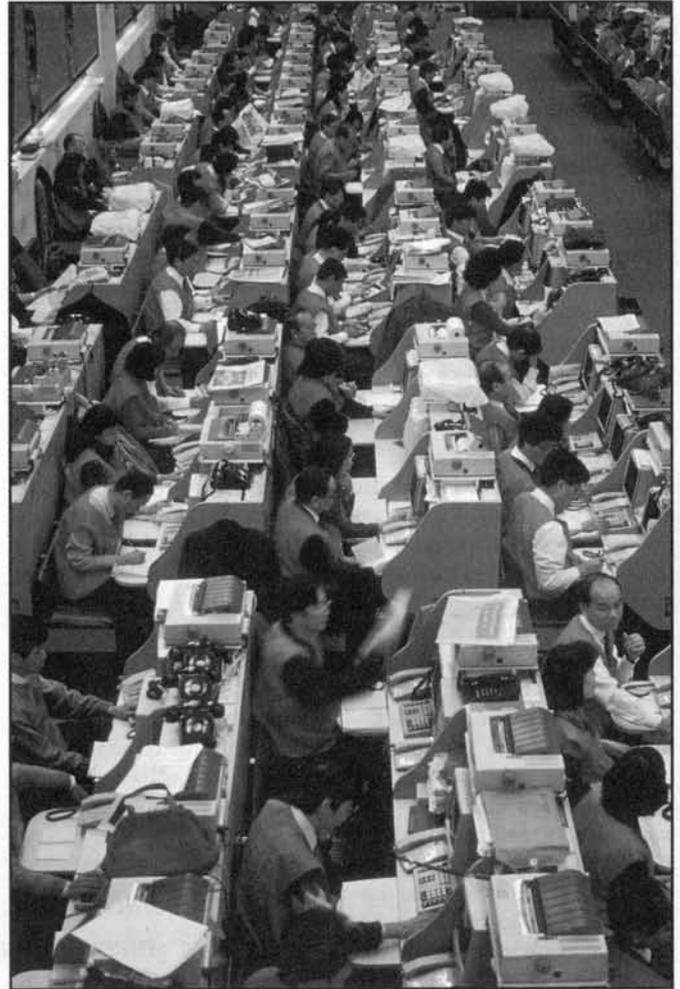
That recession will spread owing to the exchange rate dislocations, capital flight, and belt-tightening IMF stabilization programmes is certain. This will deepen as foreign direct investors increasingly follow the example of portfolio investors in reducing their profile in South-east Asia. Already, the Japanese, the biggest foreign investors in South-east Asia, are cutting back significantly on their investments. In Thailand, for instance, nearly all the key Japanese vehicle manufacturers – Toyota, Mitsubishi, Isuzu and Hino – have either shut down or reduced their operations.

While there is some talk about foreign capital returning soon to take advantage of the situation, and some speculation that South-east Asian countries will soon recover owing to competitive currencies that will allow them to regain export markets, the future is likely to be one of prolonged deflation. One key reason is that in the years before the crash the main engine of East Asian growth was increasingly intra-regional trade, with intra-Asian trade as a proportion of total Asian trade rising from 47 per cent in 1990 to 53 per cent in 1995. This strength has now turned into an Achilles heel. For unlike the early 1990s, when Japan's recession was offset by the boom in South-east Asian and continuing growth in Korea, today all three sources of regional demand have been doused, while a fourth source, China, remains a weak stimulus, with significant protectionist barriers limiting import growth to a mere 2.5 per cent in the first nine months of 1997.

This leaves Europe and the US as significant mass markets. Europe, however, is experiencing a slowdown in demand, with recession and high unemployment continuing to envelop key countries like Germany. As for the expansive US market, South-east Asian exporters are likely to encounter an uphill battle for market share against ruthlessly competitive China and the newly competitive countries of Latin America.

How the US will respond to the crisis in East Asia is a matter of great concern to the Asian élites, whose leaders tried to tell President Clinton and US officials not to press them too hard for financial and trade reforms during the APEC summit in Vancouver in late November. It is unlikely, however, that Washington will desist from taking advantage of the current crisis to achieve what it has been trying to push over the last decade, with little success: the free market transformation of economic systems that are best described as state-assisted capitalist formations.

US officials have long regarded the complex of protectionism, mercantilism, industrial policy, and activist state intervention in the economy that envelops most of the East and South-east Asian economies as a system that handicaps US economic interests. Thus as the Cold War wound down beginning in the mid-1980s, Washington began to redefine its economic policy toward East Asia as the creation of a "level



Hong Kong.

playing field" for its corporations via liberalization, deregulation, and privatization of the Asian economies.

It was a goal that the US pursued through various means in the late eighties and early nineties, including IMF and World Bank "structural adjustment" programmes; a harsh unilateralist trade campaign employing the threat of trade retaliation to open up markets and stop unauthorized use of US high technologies;

a drive to create an APEC free trade area with a comprehensive liberalization programme leading to borderless trade among 18 countries; and a strong push on the Asian countries to implement the GATT Uruguay Round agreements that eliminated trade quotas, reduced tariffs, banned the use of trade policy for industrialization purposes and opened up agricultural markets.³⁴

A golden opportunity to complete free-market reform has now opened up with the financial crisis, and it is unlikely that Washington will not take it.

Hence, its aggressive opposition to the creation of an "Asian Regional Fund" that is not supervised and co-ordinated by the IMF, which has served Washington loyally as an instrument to push a free-market agenda.

Indeed, the rollback of protectionism and activist state intervention has already been incorporated into the stabilization

The mega-projects that Prime Minister Mahathir labelled as 'top priority' included the 88-storey Petronas Towers, the world's tallest building, and the controversial Bakun Hydroelectric Dam in Sarawak (expected cost: \$5 billion).

programmes being negotiated by the Fund with Thailand, Indonesia and Korea. Thai authorities have agreed to remove all limitations on foreign ownership of Thai financial firms and are pushing ahead with even more liberal foreign investment legislation that would allow foreigners to own land, a practice that has long been taboo in that country. Even before it sought the help of the IMF, Jakarta abolished a 49 per cent limit for foreign investors to buy shares in publicly listed companies, a move that was recently replicated by Seoul, when it timed its announcement that it was seeking IMF help with a declaration that it would now allow foreign investors to buy up to 30 per cent of long-term guaranteed corporate bonds, a right they have been seeking for years in order to exploit a \$64 billion market.

Asians Debate the "Asian Model"

What makes Washington's free-market agenda especially potent at this point is that there are factions of the economic and political élites of the Asian countries that see it as the solution to the current crisis. In their view, it was the US corporate sector's embrace of radical downsizing and other reforms in the face of severe market penalties in the early 1990s that today account for the US's marked edge over the Japanese and the Europeans in almost every sector. According to this school, state-assisted capitalism in Japan – the model for Korea and the South-east Asian economies – may have worked in achieving high-growth rates in the early phases of industrialization but has become dysfunctional in an era of globalized markets, which rewards corporate structures that can respond swiftly, innovatively, and profitably.

To others, however, radical free-market reform is a prescription for disaster. For what the US economic managers have brought about in their pursuit of a lean and mean corporate strike force for global competition is one of the most

unequal distributions of income among advanced industrial countries, the emergence of poverty on a massive scale, and tremendous alienation among the lower-income groups. If this volatile discontent, which now finds expression in fundamentalist groups throughout, is also the price that will be exacted by the dismantling of the institutions of Asian capitalism, such as the lifetime employment of the core industrial labour force that is one of the central pillars of Japan, Inc., then the hesitations of Asia's economic managers are understandable.

A more significant objection is that radical free-market reform may lead, not to the transformation of Asian capitalism, but to its unravelling, since in contrast to the development of capitalism in the United States, an activist state has always been a central component in the birth and development of capitalism in Asia. Neoliberal reform will simply recreate the international economy in the image of the US economy, thus setting up a global playing field in which the economic actors that emerged in one particular historical road to advanced capitalism, the free-market/minimal-state path, will have an unparalleled competitive edge.

In this view, the solution is not to throw out the activist state with the bathwater, but radically to reform the state/private-sector relationship. Certainly, this would be along the lines of more transparency, more accountability to the public, and more democratic oversight of both government and corporations. It would also be along the lines of greater government discipline of the private sector, since in the view of some of those in this reformist current, one of the key lessons of the current crisis is not too much state intervention but lack of it. In the case of

Korea, for instance, they point out that the loosening of state surveillance of the private sector in the 1980s encouraged the chaebol to pour their profits, not into research and development, but into gambling in the stock-market and in real estate. Similarly, in the case of South-east Asia, it was lack of state intervention in financial markets that allowed over-investment in the property sector until it was too late. From this perspective, the crying need is hardly deregulation or less state intervention but the more effective regulation of the private sector and, in particular, the breaking up of corrupt particularistic patronage networks linking the public and private sectors. In other words, clean up government so it can serve as a more effective partner and regulator of the private sector.

Crisis ... and Opportunity?

But beyond recasting the relationship between the activist state and business, the emergent reformist voices in East and South-east Asia are articulating a broad agenda that breaks significantly with both the now discredited old-style state-assisted capitalism and the programme of radical free-market reform that they view as a cure worse than the disease.

Articulated by diverse voices throughout the region, the agenda is rich but, in many respects, still embryonic, one that still needs to be "operationalized" in a hardheaded fashion. Nevertheless, it is getting an increasingly sympathetic hearing from the public as the crisis develops, particularly in Thailand.

Globalization of financial markets has gone too far. Controls are badly needed on capital inflows and outflows since they are

proving to be highly destabilizing to developing economies. Proponents point out that even the deputy managing director of the IMF implicitly underlined the need for this when he told the IMF-World Bank meeting in Hong Kong in September that "markets are

*Neoliberal reform will simply recreate
the international economy in the
image of the US economy.*

not always right. Sometimes inflows are excessive, and sometimes they may be sustained too long. Markets tend to react late; but then they tend to react fast, sometimes excessively."³⁵

Very popular among reformers in the region today is the so-called "Tobin Tax" (named after its proponent, the US economist James Tobin), a transactions tax imposed on all cross-border flows of capital that are not clearly earmarked as direct investment. Such a measure, it is claimed, would help slow down the frenzied and increasingly irrational movements of finance capital.

A slowing down of the movements of speculative capital would also be accomplished by a device used by the Chileans and increasingly advocated by a number of South-east Asian experts: the requirement that portfolio investors make an interest-free deposit in the Central Bank of an amount equal to 30 per cent of their investment that they would not be able to withdraw for one or more years. This would make them think twice before pulling out at the scent of higher yields elsewhere.

Such measures would create a strong disincentive for speculative capital to enter and exit arbitrarily, with all the destabilizing consequences of these movements. As William Greider puts it, mechanisms like these "should greatly reduce the unproductive daily turnovers in currencies and other assets, thus increasing stability in money values."³⁶

Together with the excessive reliance on foreign capital, one of the negative lessons of the crisis is the consequences of the tremendous dependence of the region's economies on export markets. In the view of reformers, this has only led to extreme vulnerability to the vagaries of the global market and sparked

a regional and international race to the bottom that has beggared significant sectors of the labour force while only really benefiting foreign investors and the small domestic manufacturing élite.

Development must be reoriented around the centrality of the domestic market as the main stimulus of activity. What refocussing on the domestic market means is that, in addition to progressive taxation, there must be a more comprehensive programme of asset and income reform, including effective land reform, that is part of a "Keynesian" strategy of enlarging the domestic market to serve as the main engine of activity. There is in this, of course, the unfinished social justice agenda of the progressive movement in South-east Asia – an agenda that was marginalized by the GNP growth statistics during the miracle – but it is one that is now driven by the added logic of economic sustainability. Achieving economic sustainability based on a viable and dynamic domestic market can no longer be divorced from measures that promote equity.

There are other elements to the alternative development strategies being put forward in the region. The centrality of ecological sustainability is one of the hard lessons of the crisis; for the model of foreign capital-fuelled high-speed growth has left behind little that is of positive value and much that is negative. In the case of Thailand, at least, it is hard to dispute this contention by the reformers. As any visitor to Bangkok these days would testify, 12 years of fast-track capitalism is leaving behind few traces except industrial plant that will be antiquated in a few more years, hundreds of unoccupied high-rises, a horrendous traffic problem that is only slightly mitigated by the repossession of thousands of late-model cars from bankrupt owners, a rapid rundown in the country's natural capital, and an environment that has been irreversibly, if not mortally, impaired, to the detriment of future generations.



Kuala Lumpur: 88-storey Petronas Towers, the world's tallest building, another project on Mahathir's 'top priority' list.

Chris Stowers, Panos Pictures

References

- Margarita Debuque, "Economic Weakness Lures Speculators", *Philippine Daily Inquirer*, Sept. 22, 1997.
- "Blaming Soros is No Solution to Currency Woes", *The Nation* (Bangkok), July 1997.
- "Time for Less Hectic Growth", *Business Times* (Singapore), August 20, 1997.
- Figures from Japan Ministry of Finance.
- Thailand Development Research Institute (TDRI), *Thailand's Economic Structure*, Summary Report.
- Figures from Japan Ministry of Finance.
- Estimates in Christopher Johnstone and Atushi Yamakoshi, "Strength Without Dominance: Japanese Investment in Southeast Asia", JEI Economic Report, No.19A, May 16, 1997, p.3.
- Ibid.*, pp.5-6.
- Figures from Japanese Ministry of Finance.
- Min Tang and James Villafuerte *Capital Flows to Asian and Pacific Developing Countries: Recent Trends and Finance Prospects* (Manila: Asian Development Bank, 1995), p.10.
- "A Ride on the Rollercoaster", *Financial Times*, July 12, 1997.
- William Greider, *One World, Ready or Not: The Manic Logic of Global Capitalism* (New York: Simon and Schuster, 1997), p.260.
- Op. cit.* 10, p.15.
- HG Asia, *Communique: Philippines* ("Philippine Figures Hide a Thing or Two") (Hong Kong: HG Asia, Dec. 1996). (Internet version.)
- Op. cit.* 10, p.11.
- Ibid.*, pp.3,22.
- The BIBF was a system in which local as well as foreign banks were allowed to engage in offshore and selected onshore banking activities. BIBF licensees were allowed to accept deposits in foreign currencies and to lend in foreign currencies, both to residents and to non-residents and for both domestic and foreign investment.
- World Development Report*, 1996. Quoted in Jayati Ghosh, Abhijit Sen, and C.P. Chandrasekar, "Southeast Asian Economies: Miracle or Meltdown?" *Economic and Political Weekly*, Oct.12-19, 1996, 2779
- Quoted in Robert Chote, "Thai Crisis Highlights Lessons of Mexico", *Survey*, *Financial Times*, Sept.19, 1997, p.16.
- "Thais Market Triumph", *Asiamoney*, May 1995, p.16.
- Ed Paisley, "Asia's Property Perils", *Institutional Investor*, January 1996, p.61.
- Ibid.*
- Jayati Ghosh *et al.*, p.2780.
- HG Asia, *Communique: Thailand* ("Thailand – Worth a Nibble Perhaps but not a Bite") (Hong Kong: HG Asia, 1996). (Internet version.)
- Gill Baker, "Why the Big Mango Stayed on the Tree", *Euromoney*, Dec. 1996, p.63.
- Vatchara Charoonsantikul and Thanong Khanton, "Devaluation Seen as No Quick Fix for Economy", *The Nation*, May 6, 1997, p.1.
- Soonruth Bunyamane and Chiratas Nivatpumin, "Counting the Cost of Defending the Baht", *Bangkok Post*, Sept. 1, 1997, p.5.
- Hadi Soesastro, "The Economy: A General Review," in Colin Barlow and Joan Hardjono, *Indonesia Assessment 1995* (Singapore: Institute of Southeast Asian Studies, 1996), p.33.
- "Malaysian Asian Malaise", *Asiaweek*, Sept. 19, 1997; Bernhard Eschweiler and Sin Beng Ong, "Who Will be the Next Thailand?", *Asian Wall Street Journal*, August 21, 1997.
- Ibid.*
- Ibid.*; also, HG Asia, *Communique: Malaysia* ("A Few More Hurdles to Cross in Malaysia") (Hong Kong: HG Asia, 1997). (Internet)
- "A Race for the Sky in Asia's Cities", Sponsored section, *International Herald Tribune*, Oct. 6, 1997.
- Eddit Toh, "Dr. M Needs Long Term Plans to Win Foreign Players Back", *Business Times*, April 8, 1997.
- For an account of the dynamics of the trade conflict, see Walden Bello and Joy Chavez-Malaluan, eds., *APEC: Four Adjectives in Search of a Noun* (Manila: Manila People's Forum on APEC, 1996).
- Stanley Fischer, "Capital Account Liberalization and the Role of the IMF", paper presented at the "Asia and the IMF Seminar", Hong Kong, Sept. 19, 1997, p.4.
- Op. cit.* 12, p.257

Can We Learn the Truth about the Environment from the Media?

by David Edwards

The mass media system is made up of corporations, which themselves are part of a larger network of corporations. As such it lies very much at the heart of the establishment with which it must necessarily share the same basic assumptions and the same commitment to justifying the direction our society is taking. The media are thus unlikely, even structurally incapable, as the author explains, of offering root cause analyses of the problems we face today.

Advertising supremo Maurice Saatchi summed up what many people take for granted when he wrote recently that we live in "a democracy of information ... now nothing is hidden. Now we know everything." Reassuringly Saatchi asserted that we are free to know even "The precise ingredients of a packet of cornflakes."

Greens, apparently, are more or less in agreement. While environmentalists work hard to assemble facts and ideas relating to the devastation of the environment, they rarely discuss the idea that the media through which they are attempting to reach the public might be working to obstruct the transmission of those facts and ideas in some way.

From my own experience, I know that when the possibility has been raised with high-profile members of environmental movements, it has been clear that they have not seriously considered the problem and indeed are unaware that such a problem might exist.

The Political Economy of Truth - Filtering the 'Free Press'

The first obvious fact about the mass media system is that it is not, as some people casually (and even conspiratorially) like to remark, *controlled* by corporations: it is *made up* of them. Corporations do not control the car industry; the car industry *is* corporations. Likewise the media is made up of large corporations all in the business of maximizing profits, all tied into the stock-market. This immediately suggests that media corporations might have a tendency to be sympathetic to corporations, to the status quo and to the profit-maximizing motive of the corporate system – given that they are part of that system.

Not only are media corporations businesses, they are also owned by even larger parent corporations – NBC and Group W television in the US, for example, are owned by General Electric and Westinghouse respectively. Parent companies are often active in the Third World and in the arms trade. It seems

uncontroversial to suggest that the ultimate parental power in the media system might have some influence over what comes to be reported. How likely would a newspaper, or TV station, owned by a large arms manufacturer be to devote significant coverage to the activities of its parent company in selling arms to dictators repressing people in the Third World? How likely is this, given that journalists are employed by managers, who are employed by middle managers, who are employed by the senior management of that parent company? Again the answer seems obvious and uncontroversial.

Media corporations and the corporations that own them are, of course, owned by fairly wealthy people who are often on the board of other major corporations and who have innumerable personal and business contacts throughout the corporate and political system. Most of the British press is owned by what John Pilger calls "oligarchies in the making: Murdoch, the Maxwells, Lord Stevens, Viscounts Rothermere and Blakenham, 'Tiny' Rowlands."² We might ask what power owning a media corporation gives the owner.

Anyone who has worked in a corporation knows that the owner sets the agenda for the whole corporation. And, as corporate veterans will also know, the power system in a corporation is essentially totalitarian in structure – it is top down, with possibly a few bright ideas flowing up the chain but certainly no control.

What kind of influence might the fact that the media are all elements of the corporate system have on the contents of the average newspaper, TV station or magazine? Consider the former Soviet Union, where all mainstream newspapers were under the direct control of the Communist Party: what kind of view of the world would we expect to emerge? Naturally we would expect one supporting the goals and values of the rulers of the Communist Party; ideas such as: the Soviet people live in an association of free republics governed by the people; the Soviet government, naturally enough then, is devoted to the welfare of the people; the 'evil empire' of the West is dedicated to undermining the 'Motherland'; Afghanistan is being aided in a struggle against external imperialism; and so on.

The parallels between the Soviet and corporate capitalist systems were made clear by investigative reporter Mark Hertsgaard when discussing (in conversation) the inability of the Western media to examine the root causes of social and environmental problems:

David Edwards is author of *Free to be Human* (Green Books, 1995), also published under the title *Burning All Illusions* (South End Press, 1996). He has published articles and book reviews in *Z Magazine*, *The New Internationalist*, *Red Pepper*, *The Ecologist*, *Resurgence*, *New Humanist*, *The Contemporary Review*, *The Edinburgh Review*, *Cygnus Book Club*, *New Zealand Rationalist*.

"Those questions are not going to be asked on a consistent basis within new organizations that are owned by corporations that have every interest in maintaining the status quo. Those corporations are not going to hire individuals to run those organizations who care about that kind of reporting. Therefore, those individuals are not going to hire reporters who do that kind of reporting, and so you're not going to see it ... Generally, if you start as a reporter early in your career, you pick up the messages and it becomes almost instinctive. You don't even realize all of what you've given up, all of the small compromises that you've made along the way."⁷³

As Anthony Sampson has written of the British press:

"Journalists have been constrained from reporting or criticizing ... by pressures from owners, advertisers and public relations men, who helped set the agenda of the business pages."⁷⁴

Herman and Chomsky's propaganda model of media control – which focusses on the idea that ownership dramatically influences media content – has been almost completely ignored by the mainstream US (and British) press since publication in 1988 (in their book *Manufacturing Consent – The Political Economy of the Mass Media*). In a review published in the US journal *Atlantic Monthly* Nicholas Lemann explained that the discrepancies in media reporting described

by Herman and Chomsky are accounted for by the fact that "the press tends to focus on only a few things at a time"⁷⁵ and so cannot cover everything. Milan Rai writes that, although Lemann's analysis is "patently inadequate", it "may well be the most coherent critique of the propaganda model to come out of the mainstream press."⁷⁶ What to Sampson seems "natural" "looks like it's from Neptune" (Jeff Greenfield) and "absolute rubbish" (Tom Wolfe)⁷⁷ to mainstream journalism.

Given, as Sampson argues, the distaste for real reporting on issues that matter, it is no surprise that the British press – including the so-called "quality press" – prefer to focus elsewhere:

"They all project a lifestyle of hectic spending and travelling, heavily influenced by advertisers, and play down non-commercial tastes, whether for poetry, old books or the countryside."⁷⁸

or indeed, for understanding the true causes of environmental devastation.

Sanitizing the Truth

When considering the fact that the media system is comprised of profit-seeking businesses, we need to consider how the media make their money. A crucial factor in the modern era is advertising. Most newspapers and magazines do not survive by virtue of their cover price but by the strength of their abil-



"... the Nuclear Industry, the Petrochemical Industry, the Pharmaceutical Industry, the Biotech Industry ..."

ity to attract advertising revenue. The *New York Times*, for example, generally consists of around 60 per cent advertising and could not survive without it. Who then are the all-important advertisers? Obviously they are also major corporations who, again, are active in the environment and Third World. How might we expect these advertisers to react to extensive, critical newspaper coverage of their activities in the environment and the Third World? In fact, there is no need to speculate; there are plenty of examples of what does happen.

In 1985, the public-television station WNET lost its corporate funding from Gulf + Western after the station showed the documentary "Hungry for Profit", which contained material critical of multinational corporate activities in the Third World. Even before the programme was shown, station officials "did all we could to get the programme sanitized" (according to a station source). The Chief Executive of Gulf + Western complained to the station that the programme was "virulently anti-business if not anti-American," and that by carrying the programme the station was clearly not a "friend" of the corporation. *The Economist* reported that WNET is unlikely to make the same mistake again.

More recently, The Media Foundation, a Canadian organization specializing in the production of 'subvertisements' (anti-adverts critical of the consumer culture), bought advertising space for an anti-car advert in the commercial break half-way through a popular car programme. Understandably upset by an anti-car advert running alongside their own carefully crafted car commercials, advertisers pulled out of the programme which, as a result, collapsed. The lesson is clear: programmes which further business interests are boosted by all-important advertising revenue and so tend to flourish. Programmes

which damage corporate interests (even if, as in this case, unintentionally) don't and tend to crash, or retreat to the margins.

As profit-seeking corporations, the media are extremely vulnerable to business pressure of this kind. While it is true that environmental and human rights groups like Greenpeace and Amnesty International are able to generate significant publicity, they are no match for the enormous advertising, public relations and political lobbying power of transnational corporations, which are often more powerful than quite large nation states. Corporations have a powerful ability to lean on national governments and their media to ensure that both remain 'objective' – capital and advertising can soon be redirected to more amenable governments and media. One example of the sort of power that can be generated by state and business interests working in tandem was provided by the destruction of democracy in Guatemala during the fifties.

In 1954 the United Fruit Corporation (UFCO) in alliance with the US government and CIA decided to undermine the newly-elected government of Jacobo Arbenz – the first democratically-elected leader of Guatemala. UFCO had become concerned that the mildly-reformist Arbenz might interfere with its operations in Guatemala. With public relations guru, Edward Bernays, as co-ordinator, UFCO launched a massive propaganda campaign which, according to author Richard Immerman, "was extremely successful and, in reality, accomplished for the State Department the propaganda component of its own Guatemalan strategy."¹⁰ As a result, anti-Arbenz propaganda began to appear in major newspapers throughout

the US and beyond. The US government also contributed through the US Information Agency (USIA). From May to June 1954 alone:

"The USIA boasted that ... it prepared 200 articles and backgrounders, designed some 27,000 cartoons and posters, and developed both films and scripts for media outlets. By means of wireless file, cable, and fast pouch, this propaganda blitz reached all parts of the globe ... Action against Arbenz required a conducive international climate, and the State Department succeeded in establishing it."¹¹

The "action" was soon forthcoming in the form of a military coup arranged by the US.

Corporations often come together to form what have been called 'flak machines', the purpose of which is to promote a 'business-friendly' line in media and politics. In the United States, one such organization: AIM, or Accuracy in Media, lists at least eight oil companies amongst its supporters. Likewise, the US campaigning organization, Citizens for the Sensible Control of Acid Rain, is financed by major electrical utilities and coal companies and battles against tougher rules on air pollution.

Flak machines are operative throughout society. In an article entitled 'US schools told green means ugly' Edward Helmore reports that "Classrooms across the US have become

battlegrounds for opposing environmental ideologies ... Conservative and Religious Right groups contend that environmental education is creating a generation of 'ecocultists', indoctrinated by 'emotionalism, myths and misinformation' from green activists ..."¹²

David Reidnauer at the national Center for Public Policy Research, a conserva-

tive US think-tank, argues that "Environmental education is engaging children in politics in primary school and, frankly, is indoctrination."¹³ In Escambia, Florida, the school board is shortly to decide whether to ban a textbook entitled *Environmental Science: Ecology and Human Impact*. Whit Wise, a candidate for the school board, complained that the book presented global warming as fact and cited the UN as a scientific source. "It's absolutely against industry," he said. "It presents the student with a Unabomber theme. There's no solution except a return to the wild."¹⁴

Opponents of Green reform are powerfully supported by groups such as the Heritage Foundation, a conservative think-tank in Washington, which recently issued a report, *Little Green Lies*. Its author, Jonathon Adler, listed ten so-called eco-myths, in which he claims, among other things, that acid rain helps Eastern forests by providing nitrogen for nutrition.

As a result of this type of pressure, Helmore writes, teachers have been warned not to discuss subjects such as wilderness preservation, cattle grazing or the reintroduction of the wolf into national park land, lest they cross the interests of the state's powerful ranchers. "If I spoke about it, my job would be in serious jeopardy," says Jon Rachael, a fish and game biologist and visiting school lecturer. "Wolves, grizzlies and salmon restoration have become such hot issues that I don't do school programmes any more."¹⁵

In Meridian, Idaho, the school board guidelines state: "Discussion should not reflect negative attitudes against business or industry."¹⁶ Teachers are not to promote activism:

As a result of pressure, teachers have been warned not to discuss subjects such as wilderness preservation, cattle grazing or the reintroduction of the wolf into national park land, lest they cross the interests of the state's powerful ranchers.

planting trees, raising money to save whales, writing letters, protesting against polluting industries or rainforest destruction – all are out.

Links between business and state are well known, with a revolving door transporting senior corporate and state managers between corporations (including media corporations) and government. The state can mobilize huge resources to spread a pro-state and pro-business message. In 1968 the US Air Force PR effort involved 1,305 full-time staff, as well as countless thousands of staff with public relations duties. By contrast, the leading US dissident magazine – *Z magazine* – is run by a grand total of three people. As in the case of Guatemala, the US establishment can launch devastating propaganda campaigns against chosen enemies; the editors of *Z magazine* would be lucky to be granted space in the letters page of a national newspaper.

A further, related constraint on news reporting is that the media are heavily dependent on state news sources. Freshly harvested news from around the world is expensive to gather and the state effectively subsidizes the media by providing cheap and readily available current affairs sources from terminals such as Number 10, the Pentagon and the State Department. The effect of this subsidizing of the news is to control reporters. Erwin Knoll, former editor of *The Progressive*, tells of how, as the White House correspondent for the *Newhouse Newspapers* in the mid-1960s, he made the mistake of asking Lyndon Johnson some unplanned questions about his policy in Indochina. The result was that his career as a Washington correspondent was effectively ended.

More generally we need only consider the consequences of a newspaper or magazine adopting a radically critical line on state policy, say in the Third World or on the environment. The vital state news sources on which investigative journalists depend would dry up, starving the journalist and his or her newspaper of up-to-date news – to the clear advantage of competitors. For this reason editors have to step carefully around the toes of senior state and business managers. As David Nyhan of the *Boston Globe* has pointed out, the reality of our fearsome newshounds is that they are “a docile, not to say boot-licking, lot subsisting largely on occasional bones of access tossed into the press kennel,” happy to respond to lies with “worshipful prose”.¹⁷

This view is confirmed by historian Mark Curtis in his excellent review of British foreign policy since 1945. Curtis summarizes the performance of Britain’s media thus:

“The main argument in this study is that the systematic link between the basic priorities and goals of British foreign policy on the one hand and the horrors of large-scale human rights violations on the other is unmentionable in the propaganda system, even though that link is clearly recognizable in an analysis of the historical and contemporary record.”¹⁸

The margin for dissent in Britain, Curtis suggests, is a narrow one:

“*The Daily Telegraph*, *Times*, and *Financial Times* – which account for around 70 per cent of broadsheet readership – systematically fail to elucidate the specific link between British policy and human rights abuses. *The Independent* also regularly portrays the reality of British foreign policy in an inaccurately benevolent

light. These newspapers are firmly entrenched within a propaganda system and their reporting implicitly serves to promote the concept of Britain’s basic benevolence.”¹⁹

Deceived Deceivers

Given the amount of power and wealth circulating around the media and political systems, there is a constant incentive for journalists to rationalize any doubts they might have about their profession. As Noam Chomsky has argued, it is difficult to do a media job well if you don’t believe what you’re saying. The uncomplicated solution then (given the spoils at stake) is to believe it! Journalists need not be dishonest, or party to dark conspiracies. Often they are themselves merely victims of self-deception. They have been selected and employed to do a job precisely because they *do* think in the right way; because they *are* able to conform and yet still somehow believe themselves to be fearsomely independent.

Even a cursory glance at the mass media indicates that we do not have a free and unbiased information system. Environmentalists – no matter how accurate or brilliant their facts and ideas – will certainly encounter institutionalized obstacles to the communication of messages which threaten state and business interests; and few issues are as potentially costly as the environment. Stephen Schneider, head of Interdisciplinary Climate Systems at the US National Center For Atmospheric Research has estimated that conversion to a post-greenhouse economy would cost “hundreds of billions of

dollars every year for many decades, both at home and in financial and technical assistance to developing nations.”²⁰

Certainly, less damaging information will be allowed to reach the public, but more costly information will tend to encounter a series of filters which act to reduce the cost impact on power. This does not mean that the truth will be

completely excluded (a feature of the far less sophisticated totalitarian system of control) – we do hear about environmental crises. But we tend to hear about isolated problems; or about larger problems only in passing, while the true severity of those problems tends not to be emphasized. Also, we find that any number of experts are on permanent stand-by to rise up as a form of flak to defend corporate and state interests against “hysterical” Greens with their tendency to “exaggerate” and “spread panic” in order to “increase membership”. As Sherwood Rowland, whose laboratory first discovered the ozone-depleting properties of CFCs, has said:

“It is quite common on the scientific side of industry to believe that there aren’t any real environmental problems, that there are just public relations problems.”²¹

The public will tend to be reassured that such problems are now being dealt with, are under “new management” – even though this message may be merely a cost-saving deception. Above all, the public will tend not to be given access to an honest framework of understanding by which they might make sense of diverse problems in a wider context. What are in fact endless symptoms of societal problems are treated in isolation, so that the path society is taking remains protected *as a whole* from public scrutiny.

One result of the filter system has been vast media and political promotion of a wide range of ‘Green’ ideas which, though trivial and ineffective, act to deceive the public (including many Greens) into apathy and a sense of hopeless-

Freshly harvested news from around the world is expensive to gather and the state effectively subsidizes the media by providing cheap and readily available current affairs sources.

ness. Green consumerism and ecotourism are prime examples.

The flood of books, articles and TV programmes promoting Green consumerism from the mid-eighties onwards worked beautifully to deflect escalating public concern for the environment into the absurd but profit-friendly notion that consumer purchasing power (not true democracy) could transform the destructive tendencies of our economic and political systems. Attention has thus been diverted well away from the innately ecocidal nature of the path we are taking from one which must pursue short-term profit at almost any cost, and which traditionally defends and obscures itself behind the "necessary illusions" of 'democracy', 'defence', 'aid', 'development' and, indeed, 'Green consumerism'.

In 1990, for example, Eastern Electricity demonstrated the extent of its commitment to radical change by urging customers to use "more electricity rather than less" as a way of combating global warming; an argument based on the idea that, "should you use fossil fuels directly, you will be creating carbon dioxide and other Global Warming gases in the process of combustion."²² The obvious fact that the consumption of electricity also leads to the emission of carbon dioxide (around one kilogram per unit used) back at the power station is apparently irrelevant.

The above analysis requires no conspiracy theories, no esoteric language, no special understanding, but is based rather on simple common sense and an analysis of the standard operation of free-market forces. Yet, despite its apparent simplicity and reasonableness, analyses of this sort are entirely absent from media discussions of media freedom.

Chomsky has suggested three good reasons why the propaganda model cannot be justifiably excluded from any debate on the freedom of the media:

First, highly influential intellectuals have actually advocated that the media serve a propaganda function. In 1947, in his book *The Engineering of Consent*, Edward Bernays – who, as we have seen, was later to apply his engineering skills to the demolition of Guatemalan democracy – wrote that

"Any organization depends ultimately on public approval, and is therefore faced with the problem of engineering the public's consent to a programme or goal ... The engineering of consent is the very essence of the democratic process." (my emphasis)²³

Likewise Walter Lippmann – considered to be one of the most thoughtful and cultured journalists of all time – wrote:

"The common interests very largely elude public opinion entirely, and can be managed only by a specialized class whose personal interests reach beyond the locality. This class is irresponsible, for it acts upon information that is not common property ..."²⁴

Given that leading intellectuals propose that an élite class should "manufacture consent" (Lippmann's term, not Chomsky's), and that such views are well-received, indeed accepted as truisms, by other élites, it seems reasonable to suggest that the propaganda model should be part of the debate.

Secondly, Chomsky suggests, the propaganda model should be included because it is intuitively plausible: "If you simply look at the institutional structures of the media and the pressures that act on them, one would tend (on relatively uncontroversial assumptions) to expect that the media would serve this function." As Milan Rai comments "Media corporations are still corporations, it would be surprising if they worked to undermine corporate interests."²⁵

Chomsky's third supporting argument is that there is considerable public support for a propaganda analysis of the media. In 1981, a poll for the *Washington Post* found that public complaints were at considerable variance with media complaints. Forty per cent, the largest group, felt that the media

were "not critical enough of the government".²⁶ A Gallup poll carried out for the *New York Times* in 1986 found that 53 per cent of respondents considered the press too often "influenced by powerful people and organizations"²⁷ including the federal government, big business, trade unions and the military.

Despite advocacy, prior plausibility and general acceptance of the argument, a propaganda analysis continues to be absent from the debate – in the Green movement as elsewhere. On occasions when the issue of democracy and press freedom is raised in the media [for example the week-long Spring 1995 'Whose News?' debate in *New Statesman and Society* and on Channel Four, and the recent spate of *Guardian* articles: 'News You Can't Use' (1st April 1996) and 'Blunt Arrows Miss The Mark' (8th April 1996)], attention focusses on the problem of large media moguls monopolizing too much of the media pie, thus omitting the obvious and far more significant problem that the pie as a whole is already monopolized by corporations. Alternatively, commentators focus on the fact that news is too cynical, or sensationalist, or conflict-driven; or that there is too much intellectual 'junk food'; that the public is indifferent to foreign news; and so on. The real problem, that the media system is a corporate one and is therefore not free, is nowhere to be found.

We are living in a world where obvious truths can be ignored without anyone commenting or even noticing. Greens serious about saving the planet will need to become equally serious about restoring the public's right to the truth. At the very least, we must acknowledge the very simple fact that those problems covered by the mass media are portrayed in such a light as to confuse the public, divert attention from the more fundamental problems and minimalize the justified anger of a deceived and contaminated public.

References

1. Maurice Saatchi, *The Guardian*, 11 October 1995.
2. John Pilger, *Distant Voices*, Vintage, 1994, p.71.
3. Mark Hertsgaard. Quoted David Barsamian - *Stenographers To Power*, Common Courage Press, 1992, pp.134-5.
4. Anthony Sampson, *The Essential Anatomy of Britain*, Coronet, 1993, p.166.
5. Quoted Milan Rai, *Chomsky's Politics*, Verso, 1115, p.27.
6. *Ibid.*, p.27.
7. Jeff Greenfield, presenter of US current affairs programme 'Nightline', evaluating Herman and Chomsky's views. Quoted Mark Achbar ed., *Manufacturing Consent - Noam Chomsky and The Media*, Black Rose Books, 1994, p.149.
8. Sampson, *op. cit.*, p.167.
9. Quoted Herman and Chomsky, *Manufacturing Consent - The Political Economy of the Mass Media*, Pantheon, 1988, p.17.
10. Richard Immerman, *The CIA in Guatemala*, Austin, University of Texas Press, 1982, p.111.
11. Immerman, *ibid.*, pp.158-9.
12. Edward Helmore, *The Observer*, 9th June 1996.
13. Quoted, *ibid.*
14. Quoted, *ibid.*
15. Quoted, *ibid.*
16. Quoted, *ibid.*
17. David Nyhan. Quoted Noam Chomsky, *Deterring Democracy*, Hill and Wang, 1992, p.146.
18. Mark Curtis, *The Ambiguities of Power*, Zed Books, 1995, p.117.
19. *Ibid.*, pp.116-7.
20. Quoted in Tom Athanasiou, "US Politics and Global Warming", *Open Magazine Pamphlet Series* 14, 1991, p.4.
21. Quoted *ibid.*, p.8.
22. Quoted, presentation ceremony, Friends of the Earth, 'Green Con Awards, 1991'.
23. Edward Bernays, *The Engineering of Consent*, 1947. Quoted Achbar, *op. cit.*, p.41.
24. Walter Lippmann, *Public Opinion*, 1922. Quoted Achbar, *ibid.*, p.40.
25. Noam Chomsky (in conversation). Quoted Milan Rai, *op. cit.*, p.23.
26. *The Washington Post*. Quoted Milan Rai, *ibid.*, p.23.
27. Rai, *ibid.*, p.23

The Selfish Gene: a crude and naive fabrication

by Neil Broom

Whether selfish or not, the gene is not the unit of evolution. In isolation from the genome and the organism of which it is a differentiated part, it can do nothing. Nor is the organism itself the unit of evolution. The human organism for instance is a freak when isolated from the family, the community, the ecosystem and the cosmos. Dawkins' Neo-Darwinism merely reflects the extreme reductionism and mechanomorphism of the aberrant, atomized, and totally materialistic society we have created. It is of sociological interest only.

The rules of engagement for the neo-Darwinist are disarmingly simple. Life's evolutionary unfolding is to be accounted for in terms of an entirely material set of processes. From the first single-celled organism to the most complex of animals such as ourselves, the evolution of life is assumed to have been 'orchestrated' by Darwinian natural selection acting on heritable changes occurring largely at random in the offspring of the reproducing organism. The nonconscious has given rise to the conscious and the impersonal to the personal without any non-material guiding force or influence. This, in brief, is the philosophical worldview of the modern Darwinist.

A compelling array of metaphors has arisen, particularly in the last few decades, to help communicate to the public the complexities of modern biology's dominant paradigm. Probably the most persuasive have come from the pen of Oxford University zoologist Richard Dawkins. In his highly popular books, *The Selfish Gene*¹, *The Blind Watchmaker*² and, most recently, *Climbing Mount Improbable*³, Dawkins exploits a variety of down-to-earth metaphors that appear to make the neo-Darwinist view of life entirely believable. This brief article therefore examines several of these metaphors for the purpose of assessing whether they really confirm the materialistic presuppositions of neo-Darwinism.



Richard R. Dawkins.

The Selfish Gene

The problem of how life might have arisen on Earth is perhaps the most puzzling of mysteries confronting modern science. The issue is dealt with at some length by Dawkins in chapter 2 of *The Selfish Gene*. At the very outset he makes clear his conceptual framework:-

"Darwin's theory of evolution by natural selection is satisfying because it shows us a way in which simplicity could change into complexity, how unordered atoms

could group themselves into ever more complex patterns until they end up manufacturing people." (p.12)

He insists that life's beginning can be explained by the ordinary processes of physics and chemistry, thus

"... before the coming of life on earth, some rudimentary evolution of molecules could have occurred by ordinary processes of physics and chemistry. There is no need to think of design or purpose or directedness. If a group of atoms in the presence of energy falls into a stable pattern, it will tend to stay that way. The earliest form of natural selection was simply a selection of stable forms and a rejection of unstable ones. There is no mystery about this. It had to happen by definition." (p.13)

Dawkins then asserts the chance ("accidental") formation of some kind of replicating molecule (his 'replicator') with the capacity to encode in its 'offspring' occasional errors which are cumulative. No chemical details are offered, just a number of convenient though quite inappropriate analogies drawn with other physical processes such as the mechanism of crystal formation by the repeated stacking of layers of atoms or molecules.

This notion of a kind of chemical lottery leading to the genesis of life has been popular with scientists for many years. Huxley's⁴ much quoted analogy of a squad of monkeys strumming away mindlessly at their typewriters for millions of years and eventually writing out the complete works of Shakespeare is in

the same reductionist spirit. Given purely chance events we are led to believe that in the fullness of mega-time almost nothing can turn into almost everything.

The typing monkey analogy actually embodies a number of serious misconceptions that should be challenged. Firstly, we begin with monkeys who know how to type at random on their machines in order to produce the required endless succession of scrambled letters: i.e. the analogy assumes a highly structured system operating with appropriate non-random, mechanical devices. The analogy certainly does not represent 'brute chance' alone operating over mega-time. The use of the typewriters introduces right from the beginning what Tomlin⁵ calls an "anti-

Neil Broom works at the Biomechanics Laboratory, Department of Mechanical Engineering, University of Auckland

hazard element". Then we have the problem of recognition. The whole process assumes, again in Tomlin's words, a "phantom consciousness" stationed behind the monkeys choosing or selecting the works of Shakespeare. All this is a far cry from the intended point of the analogy, which is that pure chance operating over megatime represents the ultimate creative force behind the development of complexity in the biological world.

Finally, in keeping with the spirit of the analogy, if a group of monkeys typing at random could generate all of Shakespeare's works within the time available, the chances are that they would have, in the chaotic process, required so much paper, ink, and typewriters (these would undoubtedly wear out), as to fill the earth with junk. Actual evolution has not been so wasteful and polluting.

To Dawkins' credit he does stress in all his writings that it is a gross misunderstanding of neo-Darwinism to assume it is a theory only of pure chance. He goes to considerable lengths to remind his readers that mutation is the largely *random* process which the *non-random* mechanism of natural selection exploits. I shall comment further on what I believe to be the real nature of natural selection in due course. For now, what is important to note about Dawkins' biological world-view is that all aspects of evolution are entirely material, and this includes the sieving action of natural selection.

Herein lies, I believe, a major conceptual error. For while committed to a totally material and ultimately purposeless universe, Dawkins seems compelled to exploit the language of consciousness, intelligence and purpose to argue his case. He speaks of replicators which "may even have 'discovered' how to break up molecules of rival varieties ..." (p. 19), or which "perhaps discovered how to protect themselves ..." (p. 19). His replicators "construct for themselves containers, vehicles for their continued-existence." He asks:-

"Was there to be any end to the gradual improvement in the techniques and artifices used by the replicators to ensure their own continuation in the world?" (p. 19)

No, says Dawkins:

"Four thousand million years on, what was to be the fate of the ancient replicators? They did not die out, for they are past masters of the survival arts. But do not look for them floating loose in the sea; they gave up that cavalier freedom long ago. Now they swarm in huge colonies, safe inside gigantic lumbering robots, sealed off from the outside world, communicating with it by tortuous indirect routes, manipulating it by remote control. They are in you and in me; they created us, body and mind; and their preservation is the ultimate rationale for our existence. They have come a long way, those replicators. Now they go by the name of genes, and we are their survival machines." (p. 20)

"Now, natural selection favours replicators that are good at building survival machines, genes that are skilled in the art of controlling embryonic development. In this,

the replicators are no more conscious or purposeful than they ever were. ... Genes have no foresight. They do not plan ahead. Genes just *are*, some more so than others, and that is all there is to it." (p. 24)

But Dawkins cannot have it both ways. Either his genes really are purposeful, having, as he claims, "achieved notable triumphs" (p. 22), or they "just are". Philosopher Mary Midgley draws attention to this obvious philosophical inconsistency in Dawkins' biology when she writes⁶:-

"Genes cannot be selfish or unselfish, any more than atoms can be jealous, elephants abstract or biscuits teleological."

To claim that the gene is the fundamental ordering principle in the living world is to attribute to it wholly remarkable powers akin to intelligence and creativity. In effect, Dawkins is really talking about 'molecules with minds' which of course is a tacit denial of the very reductionist cause that he so vigorously promotes. For Dawkins it is the gene, "the ancient replicator", the master molecule, forever asserting itself in the face of natural selection, that has yielded, in the fullness of mega-time, organisms as complex as humans.

However, Paul Weiss, although writing several decades before Richard Dawkins, points out⁷ the sheer absurdity of the highly popular notion of the gene being the 'master molecule':

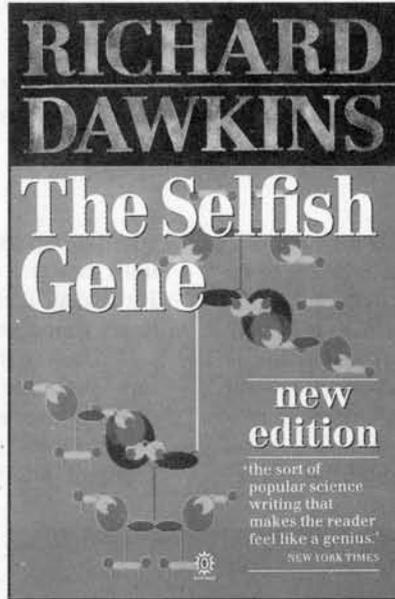
"The claim of the gene for recognition as the sole ordering principle in organisms ... rests on sheer assertion, based on blind faith and

unqualified reductionistic preconceptions." (p. 301)

There is implicit within the modern reductionist world-view, the belief that when we finally unravel the complexity of the gene we will eventually understand the great mystery of life itself. The respected Canadian geneticist Richard Lewontin is an outspoken critic of the 'atomistic machine view', so vividly articulated in the writings of Richard Dawkins. Lewontin suggests that the reductionist endows the gene with a quality akin

to some "modern form of grace". He questions the scientific and ethical motivation underlying the human genome project, the aim of which is to sequence the entire 3 billion bases of the human genetic code. With obvious tongue-in-cheek, Lewontin⁹ has this to say:

"Genes make individuals and individuals make society. If one society is different from another, that is because the genes of the individuals in one society are different from those in another. Different races are thought to be genetically different in how aggressive or creative or musical they are. Indeed, culture as a whole is seen as made up of little bits and pieces of cultural bric-à-brac: what some sociobiologists call culturgens. In this view, a culture is a sack of bits and pieces such as aesthetic preferences, mating preferences, work and leisure preferences. Dump out the sack and culture will be displayed before you. Thus, the hierarchy is complete. Genes make individuals, individuals have particular



The Selfish Gene, 1976. (New edition 1989).

"They have come a long way, those replicators. Now they go by the name of genes, and we are their survival machines."

Richard Dawkins.

preferences and behaviours, the collection of preferences and behaviours makes a culture, and so genes make culture. That is why molecular biologists urge us to spend as much money as necessary to discover the sequence of the DNA of a human being. They say that when we know the sequence of the molecule that makes up all our genes, we will know what it is to be human. When we know what our DNA looks like, we will also know why some societies are powerful and rich and others are weak and poor, why one nation, one sex, one race dominates another. Indeed, we will know why there is such a thing as a science of biology, which itself is one of the bits and pieces of culture lying at the bottom of the sack." (p. 14)

Lewontin's basic contention is that the very idea of the gene being the molecular 'mastermind' behind all living things is scientifically flawed. So often in the popular presentation of the science of life, the genes are portrayed as the 'intelligent' molecules of life with the ability to make proteins and make copies of themselves. This of course conveys to the lay mind what Lewontin describes as a "mysterious, autonomous power that seems to place them above the more ordinary materials of the body." (p. 48)

It is certainly true that the genes carry the crucial instructional information that is used by the functioning cell in order for it to construct the metabolic machinery of the living organism – the proteins. Further, the DNA molecule possesses a number of quite special features that are utilized by the living cell. However, it is equally important to stress that genes *of themselves* make nothing, nor are they self-replicating.

In order for a protein to be made, a whole sequence of biochemical processes must take place within the complex machinery of the cell with exquisite orchestration whereby the information encoded on the gene is utilised. Similarly, when copies of the gene are made (replication), the cellular machinery is again harnessed in a highly purposeful manner to achieve this end. In other words, these vital processes of life are mutually interdependent. The gene *and* the cellular machinery are absolutely essential. Lewontin comments further:

"Isolating the gene as the 'master molecule' is another unconscious ideological commitment, one that places brains above brawn, mental work as superior to mere physical work, information as higher than action." (p. 48)

One of the most serious errors of modern materialistic science is its claim to be able to 'explain' the total picture because it has been successful in unravelling isolated parts of the whole. The intellectual brilliance that led to both an understanding of the three-dimensional structure of DNA as a molecular code, and the mechanism by which it is replicated, presented an almost irresistible temptation to science. Have we not at last, by native cunning alone, discovered the ultimate secret of life? In the euphoria that followed these

dramatic discoveries of the 1950s, and repeatedly reinforced by the vast body of knowledge that has been bought for mankind by the 'aristoscience' of modern molecular biology, there seems little doubt in the minds of many people today that the puzzle of life has been largely elucidated by the tools of modern, mechanistic science. Life has been successfully 'dissected' into its component parts and laid out on the laboratory bench for all to see. Life, it would seem, has been emptied of its imagined mystery!

But is this really true? Returning for a moment to the gene, we need to remind ourselves that each individual step in the entire molecular process, whether it be the making of a particular protein, or the replication of the gene itself, is not a result of the gene's isolated activity, but arises from the functioning of an entire living cell or organism. We are compelled to think in terms of the behaviour of an exceedingly complex and highly integrated system rather than the more easily understood but isolated portions within this system. And the 'gene is God' dogma is just one extreme example of the 'nothing but' reductionist mentality that has so captivated the mind of the modern materialist.

A fundamental problem for all origin-of-life investigators is how information-rich, self-replicating molecular structures might have arisen in the prebiotic Earth by purely material means. Dawkins attempts to get around this problem with a linguistic sleight-of-hand. His molecules supposedly obey only the impersonal laws of physics and chemistry, but he then endows them with

patently anthropomorphic qualities. David Holbrook comments¹⁰ that

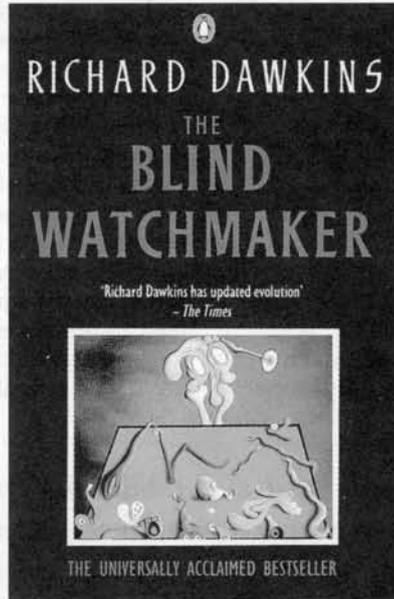
"Dawkins is forced to admitting to a non-material guiding force while denying it, and attributing its operation to something else – mere matter in motion."

Natural Selection and The Blind Watchmaker

Dawkins' metaphor of natural selection is the 'Blind Watchmaker'. He draws inspiration from William Paley, the nineteenth-century English theologian who argued that a complex object such as a watch needed a designer, an 'artificer', and that by obvious analogy, the complex machinery of life, for example the human eye,

must have had a designer. For Paley this could only have been God. Dawkins, while acknowledging the sincerity of Paley's argument, dismisses it as "gloriously and utterly wrong":

"All appearances to the contrary, the only watchmaker in nature is the blind forces of physics, albeit deployed in a very special way. A true watchmaker has foresight: he designs his cogs and springs, and plans their interconnections, with a future purpose in his mind's eye. Natural selection, the blind, unconscious, automatic process which Darwin discovered, and which we now know is the explanation for the existence and apparently purposeful form of all life, has no purpose in mind. It has no mind and no mind's eye. It does not plan for the future. It has no vision,



The Blind Watchmaker, 1988

*"Genes cannot be selfish or unselfish,
any more than atoms can be jealous,
elephants abstract or biscuits teleological."*

Mary Midgley.

no foresight, no sight at all. If it can be said to play the role of watchmaker in nature, it is the *blind* watchmaker." (p. 5)

Dawkins argues that the evolution of the human eye is entirely achievable by purely material means through a continuous series of small heritable changes arising from random mutations when acted on by the sieving action of natural selection. He also dismisses as a complete non-issue the problem raised frequently by many critics of neo-Darwinism who have argued that complex organs such as the human eye could not have evolved by a process of gradual, step-by-step assembly. Rather, these critics contend, the eye must have required the co-ordinated integration of all its parts, each evolving in synchrony, so as to produce a functioning organ of sight. No half-measures would have been permitted, since these, having no survival value, would be eliminated by natural selection. Not so, says Dawkins²:

"Vision that is 5% as good as yours or mine is very much worth having in comparison with no vision at all. So is 1% vision better than total blindness. And 6% is better than 5, 7% better than 6, and so on up the gradual, continuous series." (p. 81)

And again

"A simple, rudimentary, half-cocked eye/ear/echolocation system/cuckoo parasitism system, etc., is better than none at all. Without an eye you are totally blind. With half an eye you may at least be able to detect the general direction of a predator's movement, even if you can't focus a clear image. And this may make all the difference between life and death." (p. 41)

On the surface Dawkins might seem to have a convincing argument. No one in their right mind would disagree that a poor sensory organ (if this is what he means by "half-

cocked") is better than no sensory organ at all. It is easy to see that any slight improvement in vision will constitute a functional advantage, and might therefore be retained under the pressure of natural selection. Dawkins further buttresses his case by noting that in nature there exist many single and multi-celled animals that possess very simple light-sensing systems thus providing clear evidence for a continuum of evolutionary change from the most primitive light-sensing pigmented cell to the immensely sophisticated workings of the mammalian eye.

However, closer inspection reveals the utter poverty in Dawkins' logic. When, for example, Dawkins talks about "half an eye" he is not talking about an eye that is only half-way to achieving sight. Rather, he is referring to an eye that sees to a level of acuity or focussing that is some fraction of the quality of sight achieved by the fully developed eye. Any system that *achieves*, whether it be biological, electrical, mechanical, optical or whatever, is an *achieving* system, not a *nearly-achieving* system. The primitive light spot actually works as an eye, albeit at a low level of sophistication. It is a crude eye, not "half an eye". In evolutionary terms there is absolutely no selective advantage for a system that claims to achieve but doesn't! To illustrate more clearly what I mean, try applying this principle to the first controlled heavier-than-air flight of the Wright brothers in 1903. They could not have taken off and remained airborne for those 12 tentative seconds in Flyer I, had they not first created a minimum flyable system. When it comes to actually achieving flight it is nonsense to talk about a 'pre-plane' that couldn't fly but had say 5 per

cent or even 50 per cent of the requirements of a plane that could fly. The Wright Flyer was not merely a lucky fluke that happened to fly. It deserved to fly because it met the minimum requirements of aerodynamic stability, self-power and means of control. It is surely the height of silliness to talk about a half-cocked flying machine – either it can fly or it can't. And if it can't, it has no right to be called a flying machine.

Of course we can all appreciate that there are degrees of successful flight. The 12-second flight of the Wright Flyer cannot compare with the superb manoeuvrability and speed of a modern aircraft. However, both have flown. There is an enormous, qualitative technological leap from non-flight to flight. And in an analogous sense there is a gigantic qualitative leap from a non-eye to a functioning eye, however primitive its performance might be. There are degrees of sophistication of vision organs ranging from the primitive light-sensitive spot to the highly sophisticated optics of the human eye. But all are, optically-speaking, going concerns – *they all see* (in their own way). But Dawkins² insists that when it comes to achieving vision

"... part of an eye is better than no eye at all." (p. 85)

By the same kind of absurd reasoning it could be argued that a component representing say 1 per cent or 5 per cent of an aeroplane, perhaps a wing spar or a propellor, would be better than no aeroplane at all when it comes to achieving flight.

What Dawkins fails to point out is that any improvement in a system (remember this is precisely what he is endeavouring

to explain in purely material terms) is only possible if two important non-material conditions are met. Firstly, the very *idea* or concept of a system must exist. Secondly, there must also be the means to *recognize* that a given subset of components, whether arising by chance or by design, will actually constitute a step towards the achievement of

While committed to a totally material and ultimately purposeless universe, Dawkins seems compelled to exploit the language of consciousness, intelligence and purpose to argue his case.

the system that was originally conceived.

Going back to our analogy of flight, what is required is a *concept* of flight that is being *striven for*. A propellor or wing spar will contribute to the achievement of flight, but only if flight is being sought in a purposeful and creative way. And there must be the realization that this thing called a propellor will assist in the achievement of powered flight. One cannot select for improved flight unless there is actual flight to begin with. One cannot select for improved flight unless an improved performance can be recognized and the origin of this improvement exploited. Without this essential element of intentionality it is nonsense to talk of the power of small changes to produce any kind of technological/biological advancement or evolution.

Surely in a wholly material universe things *just are*. Can there be any purely material reason why a system should want to improve itself? Why should a functionally superior system be favoured over a functionally inferior one? On what purely material grounds is *superior* or *inferior* function to be judged? Here we seem to have exhausted the answers that a purely materialistic science can supply. Here, it would seem, the so-called scientific explanations must yield to a higher level of accounting.

The neo-Darwinist will no doubt counter that natural selection is the purely material guiding agency. Those changes in an organism that make it better equipped to face the rigours of the environment will confer on it a survival edge and will therefore be *naturally selected*. This is, of course, true. But it

fails to answer the more fundamental question – Why a premium on survival? On what purely material grounds is survival to be striven for? Again, a guiding force, i.e. natural selection, purported to be entirely material, but which is in fact loaded with an implied vitalism, is sneaked in through the back door by the neo-Darwinist.

Computer doodles, biomorphs and mixed metaphors

In *The Blind Watchmaker* Richard Dawkins also employs a form of graphic imagery to convince his readers of the creative power of cumulative small changes. He describes a computer program which begins to draw from a simple predetermined form and which ‘evolves’ an array of intriguing interrelated shapes as a direct result of small random errors or ‘mutations’ occurring in the instructional ‘genes’ contained in his program. Dawkins describes his surprise and delight when he first ran his computer program:-

“When I wrote the program, I never thought that it would evolve anything more than a variety of tree-like shapes. I had hoped for weeping willows, cedars of Lebanon, Lombardy poplars, seaweeds, perhaps deer antlers. Nothing in my biologist’s intuition, nothing in my 20 years’ experience of programming computers, and nothing in my wildest dreams, prepared me for what actually emerged on the screen. I can’t remember exactly when in the sequence it first began to dawn on me that an evolved resemblance to something like an insect was possible. With a wild surmise, I began to breed, generation after generation, from whichever child looked most like an insect. My incredulity grew in parallel with the evolving resemblance. ... Admittedly they have eight legs like a spider, instead of six like an insect, but even so! I still cannot conceal from you my feeling of exultation as I first watched these exquisite creatures emerging before my eyes.” (p. 60)

Dawkins’ main point is that as the generations pass, the total amount of genetic difference from the original ancestor can become extremely large. And while the ‘offspring’ in any one generation are different from their parents in random directions, the choice of which progeny goes forward into the next generation is determined by a non-random process, the human eye. He does admit that the model is deficient in that it uses an artificial method to do the selecting, and goes on to suggest that a really clever programmer might be able to devise a form of ‘natural selection’ that in some way modelled a mechanism of survival or death based on his so-called “biomorphs” interacting with a simulated hostile environment.

But there are glaring conceptual flaws in Dawkins’ biomorph analogy. Firstly, he has committed the fatal error of mixing his metaphors! In effect he has confused living systems with objects. What he produces are objects, a series of computer-generated doodles or ‘icons’ which certainly go through an intriguing sequence of transformations. They are nothing more than this and can never be used to model in even the most child-minded way any living system. Dawkins exploits the fact that his computer model generates shapes that crudely resemble all manner of objects, both living and non-living, and he even calls them by a name designed, it would appear, to evoke in the reader’s mind a connection with the living world – “biomorphs”. The unsuspecting reader might

then imagine a plausible connection between these computer doodles and the real thing! But actually Dawkins’ program produces pictures of anything and everything, living and non-living – a veritable array of recognizable shapes, merely crude and simplistic symbols of reality, but nothing more.

Dawkins’ use of the word ‘biomorph’ deserves even closer scrutiny. For if his computer program equally generates images of lunar landers, Spitfire fighters and crossed sabres, as indeed he demonstrates, why doesn’t he call his pictures Spitfiremorphs, lunar landermorphs, sabremorphs – or any other ‘morph’! My hunch is that if Dawkins were to do this, he knows it would destroy the intended impact of his metaphor. He beguiles the unsuspecting reader into imagining that here is a perfectly natural, chance-driven mechanism for producing all the complexities of the living world. And he wants the reader to hold onto this compelling reductionist metaphor – the ‘biomorph’. It is this very word that has the power to evoke in the reader’s mind an apparent causal connection between the real, living thing and its computer-generated icon.

But this association is of symbolic value only. It offers nothing in the way of explanation as to how living things might have come into existence. It provides no more satisfactory explanation for the evolution of biological complexity than does a picture of a Spitfire account for the creation of the real aircraft! The silly logic implied in Dawkins’ computer doodles is that the same kind of chance-driven and purely material processes

which he believes have given rise to the complexity of the living world, have also produced such sophisticated mechanical systems as Spitfire fighters and lunar landers!

This same logic might even encourage some of his more naive followers to try search-

ing for the fossilized remains of Spitfires or lunar landers in the sedimentary rock record. For, given the random generation of endless shapes of virtually anything, is there any fundamental reason why Spitfires complete with their high-performance Rolls-Royce Merlin engines and equipped with all the necessary flying controls could not have emerged in the ‘fullness of mega-time’ without any human assistance? If we conveniently ignore for the sake of argument some rather obvious problems of metallic decay, why shouldn’t we expect the rock record to yield the necessary evidence?!

Quite apart from this suggestion being a gratuitous insult to Reginald Mitchell, the brilliant British designer of the Spitfire, its obvious fatuity, as any sensible reader will judge, must surely expose the absurdity of Dawkins’ biomorph model as an explanation for evolving complexity in the living world.

But there are even more desperate deficiencies in Dawkins’ biomorph metaphor. For here is an intelligent human being programming a computer which itself has been built with an immense amount of human creativity. This computer is then instructed to generate an endless array of pictures by ‘random’ sequential changes. In other words, Dawkins requires a carefully structured, non-random, highly sophisticated and intelligent environment in which to produce, by chance, his so-called biomorphs. This is no more ‘brute’ chance than is implied in Huxley’s monkeys typing out their meaningless screeds on their typewriters.

For Dawkins’ model to carry any real conviction, even as a mechanism for ‘evolving’ an endless variety of geometric forms, he must be able to produce his biomorphs beginning only with brute chance. All ordering structures must be

Dawkins has committed the fatal error of mixing his metaphors! In effect he has confused living systems with objects.

excluded – absolutely. There can be no intelligent Being available to design, build, and program the computer. He must be able to show that with such utterly primitive conditions a ‘system’ can arise whose interacting parts actually *achieve* in a truly creative sense. Merely producing an object will not do! Frankly, I don’t think Richard Dawkins would be nearly as enthusiastic about his ‘biomorphs’ were he to remain faithful to the dogmatically reductionist position he so vigorously expounds.

He could of course draw a much more modest conclusion from his biomorph analogy but it might not make particularly exciting reading. It might go something like this: given the necessary resources of human intelligence, computer and appropriate software, the ‘random-walk’ biomorph analogy demonstrates how random instructions can be used to generate an endless variety of shapes which bear some purely external resemblance to the shape of both non-living and living things. It tells us absolutely nothing about how living systems might have evolved, nor what they are.

But Richard Dawkins, because he is totally committed to a thorough-going reductionist explanation for life, demands that we make much more of his computer doodles. Personally I think he is pushing our credulity just too far.

Climbing Mount Improbable

Despite Richard Dawkins’ insistence that the evolution of life is the result of entirely material processes, a brief inspection of one of his most recent metaphors will reveal a very different story – a story that betrays a thinly-veiled vitalism.

In his latest book, *Climbing Mount Improbable*³, Dawkins’ recurring emphasis is that the evolution of biological novelty such as the eye (his scaling the lofty peak of Mount Improbable) is achieved in the neo-Darwinian sense by gradual, almost imperceptible steps of improvement. In terms of his metaphor we take the easy route up the gentle, grassy slopes, rather than try to scale the impossibly steep cliffs and precipices. All that is required is that we head towards the summit.

For producing his eye, Dawkins draws on the computer modelling studies conducted recently¹¹ by the Swedish biologists Dan Nilsson and Susanne Pelger. They take as their theoretical starting point a flat, circular patch of pigmented light-sensitive cells sandwiched between a transparent protective layer and a layer of dark, backing pigment. Rather significantly, Nilsson and Pelger also state that they

“... avoid the more inaccessible problem of photoreceptor cell evolution ...”

In their model, ‘mutation’ works by producing, at random, small percentage changes in the degree of invagination of the patch, in the thickness of the transparent layer or in the value of the refractive index of a particular region. Selection is then made to act on those changes that improve spatial resolution or visual acuity. In a relatively small number of generations the model is shown to transform from the flat patch, through continuous minor improvements in design, into a focussed eye lens.

In the context of his own metaphor Dawkins then asks³ the fundamental question “... where can you get to on the mountain if you start from a given base camp and go steadily upwards?” (p. 151). For him the Nilsson/Pelger computer model nicely answers this question:-

“Going upwards means mutating, one small step at a time, and only accepting mutations that improve optical performance. So, where do we get to? Pleasingly, through a smooth upward pathway, starting from no proper eye at all, we reach a familiar fish eye, complete with lens.” (p. 151)

Now leaving aside certain non-trivial questions such as who or what was required to devise an appropriate computer program in the first place, or whether any such graphical representation can model in even a most simplistic sense the development of biological novelty, it is important to realize

that Dawkins’ mechanism for evolving an eye is anything but purely material. His analogy of climbing the mountain is loaded with intentionality. No climber ever reaches the summit of a high mountain without a powerful sense of wanting to get there! The very fact that Dawkins admits to “aiming for the summit”, or in his own words

“... only accepting mutations that improve optical performance” (p. 151).

is surely the most blatant admission that his version of neo-Darwinism feeds on the drive to achieve. It is profoundly goal-centred and purposeful, and the material laws of physics and chemistry as we currently understand them are unable to account for these qualities.

To conclude

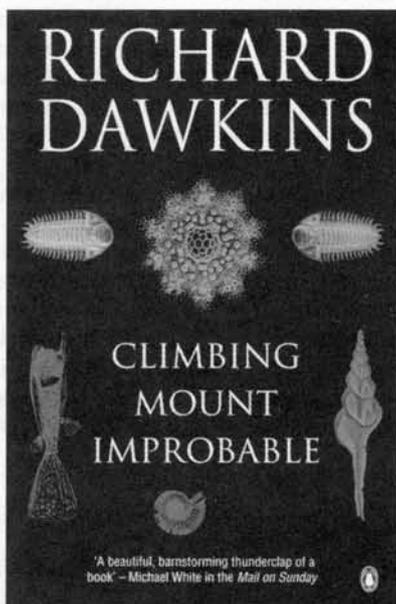
Neo-Darwinism insists that *natural selection* provides a wholly material means of capturing the functionally useful consequences of random mutations. It purports to be the integrating principle in the evolution of biological complexity. I believe this view is conceptually flawed. While it denies purpose it relies crucially on its operation.

Neo-Darwinism, as it currently stands, presents a gross trivialization of biological realities. The metaphors and images that are commonly used in support of its cause are, in my view, seriously misleading and serve only to disguise the much more fundamental teleological aspects that a purely naturalistic science is powerless to address. Neo-Darwinism is in urgent need of a major conceptual rethink.

The author is most grateful to Dr. Robert Mann for many stimulating discussions around the theme of this paper and for his critically-constructive comments on the draft.

References

1. R. Dawkins, *The Selfish Gene*. Oxford University Press, 1988.
2. R. Dawkins, *The Blind Watchmaker*. Penguin, 1988.
3. R. Dawkins, *Climbing Mount Improbable*. Viking, U.K. 1996.
4. James Jeans, in his book *The Mysterious Universe*, Macmillan, New York, 1930, p.4, attributes this analogy to Thomas Huxley, Darwin’s friend and apologist.
5. E. W. F. Tomlin, The dialogue of evolution by natural selection. *Universities Quarterly*, 38, (1), 1983/84, pp.53-69.
6. M. Midgley, Gene-juggling, *Philosophy* 54, 1979, pp.439-458.
7. P. Weiss, *Within The Gates Of Science And Beyond*. Hafner, New York, p. 301.
8. R. C. Strohmman, The coming Kuhnian revolution in biology. *Nature Biotechnology*, 15, March 1997, pp.194-200.
9. R. Lewontin, *Biology as Destiny – The Doctrine of DNA*. Harper Perennial, New York, 1992.
10. D. Holbrook, *Evolution and the Humanities*. St Martin’s Press, New York, 1987, Ch. 9.
11. D. Nilsson and S. Pelger. A pessimistic estimate of the time required for an eye to evolve. *Proc. Roy. Soc. Lond. B* 256, pp.53-58, 1994.



Climbing Mount Improbable, 1996

Return of the Native Seeds

by Rahul and Jacob Nellithanam,
Sarvodaya Shikshan Samiti

A radical counter-movement in central India is challenging the fraudulent claims of the proponents of the Green Revolution by developing practical on-farm solutions to the problems resulting from its failure. Farmers and activists have gone back to cultivating unirrigated wheat varieties by traditional methods, and their success has served to reinforce the fact that to survive environmentally, socially and economically India must set about reversing the Green Revolution.

Traditionally the farmers on the Malwa plateau in the state of Madhya Pradesh in central India cultivated a large number of unirrigated wheat varieties. With the introduction to this region in the late sixties of electricity and the technology for digging deep tubewells and drawing water with submersible pumps, they too were induced to adopt the Green Revolution. A wheat research centre was set up by the government in Indore, the nodal city of the area, to develop high-yielding varieties (HYV) of wheat appropriate to the area. The agricultural extension department of the government, aided by a grant from USAID, aggressively pushed the use of HYVs, fertilizers and pesticides and organized special training for farmers. The offer of loans for digging tubewells, the free supply of electricity, subsidized fertilizers and seeds, together with a guarantee that surpluses would be bought by the government at high support prices provided further enticement. As in the Punjab, where it all began, there was at first a visible increase in prosperity in rural areas. Farmers soon forsook their unirrigated wheat varieties and over a period of three decades these have all but vanished from the Malwa plateau.

Today, however, the chickens are coming home to roost. A study by M. Raghavan indicates that in the initially highly successful wheat-growing areas in the Punjab and Haryana the annual growth rates of production and yields of wheat began to fall from the mid-eighties onwards,¹ as they did in the rest of India. The same study shows that, though Madhya Pradesh is still showing increasing production rates, these are nowhere near as high as in the Punjab. Interestingly, this study also reveals that Madhya Pradesh is the only state in India which had higher rates of growth in wheat production and yields in the decade from the mid-fifties to the mid-sixties before the introduction of HYVs.

Raghavan goes on to show that there have been two imbalances in the growth in production and yields of wheat in India. The first is that the promotion of HYV wheat has taken place mainly in the Punjab, Haryana, and the Western Uttar Pradesh region, and the second is that it is the large farmers with the best quality land who have generally benefited from all the government support. Following from this, agricultural planners today unanimously agree that the problem of falling production can be solved only by aggressively promoting the cultivation of HYV wheat in other regions of India and among small and marginal farmers, who account for more than fifty per cent of the land holdings in the country today, and this finds expression in government policy.²



Displacement of small farmers, urbanization and the resultant social turmoil have been the natural consequences of the Green Revolution.

The input side of the Green Revolution too has become problem-ridden over the past decade or so.³ Gulati and Sharma estimate that the total annual input subsidy by the government for agriculture, including irrigation, fertilizers, electricity and credit, has risen from 25.99 billion rupees (Rs) in 1981 to Rs 150.63 billion in 1992 at constant prices and hence at a compound annual growth rate of 9.12 per cent.⁴ These subsidies now constitute 164.02 per cent of the government's planned annual expenditure on agriculture, and the trend is obviously unsustainable. Thus, while faced with an increasing demand for all these inputs the government finds that financial constraints threaten to limit severely its attempts to increase

agricultural production in general and wheat production in particular via present methods.

Irrigation through the utilization of ground water too has become problem-ridden. Excessive withdrawal has led to the need for deeper and deeper aquifers, and the water that has accumulated in these aquifers over thousands of years is being drawn out in the space of a few years, leading to a larger demand for electricity to operate the pumps. Furthermore, political exigencies have necessitated that this electricity be supplied free of charge, adding to the exchequer's already growing burden. A recent report by an expert committee set up to suggest ways and means to improve the functioning of the Madhya Pradesh State Electricity Board has strongly recommended that the free supply of electricity to farmers be stopped.⁵ The Malwa plateau has an annual recharge of only about 250 mm and so this excessive withdrawal has so depleted the aquifers that many deep tubewells have gone dry within just two years of their being sunk. The problem has been compounded by the fact that flood irrigation is very inefficient with respect to water use and most of the water flows out of the fields through drainage channels.

The economic non-viability of Green Revolution agriculture is the least of its problems. Its environmental and social consequences are far more disturbing and threaten the very existence of life on this planet. The destruction of forests by large dams, the salinization and waterlogging of fertile lands, the erosion of biodiversity, the increasing pesticide residues in

the food produced, the displacement of small farmers in part as a result of debts and mass urbanization, with the resultant social turmoil, have all been vividly detailed in the case of the Punjab by Vandana Shiva.⁶ Similar conditions are emerging in Madhya Pradesh, where already these ill effects are being felt in the areas of the Tawa and Bargi dams. Many more people (some 250,000) are to be displaced by the Sardar Sarovar dam being built on the Narmada river.

The Green Revolution package introduced into Madhya Pradesh consisted of the cultivation of the early maturing soya bean during the monsoons, followed by varieties of irrigated

wheat in the winter. A particularly disturbing aspect of this development is the replacement of such a wide variety of food crops by HYV monocultures. Leguminous crops like udad (*phaseolus radiatus*), lobia (*phaseolus lunatus*), moong (*phaseolus mungo*), cereals such as makki (maize) and jowar (sorghum), millets

and pulses like tuvar (*kajanus kajan*) and oilseeds like groundnut and sesame, which used to be sown in the monsoons, have been replaced by the soya bean. Besides a very serious erosion of biodiversity, the process has already led to a reduction of food availability among the people of the region, and hence poor levels of nutrition. What is more, studies have shown that the traditional Indian food crops are far superior in nutritive value to the HYVs.⁷ Under the circumstances, the poor subsistence farmers have suffered the most, as they do not have the money to buy substitutes for the food crops that have been displaced. The response from the government and USAID has been aggressively to promote the use as substitutes of those foods processed from the residue left after the extraction of soya bean oil.

A related problem is the susceptibility of HYVs to pest attacks and the proliferation of weeds due to the loss of the natural fertility of the land. This in turn has been countered by increasing applications of pesticides and herbicides which push up costs even further. More seriously, not only is the fertility of the land further reduced, but in the process all sorts of insects and weeds that are beneficial to agriculture are eliminated. This is a Catch-22 situation for which agricultural scientists can claim no solution. What is more, under the new conditions, denitrifying bacteria, which normally play an important role in decomposing dead organic matter, now direct their action to the chemical fertilizers that are applied. Thus the doses of fertilizer that have to be used are much higher than are actually required in order to make up for denitrification. This of course yet further increases costs.

Despite the expenditure of something close to a trillion rupees at 1980-81 prices, so far only about 35 per cent of the total agricultural area has been brought under irrigation. The irrigated area in Madhya Pradesh is only 20 per cent of the total agricultural area.⁸ Since it is clear that the further extension of irrigation will be difficult, and at best very slow, the latest government agriculture policy earmarks the use of the already irrigated areas for the high value horticultural production of fruits, flowers and vegetables for the agroprocessing industry and for exports. The production of food grains is to be shifted to newer areas which have not yet been subjected to the Green Revolution. This is clearly a last ditch attempt to save the Green Revolution, and one which must fail, given the fact that the international trade in agricultural and agro-processed products is dominated by a handful of multinational

The country is thus faced with a serious problem of food insecurity for which the agricultural planners and scientists have no effective solution.

The Role of Law in Natural Resource Management

Joep Spiertz and
Melanie G. Wiber, editors

1996 • Paper • \$29.95 • 186 pp. • ISBN 90-5250-501-2

The Role of Law in Natural Resource Management places the issues of property rights and resource management in a broad framework, describing and analyzing the contemporary pitfalls of creating law for resource management. The book addresses the concerns of property owners, the common good, and the law that attempts, but often fails, to create an equitable solution for their disputes. Case studies from both western and non-western countries are used and contributors ask questions designed to illuminate the real complexity of the natural resource arena.

Published by VUGA and distributed by Wilfrid Laurier University Press

Wilfrid Laurier University Press



Waterloo, ON N2L 3C5 • Telephone: 519-884-0710 ext 6124
Fax: 519-725-1399 • E-mail: press@mach1.wlu.ca



Sean Sprague, Panos Pictures

Studies have shown that the traditional Indian food crops are far superior in nutritive value to the high yielding varieties.

corporations which have already severely dislocated the economies and ravaged the food security of many African and Latin American countries by enticing them into producing cash crops for export.⁹ The country is thus faced with a serious problem of food insecurity for which the agricultural planners and scientists have no effective solution.

This is the context in which activists and farmers associated with the *Kisani Samvardhan Kendra* (Centre for Conservation of Traditional Farming Systems) (KSK), Indore started work in 1995 to try to conserve and develop the practice of cultivating traditional varieties in rainfed areas. Special emphasis was laid on reviving the cultivation of unirrigated wheat varieties in the Malwa region. Research done by the KSK into records maintained at the Indore Agricultural College has revealed that these varieties have been highly productive historically, which explains why Madhya Pradesh had a higher growth rate of wheat production in the fifties. These varieties of dryland wheat utilize the soil moisture for their growth. This is important because as much as 40 per cent of the total rainfall is taken up by plants as soil moisture but is not utilized by the HYVs, whose roots are too shallow. In a situation in which water is becoming a scarce resource, dryland wheat cultivation by conserving and using this moisture can provide a way out of the difficulties.

The task before the KSK was a difficult one as the traditional seeds had vanished from the Indore region. However, painstaking research finally unearthed some farmers in a

remote corner in the neighbouring Dewas district who still persisted with the cultivation of unirrigated wheat. This particular area had no irrigation facilities and so the farmers there had continued to use the older varieties. Six varieties of seed were obtained in this way and sown in sample plots in a village called Machla on the campus of the Sarvodaya Shikshan Samiti, an NGO involved in promoting Gandhian values. A one-hectare plot of land was also leased from the Kasturba Trust, Indore, an NGO set up by Gandhi in memory of his wife after her death in 1945, for comparative study with two popular HYVs of wheat sown as control in adjoining plots.

The cultivation of unirrigated wheat is a simple matter. Ideally jute is sown in the rainy season and then ploughed under to make in situ compost. Another option is to grow a short season leguminous crop or an early ripening variety of cereal. In the latter case, the land must

be given a full dose of farmyard manure before the monsoons, and it should be thoroughly ploughed in. There should be no drainage so that as much as possible of the rainfall is absorbed as soil moisture. Neither the leguminous crop nor the early ripening variety of cereal such as bajra (pearl millet) or makki (maize) competes with the wheat, as the latter's roots go down as deep as 30 cm in search of moisture and nutrients. This characteristic also insulates the wheat from competition from the weeds. These weeds, which are basically legumes, instead now enrich the soil by fixing nitrogen. As soon as the monsoon waters withdraw in early October the field is tilled. Two

It is quite clear that (even if the subsidies paid for HYV use were not counted) traditional varieties of unirrigated wheat cost much less to produce than the high yield varieties.

Yields and Costs of Wheat Varieties

Variety	Average Yield Tonnes/hectare	Potential Yield Tonnes/hectare	Cost of Production in Rs/Tonne	
			@ avg. yield	@ pot. yield
Farm Pissi	1.214	2.251	2883	1554
Jalalia	1.150	2.000	3043	1750
Thigria	1.289	2.000	2715	1750
Pissi 306	1.257	2.250	2784	1555
Khabdi Pissi	1.565	2.250	2236	1555
Sarbati Pissi	1.688	2.250	2073	1555
Lok-1	2.044	2.800	4061 (2935)*	2964 (2142)
WH-147	3.677	4.000	2474 (1849)	2275 (1700)

* Importantly, the 'cost of production' was calculated without including the input subsidy within the brackets.

Small 10m x 10m plots were taken where the yields were heaviest for each variety and the yields of these plots have been designated as "potential yields" as opposed to the "average yields" for the whole test area. In the case of the HYV variety, its publicized potential yield is taken.

tillings are done in cross directions. Then the wheat is sown. Thereafter the winter cold and dew ensure that the wheat reaches maturity by late February. There are thus savings in all the inputs as compared with the HYVs, which can survive only if weeds are removed, since, with their short roots, they are unable to utilize the moisture that lies deeper down in the ground. Sometimes a pre-sowing and later protective mid-season irrigation can be beneficial and can considerably increase yields without deleterious side-effects. This, however, depends on the kind of soil and the variety in question.

The wheat should be sown in early November but due to delay in procuring the seeds the sowing could often only take place in December and this affected production. As a consequence the unirrigated wheat has shown uneven productivity with some patches doing well and others not. The cost of producing the unirrigated wheat came to Rs 3500 per hectare. The input subsidy for the HYVs has been estimated at Rs 2300 per hectare and this has been added on to the actual monetary costs of producing it which were Rs 6000 per hectare for Lok-1 and 6800 per hectare for WH-147. The yields and costs are given in the table above. It is quite clear that at average yields all varieties of unirrigated wheat cost much less to produce than the Lok-1 HYV. This cost advantage remains, even if the subsidies paid for HYV use are not counted.

If the input subsidy is taken into account then the two Pissi varieties (varieties which can be ground easily: Pissi wheat is soft and sweet and the best wheat for making Indian bread) show a cost advantage over the WH-147 variety, and at potential yields, all the dryland varieties far outstrip it in cost effectiveness, taste and nutrition. Then there are the benefits in terms of soil quality improvement and reduced demand for water, which has

become a scarce commodity. Not surprisingly, many farmers, encouraged by these results, have opted for unirrigated wheat in the present season, and the cultivation of dryland wheat has even spread beyond the Malwa plateau to the districts of Jhabua, Kargone and Dhar.

The vast majority of farmers in India who cultivate small plots of land are driven by the desire to produce for subsistence rather than for profit. Consequently, over thousands of years they have developed a system of agriculture that makes the most of the locally available resources in terms of seeds, organic fertilizers, soil moisture and natural pest management. This led Sir Albert Howard, the pioneer of modern organic farming who did much of his work in Indore, to say some sixty years ago, "What is happening today in the small fields of India ... took place many centuries ago. The agricultural practices of the orient have passed the supreme test, they are as permanent as those of the primeval forest, of the prairie, or of the ocean."¹⁰ The clever use of rotation of a bewildering variety of crops ensured that despite flood and drought some part of the harvest was always saved. Famines occurred not because of the failure of agriculture but because of socio-economic factors such as excessive levies by kings and colonial rulers or due to usury and hoarding by money-lender traders.¹¹

Unfortunately modern agriculture and the lopsided development policies of the government and the World Bank have destroyed India's natural resource base and degraded the farmlands of subsistence dryland farmers with terrible results. Poverty forces them to migrate from their lands either seasonally or permanently in search of employment, as a consequence, and this further reduces the time they can devote

to their farms.¹² This is especially true of the central Indian region. Thus the restoration of subsistence agriculture to its previous levels of excellence and the achievement of even better results in future will require massive investments in environmental regeneration

Water that has accumulated in these aquifers over thousands of years is being drawn out in the space of a few years.

"The agricultural practices of the orient have passed the supreme test, they are as permanent as those of the primeval forest, of the prairie, or of the ocean."

- Sir Albert Howard

of agricultural and forest lands and in the conservation of water resources.¹³ This will simultaneously solve the problems of food insecurity and the present massive rural unemployment and environmental degradation that plague the Indian countryside. At present efforts in this direction are minuscule. The planners advocate watershed development and organic farming only as an adjunct to the mainstream high technology-based agriculture and so make minimal financial provisions for them. Moreover the attitude is one of condescension towards farmers and today even traditional practices are being taught the latter by city-bred experts who have never tilled a furrow.

The members of the KSK argue that traditional farming is not just a profession but a way of life that is dominated

by the conservationist ethic as opposed to the consumerist culture that has inspired the Green Revolution. Indeed, in the classical Indian language, Sanskrit, the word for agriculture 'krishi' and that for culture 'krishti' have the same root 'kri' meaning to till. This is because in ancient India, culture and production were intimately linked to the point that there was no differentiation between the two. At the present crucial juncture



When it's threshing time in Sri Lanka the neighbours come to help – a reciprocal arrangement.

when Green Revolution agriculture is on the wane it is absolutely essential for scarce resources to be directed to the promotion and enrichment of subsistence farming, which is both environmentally and economically superior. The problem of food production cannot be solved without forsaking the present crass commercialization of agriculture. This can only be achieved by a strong mass movement of farmers to force the government to reorient agriculture towards the achievement of real sustainability.¹⁴

The KSK has taken on the task of formulating alternatives, specific to the central Indian region, to big-dam-based irrigated agriculture. This work is complementary to that of the Narmada Bachao Andolan in its struggle against the Sardar

Sarovar dam being built on the Narmada river.¹⁵ The reintroduction of unirrigated wheat cultivation among farmers in the Malwa region is only part of a larger strategy of reintroducing

traditional seeds and establishing traditional farming systems as the dominant ones in the area. This is an essential step in reversing the socially and ecologically destructive, and totally non-sustainable high-input agriculture that for the better part of the last half-century has been imposed on small farmers in India by an

alliance between government, international agencies and transnational corporations in the agro-chemical industry, and which has now begun to threaten the very survival of mankind.

Traditional farming is not just a profession but a way of life, dominated by the conservationist ethic as opposed to the consumerist culture that inspired the Green Revolution.

References

1. Raghavan, M., *Performance of Wheat Crop in India 1952-53 to 1992-93*, Economic and Political Weekly, Bombay, June 24, 1995.
2. Ministry of Agriculture, *Twelfth Report of the Parliamentary Standing Committee on Agriculture*, Government of India, New Delhi, 1995.
3. Gulati, A. and Svendsen, M., eds., *Strategic Change in Indian Irrigation*, Macmillan India, New Delhi, 1995.
4. Gulati, A. and Sharma, A., *Subsidy Syndrome in Indian Agriculture*, Economic and Political Weekly, Bombay, September 30, 1995.
5. Tatarao, N. et al., *Report of the Expert Committee on Restructuring of the Madhya Pradesh State Electricity Board*, Government of M.P., Bhopal, 1997.
6. Shiva, V., *The Violence of the Green Revolution: Third World Agriculture, Ecology and Politics*, Third World Network, Penang, 1991.
7. Gopalan, C. et al., *Nutritive Value of Indian Foods*, National Institute of Nutrition, Hyderabad, 1987.
8. Centre for Monitoring the Indian Economy, *India's Agricultural Sector*, Bombay, September, 1995.
9. Bernstein, H., Crow, B., Mackintosh, M. and Martin, C., *The Food Question - Profits versus People?*, Earthscan Publications, London, 1990.
10. Howard, A., *An Agricultural Testament*, Oxford University Press, London, 1940.
11. Patnaik, U., *Food Availability and Famine*, Journal of Peasant Studies, Vol.19, No.1, 1991.
12. Rao, C.H.H., *Agricultural Growth, Rural Poverty and Environmental Degradation in India*, Oxford University Press, New Delhi, 1994.
13. Agarwal, A. and Narain, S., *Towards Green Villages*, Centre for Science and Environment, New Delhi, 1989.
14. Rahul, *Ungreening the Revolution*, Down to Earth, New Delhi, April 15, 1996.
15. Fisher, W., ed., *Working Towards Sustainable Development: The Damming of the Narmada River*, Cambridge University Press, Boston, 1994.

US petroleum giant to stand trial over Burma atrocities

The case of *John Doe I et al. v. Unocal Corp. et al.*

by Jed Greer

In close partnership with Burma's famously harsh military junta (SLORC), and heavily involved in the building of a controversial natural gas pipeline and drilling stations in that country, US-based petroleum giant Unocal may, following an unprecedented ruling by a US Federal Court judge, face trial and potentially be held liable for its alleged complicity in ecological and human rights atrocities carried out to its advantage in Burma. A ruling in favour of "John Doe I et al.", the plaintiffs, against the corporation could have vast repercussions and could set in motion new legal mechanisms for achieving corporate accountability.

In 1993, the United States-based petroleum giant Unocal agreed to build a natural gas pipeline and drilling stations in Burma with that country's military dictatorship, the state-owned gas company and the French energy firm Total. Three years later, lawyers representing Burmese citizens filed a lawsuit in US federal court, alleging Unocal's complicity with the dictatorship's forced relocation, enslavement, killing, torture, and other human rights abuses of the population living near the pipeline. Unocal responded by trying to have the suit dismissed. In a March 1997 pretrial hearing, however, the presiding judge issued an unprecedented ruling: Unocal could face trial – and potentially be held liable – in a US court for human rights abuses which its partners allegedly committed in Burma.

This initial decision is important, first and foremost, because it may lead to some justice for some Burmese suffering under the unregenerately harsh yoke of Burma's military junta (called the State Law and Order Restoration Council, or SLORC*). But the ruling is also significant because it extends an innovative legal trend which combines US and international law and, in so doing, marks a noteworthy step in the struggle for greater corporate accountability across national borders. "This case is not only about Unocal and Burma," law professor Robert Benson noted, but instead whether "corporate capital is going to be responsible for the human rights consequences" of its activities around the globe.¹

Burma, Unocal, and the Yadana Gas Pipeline

Shunned by much of the international community for crushing democratic opposition and imposing martial law in 1988, the Burmese regime's ongoing brutal suppression of political and civil rights, including repression of the country's pro-democracy leader and Nobel Prize winner Daw Aung San Suu Kyi, continues to earn it widespread opprobrium and to interfere

with funding it needs to maintain power. In April 1997, for example, President Clinton declared a ban on any new US investment in Burma, and a number of US corporations have succumbed to pressure and divested from the country.²

Not Unocal, however. The company has a 28 per cent working interest in the gas pipeline project, which involves extracting and transporting natural gas from the Yadana gas field in the Andaman Sea across Burma to Thailand. Viewing Asia as "the most opportunity-rich part of the world for the energy business," the company has made the Yadana project a priority recipient of its foreign exploration and production group's capital spending, which in 1997 increased by 44 per cent from the 1996 level.³ According to Unocal, the project offers "important benefits" to the Burmese populace, "through

hiring and training programmes, use of local vendors where appropriate, infrastructure improvements, and socio-economic programmes (medical care, schools, small business development)."⁴ "We firmly believe," Unocal's Chairman Roger Beach

asserted in early 1997, "that Unocal can contribute as a partner in this region to the betterment of the lives of the people."⁵ The company's President, John Imle, echoed these sentiments, saying as well that "the fastest way to democracy is to encourage economic development."⁶

The problem with this perspective, however, is the lack of evidence that the project is furthering either people's needs or democratic reform. Indeed, says EarthRights International, a Thailand-based organization that has investigated the effects of the pipeline's construction, the Yadana gas project is "perhaps the largest threat to human rights and the environment in Burma today."⁷ "In building the pipeline," EarthRights International explains:

"SLORC is committing a variety of severe and per-

*"The fastest way to democracy is to encourage economic development."
Unocal company President, John Imle.*

Jed Greer studies law at Yale University and is co-author of *Greenwash: The Reality Behind Corporate Environmentalism* (1996).

* In November 1997, SLORC renamed itself the State Peace and Development Council as part of an internal consolidation effort, but no serious observer believes this will alter the junta's policies.

vasive human rights abuses, primarily against indigenous peoples ... The Burmese army has arbitrarily detained, tortured, raped, intimidated, summarily executed, and stolen from villages. The army has also forcibly re-located numerous villages near the pipeline and has confiscated farms along the route without compensation. Moreover, the regime has been forcing tens of thousands of villages to work as military porters and as forced labourers on the pipeline route and other roads, buildings, and military camps related to the pipeline ... Workers are routinely beaten and even killed, and many others die as a result of exhaustion, disease, or accidents. Many villagers have fled their homes to avoid pipeline-related abuses and many of these have crossed over into Thailand.⁸

Furthermore, EarthRights International points out, the pipeline endangers both the marine and forest environments along its path. The organization notes, however, that the extent of this ecological harm is impossible to ascertain, because no independent environmental impact assessments exist and Unocal and Total refuse to divulge their own assessments.⁹

Contrary to Unocal's declaration of political and economic beneficence, the real impetus behind the gas pipeline is the Burmese regime's need for money. The Yadana project is one of many socially and ecologically destructive ventures the cash-strapped junta has pursued to obtain foreign currency. If completed, the project will be a key source of income, worth up to US\$400 million a year for the next three decades.¹⁰

The Lawsuit: John Doe I, et al. v. Unocal Corporation, et al.

The human rights abuses described above – in particular, torture, forced labour and relocation – prompted lawyers from the United States, including the New York-based Center for Constitutional Rights, as well as from EarthRights International, to file a lawsuit in October 1996 in a Los Angeles, California federal court, near Unocal's headquarters. Filed on behalf of a dozen Burmese plaintiffs, all farmers in Burma's Tenasserim region, who sought to represent the many thousands of people residing near the pipeline's construction route, the lawsuit named as defendants Unocal, Total, SLORC, and Burma's state-owned gas company. (The farmers bringing the suit are anonymous to protect them from retribution.) The gist of the charges against the corporations is that they "knew or should have known" about SLORC's history of human rights violations as well as the specific abuses allegedly resulting from the project, that they provided decision-making capacity and funds to advance construction, and that they are benefiting from the alleged abuses.¹¹

Unocal denies these allegations. "We speak only to our projects," announced Dennis Codon, the company's general counsel, "there is no forced labour."¹² He added elsewhere, "the accusations that we have been involved in torturing people or providing some human suffering: it's bizarre."¹³

As is common in such lawsuits, however, the initial response of the defendants – in this instance lawyers from Unocal – is not to fight the claims themselves but to attempt to prevent a trial from ever occurring. Typically, for instance, US-based corporations accused of causing harm in a country, especially a less industrialized nation, argue that US courts are not the proper "forum" to have the trial, which, they say, ought



Mandalay Prison, Burma.

Many villagers have fled their homes to avoid pipeline-related abuses and many of these have crossed over into Thailand.

to be held in the country where the harms are alleged to have occurred. Interestingly, Unocal did not make this particular argument with respect to Burma, a tacit acknowledgement that the country has no legitimately functioning judiciary that could fairly try the case.¹⁴

Instead, Unocal attempted to have the lawsuit dismissed through several other manoeuvres. First, it argued that SLORC and Burma's state-owned gas company enjoyed "sovereign immunity", which, as the name suggests, is a doctrine that usually affords sovereign states immunity from lawsuits in US federal court. Judge Richard Paez, who is presiding over this case, accepted Unocal's contention but rejected its

consequent argument: that Burma's government was a "necessary" and "indispensable" party whose absence would somehow deprive the plaintiffs of the redress they sought.¹⁵ Here, Judge Paez noted in his detailed opinion, the Burmese citizens are demanding that Unocal (and Total) pay for damages and withdraw from the project until the human rights abuses cease, neither of which requires involvement by the country's dictatorship or its gas company if the corporations are found liable.



Villagers fleeing from forced relocation and SLORC troops charged with securing the gas pipeline.

Additionally, Unocal asserted, the lawsuit deserved dismissal because it could interfere with the foreign policy initiatives of the US President and Congress to exert pressure on SLORC for reform of its human rights practices. Given the relative unity other branches of the US government have shown in opposition to SLORC, Judge Paez repudiated this argument as well (and in July 1997, the US State Department confirmed that a trial would neither "prejudice nor impede" US policy with respect to Burma).¹⁶ Judge Paez treated Unocal's claim that the plaintiffs' allegations did nothing to suggest the company's potential liability for SLORC's actions – that Unocal only had a "business relationship" with SLORC – with even greater scepticism, declaring it "meritless".¹⁷

The Alien Tort Claims Act

Unocal's most serious objection to the lawsuit – serious because it targeted an essential foundation of the suit – was that the plaintiffs could not assert claims based on violations of international law against so-called "private" defendants, that is, individuals or entities that are not representing a national government. To understand why Judge Paez determined that the Burmese citizens could assert their claims, it is necessary to examine briefly the statute on which those claims are rooted, the Alien Tort Claims Act (ATCA).

The Alien Tort Claims Act allows US federal courts to try a case in which non-US citizens ("aliens") have alleged a tort (harm or wrong) in violation of international law. Although it was enacted long ago, the concerted application of the ATCA is of relatively recent vintage, dating back less than two decades. Only in 1980 did a US court permit a lawsuit to proceed, although neither party was a US citizen and the alleged harms had occurred outside the US. And only in 1995 did a US court extend the ATCA's reach beyond violations that government agents allegedly committed to such alleged wrongs by "private" individuals found to be acting in co-operation with government officials or significant government aid.¹⁸ The further leap which plaintiffs' lawyers made in the case against Unocal and Total was to apply the ATCA to corporations. "For

almost all areas of the law", says Judith Brown Chomsky of the Center for Constitutional Rights, "a corporation has liability just like a person if the corporation is the wrongdoer. If any person can be liable under the statute, then a corporation can."¹⁹ Crucial to the ATCA's application, however, is the nature of the alleged violation. Not only must US courts recognize the violation as one against "the law of nations" (those legal norms defined in juridical writings, national practices, and judicial enforcement of international law), but near universal recognition must also exist. In legal terms, there must be a violation of a *jus cogens* norm, which the Vienna Convention defines as "a norm accepted and recognized by the international community of states as a whole as a norm from which no derogation is permitted, and which can be modified only by a subsequent norm of general international law having the same character."²⁰

So far, violations which fall under this category are few and may differ depending on whether a government official or private individual is the alleged wrongdoer. Slavery and genocide, for example, qualify as violations of *jus cogens* norms if a private individual – or, according to Judge Paez's opinion, a corporation – is involved, but torture appears to qualify only if the defendant is a government official. Thus Judge Paez's focus on slavery as he affirmed the ATCA's applicability:

"The allegations of forced labour in this case are sufficient to constitute an allegation of participation in slave trading. Although there is no allegation that SLORC is physically selling Burmese citizens to the private defendants, plaintiffs allege that, despite their knowledge of SLORC's practice of forced labour, both in general and with respect to the pipeline project, the private defendants have paid and continue to pay SLORC to provide labour and security for the pipeline, essentially treating SLORC as an overseer, accepting and approving the use of forced labour. These allegations are sufficient to establish ... jurisdiction under the ATCA."²¹

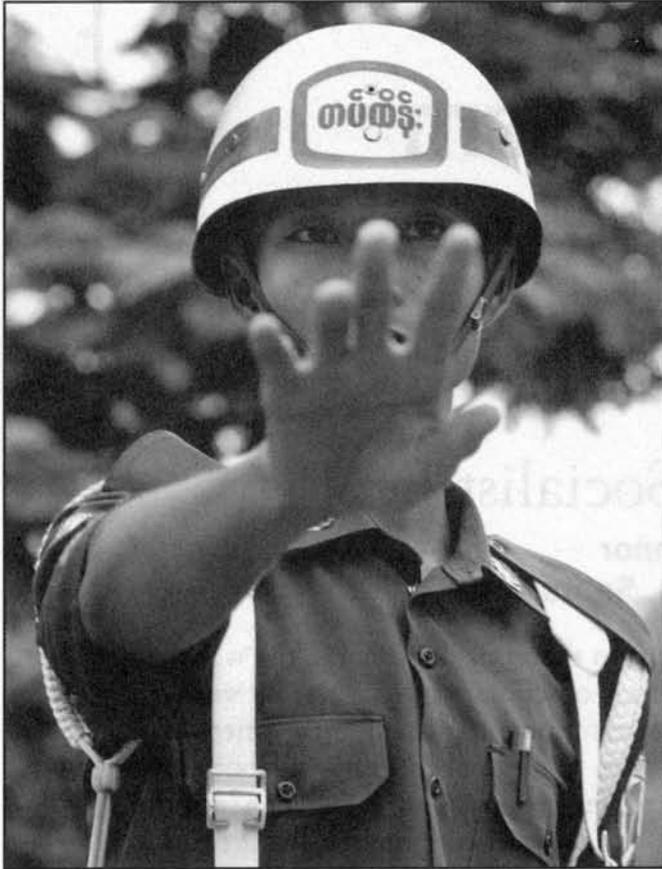
Legal Implications: Small Steps and Large

Judge Paez's ruling allowed lawyers for the Burmese citizens to clear a major hurdle; as of this writing, they and the defendants' lawyers are engaged in "discovery", a process where they investigate their case further and exchange information. More

broadly, the implications of Judge Paez's ruling are also significant. According to Carole Basri of the Greater New York Chapter of the American Corporate Counsel Association, even if Unocal and Total are not found liable, corporations "are on notice that they may not get by the next time around."²² If the plaintiffs prove successful, Unocal's general counsel warned, "it could have a chilling effect with regard to foreign investment."²³

While many might justly celebrate if this case prevents current or future corporate investors from subsidizing or benefiting from forced labour, the legal battle is far from over. Additionally, particular factors aiding the plaintiffs' cause warrant mention. The extensive condemnation SLORC has received is a reflection of the junta's egregious practices, and the affiliation of Unocal and Total with such a government helped Judge Paez overcome certain objections discussed above

Extensive condemnation SLORC has received is a reflection of the junta's egregious practices, and the affiliation of Unocal and Total with such a government helped Judge Paez overcome certain objections and find the rather narrow if vital means to extend application of the 'Alien Tort Claims Act'.



The Burmese army, responsible for the torture, rape and execution of numerous villagers, forcibly relocated whole villages and confiscated farms near the pipeline.

and find the rather narrow if vital means to extend application of the Alien Tort Claims Act. Cases involving other kinds of corporate malfeasance in different circumstances might not fare so well, and attention to a host of legal and political issues is clearly needed when crafting these types of lawsuit.

Nonetheless, the case against Unocal and Total is a salutary example of what law professor Harold Koh calls "transnational public law litigation", a recent and evolving trend in US jurisprudence.²⁴ Marked by a fusion of "international legal rights with domestic judicial remedies", where individuals or governments file suit in US courts contesting violations of international law, this litigation typically aims not only to compensate victims of a wrong and deter transgressors, but also "to vindicate public rights and values ... and to ask courts to declare and explicate public norms."²⁵ By its nature, in Professor Koh's view, the Alien Tort Claims Act can and should be a guiding and enabling mechanism for US judges

"to determine whether a clear international consensus has crystallized around a legal norm that protects or bestows rights upon a group of individuals that includes plaintiffs. If so, the court could ... make violation of that norm a federal 'tort in violation of the law of nations' for purposes of the Statute."²⁶

As was evident in Judge Paez's opinion, a judge's ability to make such rulings is circumscribed by the current consensus around a given norm. *Jus cogens* norms should define those international law violations for which the ATCA may be applied, Professor Koh notes suggestively, "at a minimum."²⁷

In this spirit, EarthRights International takes the possibilities of "transnational public law litigation" a step further when it argues that "international law already supports and

should explicitly recognize the human right to a satisfactory environment."²⁸ Observing that violations of human rights as they are traditionally conceived often go hand in hand with severe ecological destruction, especially in less-industrialized countries, the organization has strongly urged the United Nations Human Rights Commission to endorse and implement various principles and recommendations which expressly posit this linkage. As EarthRights International points out, the Human Rights Commission

"is the global institution with comprehensive responsibility for promoting and protecting all human rights ... It is the UN body with primary authority to prepare standard-setting instruments of general applicability and to conduct studies and fact-finding related to important human rights concerns. In so doing, the Commission advances international human rights law, encourages the creation of national and local norms and institutions and fosters greater awareness of human rights requirements and of specific violations."²⁹

Such efforts deserve support, not least because they may at some point in the future afford "transnational public law litigators" increased capacity to challenge injustices of which the situation in Burma provides so tragic an example.

References

1. Quoted in Cox, G.D., "Unocal May Be Liable For Partner's Acts," *The National Law Journal*, 5 May 1997.
2. Erlich, R., "Oil Giant Suffers Legal Setbacks," *Inter Press Service*, 8 May 1997; Lobe, J., "Pressure Build for Investment Ban," *Inter Press Service*, 18 April 1997.
3. A New World A New Unocal, Unocal 1996 Annual Report, pp.10, 22, 26.
4. *Ibid.*, p.11.
5. *Inter Press Service*, 8 May 1997, *op. cit.* 2.
6. Iritani, E., "Unocal May Be Liable in Myanmar Case, Judge Rules," *Los Angeles Times*, 17 April 1997.
7. "A Special Look at Burma," *EarthRights News*, Vol.2, No.1, January 1997, p.4. See also EarthRights International and Southeast Asian Information Network, *Total Denial: A Report on the Yadana Pipeline Project in Burma*, 10 July 1996, *passim*.
8. *EarthRights News*, *ibid.*, pp.4-5.
9. *EarthRights News*, *op. cit.* 7, p.5.
10. *EarthRights News*, *op. cit.* 7, p.4.
11. United States District Court (C.D. California) Order, John Doe *et al.*, Plaintiffs v. Unocal Corp., *et al.*, Defendants, 25 March 1997, in 963 Federal Supplement, p. 885. Other law groups representing the plaintiffs include Hadsell & Stormer, Pasadena, California, and Paul L. Hoffman Law Offices, Santa Monica, California.
12. *The National Law Journal*, *op. cit.* 1.
13. Bencivenga, D., "Human Rights Abuses: Suits Attempt to Extend Liability to Corporations," *The New York Journal*, 4 September 1997.
14. This observation made to author by Katharine Redford of EarthRights International.
15. *Op. cit.* 11, p.889.
16. Investor Responsibility Research Center, *Multinational Business in Burma (Myanmar)*, 1997, p.iii.
17. *Op. cit.* 11, p.896.
18. Walker, Hon. J.M., Jr., "Domestic Adjudication of International Human Rights Violations Under the Alien Tort Statute," in *Saint Louis University Law Journal*, Vol.41, No.2, Spring 1997, pp.543-549.
19. *Op. cit.* 13.
20. *Op. cit.* 11, p.890.
21. *Op. cit.* 11, p.892.
22. *Op. cit.* 13.
23. *Op. cit.* 13.
24. Hongju Koh, H., "Transnational Public Law Litigation," *Yale Law Journal*, Vol.100, No.3, 1991.
25. *Ibid.*, pp.2347-2348, 2371.
26. *Op. cit.* 24, pp.2385-2386.
27. *Op. cit.* 24, p.2385 (footnote 193).
28. EarthRights International, *Human Rights and the Environment*, Issue Paper Presented to the Centre for Human Rights, United Nations Office in Geneva, January 1997, p.1.
29. *Ibid.*, p.4.

CNS

Capitalism Nature Socialism

A Journal of Socialist Ecology

Edited by James O'Connor
University of California, Santa Cruz

CNS is the only serious red-green theoretical journal in the world. It is edited by a distinguished group of scholars and scholar activists, half of whom are North American, the other half from a variety of countries. CNS seeks to meld the traditional concerns of labor movements with the ecological struggles in particular, and demands of the new social movements in general. To this end, it publishes articles, reviews, interviews, documents, and poems that locate themselves at the site between history and nature, or society and the environment. The result is a publication that explores such topics as historical ecology, Marxism and ecology, sustainable development, philosophy of nature, political economy of ecology, socialist eco-feminism, environmentalism and the state, and ecological racism.

ARTICLES INCLUDE: Merchandising Biodiversity, *Joan Martínez-Alier* • Jakob Boehm: A Gate into the Green World, *Paul Buhle* • Land, Nature and Human Community: Wes Jackson's Vision of the Domestic Prairie, *Donald G. Richards* • "Nature" as Aesthetic Norm, *Arthur Lovejoy*

Sample copies available! (samples@guilford.com)

SUBSCRIPTION INFORMATION

ISSN 1045-5752, Volume 8, 1997 (4 issues)

Individuals: \$25.00, Outside U.S.: \$32.00 (surface mail),
\$47.00 (airmail)

Institutions: \$77.00, Outside U.S.: \$99.00 (airmail)

Also available in better bookstores.

Guilford Publications, Inc.

72 Spring Street, New York, NY 10012, Attn: Journals Dept.



Call Toll-Free 1-800-365-7006, 9 AM to 5 PM EST

(In Area Codes 212, 718, 516 & 914,
call 212-431-9800), FAX 212-966-6708

E-mail: staff@guilford.com



Reviews

Mad Experts' Disease

MAD COW U.S.A.: Could the Nightmare Happen Here?

by John Stauber and Sheldon Rampton

Common Courage Press, 1997, 246pp,
\$24.95 (cloth), ISBN 1 56751 111 2

More than 100,000 cows in Britain have been diagnosed with Bovine Spongiform Encephalopathy (BSE) or mad cow disease. A recent European newspaper announced that a similar disease has been identified in chickens and that sheep scrapie remains infectious after being boiled at 680°F (360°C). Last October, at the age of 24, a vegetarian of 15 years became infected with Creutzfeldt-Jakob Disease (CJD). Animal by-products are used in everything from pharmaceuticals and cosmetics to animal feeds and vegetable fertilizers, any of which could potentially carry Transmissible Spongiform Encephalopathies (TSEs).

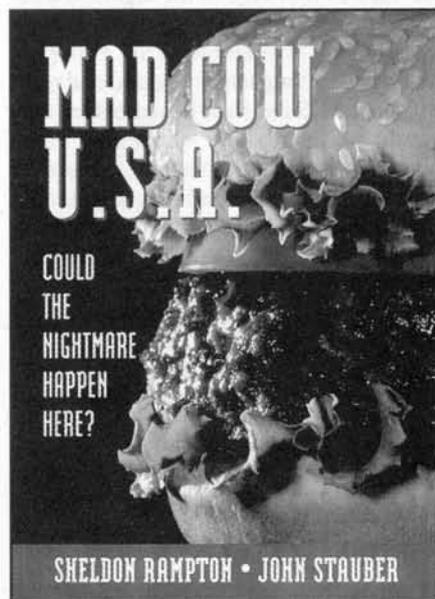
There is limited information about TSEs in the United States – a country whose very identity is enmeshed in the beef culture. American children eat McDonald's burgers as a staple of their diet. But many of those same children may not even realize that beef comes from cows. And most adults may not be aware that livestock feed is made from the remains of slaughtered animals. The connection between Americans and natural systems has been severed, making it easy for industry to shape the public mind, especially on issues of food safety.

Mad Cow USA: Could the Nightmare Happen Here? by Sheldon Rampton and John Stauber [authors of *Toxic Sludge is Good for You: Lies, Damn Lies and the Public Relations Industry*, Common Courage Press] is well-documented and informative and provides an excellent account of the history and future of mad cow disease and other TSEs. The authors use the disturbing example of BSE as a demonstration of how industry uses politics and government to censor infor-

mation and thus allow the agriculture industry to remain unaccountable to the public.

Despite its title, this book does not focus entirely on the US; rather it spans the world and uses investigative journalism to expose information on the mad cow disease epidemic. "[*Mad Cow U.S.A.*] is a book about politics ... and how government officials have placed concerns for the food industry over human health and welfare ... we have written this book to report on equally dangerous legal and political trends which threaten not only our physical health, but also our fundamental democratic rights to discuss and debate concerns about the food we eat," – a basic right, one might add, which seems to have been mislaid in the march to progress, with law after law being passed, further barring consumers from participation in issues on food safety (see, for example, "Food Slander Laws in the US: The Criminalization of Dissent", by Ben Lilliston and Ronnie Cummins, *The Ecologist*, 27/7, (November/December 1997).

Mad Cow U.S.A. shows that industrial farming is closer to causing an epidemic than solving the world's food crisis. Producing food on an industrial scale has resulted in the sacrifice of human and ecological health in favour of profit. That the practice of feeding rendered animals to livestock is a dangerous gamble can hardly be contested. TSEs have been proven to be infectious and cannot be killed using heat, solvents or radiation. Yet, the meat industry has played a role in censoring this information and swaying policy to ignore the warning signs. According to Stauber and Rampton, one public relations firm has explained, "The 'precautionary principle' holds that a manufacturer must prove that its product does no harm, before it can be marketed." This same PR firm advised the National Cattlemen's Beef Association to initiate a campaign against activists who may try to implement the "precautionary principle". Their advised approach has proven a success: policy-makers in the US routinely avoid implementing pre-



cautionary policies and have consistently averted steps to prevent a TSE outbreak.

'Food disparagement' laws in the US provide a case in point. When Howard Lyman of the Humane Society explained on Oprah Winfrey's popular TV talk-show "that the US was following exactly the same path that they followed in England – ten years of dealing with it as public relations rather than doing something substantial about it. A hundred thousand cows per year in the US are fine at night, dead in the morning. The majority of those cows are rounded up, ground up, fed back to other cows. If only one of them has mad cow disease, it has the potential to affect thousands," – his statements provoked an industry response. A lawsuit was filed against Lyman and the Oprah show and hundreds of thousands of dollars were immediately pulled out of network advertising. The lawsuit was based on 'agricultural product disparagement' laws, new laws being implemented in many US states which, according to Rampton and Stauber, "gave the food industry unprecedented powers to sue people who criticized their products ... which dramatically shifted the burden of proof in favour of the industry."

So does mad cow disease exist in the

USA? There have not been any documented cases of BSE thus far. However, this does not rule out the possibility. Cases of CJD are on the rise in the US, yet most cases probably go unreported. There are numerous examples of mink populations which have contracted TSE, all of which were fed a diet of 'downed cows' (downed cows are cattle that are slaughtered because they cannot stand up for various reasons). In the eighties, studies on pigs revealed a disease with symptoms that resembled TSE. However, TSEs have a long latency period and most pigs in the US are slaughtered before they would begin to show symptoms. These and other stories demonstrate a reason to be concerned about mad cow disease and they should lend support to arguments in favour of a 'precautionary principle'.

Needless to say, policy-makers in the US have been reluctant to take any precautionary actions.

In the past few years, there has been a lull in news stories relating to mad cow disease. But we shouldn't be fooled into believing that this case is closed. On 4th June 1997, the US Food and Drug Administration finally implemented regulations which banned ruminant protein in ruminant feeds. And on 7th November, Jude Webber of Reuters World Report Wire Service reported that US pharmaceutical companies would be hammered by the upcoming European Union ban on beef by-products that carry a risk of TSEs. This ban could effect \$14 billion-a-year worth of trade and the EU is softening regulations to avoid the US threat of a trade war.

BSE is but one symptom of an inherently unhealthy centralized and homogenized agricultural system. As the authors demonstrate, this epidemic has got to be seen in context and a reversal is needed of the process which places the interests of public health and ecological integrity beneath those of big business. Surely the balance must be wrong when the primary reaction of governments across the West to a potentially devastating epidemic has been to protect those responsible from those whom they are supposed to serve.

Miyoko Sakashita

Miyoko Sakashita works at the Foundation for Deep Ecology. She also co-founded a local currency system in Berkeley, California.

From Abstract and Empty to Ecological Thought

THE ECOCRITICISM READER: Landmarks in Literary Ecology
by Cheryll Glotfelty and Harold Fromm (eds.)

University of Georgia Press, Athens, Georgia, (Eurospan, London), 1996, 360pp, £15.95 (pb), ISBN 0 8203 1781 0, £35.30 (hb), ISBN 0 8203 1780 2

The late Norman MacLean, author of the now-classic American fishing tale, *A River Runs Through It*, describes a cool rejection letter he once got from a New York publisher: "These stories have trees in them." Provincial Manhattan has claimed to be the centre of culture for a long time now, and there is a sense in which nature, the earth, the environment, the whole, whatever you want to call it, has gotten the short straw in American culture.

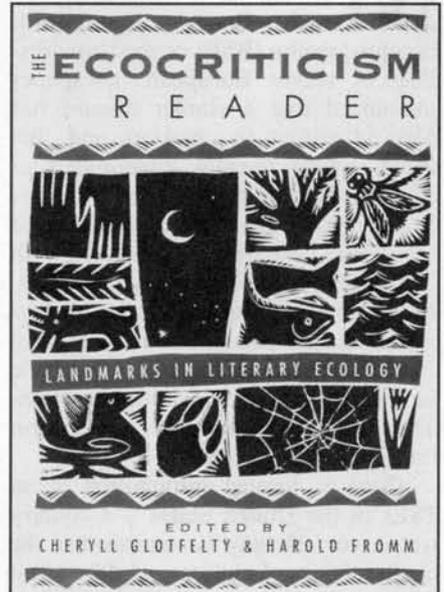
Of course there has long been a strong pastoral tradition in American literature, running from Washington Irving and Herman Melville through Thoreau and Emerson on up to Gary Snyder, Wendell Berry, and Edward Abbey. The words are out there, and they have inspired many to environmental awareness and activism, all the while remaining somehow outside the mainstream of this country's cultural elite. "Nature and I", summarized Woody Allen, "are two." (And who chronicles the American cultural elite better than Woody Allen?)

Blame the urban bias of the publishing culture, blame the mass migration of Americans to the bloated cities, blame the paving over of farmland and the condo-ization of pristine forests, but you can also blame this country's literary critics. For years our universities have been promoting a relativistic, ethically evasive tactic of reading literature inspired by convoluted French philosophers such as Jacques Derrida and ex-Nazi Paul de Man, reminding us that there is "nothing outside the text," and encouraging readers to read all of our experience as if it were a malleable mess of words, tossing essentialized meaning out to the winds.

Empty fads do not last long. Deconstruction, morally bankrupt, seems on the way out in the halls of academe. What's next? Articles in *The New York Times*, *The Utne Reader* and the *Chronicle of Higher Education* have announced a surprising new trend: ecocriticism, or the "greening of the humanities".

Don't get your hopes up. Things are not as eco-laudable as they seem. True, literary critics are rebelling against the playful emptiness of deconstructive approaches. Many are returning to a more traditional role, simply teaching people to enjoy literature and reading again. A few, a dedicated few, are examining how literature might learn from, as well as inform, ecological thought. But it is in no way as big a fad as these big-time publications are reporting.

The Ecocriticism Reader, edited by Cheryll Glotfelty and Harold Fromm, is the first anthology to promote this new sub-discipline within the field of literary criticism. If you're an English professor,



and you want to enliven your courses with an environmental perspective, this could certainly be a good book for you to peruse. Now, for the rest of us, how are we to assess this latest new specialization that claims to be interested in generalities?

You'll certainly find some fine readings in this collection of 26 separately authored essays. The book begins by reprinting Lynn White's classic "Historical Roots of Our Ecological Crisis", which is in some senses a surprising choice, as this is the article which presents a rather naïve view of the evils of Christianity as a cause of our environmental predicament. Well said in the sixties, but by now a bit out of date. Besides, none of the rest of the book is about religion, no recent spiritual pieces

to counter this negativism.

Princeton professor William Howarth explains most concisely what an ecocritical approach brings to any kind of reading: a mix of ecology, ethics, language and criticism. You've got to learn your natural and cultural history, to know how words have been read across the land through time. You can't be afraid to consider what is right and what is wrong. You must assess the quality and range of the language, not only the value of the insights described. And you must not be afraid to criticize, to say what writing is good and what is bad.

It's not so simple to say that what is good for the Earth is good writing and what is threatening is bad. That would turn literature into propaganda. Our critics certainly don't want that, though certain environmental writers do.

There is a fine excerpt from Joseph Meeker's classic book *Comedy of Survival*, which argued, first in the 1970s, that humanity has pushed itself too far imagining that we are tragic figures of some kind in an environment of adversity, destined to fail upon some tragic flaw of hubris. Instead, why not recognize that comedy is a better mode for getting along with nature? Live a little, relax, don't push too hard, dance, accept limitations rather than cursing fate. Ecological humility is thus by no means humourless, and Meeker demonstrates that there is a delicate and subtle way to be quite radical, by re-interpreting our species' greatest myths of origin and redemption.

Dana Phillips asks "Is Nature Necessary?", using examples from

Hemingway and from pop novelist Carl Hiaasen to show how we are always re-inventing nature to fit our cultural whims. When you read about it in all kinds of account, nature appears stranger than ever. He describes the professionalization of bass-fishing, with fishermen in full-length waterproof artificial body suits cruising in artificial lakes stocked with larger-than-life fish, purely for the pleasure of catching them with high tech fishing equipment made of synthetic materials. The great outdoors!

As in any anthology, these essays are all over the place. Many bear the conceit of the profession: the expert shows you some strange new way of reading something you thought you understood in a much simpler way. The argument can get obscure, but it is usually interesting. Readers not used to such close and querulous reading might lose patience with the drift.

If you want to learn the range of ecocritical behaviour, this is the book to get. But the question remains: is an environmental speciality inside the field of literary studies what we need right now?

I tend to agree with John Elder, Chair of the Department of Environmental Studies at Middlebury College and one of few humanists to hold such a job in the US. He says no. Those involved in the teaching of literature should not create a new ecological niche and hide out there, building Centres, writing dissertations, starting ever more obscure journals. The right way to go is to show how environmentalism and literary culture must work closer together in the wider world. There

is great description of the natural world not just in nature writing, but in the mainstream classics of literature past and present. There is no need to give all texts and ecological reading, but we can find in the best fiction, pithy examples of how to live in an environment without losing sight of the ambiguity of our selves and our claims to be able to better the world.

Think of Jean Giono's fabulous *Joy of Man's Desiring*, which tests the limits by which one person can bring joy to a suffering community by teaching them to be aware of the world around them; Richard Ford's fine novels about the brooding possibilities in suburbia, *The Sports-writer* and *Independence Day*; and never forget *Moby Dick*, for the incredible contest of man and beast. These are not eco-books, but they explore, they are wonderful examples of writing on nature. If ecocriticism is to have any influence, it must reach from English departments out into the world of real concern for the Earth and its finitude. These Earth critics ought to learn a lesson from their colleagues who got lost in the quagmire of cultural studies. Don't just criticize it, step within it! Get your feet and hands dirty, and literature will get that much closer to life: messy, cold, windy, warm, wet, impossible to put down.

David Rothenberg

David Rothenberg is the author of *Hand's End: Technology and the Limits of Nature*, and the founding editor of *Terra Nova: Nature and Culture*. He is associate professor of humanities at the New Jersey Institute of Technology.

Hormone Havoc

OUR STOLEN FUTURE

by Theo Colborn, Diane Dumanoski and John Peterson Myers

Penguin Books USA, New York, 1996, 294pp, US\$24.95, ISBN 0 526 93982 2

This carefully documented and skilfully crafted study of "hand-me-down" poisons, hormone impostors and other endocrine-disrupting chemicals picks up where Rachel Carson's *Silent Spring* left off more than three decades ago. The three authors – two leading environmental scientists and an award-winning journalist – have put together a scientific detective story that is both a fascinating read and a cautionary tale which we would do well to heed.

Supported by numerous case histories and empirical studies from many countries, the authors present irrefutable evidence that those man-made chemicals which in the last half-century have spread across the planet and permeated almost every living creature in the wild are now wreaking their havoc on humans as well.

So far, over 50 synthetic chemicals have been identified which disrupt our endocrine system, causing birth defects and sexual abnormalities and upsetting normal development processes, both physical and mental. Since the beginning of what the authors call the chemical age (ca 1940), male sperm counts have dropped by about 50 per cent and prostate cancers more than doubled, while women have experienced a sharp rise in hormone-related cancers such as breast cancer, the incidence of which has

increased two-and-a-half times (from 1 in 20 to 1 in 8). These "hormone impostors" include such large chemical families as the 209 compounds classified as PCBs, as well as the 75 dioxins and 135 furans, collectively posing a vast spectrum of disruptive effects on our endocrine system.

In the period from 1940 to 1982, the production of synthetic materials increased by a factor of 350, with some 100,000 synthetic chemicals now on the market worldwide and another 1,000 added each year, only a fraction of which are adequately tested for toxicity and persistency. In the United States alone, 435 billion pounds are produced annually (which equals 1,600 pounds per capita), including 2.2 billion pounds of pesticides (8.8 pounds per capita) – a quantity which is not only 10 times greater, but also 10 times as potent as 50

years ago – adding up to a hundredfold increase in total toxic load. (Some of these pesticides, while banned in the US, have somewhat hypocritically been “NAFTALized”, that is, exported to Mexico and other neighbours, only to be reimported on fruit and vegetables.)

For many years, the scientific community was reluctant to concede that lab tests showing the disruptive effects of these man-made compounds on mice and other animals might also apply to *homo sapiens*. This anthropocentric arrogance, rooted in the nonsensical notion that we humans are somehow above those natural laws which govern all other life-forms, has been effectively deflated in *Our Stolen Future*. For, superficial physical differences notwithstanding, the oestrogens, testosterone and other hormones that

govern our development have not changed through millions of years of evolution; to this day their chemical composition remains identical in all vertebrates.

Since the beginning of the chemical age, male sperm counts have dropped by about 50 per cent and prostate cancers more than doubled, while women have experienced a sharp rise in hormone-related cancers.

In the face of the overwhelming evidence of life-threatening chemicals presented in this seminal work, it would be tempting to retreat into denial, but “facts are not fate”. As the authors point out, the growing scientific knowledge about endocrine-disrupting substances gives us the power to avert their threat -

just as Carson’s warnings about the impact of pesticides woke us up a little 30 years ago. Right now, we need to take decisive action to defend ourselves in the short term, while at the same time initiating a fundamental reassessment of the chemical culture which has become such an integral part of our modern lifestyle.

In 1938 the German Dr Paul Mueller invented a ‘wonder pesticide’ called DDT. That same year the British scientist Edward Dodds synthesized the chemical diethylstilbestrol (DES), a hormone-mimicking ‘wonder drug’ which in the next three decades was religiously administered to millions of pregnant women, with disastrous consequences for many of their offspring. For their troubles the two scientists were respectively awarded a Nobel Prize and a knighthood.

Gard Ellwyn Binney

Gard Binney is an occasional writer on environmental issues.

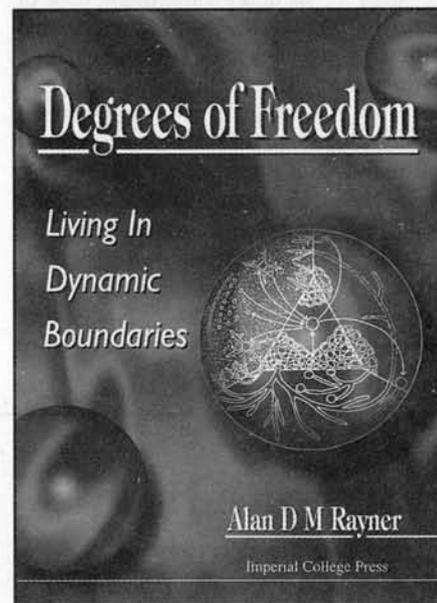
Organic Boundaries and Context

DEGREES OF FREEDOM: Living in Dynamic Boundaries
by Alan Rayner

Imperial College Press, London, 1997,
328pp, £27.00 (hb), ISBN 1 86094 037 4

Woven throughout *Degrees of Freedom* is a compassionate and systemic understanding of living systems from the smallest to the largest in scale as they relate, through their boundaries, to their surroundings. It is a treasure trove for ecologists and highlights the fundamental importance of the less obvious creatures which most of science overlooks, such as fungi. Much more than a fascinating information source, the book challenges head-on the idea that living systems are made up of fully separable building blocks, like genes, which can be understood in isolation from their environments. Drawing from the latest ecological findings on fungus biology to look at life in a new way, the book is set to become a biological paradigm shifter. The book considers a wide variety of dynamic boundaries and the diversity of form they contain; from amino acids and proteins to cell membranes, trees, root systems, leaf venation patterns, army ant raids and moving trajectories of individuals and populations over time.

Making exciting parallels to rivers, their watersheds, tributaries, distributaries and deltas, Rayner explores the underlying principles involved in the feedback between the boundaries of all living systems and their environments. The ability organisms have to alter their boundary properties, Rayner explains, enables them to react to their local environments appropriately. Rayner’s lengthy research into fungal ecology, biochemistry and genetics merges to form a challenging and novel synthesis of biological theory; making new and more complete sense of ideas which have previously been held in artificially separated disciplines. These ideas finally render obsolete the notion that evolution is driven only by competition and controlled by selfish genes; indeed it is only in context that genes have any true meaning. By showing how genes influence the reactive boundary properties of organisms, Rayner dismantles the present “gene-centred” paradigm of the life sciences and suggests an important but far more subtle role for the molecules of inheritance, which he describes as “Contextual Dynamicism”. Here, both environment and information regarding previous boundary responses to it, influence an intrinsic non-linear organization of life’s patterns, forms and processes common to all living systems. For such a concise book (312 pages), well-referenced and indexed, it is extraordinarily wide in scope. The final chapter ‘Compassion in place of strife’ explains



how the incomplete understanding of life which prevails in Western culture has caused huge suffering and loss of diversity and beauty. Rayner offers hope that a more contextual and holistic understanding of life would help undo these wrongs, one in which society regains a sensitivity to local environments at every scale and greatly reduces its need of centralized power.

Christian Taylor

Christian Taylor is a postgraduate student at the School of Biology and Biochemistry, Bath University, UK.

Bringing the Economy Home

BUILDING A COMMUNITY-CONTROLLED ECONOMY:

The Evangeline Co-operative Experience

by Paul Wilkinson and Jack Quarter

University of Toronto Press, 1997. 186pp, US\$16.95, £12.50 (pb), ISBN 0 8020 7857 5

Once, when people dreamt, they dreamt of America: of its high wages, comforts, gadgets and huge cars. "If only we could live there or make our country like it," millions said to themselves. But no more. Only the dirt-poor, the deluded or the oppressed wish to emigrate to the US today or to build their countries in its image. This matters because, as no other country has claimed the American mantle, we no longer have a vision of what our future might be. Indeed, we try not to envisage the future at all, so terrifying are current trends.

But there are places in the industrialized world where an attractive, achievable future can be glimpsed. Maleny, near Brisbane in Australia, is one. The area around Forres in Scotland is another, thanks to the Findhorn community. And East Clare in Ireland is a third. In all three, well-educated outsiders seeking new ways of life have combined with local people to revitalize dying areas. In the process, new cultures – new ways of living in those places – have been born, which involve a far higher degree of mutual support and collective action through such things as co-operatives, credit unions and local currencies than is found in places of similar size nearby.

The significance of Wilkinson and Quarter's book is that it brings news of a fourth community in which a new culture has been developed. This time, however, the new one was created out of the old by insiders without much input from recent arrivals. Indeed, preserving the old culture was the main reason why this community of 2,500 French-speaking Acadian people living in the Evangeline region of the predominantly anglophone Prince Edward Island off Canada's east coast took the self-reliant path they did, a path which frequently required them to say "No" to easy options placed before them by non-local organizations.

For example, in 1985, when an out-

side cable television company proposed providing services in part of the area, the locals turned it away. "It would be like a foreign occupation force coming in," a local said. Instead, the community set up a co-op, and started its own system. By 1992, the co-op was profitable and its plans for a mini-studio to produce local TV and radio programmes were well advanced.

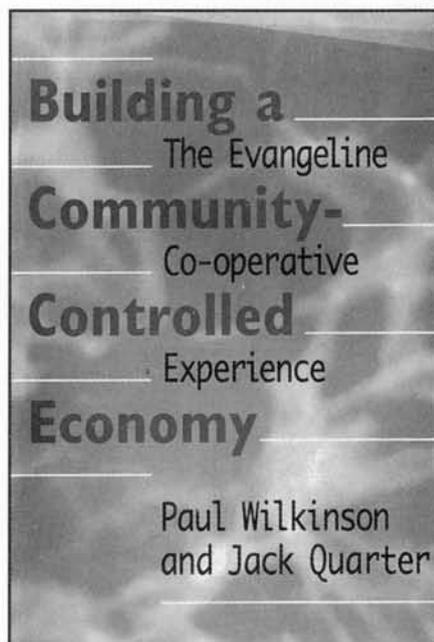
Similarly, a proposal by a giant food-processing firm, McCains, to open a factory in the area was opposed, while other parts of Prince Edward Island vied to get it. "The Evangeline people have understood that their aspirations for themselves and their children can only be achieved through a political process of struggle," the authors say.

So what has this contrariness brought? Perhaps the best developed community economy in the world. In 1990, the sixteen locally-owned co-ops provided 352 permanent or seasonally full-time jobs and 14 part-time ones, more than the state and private sectors combined. One person from every two households was employed in a co-op and, in cash terms, the co-ops' contribution to the local economy through pay and local purchases exceeded 32 million dollars. "[The co-ops] are a social infrastructure for the community, providing its most basic services from the cradle to the grave," the book states.

Indeed, we try not to envisage the future at all, so terrifying are current trends.

"The most striking feature ... is the way [they] are linked together to pursue a community development strategy for the entire region."

Co-ops in the area can be traced back to the establishment of a seed bank in 1862. Those set up specifically to provide employment have been less successful and four out of eight start-ups closed. The failures involved raising rabbits and the manufacture of woodchips, children's clothes and potato crisps. As the book points out, for these co-ops to have survived, they would have had to win markets outside the community's control and this proved the stumbling block. However, the co-operatively-owned fish-processing plant is the community's biggest employer and a fresh batch of new manufacturing co-ops can be expected because the local credit union, a co-op



itself, has set up a special organization – the Baie Acadienne Venture Group – to provide them with equity capital.

While *Building a Community-Controlled Economy* has an exciting message, namely "that it is possible to create an economy in which economic organizations exist to promote general community welfare rather than simply to benefit individual interest," the book itself suffers from having been written for an academic audience.

This means that its authors felt that they had to limit the number of adjectives they employed and avoid any descriptions of the place or of individual people. As a result, they convey no impression of what it must be

like to live in a community with 150 voluntary organizations which has been called "the uncontested co-operative capital of North America". In short, the book paints no pen-pictures for us and thus fails to provide a vision about which we can dream. No-one will come away from reading it saying "I wish I lived there or that my community was like that." This may be how academics like their books, but what a shame.

Richard Douthwaite

Richard Douthwaite's most recent book, *Short Circuit* (Green Books, Totnes, 1996), looks at ways in which communities in the industrialized world have achieved greater self-reliance. A German edition will be published in May 1998 and French, North American and Australasian editions are in preparation.



Delicious Ways to Save the Planet

LOCAL HARVEST
by Kate de Selincourt

Lawrence & Wishart, London, 1997,
229pp, ISBN 0 85313 853 3

For anyone interested in food and the politics of food, *Local Harvest* is the sort of book that's been waiting to happen for the best part of a decade. Its everyday language contains a happy blend of analysis and solution which makes the complexities of a full stomach readily available to any reader.

Kate de Selincourt combines well-researched anecdote and evidence to produce a very clear picture of the peculiar lunacy which dominates the food industry. Essentially, the book centres on the debate about public complacency when it comes to accepting the benefits of technological advances in the food industry. Economists, politicians and business people are all too happy to enter their considerable monetary successes in the credit column of the accounts book, and balance these against the usual debits which include labour, transport, packaging and the like. De Selincourt exposes many of the fallacious arguments which exist at this level, and then goes on to examine what are described as 'externalities' of the conventional economic system.

Sure enough, I can buy out of season parsnips from Western Australia but do

they taste as good as those grown on a nearby organic farm? Certainly the supermarkets have devised a wonderful system to put fresh produce on the shelves all year round, but is all this jet-lagged food as nutritious as that picked in the morning and sold at the corner shop later on the same day? I can enjoy the banter and back-chat of market stallholders, but is there much meaningful exchange to be had with corporately dressed supermarket staff? If you asked any conventional economist to take account of such things, he would probably try to assign you to the nearest state home for the bewildered. De Selincourt vividly illustrates just how important these little externalities are, not only to our physical and emotional health, but to the well-being of small communities all over the world.

For anyone of my generation (born in the 1940s) the book acts as a powerful reminder of the way in which our food has been manipulated over the years. As a mature student in the early seventies, I went on a geography field trip where we stayed in a monastery. On arrival, we were served a delicious meat casserole with fresh vegetables and potatoes. None of us was sure just what we were eating. Was it rabbit, chicken, turkey, or maybe goose? Later we questioned the monks about the mystery meat. "It was chicken," they replied. Everyone agreed it was the best they had ever tasted and began to talk about recipes. "Nothing fancy," replied our hosts, "you're all probably used to battery meat, and what you had tonight was free range." Anyone with a similar story to tell will find throughout the pages of this book just how much has been sacrificed on the food industry's altar of profit and convenience.

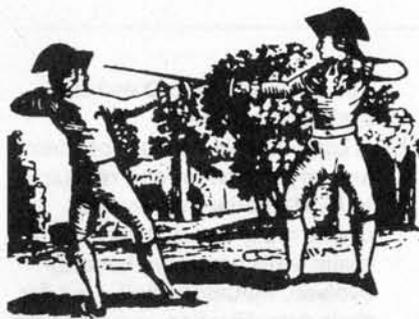
De Selincourt points to the crazy world of the food which travels thousands of miles to reach your plate. Imported from countries with low public safety standards, it may well have been drenched in chemicals banned in Europe but sold openly in the majority world. It will have been picked before time, and usually sprayed with preservative to last the journey. It will almost certainly put vulnerable Third World communities at the mercy of volatile international markets. Following air or ship freight, it will be over-packaged in sanitized containers, and distributed by road – further congesting this crowded island. Add to that the environmental destruction caused by our insatiable appetites, the fact that our own growers and farmers are forced out of business

by unfair competition and the fickle nature of supermarket buyers. Then mix in the increasing incidence of health problems, sprinkle with a little BSE, salmonella and listeria, stir in over-packaging, closure of high street shops and absurd rulings by the regulatory bureaucracies, and you soon have a recipe for wanting to find a way out. This is where the real strength of the book lies.

It's not all doom and gloom. Right from the beginning de Selincourt offers balance in a world turned upside down. We are immediately introduced to the pioneering work of Matt Dunwell and Mandy Pullen at Ragman's Lane Farm in Gloucestershire. Here the land is dedicated to producing high quality meat and vegetables for local sales: you'll see pigs wallowing in mud to keep themselves cool while chickens feed off the abundance of tadpoles in the irrigation pond. In just one acre Mandy grows 150 different varieties of vegetables which are selected for taste rather than travel. Certainly, it's hard work but Matt and Mandy have none of that 'ground down by toil' look of so many conventional farmers. Much of their success is owed to the fact that, through their various local marketing schemes, they remain in touch with their customers. Visits are also arranged for people to see just how their food is produced, and through this two-way process they can be guided by their customers' preferences and aspirations.

Local Harvest, as its title suggests, offers a multitude of such examples. Increasingly, small farmers and growers are being faced with the prospect of having to sell up or devise imaginative marketing schemes that will keep them in business. At the same time it is we the customers who probably have the most important role to play. By voting with our feet, demanding local organic produce which is both nutritious and tasty, we can stimulate a market which is waiting in the wings to supply our needs. Moreover, as the movement towards local production and retailing grows, it will encourage yet more farmers into positive action. Thus we may even begin to reverse the trends of soil erosion, countryside depopulation, and exploitation in the majority world. One thing is absolutely certain – the imaginative ideas expressed in *Local Harvest* will have a much longer shelf life than brightly coloured items in the supermarket.

Malcolm Baldwin



Letter Forum



What has been presented as fact is no more than personal opinion, according to BP's Dr Nigel Moore.

I'm writing to you in response to a recent article by Dr Vyvyan Howard (*The Ecologist*, 27/5, September/October 1997).¹ An important consideration in communicating specialized scientific information to a broad readership is that of balance, something that was missing from this article and something that I would like to address.

A significant issue raised in the article is that of synergism between endocrine-disrupting chemicals. Howard refers to one paper that reported that mixtures of chemicals could act synergistically at the oestrogen receptor.² Although he later admits that this paper was formally withdrawn by the authors, he does not acknowledge the work of others who failed to replicate the findings,^{3,5} as indeed did the group who published the original work,⁶ and actually uses it as a basis for his thesis. Howard also uses other studies on synergism, unrelated to endocrine disruption, to support his assertion that "[industrial chemicals] may be able to potentiate our own naturally occurring endogenous oestrogens or phytoestrogens." Although synergism is a well-recognized phenomenon (many other examples can be given in addition to those cited), there is no evidence that it is relevant to the issue of endocrine disruption. Indeed, current data indicates that mixtures of endocrine-disrupting chemicals seem to

work in an additive manner.^{3,5,7,9} This is a rapidly developing area of science, and we must be prepared to adapt our thinking in the light of any new data, but we can only work confidently and responsibly within the bounds of supported evidence.

It is true that the endocrine system is extremely complicated, and incompletely understood, and that chemicals may interfere with its function in many ways. Therefore simple testing strategies may not be suitable for evaluating the potential activity of chemicals, and this is an area of ongoing research and co-operation between industry, academia, and the international regulatory community. However, whilst it's true to say that a "disrupting influence can only 'up regulate' or 'down regulate' the system," this is not the same as an absence of a no effect dose level. By definition, a disrupting influence cannot be induced by a no effect dose level of any substance!

More importantly, Howard appears

observed effect, is as relevant to 'traditional' toxicology as to endocrine toxicology. Therefore, in this context it is not true to state that "Disrupters of the endocrine system are not like most 'toxins'."

Howard's concern over the endocrine-disrupting activity of industrial chemicals is apparently to the extent of dismissing, or at least minimizing, other potential influences. For example, whilst he states that phytoestrogens "occur naturally in bulk in the diet", he fails to acknowledge that phytoestrogens may be as much, if not more, of a contributing factor to endocrine imbalance as industrial chemicals. A recent review states that, although some industrial chemicals have weak oestrogenic activity, many phytoestrogens are both more potent and more abundant.¹⁰ Furthermore, in a follow-up study into the feminization of male fish exposed to sewage outfalls, the Environment Agency assessed the oestrogenic activity of seven sewage effluents discharged into UK rivers. The

report concluded that steroid hormones represented the only significant oestrogenic activity measured, although it did not rule out possible contributions from other weakly-oestrogenic chemicals.¹¹ As with all human and environmental health issues, when addressing

endocrine-disruption it is important to consider all potential influencing factors, natural and anthropogenic, chemical and non-chemical. A holistic rather than isolationist approach is called for.

In a different vein, Howard discusses organo-chlorine chemistry as a specific issue, and asserts that "nature would have been perfectly capable of evolving this chemistry in the mainstream of animal evolution. The fact that it didn't should warn us that their introduction into the body is likely to be damaging!" This is a simplistic, speculative argument which overlooks the fact that nature has shown itself to be quite capable of evolving potent toxins itself, the

We can only work confidently and responsibly within the bounds of supported evidence.

to confuse the concepts of 'no effect level' ("a 'zero effect' dose level") and 'no observed (adverse) effect level' ("a concentration below which the toxic effect cannot be detected"). The former represents a threshold for an effect of a chemical, whereas the latter represents our ability to measure or observe a threshold. There is no evidence that there isn't a no effect level for chemicals that disrupt, or modulate, the endocrine system because, although the system is in equilibrium, there is a certain amount of 'noise' (e.g. from inter-individual variation, analytical precision) associated with actually *measuring* it. This philosophical conundrum, the distinction between no effect and no

introduction of many of which into the body is certainly damaging! Whilst it may be true that nature has not exploited chlorine chemistry, the basis for this may simply be that precursor (bio)availability and 'cost-benefit' concerns favour some metabolic pathways and defence mechanisms over others. Inferring that nature has "assiduously avoided" evolving particular groups of chemicals, and further inferring that there is a specific, sinister, reason for this, is purely conjecture and should not be presented as fact.

On the whole, Howard's article is marred by its lack of balance and perspective, and that's unfortunate because this is an important issue. Such articles may be misconstrued as representing fact when in reality they are only a personal viewpoint. As such, they may be better cited in the journal as 'opinion', so that the casual reader will not be unintentionally misled.

Dr Nigel Moore, CBiol, MIBiol
BP Chemicals Limited

The views expressed herein are my own, and do not necessarily reflect those of my employers.

- aquatic environment." *Environmental Health Perspectives*, 103 (suppl 7), pp.173-178, 1995.
- Turner, K.J., Sharpe, R.M., "Environmental oestrogens – present understanding." *Reviews of Reproduction*, 2, pp.69-73, 1997.
 - Environment Agency, "The identification and assessment of oestrogenic substances in sewage treatment works effluents." R&D Technical Summary P38, 1996.

Vyvyan Howard responds:

I have read the letter of Dr Nigel Moore with interest. Thank you for the opportunity to respond to some of the points which he robustly argues.

Perhaps it is best to start with his last paragraph, where he points out that articles such as mine should be entitled 'opinion' when appearing in the journal. In view of the fact that the whole drive of my article was to point out that we have no practical or intellectual tools with which to arrive at certitude with respect to the chemical mixtures problem, then all we are left to consider are opinions. Dr Moore's letter represents 'opinion' every bit as much as does my article. In addition, risk assessments performed to access this particular type of problem (which I discussed in the article) yield nothing more than 'opinions' which, depending on the type of assumptions used to fill in the many unknowns, can arrive at literally any conclusion the author wishes to portray. Therefore I find myself in some measure of agreement with Dr Moore's final paragraph: in the absence of exhaustive hazard assessment data, anybody who speaks on this subject is expressing an 'opinion'.

Dr Moore, in his penultimate paragraph, describes my conjectures about the absence of organo-chlorines in the majority of life forms on the planet as "simplistic and speculative". They do however seem to find a certain resonance with the observations of Dr Barry Commoner, which the Editors introduced into my article as a box on page 194. Presumably Dr Commoner's thoughts will also be too "simplistic and speculative" for Dr Moore. However, Dr Commoner and I are only pointing things out the way they actually are. Specifically, with organo-chlorines:

- They are NOT present in the mainstream of biochemistry – which is to say that whether we do or do not know the precise mechanism of their exclusion –

nature definitely DID eschew their incorporation.

- A considerable number of them are very persistent and resistant to biodegradation because, unlike many naturally occurring toxins with which we have co-evolved, metabolic pathways for their detoxification appear to be absent or extremely inefficient.
- Amongst them are some of the most potent disrupters of metabolism that we know of, some working in parts per trillion, the sort of concentration at which hormones, our own chemical messengers, operate.
- They ARE now present in the body fat of every person on the planet, at levels that are the result of anthropogenic activity.

The above are undisputed facts.

Organo-chlorines are major contributors to the global mixture of chemical pollutants. No doubt many interesting theories about 'how we got here' without organo-chlorine chemistry could and may be constructed. However, the much more urgent question of 'how do we get out' of this man-made problem should not be held up while waiting for such erudite theories to emerge.

Continuing moving backwards to Dr Moore's pen-penultimate paragraph, he suggests that I have ignored the possible effect of phytoestrogens, despite the fact that they are discussed on page 193. Consider the following: phytoestrogen production is a defence mechanism of plants that has evolved to reduce the fertility of animals that browse upon that particular species. In all probability this will have been successful and even led to the demise of certain species in the distant past. Examples of problems when moving animals outside their usual habitat, as with sheep eating certain clover species when introduced into New Zealand, are well known. However, what of those species here today? In their natural habitats they will have co-evolved with phytoestrogen-producing plants, be well adapted to them and be able to rapidly hydrolyse them (as is in fact the case) and excrete them. We have to ask the question:

"Why should phytoestrogens suddenly start to cause problems to humans in the most recent 30 years of history when they clearly have not given problems for the previous several million years?"

Could it be anything to do with the additional mixture of environmental

- Howard, V., "Synergistic effects of chemical mixtures – can we rely on traditional toxicology?" *The Ecologist*, Vol.27 No.5, September/October 1997, pp.192-195.
- Arnold, S.F., Klotz, D.M., Collins, B.M., Vonier, P.M., Guillet, L.J., Jr., McLachlan, J.A., "Synergistic activation of estrogen receptor with combinations of environmental chemicals." *Science*, 272, pp.1489-1492.
- Ashby, J., Lefevre, P.A., Odum, J., Harris, C.A., Routledge, E.J., Sumpter, J.P., "Synergy between synthetic oestrogens?" *Nature*, 385, p.494, 1997.
- Ramamoorthy, K., Wang, F., Chen, I.-C., Safe, S., Norris, J.D., McDonnell, D.P., Gaido, K.W., Bocchinfuso, W.P., Korach, K.S., "Potency of combined estrogenic pesticides." *Science*, 275, pp.405-406, 1997.
- Gaido, K.W., McDonnell, D.P., Korach, K.S., Safe, S.H., "Estrogenic activity of chemical mixtures: is there synergism?" *CIIT Activities*, 17 (2), pp.1-7, 1997.
- McLachlan, J.A., "Synergistic effect of environmental estrogens: report withdrawn." *Science*, 277, pp.462-463, 1997.
- Soto, A.M., Sonnenschein, C., Chung, K.L., Fernandez, M.F., Olea, N., Olea Serrano, F., "The E-SCREEN assay as a tool to identify estrogens: an update on estrogenic environmental pollutants." *Environmental Health Perspectives*, 103 (suppl 7), pp.113-122, 1995.
- Jobling, S., Reynolds, T., White, R., Parker, M.G., Sumpter, J.P., "A variety of environmentally persistent chemicals, including some phthalate esters, are weakly estrogenic." *Environmental Health Perspectives*, 103, pp.582-587, 1995.
- Sumpter, J.P., Jobling, S., "Vitellogenesis as a biomarker for estrogenic contamination of the

hormone disrupting-chemicals, to which each and every one of us is exposed, affecting the potency of phytoestrogens or even of endogenous oestrogens? That is the question that I posed in my article and is a hypothesis that I think must be tested. One of the main arguments made against the possibility of industrial pollutants causing the fall in human mean sperm count etc. noted in epidemiological studies, is that there simply isn't enough present in individual's bodies to do it. However, if the two-to three-fold level of synergism found for mixtures of three or four chemicals being reported by Soto *et al.* (1997) *in vitro* were to similarly affect the bulk dietary or endogenous oestrogen in our bodies, then this could explain most of what is being observed in the population. Bear in mind that we have considerably more than three or four xenoestrogens present at any one time.

This is why I purposefully referred to that Arnold *et al.* *Science* paper, with the express intention of bringing to the attention of the readership that it had been withdrawn because it could not be reproduced. I did not rely upon the findings of Arnold *et al.* to develop the discussion in the article but mainly to flag the fact that comments from some quarters were now saying that synergism *per se* was no longer a problem. It was precisely because I wanted to develop the argument in the paragraph above that it was important to put it all in context.

If my writing gave Dr Moore the impression that I had confused 'no effect level' with 'no observed effect level', then I apologize. I did not mention the latter and did not (I had thought) imply it. I was discussing 'no effect levels' as I will outline below. However, Dr Moore comes to the nub of a very important discussion, the difference between perturbations of homeostasis in individuals, compared to perturbations of whole populations.

Consider the following:

Critical homeostatic equilibria, such as the pH of the blood, the temperature of the body or the concentration of certain hormones in the blood, have been arrived at after a process of evolution, presumably with directional selection pressures leading to low variance. The coefficient of variation for the pH of the blood in

human populations is of the order of three per cent, for example. With any measurement of some homeostatic index within one individual, which falls inside the normal range of variability for the species, it is not possible to determine if there has been any deleterious effect due to some treatment. This statement will apply to many classes of measurement.

If a 'treatment', for example a hormone-disrupting chemical, is given to a group of individuals within the population and causes a 'shift' in the mean value of a related and relevant homeostatic index such that it differs from an untreated control group but still falls within the normal range of variability of the population, a question arises as to whether this is an 'abnormal response'.

Industry is currently arguing, with respect to the effects of environmental pollutants, that the shifting of a population mean of some index of

Asking for chemical by chemical analyses before anything can be banned is the same as 'asking for the moon', and those who propose this avenue know that it is impossible to achieve.

homeostasis should not, of itself, constitute an abnormality unless there is demonstrable 'harm' as a result. Under this scenario, for example, the life-long induction of liver enzymes associated with dioxin exposure seen in rodents would be quite acceptable unless a direct link could be made with harm, such as the increased incidence of hepato-cellular carcinoma also associated with dioxin exposure in rodents. An ecologist would intuitively recognize the perturbation of critical homeostatic equilibria in an ecosystem or population as a stressor of the system and consider it as abnormal.

Now, returning to Dr Moore's critique, with respect to endocrine-disrupting agents and populations, because we are considering receptor-mediated phenomena, there is in theory no level of exposure which will have no effect. I admit that it might not be possible to detect it if it is too small but that does mean we should not expect it to be there *a priori*, as discussed in my article when likening the endocrine system to a 'running motor'. Furthermore, we would only

be able to detect such an effect by the study of populations. I am personally of the 'opinion' that the perturbation of sensitive homeostatic indices of populations should be regarded as abnormal in and of themselves, whether the perturbation lies within the range of normal variability of the control population and without the requirement to have to demonstrate harm. This presumably will fit in well with Dr Moore's call for a holistic rather than isolationist approach, which he mentions at the end of his fifth paragraph.

In conclusion, I agree with several things that Dr Moore says; however, man's activities with respect to the production of mixtures of pollutants has led to a problem which is clearly insoluble with current technology. I suggest this state of affairs is unlikely to change in the foreseeable future although many of us are working on developing new assays. We are

therefore restricted to 'opinions'. That leaves us with precaution and little else. Some governments are now actively considering controlling some whole groups of chemicals; the Swedish government has announced its intention to phase out PVC by 2007 while the Danish government is talking of completely

phasing out the use of phthalate esters. A very recent report confirming that the sperm count is falling in the USA as well as in Europe is likely to accelerate this approach. The precautionary principle has been invoked before with the phasing out of PCBs and CFCs. I think it will be used with increased frequency in the near future and the calls for more research before action is taken will go unheeded. Asking for chemical by chemical analyses before anything can be banned is the same as 'asking for the moon' and those who propose this avenue know that it is impossible to achieve.

Dr C Vyvyan Howard

MB, ChB, PhD, MRCPATH.

Fetal and Infant Toxicology-Pathology
University of Liverpool
Liverpool L69 3BX

Reference:

Soto AM, Fernandez MF, Luizzi MF, Oles Karasko AS & Sonnenschein C (1997). Developing a marker of exposure to xenoestrogen mixtures in human serum. *Environmental Health Perspectives*, 105(Suppl 3): pp.647-654.

ECO-PIONEERS

Practical Visionaries Solving Today's Environmental Problems

Steve Lerner

"In a series of fascinating profiles of 25 eco-pioneers, Steve Lerner highlights a range of economically attractive alternatives to the unsustainable practices that are undermining the prospects for our common future. A real page-turner." — Jim MacNeill, Chairman of the Board, International Institute for Sustainable Development

"If you want to know who's doing the most creative hands-on work on sustainability, read *Eco-Pioneers* and get set to be inspired."

— Brent Blackwelder, President,
Friends of the Earth

440 pp., 45 illus. \$25

Original in Paperback

GLOBAL GOVERNANCE

Drawing Insights from the Environmental Experience

edited by Oran R. Young

"This is an interesting and compelling collection of essays that provides valuable contributions to the current and growing literature on international environmental regimes. This field is currently young enough that each contribution in volumes such as this plays a critical role in furthering the research program: many of these pieces are likely to be frequently cited because of the strength of the analysis. This volume will provide a single source for considerable good scholarship in the field."

— Ronald Mitchell, University of Oregon; author of *Intentional Oil Pollution at Sea*
Global Environmental Accords series • 344 pp. \$20 paper

ECO-EFFICIENCY

The Business Link to Sustainable Development

Livio D. DeSimone and Frank Popoff,

with the World Business Council for Sustainable Development

"*Eco-Efficiency* is not about theory: it is about action. Through concrete cases, it shows that with commitment and imagination, both economic benefits and environmental improvements can be achieved."

— Jacqueline Aloisi de Lardere, Director, UNEP
(United Nations Environment Programme) Industry and Environment

292 pp. \$25

Original in Paperback

SHADOWS IN THE FOREST

Japan and the Political Economy of Deforestation in Southeast Asia

Peter Dauvergne

Explores the role of Japanese trade, direct investment, and "development assistance" in the rapid deforestation of Indonesia, East Malaysia, and the Philippines.

Politics, Science, and the Environment series • 336 pp. \$22 paper

THE U.S. PAPER INDUSTRY AND SUSTAINABLE PRODUCTION

An Argument for Restructuring

Maureen Smith

"Smith's book is an entirely credible and comprehensive plan for restructuring an entire industrial sector toward ecological imperatives."

— Paul Hawken, author, *The Ecology of Commerce*

Urban and Industrial Environment series • 300 pp., 5 illus. \$30

Classified

DIARY DATES

4 February 1998: **TRANSFORMING INDIAN ENERGY: Government policy and the role of foreign investment in electricity, oil and gas.** Chatham House, London. For more information, contact The Royal Institute of International Affairs, Chatham House, 10 St James's Square, London SW1Y 4LE. Tel: 0171 957 5700; Fax: 0171 957 5710.

5/6 February 1998: **CLIMATE AFTER KYOTO; Implications for Energy.** For registration details, contact Sharon Moore, The Conference Unit, The Royal Institute of International Affairs, Chatham House, 10 St James's Square, London SW1Y 4LE. Tel: 0171 957 5700; Fax: 0171 321 2045.

11-13 February 1998: **THE SEA EMPRESS OIL SPILL**, Cardiff, Wales, UK. For details, contact Hannah Sime, CIWEM, 15 John St, London WC1N 2EB. Tel: 0171 831 3110; Fax: 0171 405 4967.

12 February 1998: **JOHN WILLIAMS** in a **RECITAL FOR PEACE** by candlelight. St James's Church, 197 Piccadilly, London W1. For details, contact MANA, 71 Greenfield Gardens, London NW2. Tel: 0181 455 1030.

8/9 March 1998: **THE CHANGING ROOFS OF EUROPE: Renewable Energy on Roofs and Façades**, Leeuwenhorst Congress Centre, Nordwijkerhout, THE NETHERLANDS. For more information, contact Alex Mee, European Media Marketing, PO Box 259, Bromley, BR1 1ZR, UK. Tel: 0181 289 8989; Fax: 0181 289 8484.

10-13 March 1998: **THE GLOBAL OCEAN**, The Brighton Metropole, UK. For information on this and all aspects of the Oceanology International series of events, contact Spearhead Exhibitions Ltd, Ocean House, 50 Kingston Road, New Malden, Surrey KT3 3LZ, UK. Tel: 0181-949 9222; Fax: 0181 949 8186; <http://www.spearhead.co.uk>; e-mail: <oi98@spearhead.co.uk>

23-25 April 1998: **Ecologue XXI WINDENERGY SYMPOSIUM**, Narbonne, FRANCE. In English and French. For more information, contact Ecologue XXI, BP8 - 11200 Fabrezan, FRANCE. Tel: +33(0)4 68435474; Fax: +33(0)4 68435475; e-mail: <ecologue@easynet.fr>

CALL FOR PAPERS

DEVELOPING INTERNATIONAL CONNECTIONS, 9-11 September 1998, University of Greenwich, Chatham Maritime, Kent, UK. **Abstracts** (500 words) on all aspects of remote sensing and international collaborative projects to: RSS98, School of Earth and Environmental Sciences, University of Greenwich, Medway Towns Campus, Chatham Maritime, Kent, ME4 4AW, UK. Tel: 0181 3319803; Fax: 0181 3319805.

ENVIROSOFT 98, 10-12 November 1998, Las Vegas, USA. Development and Application of Computer Techniques to Environmental Studies. **Abstracts** (300 words) a.s.a.p. to: Liz Kerr, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton, SO40 7AA. Tel: 01703 293223; Fax: 01703 292853; e-mail: <liz@wessex.ac.uk>

WORLDWATCH PAPERS

No. 129

Anne Platt

INFECTING OURSELVES: How Environmental and Social Disruptions Trigger Disease. 79pp, £3.

No. 131

Gary Gardner

SHRINKING FIELDS: Cropland Loss in a World of Eight Billion. 55pp, £3.

No. 132

Sandra Postel

DIVIDING THE WATERS: Food Security, Ecosystem Health, and the New Politics of Scarcity. 76pp, £3.

No. 133

David Malin Roodman

PAYING THE PIPER: Subsidies, Politics, and the Environment. 80pp, £3.

No. 134

David Malin Roodman

GETTING THE SIGNALS RIGHT: Tax Reform to Protect the Environment and the Economy. 66pp, £3.

No. 135

Gary Gardner

RECYCLING ORGANIC WASTE: From Urban Pollutant to Farm Resource. 59pp, £3.

No. 136

Lester R Brown

THE AGRICULTURAL LINK: How Environmental Deterioration Could Disrupt Economic Progress. 73pp, £3.

No. 137

Michael Renner

SMALL ARMS, BIG IMPACT: The Next Challenge of Disarmament. 77pp, £3.

No. 138

Christopher Flavin and Seth Dunn

RISING SUN, GATHERING WINDS: Policies to Stabilize the Climate and Strengthen Economies. 84pp, £3.

Send orders (cheques payable to "The Ecologist") and Worldwatch Paper subscription enquiries to: The Ecologist, Agriculture House, Bath Road, Sturminster Newton, Dorset DT10 1DU, UK. Tel/Fax: 01258 473476
Credit cards accepted. Back copies available.

COURSES

Are you Seeking a More Sustainable Lifestyle? Oxford Centre for the Environment Ethics & Society (OCEES) aims to combine academic research with social engagement and to contribute to the current public policy debate. For details of **seminars**, contact The Administrator, OCEES, Mansfield College, Oxford, OX1 3TF. Tel/Fax: 01865 270 886; e-mail: <ocees@mansf.ox.ac.uk>

Classified Advertising Rates

40p per word, min. 20 words, plus VAT

Send to: **The Ecologist (Classified)**, Agriculture House, Bath Road, Sturminster Newton, Dorset DT10 1DU, UK. Tel/Fax: 01258 473476

CERES - Centre for Education and Research in Environmental Strategies. Incorporating Centre for Energy Studies, Centre for Cultural Studies, Centre for Environmental Studies. Full range of CSF, VCE and Tertiary units plus adult, vocational education, holiday programmes. All ages. Contact: Annette Herschtal, CERES, 8 Lee Street, East Brunswick, NJ 3057, USA.

FIELDPROJECTS '98. Courses in variety of locations, including Vietnam, Nepal, Turkey, Tenerife. All projects with local NGOs and have objective of establishing working relations. Participants pay £70 p.w. For further information, contact Proyecto Ambiental Tenerife, 55 Monmouth Street, Covent Garden, London WC2H 9DG. Tel: 0171 240 6604; Fax: 0171 240 5795.

PUBLICATIONS

The Hemp Revolution, a 72-minute video which explores in-depth the hemp plant's fascinating history, its thousands of uses, the economic and cultural forces behind its prohibition, and its current potential to tackle environmental problems. Renowned scientists and academics argue that hemp could fulfil the world's need for paper, cloth and fuel, as well as provide high protein food and valuable oil and act as a useful medicine. Their debate is supported by current and archive footage from around the world. Price £12.99 plus £1.50 p&p. Write to Ecologist Video Offer, PO Box 50, Harlow, Essex CM17 0DZ, UK. Credit card hotline 01279 417450.

VALUES EDUCATION. Information about how we are damaging our planet and ourselves is not enough to encourage people to behave responsibly towards the environment and future generations. Values education is a way of getting people to *want to care*, without conditioning or pressure. Please send four 20p stamps to Dr Bill Robb, CAVE, 85 Argyll Place, Aberdeen, AB25 2HU.

MISCELLANEOUS

THE HUMAN PHYSIQUE AND POLLUTION. People born since the mid-1940s have a different physique from earlier generations - for example, they have **SMALLER HANDS** and wrists. This probably has an **environmental cause**. For more information, contact Nick Akrill, Flat 4, 130 Upper Hanover Street, Sheffield, S3 7RS. Tel: 0114 276 7211.

Opportunities to **WORK WITH SEA TURTLES** in GREECE.

May-October **Field work** on nesting beaches in Zakynthos, Crete and Peloponnesus.

Throughout the year at Sea Turtle Rescue Centre in Glyfada, Athens. For further information and application forms, write to: Sea Turtle Protection Society of Greece, 35 Solomou Street, GR-10682 Athens, Greece. Tel/Fax: +30 1 3844146.

Waterway Recovery Group, a registered charity, carries out restoration work on the inland waterways of Britain. For enquiries, contact WRG, 114 Regent's Park Road, London NW1 8UQ. Tel: 0171 586 2510.

Ancient Futures: Learning from Ladakh

by Helena Norberg-Hodge

"Everyone who cares about the future of this planet, about their children's future, and about the deterioration in the quality of life in our own society, should read this book."

The Guardian

Also an award-winning video

"An extraordinary film."

The Times Educational Supplement

Available in a language near you

Mongolian, Navajo, Dogril, Nepalese, Ladakhi, Tibetan, Burmese, Korean, Thai, Japanese, Slovak, Czech, Hungarian, Danish, Norwegian, Swedish, Portuguese, Italian, Spanish, German, French, English ...

Special Offer*

Book: £8 or US\$12

Video: £16 or US\$24

(California residents add 8¼%)

plus 10% packing and postage from The International Society for Ecology and Culture

Apple Barn, Week, Dartington, Devon TQ9 6JP, UK

850 Talbot Avenue, Albany, CA 94706, USA

*English language only. Please ask about other languages.

