

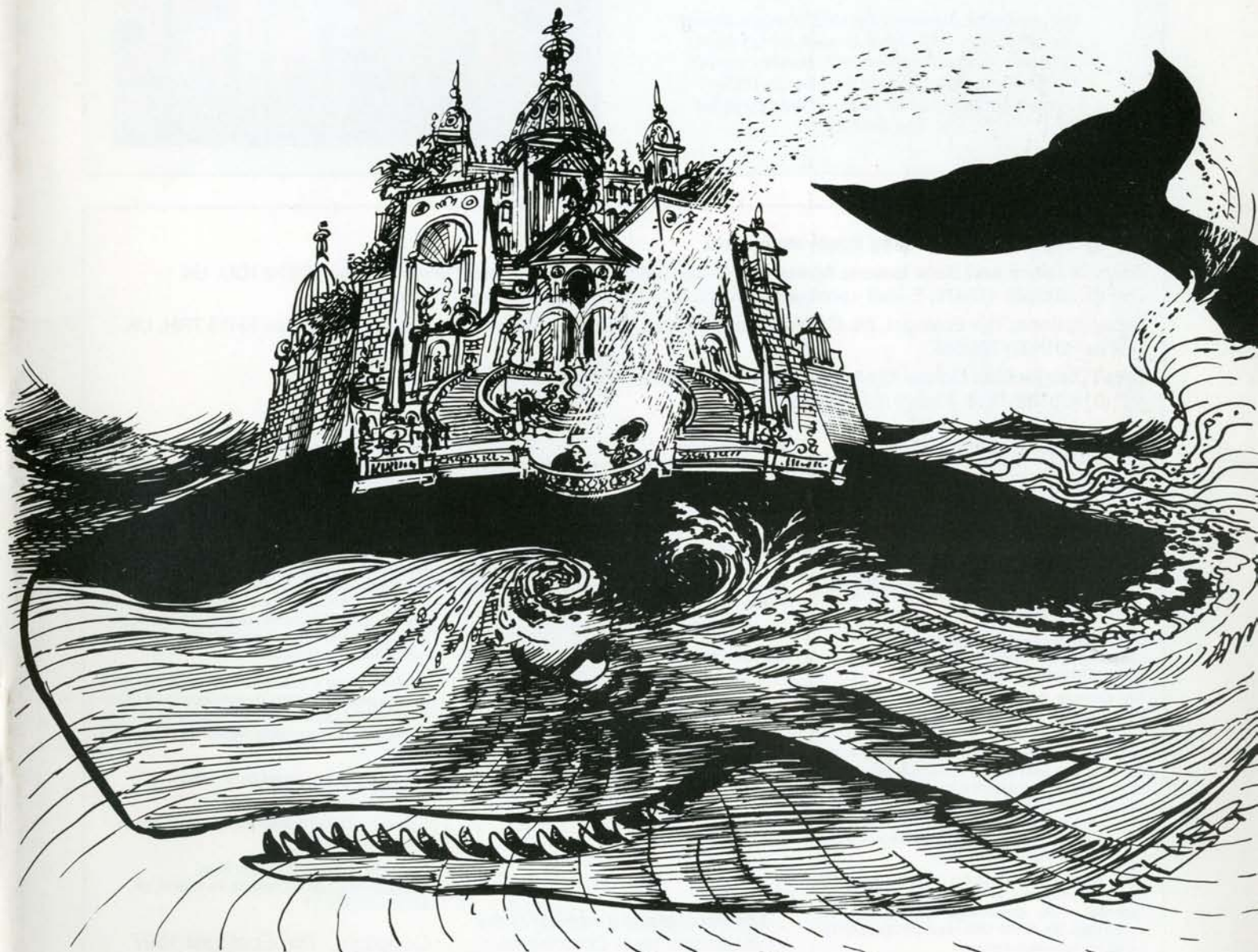
The Ecologist

Vol 27 No 4

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Rethinking basic assumptions



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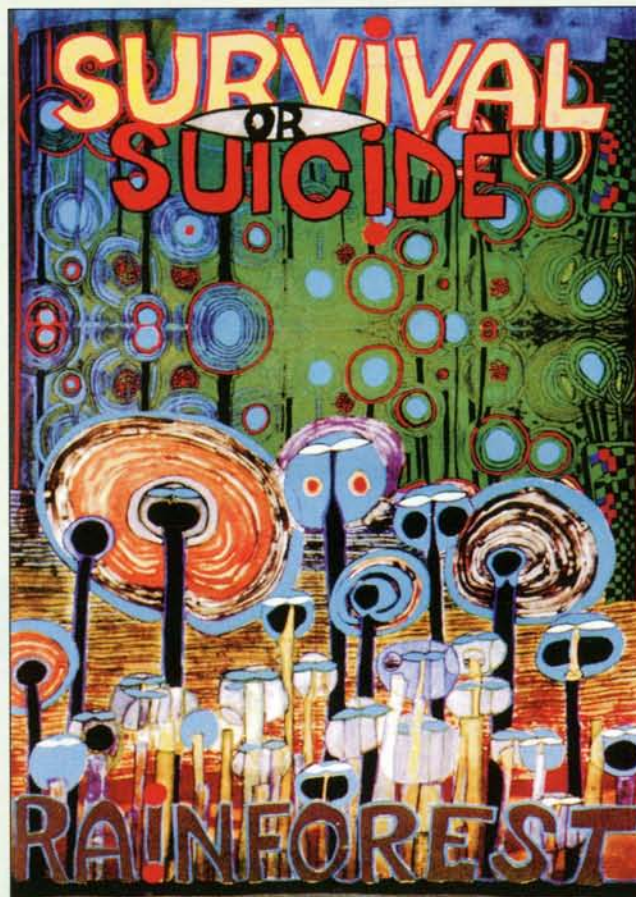
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Classified

See inside back cover

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The Ecologist

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Most governments and international agencies slavishly accept the biotechnology industry's assurance that their products are totally safe. This notion is promoted by an unholy alliance between big business and reductionist scientists. On the basis, however, of a holistic science, it becomes clear that the consequences of genetic engineering could well be devastating for the planet.

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Editorials

As our readers have probably gathered, the team that has edited *The Ecologist* since 1991 (Nick Hildyard, Sarah Sexton, Tracey Clunies-Ross and Larry Lohmann) has decided to leave in order to devote more time to the institute that its members are setting up together and that will carry on the campaigning and consultancy work that they have already been involved with over the last few years. This means that I have had to resume the editorship after having been out of it for six or seven years. This I shall do in conjunction with my nephew Zac Goldsmith and the International Society for Ecology and Culture (ISEC) with which he is associated – a society run by Helena Norberg-Hodge, John Page (in Devon and Ladakh), and Steve Gorelick (in Vermont). We shall of course have great difficulty in maintaining the standard of excellence that we feel was achieved by our predecessors over the years – but we shall do our best. We do not plan to change too much, but we will probably alter the accent. In particular we wish to concentrate on questioning or indeed rethinking a lot of today's basic assumptions.

We consider that every one of the depressing problems which we have described *ad nauseam* in *The Ecologist* during the past 27 years is the inevitable consequence of the policies imposed on society by our political and industrial leaders.

If this is so, then the only responsible and indeed the only honest thing to do is to stand back and reconsider the basic

assumptions on which these policies are based – the basic assumptions that unfortunately underlie the disciplines (as they are taught today) into which modern knowledge is divided.

This knowledge has got to be wrong – otherwise the policies that it serves to rationalize and hence legitimize would not be as totally misguided – one might even say suicidal – as they clearly are. Few people within academia are doing this. A Nobel Laureate is unlikely to question the basic assumptions which underlie his life's work and on the basis of which his professional status depends. Nor would too many young academics dare to divert too drastically from the accepted line within their discipline for fear of losing face with their peer group, while at the same time compromising their research grants.

Those who are courageous enough to do so have paid the price. Consider the case of Herman Daly, for instance. He was for years a professor of economics at the Louisiana State University at Baton Rouge. He then moved on to the World Bank, where he tried hard for years to persuade those who run this institution to rethink the basic economic principles which justify that institution's hideously destructive development policies. He failed, and sought to return to his old job at Baton Rouge, but the Economics Department of his old university would not have him back. For them *he was no longer an economist*, and all the university would do was offer him a job in the Geography Department, which he turned down.

Fortunately, the new discipline of Ecological Economics which he had done so much to bring into being was gaining increasing credibility, and he was given the Chair in the new Department of Ecological Economics at the University of Maryland.

Less eminent rethinkers of basic assumptions in academia may not always fare so well. Nevertheless, there are some brave academics who are willing to take the risk, as there are courageous non-academics who also have difficulty in not toeing the line in the various institutions that they work for. It is with these courageous people that we shall work, as Nick Hildyard and his colleagues have done, and with those independent people, who, like myself, have the privilege of being able to say what they like with almost total impunity.

In any case, that is how we see the work of *The Ecologist*. However, our minds are open and what we would really like are suggestions from you – our readers – as to how you see *The Ecologist* in the coming years. I should be very grateful if you would take a few minutes off from your normal activities and fill in the short questionnaire on the prepaid card you will find included in this issue. We shall publish the results of this little enquiry in a future issue of *The Ecologist* and you can rest assured that we will take all your suggestions very seriously indeed. With many thanks.

Edward Goldsmith

The Erosion of Democracy in the UK

In September 1996, just before the start of the last parliamentary session before the General Election in the UK, the Joseph Rowntree Reform Trust published its annual State of the Nation opinion poll. The results showed that public disillusionment with politicians and our political system had reached unprecedented levels. Three out

of four voters then believed that our democracy was not working. During the first few weeks of Parliament, business took place against a backdrop of widespread public concern about the degree of sleaze in government, about the openness and honesty of politicians and about the declining standards of those in public life. This mood was not just a

question of perception. It was based upon a real decline in the quality of our democracy.

British democracy is based upon a central pillar – the doctrine of the accountability of government to parliament. Ministers, by virtue of their membership of parliament, can be questioned and held to account by our

elective representatives; at least that's the theory. In practice, there has always been a sense of mythology about parliamentary sovereignty and the accountability of government. Any party with a significant Commons majority has always been able to push its legislation through relatively unscathed. The government of the day has almost complete control of parliamentary procedure – from the time tabling of legislation to the powers of patronage and control of the honours system. As a consequence, real accountability has often been a charade. And the powers of the Royal Prerogative (originally exercised by the monarch but now by governments) allow parliament to be bypassed altogether. It was even suggested by the former government's legal advisers during the debate on the Maastricht Treaty – one of the most far-reaching pieces of legislation in recent years – that the government could ratify the treaty without the consent of parliament.

So, in reality, accountability is limited – and declining. This is due at least in part to the increasing complexity of modern government. No minister can be expected to know every decision made by their department's civil servants. But 17 years of unbroken rule by one party also led to an arrogant use of power by the government that is more disturbing. Lord Justice Scott found in his inquiry into the arms to Iraq affair that parliament had been systematically misled by civil servants and ministers over the change in government policy towards Iraq. As Alan Clark MP, the former Trade and Defence Minister, told Justice Scott's inquiry, "the House of Commons is very volatile and you get all sorts of rows and oooh-er. They are a bit of a nuisance ... you try not to invite too much intrusion." Alan Clark may not be alone in wishing to avoid "intrusion", but this intrusion is the only way in which parliament can scrutinize the work of government.

Government has also curtailed the traditional role of parliament in scrutinizing legislation by increasing the use of delegated legislation. Increasingly the government is introducing very general Acts of Parliament and then using statutory instruments as a tool to fill in the gaps. Unlike Acts of Parliament, statutory instruments cannot be amended, only voted down, and are not subject to the same detailed scrutiny and debate. British MPs themselves have expressed concern about this manipulation of parliamentary procedure. In 1986 the Joint Committee on Statutory

Instruments reported that the volume and complexity of statutory instruments had increased to a point where "instead of simply implementing the nuts and bolts of government policy, statutory instruments have increasingly been used to change policy, sometimes in ways that were not envisaged when the enabling primary legislation was passed."

Moreover, the last government increased the use of parliamentary guillotines to curtail the passage of Bills and therefore prevented debate. Between 1979 and 1989 the government used the guillotine 47 times – more than all other post-war British governments up to 1979 combined.

Nor is erosion of democracy confined to the way parliament has been manipulated by the government. The power and control exercised by

Westminster and Whitehall over the whole of our democracy has also increased. There has been a wholesale transfer of power away from democratically elected local councils – and therefore from local communities. In recent years transport, education, planning, economic development and many other services have been transferred from local councils to central government or quangos. London is one of the few capital cities in the world with no elected authority, thanks to the 1985 Local Government Act which abolished the GLC and the Metropolitan County Councils.

Unelected quangos have grown in size and importance – there are now around 60,000 quangocrats compared with just 25,000 local councillors in the country. In addition, the Audit Commission has warned that inexperi-



enced governing boards and managers are being handed millions of pounds in public money with too few safeguards against fraud and mismanagement and inadequate mechanisms for independent scrutiny. The last government even used its power of patronage to reward political supporters. Some of those appointed to quangos have been involved in businesses which have made financial contributions to the Conservative Party (for example, Sir Christopher Benson, chair of the Sun Alliance Group which donated £280,000 to the Conservative Party, was appointed to the Funding Agency for Schools). The BBC has calculated that ministers can make a total of 50,000 appointments to quangos – a vast opportunity for patronage. Other appointments indicate straightforward political considerations. Baroness Denton, a former government minister, has been quoted as saying, "I can't remember knowingly appointing a Labour supporter" to a quango. This illuminates a report by *The Independent* newspaper stating that, of the 185 NHS Trust chairs, examined, 62 had "clear links" with the Conservative Party.

In 1979 local government raised 60% of all the money it spent through local taxation. Now it raises only 19%, and the balance of local authority spending comes from central government. It can be withheld from individual councils that step out of line, or cut if the government disagrees with the spending priorities of particular local authorities. To many observers, local democracy has thus virtually ceased to function in all but name, and local accountability has disappeared. Again, the Audit

Commission considers this to be a mistake. In 1993 the Audit Commission stated that local authorities were being left with cosmetic accountability for decisions largely made by central government. The lack of independent local government has arguably reduced interest in local politics. Turnout for local elections, at 40% of the electorate, is well below that of most other European countries which accord far higher status and value to local government for local communities. While the rest of Europe was moving towards a devolved

**Three out of four
voters then believed
that our democracy
was not working.**

approach to power-sharing, to a strengthening of local democracy, the last British government centralized power and weakened local accountability to an unprecedented degree.

If our democracy is to meet the complex challenges we face, there must be change. Over the past 17 years a powerful centralized government machine has been created. When last in opposition, Lord Hailsham spoke for many Conservatives when he described the British system of government as an "elective dictatorship". That dictatorship has strengthened in the last 18 years and it needs to change. It has been the Conservative Party which has overwhelmingly resisted any changes to our system of government.

We do need reforms to parliament to make it effective in holding the government to account and to enable backbench MPs to undertake pre-legislative scrutiny of all Bills. But we also need a substantial decentralization of power down from Westminster. A fully democratic society begins at a local level. It is at a local level that most people naturally want and feel able to participate in political life, in debate and in the making of decisions which affect their lives. At that level, people are clearly better equipped to deal with local issues than are distant bureaucrats, far removed from the reality of that environment. The role of voluntary and community groups is vital. Strengthening local democracy is therefore the starting point – not just of renewing political institutions, but renewing our political culture.

It is now the duty of Tony Blair's new government to bring about and encourage more than superficial decentralization. Already we hear reports of his tightening the reins on Members of Parliament and increasing the pressure on them to toe the party line, regardless of their standing. Let us hope New Labour, clearly the more human of the two parties, will learn from the follies of Tory rule.

Andrew Puddephatt

Andrew Puddephatt is Director of Charter88, the independent campaign for democratic reform. For further information about Charter88, telephone 0171 833 1988, or see the organization's web site at www.charter88.org.uk

2001: Entering the Era of Radioactive Consumerism

The year is 2001. You are driving to work in your car, having just had a pleasant breakfast and a good night's sleep. You pass your friend who is going to work on her bicycle. You think her stylish pollution filter mask is very fetching and resolve to tell her this when you have dinner together. You cannot know that your car is radioactive; the steel body contains: 9,000 Becquerels per kilogram (Bq/kg) of the isotope Cobalt-60. This substance is decaying with the emission of gamma

rays which are penetrating your body and producing high speed electrons which are smashing through tissue causing repairable and irreparable damage to chromosomes in your cells, damage that will lead to cancer and an early and terrible death.

The handlebars of your friend's bicycle, the plastic in her filter mask, the plate you ate your breakfast from, your breakfast, your teapot, all your cutlery, the lenses in your spectacles, your bed, indeed most of your surroundings, con-

tain large quantities of man-made radioisotopes like Strontium-90, Tritium, Cobalt-60, Caesium-137, Plutonium-239, unnatural substances, pollutants from nuclear industry processes or nuclear explosions.

Has another Chernobyl accident occurred?

Has the Third World War happened, the one we all expected in 1963?

Have the French or Chinese resumed atmospheric nuclear testing?

Actually, none of these: the radioac-



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tivity is a result of the recycling of nuclear waste into consumer goods, a consequence of the Euratom 96/29 Directive, which became European Community law on March 16th, 1996, and was transposed into UK law in the year 2000. Your car has been made from cut-up pieces of the reactor pressure vessel ducting from the decommissioned Dungeness power station. All the nuclear waste which piled up with NIREX and other nuclear waste disposers in the late 90s is now out of the waste repositories and in the environment.

While the anti-nuclear lobbies had been congratulating themselves on the impossibility of the industry being able to extricate itself from its economic privatization problems, the increasing costs of decommissioning its first generation stations, and its increasing problems with nuclear waste, the industry had thought of a way out. Radiation was to be diluted and recycled back into the environment. After all, isn't that where it came from? Isn't the environment radioactive anyway? And if it turned out that man-made radiation was more dangerous than the natural variety,

instrument was drafted and passed through the European Commission masquerading as a Basic Standards Directive and ostensibly aimed at unification of statutory radiation exposure limits across member states. Its real purpose was the relaxation of the existing controls on the disposal of nuclear waste.

The regulation of all practices involving radioactive materials and exposure to the public was drastically altered by this document. It explicitly permits, without authorization or reporting:

- the disposal of radioactive waste into the environment,
- the dilution of radioactive materials into ordinary waste for disposal by incineration or landfill,
- the recycling of radioactive waste into consumer goods, as long as they are not food, children's toys, cosmetics or jewellery,
- any practices involving radioactive substances,

so long as the average concentration of radioactive isotopes in any material being considered is below new threshold levels laid down for each isotope in the Annex to the directive.

at least there would be no more leukaemia clusters near nuclear sites and no more distraught families or local anti-nuclear groups calling attention to high cancer rates near Plutonium reprocessing plants. Everyone was going to have a share! Chemotherapy children, like tragic little aliens, would be seen all over the country, not just near nuclear sites.

Clearly the public relations people had brought in the psychologists to figure out a way forward in the face of the total (irrational?) public opposition to all things nuclear. They would no longer try to pretend that they were Green; they would just paint everything black! With the help of the International Atomic Energy Agency and the UK National Radiological Protection Board, a legal

The Annex is the key to understanding the purpose of the document. It lists threshold concentrations for all the novel man-made isotopes that came into existence on Earth for the first time in 1945 – substances like Strontium-90, Caesium-137 and Plutonium-239, which cause genetic damage and cancer at vanishingly small ingested doses. These substances were universally distributed in the global weapons testing fallout in the period 1955-63. President Kennedy recognized the dangers and banned testing in 1963. In his Senate address he referred to "... children with cancer in their bones, with leukaemia in their blood or with poison in their lungs ..." and said, "the loss of even one human life, or malformation of one baby, who may be born after we are gone, should be of concern to us all." Twenty years after the fallout, as Kennedy had predicted and feared, cancer and leukaemia rates began to increase; particularly in areas of high rainfall and fallout, like Wales.

The handlebars of your friend's bicycle, the plastic in her filter mask, the plate you ate your breakfast from, your breakfast, your teapot, all your cutlery, the lenses in your spectacles, your bed, indeed most of your surroundings, contain large quantities of man-made radioisotopes like Strontium-90, Tritium, Cobalt-60, Caesium-137, Plutonium-239, unnatural substances, pollutants from nuclear industry processes or nuclear explosions.

But when the testing stopped, the pollution did not: the nuclear industry took over and began pouring significant quantities of the same isotopes into the air and sea from reprocessing plants like Sellafield, Dounreay and La Hague. All these sites have undisputed childhood leukaemia clusters nearby of ten, eight and fifteen times the national average. Moreover, all have local sam-

ples of silt, soil and some biological materials (e.g. lobsters) so radioactive that they are classifiable as low-level radioactive waste. Furthermore, county districts containing outfalls from the nuclear sites at Harwell and Aldermaston, places which have released these substances to inland areas since 1952, were recently shown to have statistically significant childhood leukaemia excesses. Naturally, the nuclear industry, and its friends in the radiation risk establishments, dispute the origins of these cancer clusters, arguing that their study of the Hiroshima A-Bomb survivors does not predict cancer at such low doses. But, following the clear effects of Chernobyl and recent advances in radiobiology, it has become obvious that the Hiroshima study of acute high-level external exposure cannot be used to predict effects at chronic low dose from internal or ingested man-made radioisotopes. These are radioactive substances which mimic the very atoms used in the molecular structure of living cells. The accepted risk factors for radiation-induced cancer from these types of internal exposure are plainly wrong.

The present law in the UK regulating the disposal of nuclear waste is the Radioactive Substances Act 1993 which defines any material containing activity above 400 Bq/kg as low-level waste, subject to licensing and control. The Euratom Directive, however, defines low-level waste on an isotope-specific basis. For Strontium-90, a recorded

cause of genetic damage, infant mortality, bone cancer, leukaemia and congenital heart defects, the threshold is 100,000 Bq/kg. Below this concentration no reporting or authorization is required – we can leave the stuff out for the dustman. The new Euratom Directive law is 250 times more lax than the old. Similar or greater relaxations in

The new Euratom Directive law is 250 times more lax than the old.

The present legal threshold for disposal to the environment for Tritium is 2500 times lower than it will be when the Euratom Directive is substituted for it.

the law occur with all other radioactive isotopes. For example, Tritium is a radioactive form of hydrogen, the main component of water and every other molecule in the human body. The present legal threshold for disposal to the environment for Tritium is 2,500 times lower than it will be when the Euratom Directive is substituted for it. No wonder a recent article in *Nuclear Energy* drooled:

“At Berkeley power station the large diameter gas ductwork ... has a Tritium activity of 100,000 Bq/kg ... free release in the UK is defined as 400 Bq/kg ... We have had to treat the steel before we can send it for smelting [but] proposed free release in the EU is 1,000,000 Bq/kg! This is the culmination of a number of years' work by international bodies such as the International Atomic Energy Agency (IAEA) and the OECD's Nuclear Energy Agency. Development in the field ... is promising.”

There was once a family, in which for several generations all the members died of cancer. Everyone assumed it was genetic predisposition. It was accidentally discovered one day that they owned a beautiful dinner set, with an unusual orange glaze. The glaze was made from a salt of Uranium. This anecdote is a metaphor for our present and our future and that of our children, and their children. The Low Level Radiation Campaign, together with similar groups in other member states, are gearing up to oppose the implementation of the directive and are organizing a petition for the revision of the Euratom Treaty. The European Parliament was misled about the nature of this directive, and in any case have only an advisory role in Euratom. There is thus no democratic control over a project which is aimed at dispersing large quantities of cancer-producing poisons into our bodies and those of our children. This Euratom 96/29 Directive and its agenda is the latest move by the Nuclear Empire. It is a perfect example of the project that Professor John Gofman, once adviser on radiation and health to the US Atomic Energy Agency was referring to when he said, “The nuclear industry is waging a

Dr Chris Busby trained as a physical chemist and is an independent researcher of the effects of low-level radiation. His book *Wings of Death: Nuclear Pollution and Human Health* (1995) outlined evidence that radioactive pollution was the main cause of infant mortality in the 60s and contemporary increases in cancer and other illness, especially in areas of high rainfall. In 1996, he helped found the Low Level Radiation Campaign which is presently engaged in opposing the transposition of the Euratom Directive in the United Kingdom. Through his membership of the European Committee on Radiation Risk he is also engaged in a project to repeat the original Euratom Treaty of 1957, which called for the development of nuclear power throughout Europe. These campaigns are desperately short of person power and also funds. Anyone wishing to help in any way is invited to write to The Low Level Radiation Campaign, Ammondale, Spa Road, Llandrindod Wells, Powys, LD1 5FY or telephone 01579 824771.

Drawing by Richard Willson.
From *Stockholm Conference Eco*,
Vol II.



war against humanity.”

The European Committee on Radiation Risk is co-ordinating a campaign

- to have Directive 96/29/Euratom repealed,

- to block and/or amend its transposition into domestic law,
- to have the Euratom Treaty renegotiated.

Chris Busby

The Low Level Radiation Campaign is the contact point in the UK and will produce a range of materials and briefings (as far as funds allow). Write to LLRC at Ammondale, Spa Road, Llandrindod Wells, Powys, LD1 5FY. Tel: +44 (0) 1597 824771.

“Sustainable” Incineration and Death by Dioxin

People living within one kilometre of municipal waste incinerators are reported to be suffering significant increases in all cancers, including a 37 per cent increase in liver cancers.

Despite these horrific findings, the British government is going ahead with its plans to build huge municipal solid waste-to-energy incinerators (MSW) in most of the major cities of the United Kingdom.

Plans to build four in Manchester, four in Hampshire, and one near Rochester have already been revealed. These are in addition to any planning applications already submitted.

The scheme is the brainchild of 28 senior representatives from leading companies as the answer to the millions of tonnes of packaging waste their industries create each year.

Communities living with existing incinerators have expressed concerns about the effects incineration plants were having on their health for decades. Perhaps unsurprisingly however, former Secretary of State for the Environment, Chris Patten, declared, “We have a first-class technology for dealing with waste” and accused protesters of “scare-mongering”, and “discrediting the standards of British technology in waste disposal.” The record of UK incinerators more than justifies questions being asked about the technology of the process as a ‘safe and sustainable’ method of waste disposal, and contamination of the environment surrounding

some waste plants raises serious questions about our government’s attitude towards the dangers to public health.

One MSW facility in Stoke-on-Trent, for example, was producing dioxin, described as “the most toxic chemical known to man”, an amazing 300 times over the new plant standard, yet was allowed to continue operating until last year.

**In just six months,
a breast-fed baby in
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Even the most modern MSW incinerator in the UK (SELCHP) is not problem-free: I witnessed, along with others, a newspaper quite legible among the ash. If an incinerator cannot destroy a simple newspaper, what chance has it got with more difficult wastes?

In Pontypool, South Wales, the local ReChem facility has a colourful history of fires, explosions and community protests. An extensive survey by the University of East Anglia revealed high levels of PCB and dioxin contamination around the plant. Regulatory officials maintain that the facility poses no danger to human health, but one local family has been warned by the Welsh Office to avoid their duck eggs because of their high content level of dioxin. Children with eye defects have been born in the area, (there were cases of this around another incinerator at Bonnybridge, Scotland), but no direct cause or effect has been proven at either location. A report from the Welsh Office recommended that “major incinerators are not in future located near residential areas ...” recognizing the “grounds for concern about public health”.

Dioxin and dioxin-like chemicals (also called endocrine disruptors) are extremely persistent in the environment, lasting for decades, even centuries. They are not metabolized by bacteria or humans, and do not degrade in the environment. They can have far-reaching and serious effects on human health, especially that of the developing foetus, by interfering with, or mimicking, the natural hormone process. This can cause irreversible abnormalities in the development of the brain, which in the foetus has specific and narrow “windows of development”, during which exposure to a variety of chemicals can cause permanent damage. When a particular “window” closes, any damage that has occurred remains and is irreparable. The child carries that damage throughout its life.

Endocrine disruptors can also affect a baby’s sexual development and sometimes the effects don’t appear until puberty or afterwards. Advocates of incineration will maintain these chemicals will only be emitted in small quantities from the proposed plants. But hormones work at minuscule amounts – at parts per trillion – a degree of sensitivity “beyond most people’s wildest imagination”. (Frederick Von Saal – Biologist).

The experiences with chemicals and drugs like Thalidomide, where women who took only two or three tablets at five to eight weeks into their pregnancy, (the critical time for the development of arms and legs), tell us that it is not just the dose of the drug or chemical, but the timing of the exposure that is also critical.

It is not only while in the womb that children are at risk from dioxin and other endocrine disruptors. Breast-feeding, too, the most natural thing in the world, carries a high risk for the child. In just six months, a breast-fed baby in Europe or the United States gets the

Ellesmere Port, Cheshire, is the home of the most recently-built hazardous waste incinerator in the UK. This came on line in 1992 and, although incorporating the most up-to-date technology available, this plant already has a chequered and colourful history with dump stack releases, fires and an explosion. In one month alone (May 1992) there were confirmed sightings of chemical emissions on seven occasions. September 1995 saw the town covered with a purple cloud of iodine from the plant.

maximum recommended lifetime dose of dioxin. After one year of nursing, the daily intake for breast-fed infants is ten times the USEPA's safe dose which is based on a lifetime of exposure. Dr Arnold Schecter tested the blood of women exposed to dioxin through their occupation 25 years previously. He still found elevated levels of dioxin "... far more interesting ... we found elevated levels in the children, which we think come from nursing."

Rejecting the recommendations from the Welsh Office (above), and the scientific evidence on the dangers to health, the government is spending £10 million of taxpayers money on a PR exercise to

'hoodwink' the public into accepting the proposed plants by calling them "recycling facilities" instead of "incinerators".

Under the previous government, Britain justifiably earned the tag, "the Dirty Man of Europe". The private waste industry had friends in high places, with Dennis Thatcher on the Board of Attwoods, the largest disposal company in the UK. Imports jumped from 5,000 tonnes in 1983 to 183,000 in 1987 during his wife's period as Prime Minister. Renaming these plants as "recycling facilities" has paved the way for massive waste imports. The current Directives and legislation on imports of

"materials" for "recycling and reuse" are full of loopholes which certain members of the waste industry will no doubt be thrilled to exploit.

Ralph Ryder

Ralph Ryder is editor of *Toxcat*, a grassroots environmental publication, and co-ordinator of *Communities Against Toxics*, a coalition of groups throughout the UK and Ireland living with unsafe, polluting waste disposal and chemical installations. If your community is threatened by an incinerator or by a similar installation, or if you are associated with an organization which could fund valuable initiatives in this field, then please contact Ralph Ryder at *Communities Against Toxics*, 31 Station Road, South Wirral, L66 1NU. Tel: 0151 339 5473.

The WTO's Record So Far – Corporations: 3 Humanity and the Environment: 0

If anyone was in any doubt as to the true nature of the World Trade Organization, its actions in the three years since it was created paint a depressingly clear picture. As feared, in every case brought before it to date, the WTO has ruled in favour of corporate interest, striking down national and sub-national legislation protecting the environment and public health at every turn.

The WTO is structurally designed to ensure this outcome. To preserve environmental, health and worker safety standards that provide more protection than industry-shaped international ones is a near-impossible task. Governments against which a complaint is lodged have to prove to the satisfaction of a WTO panel that a number of narrowly restrictive provisions have been satisfied. They must in effect prove that a purely scientific justification exists for a law's action. But this ignores the reality that risks are very rarely immediately scientifically quantifiable, and, following the precautionary principle, should therefore not be taken. The WTO's narrow scientific requirement also ignores the fact that a country's citizens may simply not wish to be exposed to the higher level of risk accepted by lower international standards, a factor which the WTO does not

regard as legitimate justification for governmental action.

Furthermore, when an industry-backed governmental challenge to a 'disadvantageous' national or local law is brought before the WTO, the contending parties present their case in a secret hearing before a panel of three totally unaccountable trade experts –

The WTO does not regard as legitimate justification for governmental action the fact that a country's citizens may simply not wish to be exposed to the higher level of risk accepted by lower international standards.

generally lawyers who have made careers of representing corporate clients on trade issues – hardly the most neutral of arbiters. There is no provision for the presentation of alternative perspectives from non-governmental organizations, and documents presented to the panel, and the identification of the panellists who supported a position or conclusion, remain secret.

If the defending government fails to persuade the panel of the offending law's validity, it is legally and automatically bound to bring its law into line with the lower international standard, or be subjected to perpetual fines or trade sanctions. There is a theoretical possibility of appeal, but this will only be successful if all member countries vote to stop the decision within 90 days – a procedure designed to ensure that any appeal is highly unlikely to succeed.

All in all, an environment more conducive to ensuring that trade goals take precedence over all other policy concerns could not be imagined. The WTO's rulings should therefore come as no surprise.

The first blow was struck in mid-January 1996, after a challenge was filed by Venezuela and Brazil to the US Environmental Protection Agency (EPA) over its Clean Air Act. This act sets standards for gasoline, designed to reduce emissions that cause smog and air pollution, standards clearly too rigorous for the highly polluting Venezuelan and Brazilian petroliers to meet. But when corporate profits are at stake, in whichever country, the WTO appears to be in no doubt as to which side to take. The panel charged with arbitrating the case ruled in favour of the polluters, arguing that an important

implementing regulation of the Clean Air Act discriminated against foreign gasoline producers and thus violated GATT rules. The US was legally bound to comply with the ruling and in May 1997 the EPA announced that it was changing the Clean Air Act to comply with the WTO panel's decision. The WTO has thus enabled foreign countries representing commercial interests to subvert the national democratic process by successfully appealing to an outside forum over which citizens can exert no direct influence. In this way they have achieved what even US industry, which had pounded at the Clean Air Act at every stage of the law-making process, itself failed to achieve.

In May 1997, in a move which bodes ill for the European Union law requiring the labelling of all genetically engineered food, a WTO panel declared that the European Union's ban on imports of beef produced with artificial growth hormones violated international trade rules and was consequently illegal. This represents an important victory for the agro-chemical giant Monsanto which produces the hormones, and for the American cattle industry, which uses them to make cattle grow faster and produce more milk.

The issue before the three-member WTO panel was whether the ban was grounded on any scientific evidence that the use of hormones might endanger health. The 'consensus' among 'scientific experts' was that there was no such evidence, despite the fact that the results of Monsanto's own clinical trials, which it attempted to disguise, showed that the use of the hormone rBST increases the rate of udder cell infection by 20 per cent, leading to a set of painful and disabling health effects. The most important of these is mastitis, inflammation of the mammary gland or udder, which results in pus clots in milk, a swollen red udder and, in bad cases, terminal sickness. Independent experts such as David Kronfield, Professor of Agriculture and Veterinary Medicine at the Virginia Polytechnic Institute, and Samuel Epstein, Professor of Environmental Medicine at the University of Illinois, claim that the risks of contracting mastitis due to rBST are even higher. They have also found that in nutritional terms, rBST milk has increased fat concentration and decreased protein concentrations relative to natural milk. It is also contaminated by rBST, increased levels of thyroid hormone enzyme, pus, antibiotics (used to treat the mastitis) and increased levels of IGF-1 which has

been incriminated as a risk factor in breast and colon cancer, particularly for young children.

Not only was this public health risk disregarded by the WTO under the cover of free trade, but so was the popular will. For the law's principal purpose was to meet widespread popular concerns among European consumers over chemicals in food. And surely, if European consumers and governments are opposed to hormone-treated food and want to promote more organic methods of raising cattle, they should have the absolute right to do so. With its ruling, however, the WTO has shown that it has the power to go over the heads of democratically elected governments to decide what health or environmental rules have a 'valid' scientific basis.

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If the WTO has swept away laws protecting human health and the balanced composition of the atmosphere, legislation designed to safeguard endangered species has been given even shorter shrift. The US Marine Mammal Act placed an embargo on tuna caught with dolphin-killing methods. It was denounced by Mexico as a protectionist trade weapon designed to close markets to foreign competitors. Rather than reform its practices, Mexico sued the US and succeeded in having the law declared illegal under GATT rules, under the pretext that the way in which a product is produced may not be used as grounds for trade discrimination.

The US law restricting the import of shrimps from countries whose fishermen catch them with methods that kill endangered sea turtles appears set to follow a similar fate. This law requires domestic and foreign shrimp fishermen to fit shrimp nets with 'turtle excluder devices'. However, some Asian nations claim that the US cannot use import bans to influence fishing behaviour outside US borders. Although the

shrimp-turtle case has not yet been decided, given that the US ban is similar to 'dolphin-safe' restrictions on tuna imports that trade panels have repeatedly found violate trade rules, there is cause to worry that US turtle protection law is extremely vulnerable too.

Indeed, very little is now safe. It has been estimated by the US chief negotiator at one of the preparatory meetings for the Rio conference that 80 per cent of America's environmental legislation could be challenged and declared illegal before WTO panels. Regulations requiring that imported products meet local standards on such matters as recycling, toxic substances, labelling and meat inspection could all be subject to challenge. Conservation measures that restrict the export of a country's own resources, such as forestry products, minerals, and fish products, could be ruled unfair trade practices, as could requirements that locally harvested timber or other resources be processed locally to provide local employment. Local interests are no longer a valid basis for local laws under the WTO regime. The interests of international trade, which are primarily the interests of transnational corporations, take precedence.

Every ruling of the WTO proves that the institution as it stands is fundamentally flawed, designed as it is to place corporate profits above the need to protect our environment, our health and our democracy. Senior members of the new Labour Government talk of 'greening' the WTO and introducing social clauses, but what hope can there be if environmental and social standards that will increase costs to industry are summarily rejected? Our politicians must accept that in order to govern in the public interest they will have to curb the destructive activities of big business and its perceived right to make profits at any cost. Until they do, the list of essential laws struck down in the name of free trade will continue to grow ever longer.

Simon Retallack

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The IFG is an alliance of activists from around the world working to oppose and reverse the current rush toward economic globalization. It organises public teach-ins and is involved in research projects, publications and has plans to initiate a media education campaign. An IFG research service is also available for information on specific dimensions of the globalization process and issues, such as the WTO.

Why Transnational Corporations are Organizing to "Save the Global Environment"

by Matthias Finger and James Kilcoyne

This is the edited text of a talk given by Matthias Finger at a meeting of the International Studies Associations, 37th Annual Convention at San Diego, California, on 16-19 April 1996.

Introduction

Transnational corporations, that have so far been responsible for much of the terrible environmental destruction of recent years, are now insisting that they have turned over a new leaf and are to become the guardians of what remains of our natural environment. The authors of this article are not convinced. TNCs are difficult to reform. By their very nature their activities must be environmentally destructive. A new interest in "saving the global environment" is merely part of a strategy to enable them to achieve their real goals – foremost among which is the setting up of a global "free" and ever more homogenized market for their products.

The authors tell us how they see this strategy. First of all they see it as divided into three different but closely associated parts. The first was set by the UN Conference on Environment and Development (UNCED), otherwise known as the "Earth Summit" that was held in Rio in 1992. It is around UNCED that a group of 48 TNCs created what was then called the Business Council for Sustainable Development (BCSD). In this first stage they tested their conceptual framework, lobbied to shape the outcomes of UNCED, "co-opted" the world's major environment NGOs, and also tested their approach. Given their easy success at UNCED, they started to organize, in a parallel process, for the post-UNCED era. This led, as of January 1995, to the creation of the World Business Council on Sustainable Development (WBCSD) which largely replaced the BCSD. The WBCSD is currently engaged in the second stage of their strategy, which involves lobbying strategic national governments in the South, as well as multilateral organizations, especially the World Bank. In this way they hope to shape the outcomes of various international negotiations currently under way. The big question that faces us today is how the ever more powerful TNCs are to be controlled. If they cannot be, we have little hope.

In a third and probably final stage, they will almost certainly lobby two strategic international organizations, the ISO (International Standardization Organization) and the WTO (World Trade Organization). Having achieved the goals set for these three stages, so goes our argument, WBCSD multinationals will be uniquely positioned to determine and control global environmental and other standards, as well as trade rules.

The emergence of global environmental issues and problems during the 1980s initially appeared to business as a threat, for they feared that the negative consequences of industrial development, such as ozone depletion, global warming, desertification and the loss of biodiversity, would serve as an argument to restrict growth and development. More immediately, there was a danger that corresponding (environmental) regulations would restrict free-market activities.

This threat became concrete at UNEP's 10-year review conference in 1982, where it was seriously proposed that the United Nations Environment Programme (UNEP) should be strengthened. Already measures had been taken, not so much by the TNCs themselves, but by neo-liberal governments such as the USA, the UK and Switzerland, to diffuse that threat and redefine the "environmental issues and problems". In this way it was tacitly decreed that "development" was the solution rather than the cause of global environmental degradation. This principle was further established with the so-called Brundtland report, preparing the way for the UNCED process. But, to the global business community, the UNCED process remained a threat. In the meantime, the business community, especially via the International Chamber of Commerce (ICC) had already mobilized to present its (free-market) vision of environment and development issues.

Clearly, the natural venue for TNCs to promote their interests was GATT (the General Agreement on Tariffs and Trade) and now the WTO, (the World Trade Organization). This is quite logical, since, as global businesses they are particularly interested in all forms of (national and international) regulations governing trade. This must be so, for their business strategy quite logically seeks maximum freedom from, and at the same time control over, the rules governing the movement of capital, technology (patents and property rights), labour, components and finished products.

The free movement of capital was basically achieved as a result of financial deregulation throughout the 1980s, and is

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therefore no longer a major concern for TNCs. The free movement of labour had not yet been achieved, but it was not essential as "delocalization" (the movement of manufacturing facilities to whatever country offers the most favourable conditions for maximizing profits) is a powerful strategy to circumvent regulations, since it has the advantage of conferring competitive advantages to those businesses that are most mobile, which is of course the TNCs. The free movement of technology, as well as of component parts, finished products (and services) was to be negotiated via GATT. But there were some serious problems with the GATT negotiations. Besides the fact that they were long and drawn out, and that multinationals were often put into competition with one another by the negotiating governments, the main problem with GATT was that the TNCs were forced to speak through their respective governments, rather than directly for themselves, as was the case with UNCED.

In 1990, at a preparatory regional conference (prepcom) for UNCED, ICC was mandated to prepare seven industry projects to form the core of an industry initiative for UNCED. This initiative was to be adopted at WICEM II. (The first, WICEM I, was held at Versailles in 1984.) The second World Industry Conference on Environmental Management was held in April 1991 in Rotterdam. But in the meantime (late 1990) Maurice Strong, Secretary General of the UNCED process, had appointed Dr. Stephan Schmidheiny as his principal adviser for UNCED. Schmidheiny recruited a group of 48 business leaders (almost all representatives of TNCs) and during WICEM II created the Business Council for Sustainable Development (BCSD), thus "hijacking", so to speak, the ICC efforts. The ICC set up in February 1993 a new organization, the World Industry Council for the Environment (WICE), which was deliberately done to compete with Schmidheiny's Business Council, and sixty multinational companies were its founding members.

It was during the preparations for Rio that the UNCED began to be perceived by both the ICI and the BCSD as an opportunity rather than a threat. This became clearer with the publication of Schmidheiny's book *Changing Course*¹ – the book that provided the rationale for the BCSD and more generally for the TNCs' concern for the global environment.

It made clear that the basic motivation and driving force of the TNCs is not the environment, but remains the achievement of free trade at the global level. Schmidheiny's book is in fact no more than the application of the neo-liberal framework to the global environment. But it is, in our view, more than that: if the free-market ideology could successfully be applied to environmental issues and problems, the most serious obstacles to industrial and corporate growth would have been removed and it could then be applied to almost everything else, especially to social and labour issues. But, as we shall see, this was not the main reason the TNCs decided to become involved in global environmental issues.

Rio turned out to be a great triumph for the BCSD and the ICC. They achieved just about all their goals. One reason is that the Rio meeting was largely financed by Schmidheiny – who is reputed to be one of the richest men in Switzerland. He is, for example, on the boards of ABB (Asea Brown Boveri) and Nestlé. This, of course, put the BCSD in a strong position during the prepcom meetings where the Rio Conference was prepared. During this period the ICC and the BCSD spent a lot of time lobbying Northern governments, especially the United

States, Canada, the UK and Switzerland, and seeking to co-opt the major environmental NGOs, which they quite successfully did, in particular the WWF (World Wide Fund for Nature), IUCN (International Union for the Conservation of Nature) and the US Big Ten (i.e. such organizations as the Environmental Defence Fund, The Natural Resource Defence Council, etc.).

The ICC and the BCSD made sure that no mention was made of Transnational Corporations in Agenda 21 – the principal document produced by UNCED – except that they were partners in and active contributors to solving global environmental problems. This meant that there is nothing in Agenda 21 about the control of TNC activities. This was left to market-oriented mechanisms such as tradable pollution permits, which

they would have little difficulty in acquiring from smaller companies that could not afford to pay for them. There is also occasional reference to the internalization of environmental costs, something which they can control quite easily and make sure that only the most obvious and the cheapest costs are in effect internalized.

However, the serious regulation of their activities by a body with the requisite executive powers was never mentioned. Only self-regulation is accepted.

In general the TNCs succeeded in shaping Agenda 21 in accordance with their requirements. It emerged as a non-binding, watered-down text of general principles, with a heavy bias towards development and the free market. Very much the same thing is true of the Biodiversity Convention, the Climate Change Convention and the Forest Principles. They were all shaped by the TNCs and designed, above all, to satisfy their immediate economic interests.

The ICC and the BCSD also succeeded in persuading Northern governments to kill the draft code of conduct that had been drawn up by the United Nations Center on Transnational Corporations (UNCTC) over many years to control the activities of TNCs.

The UNCTC was set up in the early 1970s, when the Chilean President Salvador Allende appealed to the UN General Assembly to establish legally enforceable rules to counter TNC, sponsored political destabilization. It required 19 rounds of negotiations before the UNCTC could work out and publish this code of conduct. Finally, it appeared in early 1992, and was not surprisingly, not to the taste of the TNCs. They succeeded not only in killing it, but in abolishing the UNCTC itself. The pretext was that the institution that would be set up by UNCED at the Rio meeting would be far more qualified to control TNCs than UNCTC, which, as a result, no longer had a *raison d'être*. Officially the UNCTC was integrated into UNCTAD (the UN Conference on Trade and Development), itself under threat.

The TNCs' greatest achievement of course was firmly to establish the principle that industrial development or economic growth, now referred to as "sustainable development" was the only acceptable solution to global environmental problems, and that to maximize the pace of this process, international trade had to take precedence over all other considerations.

Post-Rio Strategy

After Rio the BCSD and WICE had to reassess what they were going to do. While the BCSD was now expanding its activities and starting to lobby developing countries, WICE was setting up its headquarters in Paris.

The BCSD-controlled magazine *Tomorrow* made it a point to convince its readers – managers of TNCs – that it made no sense having two competing Green business organizations and, as of January 1st, 1995, the Business Council for Sustainable Development (BCSD) and the World Industry Council for the Environment (WICE) merged to form the World Business Council for Sustainable Development (WBCSD). The WBCSD moved to Geneva, interestingly into the offices of the UNCED, and most of the WBCSD Executive Committee members are from the BCSD. On the other hand, the chairmanship was given to Rodney Chase, Chairman of WICE and Managing Director of British Petroleum. Björn Stigson, a former CEO of ABB Sweden, became the executive director of the merged organization. The WBCSD office in Geneva has a staff of nine full-time people, whose main role is the co-ordination and public relations. WICE and BCSD had respectively 85 and 52 members representing TNCs in 35 countries. (1996)

Since the beginning of their involvement in UNCED, the BCSD members had identified the idea of "Green products", "Green technologies" and "eco-efficiency" as providing means of acquiring a potential advantage vis-à-vis competitors who had not embarked on the environmental bandwagon early enough or who were too small to afford them. However, they could only benefit from these advantages by ensuring that international standards were set to ensure non-Green production was put at a corresponding disadvantage. Given their success in influencing the UNCED outcomes, Schmidheiny and the BCSD started to think about influencing or even setting these global product and production process standards. Having such standards set according to their needs, would indeed provide the BCSD members with the ultimate competitive advantage. We are pretty confident that in the aftermath of Rio the main strategy was to influence the International Standardization Organization (ISO) in Geneva. Indeed, we read in *Tomorrow Magazine* (the "voice of global environmental business") that "Far from lobbying against cleaner standards, business will push for stronger standards that they can meet and their competitors cannot." Moreover, if one could have an influence on environmental standards, one could of course influence other standards as well. Quite logically, there is talk today also of social standards to be set by the ISO.

Another post-Rio strategy was to cash in on the newly established principle that "sustainable development", a new name for industrial growth, had now been established as the solution to all environmental problems, which justified in the eyes of the public the vast sums of money that could now be allocated for this purpose – much of which would be made available to the Southern countries.

This was so-to-speak the price the North was going to pay for getting the South to the table. This allocation of funds is provided mainly via the World Bank and the Global Environmental Facility (which is in effect controlled by the World Bank – a longstanding ally of the TNCs) – that had been set up at Rio. It was also provided bilaterally through big donor countries, such as the United States, Canada, France, Germany, Japan and the Scandinavian countries. "Green multinationals" could take advantage of these funds by presenting themselves as "sustainable developers". This was a great bonanza for infrastructure companies involved in building railways, dams, power plants and, more generally, utilities

(electricity, gas, water), such as, for example, ABB. Moreover, the buzzword was now "joint implementation", which means that NGOs, governments and multilateral agencies would work together in the implementation or realization of these projects. As an immediate next step, the BCSD therefore targeted the joint implementation of sustainable development projects in developing countries. This not only has the advantage of getting governments and multilateral agencies – which must thereby be lobbied – often with the help of previously co-opted NGOs – to finance the BCSD, but moreover presents the opportunity to lobby strategic Third World governments for longer-term purposes.

Nevertheless, they realized that there was still some resistance to the TNCs taking over the "global environment".

There has been virtually no resistance from Northern governments. They have readily accepted the TNCs' view on sustainable development and, actually, in the case of some, made themselves the active spokespersons of their view (for example in the case of the United States, the UK, Canada

and Switzerland). There was not much resistance from the major UN agencies either, except for some very few science-based, independent, and financially more solid UN agencies, such as the World Meteorological Organization (WMO) on the subject of climate change issues. And, as a matter of fact, the big loser agency of the UNCED process, the United Nations Environment Program, (UNEP), rather than oppose the TNCs, turned out to be an important ally. Nor was there much resistance from major NGOs, which gladly accepted to support the multinationals in their commitment to sustainable development. Resistance, however, came and still comes from the South, in particular from the Indian, Malaysian and Brazilian governments, who feel that concern for the environment is but a means of preventing them from developing, and hence but a pretext for "re-colonizing" them. There is also some resistance to this neo-liberal world-view from Third World NGOs, especially the Malaysian based Third World Network, which considers that the UN and the Northern governments are caving in to the transnationals, "letting the fox take over the hen house" (Watkins, 1992).²

The WBCSD is an exclusive club of self-selected TNCs. As the WBCSD brochure tells us: "Membership is by invitation only." Though we have not conducted a corresponding analysis, it is obvious that for each of the above-mentioned strategic sectors, the WBCSD members constitute a powerful cartel. They have truly carved up the planet among themselves as part of their business strategy for dealing with their competitors. But there are also other, more official reasons, why one would want to be a member of the WBCSD. The WBCSD brochure lists three types of official activity, the first being clearly the most important.

- The first is *policy lobbying* in key strategic areas, which is also called "policy development". Not surprisingly, these areas are trade and environment, sustainable consumption and production, climate, forests and biodiversity.
- The second type of activity is much more concrete and pertains to issues of environmental management, in particular eco-efficiency and *environmental assessment*, i.e., the assessment of environmental risks and their costs to the company.
- The third type of activity is much more symbolic, but nevertheless very important. The WBCSD supports a series of

The WBCSD counts among its ranks some of the most important multinational corporations, such as Total SA (France), Volkswagen (Germany), Fiat (Italy), Shell and Unilever (Netherlands), Norsk Hydro (Norway), ABB (Sweden/Switzerland), Volvo (Sweden), Ciba-Geigy, Nestlé, SGS (Société Générale de Surveillance, a certifier of set standards), Swiss Bank Corporation (all Switzerland), BP, ICI (both UK), Ontario Hydro, TransAlta Utilities Corp. (both Canada), AT&T, Browning-Ferries, Dow, IPC, Johnson & Johnson, 3M, Mobil, Texaco, Weyerhaeuser, Xerox (all USA), Hitachi, Mitsubishi, Mitsui, NEC, NTT, Sony, Toshiba, Toyota (all Japan), Aracruz Cellulose SA (Brazil), Samsung (Korea), and Western Mining (Australia). As one can see, most of these multinationals are from the North, especially the United States. There is also a heavy bias towards Switzerland: Among the 13 members of the executive committee of the WBCSD

three represent Swiss multinationals, i.e., Schmidheiny (vice-chairman, Anova Holding SA), Barnevik (ABB), and Maucher (Nestlé).

A preliminary analysis of the represented sectors shows that most industrial sectors are represented in the WBCSD. Particularly well represented are the automotive sector (Renault, Volvo, Fiat, Volkswagen, Toyota, Mitsubishi – no American car maker though), the petrochemical sector (Mobil, Texaco, Total, Shell, Statoil, Saga, BP), the power and infrastructure sector (power plants, railways: Norsk Hydro, ABB, Schindler, Sulzer, PowerGen, Kansai, Ontario Hydro, Browning-Ferries, Neste, Pohjolan Voima), the paper and pulp industry (Kymmene, IPC, Aracruz, Mitsubishi), the chemical industry (Rhône-Poulenc, Henkel, Akzo Nobel, Ciba-Geigy, Hoffmann-LaRoche, Sandoz, Glaxo, ICI, Dow), the mining industry (Western Mining, Mitsubishi, Rio Doce, Caemi Mineração, Weyerhaeuser, 3M, TransAlta), and the Telecom sector

(AT&T, NTT, Northern Telecom). The less well represented sectors are banking, insurance, consulting, and food.

One can clearly see from this list that we are dealing here with multinationals interested in mainly industrial, as opposed to service sector development. In other words, these are industries that have a particular interest in developing countries and their growth. This, at least, will explain their lobbying activities, in particular the lobbying of the World Bank and other agencies that allocate funds for Third World development. It also explains their lobbying of specific developing countries, in particular the ones that constitute a growth market, such as Thailand, Malaysia, Indonesia, Nigeria, and more generally Eastern Europe and Latin America. Not astonishingly, these constitute at the same time the countries and regions where since 1993 national and regional BCSDs have been set up.

demonstration projects and training activities, which it does not conduct itself, but for which it uses external expertise, often from NGOs. Funding, here, is project specific. This is also an opportunity to create "multiple partnerships".

Stage No.2: current operations

In the second stage – which is the current stage of operations of the WBCSD – mainly three objectives are pursued, namely (1) to diffuse threats posed by international environmental negotiations currently under way, (2) to obtain contracts for the joint implementation of sustainable development projects, and (3) to get a foothold in strategic countries. The third objective is important in order to be able to shape trade rules and standards to the liking of the WBCSD members. Different devices are resorted to for the purpose of achieving these and other longer-term objectives, namely (1) the creation of subsidiaries, (2) training activities and research projects, and (3) the setting-up of "multiple partnerships", as they call them.

There remains the general objective, for the multinationals, to diffuse the danger of environmental regulations. This is particularly so with regard to the implementation of the Biodiversity and the Climate Conventions, but also that of the Proposals of the Intergovernmental Panel on Forests. Here, the transnationals want to make sure that the outcome of these negotiations is favourable to their interests. Yet, their interests are somewhat contradictory. If, in the case of climate and forests, they are mainly interested in liberalization and deregulation, in the case of biodiversity exactly the opposite is the case. It follows that, in the area of climate change and forests, the WBCSD seeks to buy time and proposes, for example, joint implementation schemes as a means of reducing greenhouse gas emissions (in the South). In the case of forests the WBCSD, through friendly governments from Europe and G-77, mainly seeks to slow down or even obstruct the process,

waiting for the issue to be brought to the WTO through the ITTO (International Timber Trade Organization).

In the case of biodiversity, the main objective for WBCSD transnationals is to make sure that patents on life forms are granted to them and that these patent rights are protected. The WBCSD acts in these negotiations either directly as a lobbyist or more indirectly via friendly governments. Indeed, increasingly as national business councils are being set up, national business council representatives are taken along by national governments to these negotiations. Finally, these negotiations are always also an opportunity to promote the overall conceptual framework, namely that the market offers the best solution for global environment and development problems, and that regulations are inefficient because they "distort free" trade.

Another key goal of the second stage is to obtain sustainable development projects and joint implementation contracts. These are mainly infrastructure projects, but can also be health-related or educational. Here the WBCSD or member companies lobby their national governments or multilateral agencies, in particular the World Bank or Bank affiliates, such as the International Finance Corporation (IFC) or the Multilateral Insurance Guarantee Association (MIGA), in order to obtain funds (or guarantees in the case of MIGA) for concrete projects in specific developing countries. For example, Ciba-Geigy induced the Swiss government to pay for a project established by the Madagascan authorities for which Ciba provides managerial, technical and infrastructure support,³ and as an indirect outcome can now sell its pharmaceuticals. On another occasion, the Swiss Federal Office of Foreign Economic Affairs signed a three-year co-operation agreement, brokered by the BCSD, with the New-York-based World Environment Centre (WEC) to "increase economic efficiency while improving environment, health and safety policy and practices" in Bulgaria, Romania, Chile and Columbia under the multi-million Swiss Franc

agreement, WEC will "work in partnership with the Swiss private sector and the WBCSD".⁴ Lobbying the Bank takes various direct and less direct forms. For example, as the World Bank is reorganizing and integrating both MIGA and IFC into a "private sector development group", the WBCSD and the Bank have recently come to a special agreement, by which 50 senior Bank staff will be sent for management training on "exchange programs and secondments with leading industrial companies, banks and agencies throughout the world".⁵ In the case of "joint implementation", the basic idea is that countries can partially meet their commitments to eliminate greenhouse gas emissions by investing in greenhouse gas emission reduction in other countries. By this type of (non-binding) business regulation, TNCs can invest in developing countries, while pleasing Northern governments and even getting on occasion multilateral agencies (for example the Global Environmental Facility) to pay for it. And this is a particularly interesting form of "sustainable development" for TNCs, as they often get paid by national governments and multilateral agencies for obtaining a strategic advantage over their competitors, as well as a foothold in a developing country. Besides lobbying concretely in order to obtain such joint implementation contracts, the Business Council is also active in "explaining" to Third World governments and NGOs the advantages of joint implementation, which, they say, is currently "misunderstood in many places as a form of eco-colonialism".⁶

In the meantime, other countries are being targeted by the WBCSD because they are of especially strategic value for business development purposes. This is, in particular, the case with Thailand, some Eastern European countries, as well as Nigeria and the Southern African region. Hence the creation, since 1993, of subsidiaries, i.e., national or regional chapters of the BCSD in these countries. Malaysia is, in our view, a particularly interesting case, as Malaysia has presented itself since the early UNCED process as speaking on behalf of other Third World interests in general. Malaysia also was the first country to chair the UN's Sustainable Development Commission which was created at Rio. It was therefore only logical that a Malaysian Business Council for Sustainable Development should be set up. Its immediate strategic goal is of course to lobby national governments to agree to sustainable development and joint implementation projects. But in the long run, the strategic goal is also to become included as NGO representatives on government delegations to international negotiations (see stage 3 below). In the case of Malaysia, for example, on specific occasions,⁷ this already happens today.

The WBCSD also sponsors training activities and conferences, by which its three main messages – i.e., the economic growth imperative, free-market solutions (international harmonization and free trade), as well as business type regulations – are being conveyed. Preferred target audiences are future leaders, like, for example, those at the Global Leadership Conference held in September 1995 in Costa Rica. It is also interesting to note that such events are always done through multiple partnerships, in particular with academic institutions, UN organizations, or even NGOs, making it appear that the WBCSD is but a simple partner in a commonly

shared endeavour. There are always also local partners involved, making sure that the WBCSD appears to be rooted locally.⁸ A similar result is obtained through commissioned research reports, often directly managed by NGOs, such as WWF, IUCN, IIED, or even local ones.

Stage No.3: controlling global standards and trade rules

After stage No.2 which is still ongoing, we foresee yet another stage: it seems to us that the WBCSD is now systematically putting into place the necessary elements for the successful lobbying of the two international organizations that are of greatest strategic importance to its members, i.e., the WTO and the ISO. This preparation includes the successful lobbying of strategic governments, especially from developing countries, getting on strategic countries' national delegations, preparing all kinds of background research-based materials, creating joint working groups with WTO and ISO, as well as training WTO and ISO officials.

But it seems to us that ISO is actually perceived by the WBCSD as being even more important than the WTO. Indeed, the most effective means to ensure that TNCs will create their global "level playing field" is to assure that the ISO sets those products, and, even more so, production process standards, that must favour WBCSD interests. That is why ISO has set up "a Strategic Advisory Group on the Environment (SAGE) to look into international environmental standardization needs. SAGE was set up by the ISO at the request of the BCSD during the Earth Summit".⁹

Concluding remarks

If we are right in our analysis, then it must be quite clear that the TNCs, especially those that have become members of the WBCSD, have used their enormous financial resources and equally enormous influence with governments and international agencies to subvert the efforts by the United Nations to prevent the further degradation of the world environment – largely at the hands, one might add – of the same TNCs. We leave it to the reader to judge the morality of this enterprise – but one thing is certain, and that is that, with the development of the global economy that has been institutionalized with the ratification of the GATT Uruguay Rounds treaty and the setting up of the World Trade Organization (WTO), the TNCs will become ever more powerful and ever less controllable. The fact that they are beginning to organize themselves, developing cartels, setting standards, increasing their influence over national governments and multilateral organizations, international agencies and NGOs for this purpose, is increasingly worrying. If their power cannot be reduced and they cannot be brought back under control, how are we going to prevent the further – and one might add – ever more rapid – degradation of what remains of the natural world? How indeed can we, assure that it will not rapidly become so degraded that it will cease to be capable of supporting human life? At the present accelerating rate of global deforestation, soil erosion and desertification, chemicalization of soil, water and air, erosion of the ozone layer and global warming, this question is not unrealistic.

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The Americanization of Canadian Education

by Maude Barlow and Heather-jane Robertson

*Citizens' groups fought a tremendous campaign to prevent the signature of the Canada-US Free Trade Agreement and later NAFTA, not only on environmental and economic grounds, but also to avoid the Americanization of Canadian culture that this would inevitably bring about. Maude Barlow and her organization, The Council of Canadians, spearheaded this campaign. In this article Maude Barlow joins Canadian education writer Heather-jane Robertson in describing the effects of NAFTA on Canadian education in particular. Heather-jane Robertson is director of professional development for the Canadian Teachers Federation, a member of the Canadian Centre for Policy Alternatives, and a frequent commentator for the Canadian Broadcast Corporation. Barlow and Robertson are co-authors of *Class Warfare: The Assault on Canada's Schools* (1994), and Barlow is author of *Parcel of Rogues* (1991), a best-seller, and *Take Back the Nation* (1991) with Bruce Campbell.*

During the last decade, Canada has fundamentally realigned its orientation from east-west to north-south, in essence becoming part of a new borderless North American economy. The resulting harmonization can be seen everywhere.

Big business' interest in our schools is symbolic of the Americanization of Canadian education, which in turn is part of the current major transformation of Canadian economic, social, and cultural life. It comes as no surprise to anyone who has witnessed the transformation of the work-place and the street. Canada is now experiencing an unprecedented, corporate-led assault on the sense of collective responsibility upon which our country was founded.

All Canadian institutions are now under intense pressure to operate as if they were businesses. The corporate model, based on head-to-head competition and survival of the fittest, has become the prototype for all government and, more recently, educational institutions. As the United States and Canada effectively merge, Canada finds itself adopting American-style individualism, unabashed entrepreneurialism and a culture of competitiveness.

Continental Drift

In the wake of NAFTA, virtually all control over foreign investment in Canada has been removed, and thousands of Canadian enterprises have been taken over by American and other transnationals, which often shut down production and convert the Canadian branch office to a warehouse or marketing division. North American corporations, whether Canadian-based or not, now see Canada as another "state", about the market size of California.

Wal-Mart, the world's largest retailer and America's third-largest corporation, has invaded the Canadian market with a vengeance, swallowing Woolco stores in one gulp. Deregulation in the telecommunications industry has opened the door to the invasion of US firms: as many as 80 companies, including AT & T and all its major American competitors, have set up shop to lease phone circuits at deep discounts, bringing to Canada the same consumer chaos and industry layoffs that characterize the deregulated US system of a decade ago.



The Canadian tax structure is also being adapted to the reality of a continental, indeed global, economy in which capital can move across national borders as if they don't exist. The federal government is contracting out many operations formerly handled by the public service sector, and competition for these contracts must now be open to American companies. One of the last acts of the Mulroney government was to award the contract to computerize the entire delivery system of Family Allowance, Canada Pension and Old Age Pension checks to a Texas-based transnational formerly owned by Ross Perot.

Canadian culture takes up less air and screen time than ever. Protections – postal rates for Canadian magazines, film distribution, tax credits for Canadian films, legislation to keep

Canadian book publishing companies in Canadian control – are being eliminated steadily.

Canada no longer has an energy policy to protect our supplies of natural gas and oil. The labelling of water as a “tradeable commodity” under the terms of NAFTA sets the stage for massive water-diversion projects to the thirsty US midwest, California and Mexico. An acre of Canadian forest is being clearcut every twelve seconds (Brazil cuts one acre every nine seconds), mostly by foreign-based transnationals.

Increasingly, we are adopting the American definition of welfare as charity for those unable to make it in a system that goes unquestioned and moving away from our traditional view of welfare as protection for the community as a whole. We are becoming a harsher people – less compassionate about the unemployed, less responsible to one another.

Given all the sweeping changes to Canada’s structures and values and the unprecedented continentalization that has occurred in so short a time, it is not reasonable to suppose that Canadian education can escape the pressures to “harmonize” with the US system of education.

Free Trade in Education

The Canada-US Free Trade Agreement and its successor, the North American Free Trade Agreement, have been sold fraudulently to the Canadian people as mere processes to liberalize trade and solve cross-border disputes. In fact, they establish a whole new framework of social and economic policy for the Americas and create an alternative, non-elected continental governing structure that has as much influence on education as on every other sector.

In their book *Pandora’s Box* (1993), John Calvert, of the Canadian Union of Public Employees’ and Larry Kuehn, of the British Columbia Teachers’ Federation, warn that: “NAFTA, like the Canada-US Free Trade Agreement before it, treats many of our social institutions, including education, as service commodities that must be opened up to the competitive pressures of the marketplace. The assumption that educational services can – indeed should – be treated as economic commodities constitutes a fundamental break with our Canadian traditions and presents a clear and present danger to the educational programs that we cherish.”

Here’s how NAFTA poses this danger: First, the agreement opens up Canada’s services, including many public sector and educational services, to US companies for competition in our market and for government contracts. Although the deal technically allows governments to run public education systems, they must do so within the rules set out in the sections dealing with services. This is the catch: NAFTA gives US companies what are called *national treatment rights*. This means that Canadian governments must treat US companies as if they were Canadian and cannot give preference to domestic companies. The rule also applies to provincial governments and contracts. In other words, governments cannot favour Canadian companies, even if they believe that in culture, broadcasting, and educational services, a Canadian perspective is crucial.

Second, Canadian governments can no longer require that companies bidding on Canadian contracts maintain a presence in the country. As Calvert and Kuehn point out, US companies can carry out work or services in Canada without having any investment in the country, without providing any employment, and without even having an office in Canada. This means that public licensing and regulation of educational service providers could be carried out in a manner that does not favour Canadian firms. What will that mean to Canadian standards and content?

Third, NAFTA extends what are called *procurement rights* to American companies, enabling them to bid on public and government contracts. Under this provision, for example, the Canadian government could not reverse a contract with an American transnational to process and deliver Canada’s social security checks.

For provincial, state and local governments, procurement rights do not begin right away, but the process for establishing them does. The intention of opening up other levels of government to transnational bids is quite explicit.

NAFTA negotiators argued that the concerns raised by educators and others were exaggerated, because the agreement allows for some exemptions to the rights just mentioned: that is, a province can opt to exclude certain current public practices from a NAFTA challenge. But there are so many qualifications to the exemption that it is almost meaningless.

Several provincial governments are already rapidly privatizing many educational and other public services functions. The Conservative government in Alberta is perhaps the most radical in its privatization drive. And should future Alberta governments, of whatever political persuasion, want to reverse the privatization steps, the new rules of NAFTA will not allow it.

The economic “harmonization” of the continent will forever change the nature of education in Canada. It will become more privatized, much closer to the American system, and more commercial in its operations, allowing business big and small to move into this once-restricted sector. As jobs become scarcer and the competition for them more fierce, and as education comes to be viewed as a competitive advantage, education as a business is attracting more corporations and entrepreneurs.

Only 25 per cent of educational book publishers in Canada are now Canadian. Under NAFTA, transnationals can now develop educational products for a pan-North American market. Because of their size, American firms will have a market advantage and will be able, under NAFTA, to lower their costs by operating their data-processing in low-wage Mexico. Like other US-based corporations, they now view Canada as part of a single North American market and will be impatient to erase any inconsistencies in the systems.

With high-tech telecommunications, one might operate a college, trade, or language school from Florida, say, for all of North America without employing a single Canadian or Mexican and not all that many Americans. The information highway will make it possible for teaching to be done electronically. Thus, a private American corporation could win and fulfil a provincial contract to provide teaching materials or advise on cost-cutting without leaving the head office, wherever that may be. (Several provinces have already hired US management consultants to advise on cutting health care costs.)

As long as educational services are performed by the public sector, they can be kept in Canada; but once a service is privatized, it must be governed by NAFTA rules of “national treatment” and cannot be returned to the public sphere without financial compensation to private interests that were making money in that area or might one day. For instance, the government of British Columbia decided several years ago to contract out the preparation of twelfth-grade provincial examinations. When the contract with the local firm expires, it will have to be opened to competing firms from all over the continent. The Department of Education will have a difficult time arguing that cultural concerns should keep the contract in British Columbia. Under NAFTA, such action could be challenged as a barrier to free trade.

In 1992, the Ottawa Separate School Board hired Texas-based Energy Education Ltd., at a cost of \$17,000 a month, to

advise it on energy conservation and to design a curriculum for the students on how to implement the project. The board also hired a \$50,000-per-year "energy educator". Angry school trustees charged that the company was being paid to "turn off the light bulbs" and rightly pointed out that Canadian companies, including Ontario provincial government consultants, could do the job for much less money. It was a disgrace, they argued, to allow private American consultants to design student curricula when the board was laying off teachers. Should their concerns result in a resolution to hire a Canadian company when the contract comes up for renewal, however, the board would be in violation of NAFTA.

At present, contracting extends to support services such as cleaning, food services, school-bus transportation, building maintenance, computer services, and consulting. American fast-food chains, such as Wendy's and Pizza Hut, have already obtained contracts to provide cafeteria services to many US schools and universities and now have the right to bid in Canada.

The current debate in Canadian schools about YNN, the for-profit youth education and news network, will seem a mere skirmish when its American competitors expand into Canada.

As Calvert and Kuehn state, "The fact that a communications system is the vehicle through which a nation speaks to itself, or that a telecommunications system has cultural and other non-economic functions, is simply ignored."

When the deregulated information highway becomes a reality and is dominated by transnational phone, cable, and retail giants, and when non-Canadian companies are guaranteed national treatment in Canada, there will be no way to prevent the mass marketing of American for-profit "educational services" once the precedent has been set by YNN. Nor will there be a way to force the services to offer Canadian content – after all, the companies will not even have to have an office in Canada.

Another crucial set of corporate rights contained in both NAFTA and GATT that have wide implications for education is intellectual property rights. Large transnationals, which hold the vast majority of the world's patents, have been attempting for years to enshrine ownership and control of technology and knowledge in international law. The complex ethical and legal question of who owns the fruits of learning is a long standing issue. In Canada, a compromise position of public and private rights has characterized our legal framework. Knowledge was viewed as a common heritage to be used for the public good, but public access had to be balanced with the rights of the inventor or creator.

The new system, however, skews the balance away from the public interest. The intellectual property provisions of NAFTA and GATT treat knowledge as a commodity and as the exclusive property of the company that takes a patent or holds a copyright on it. That this knowledge may be the consolidation of years, maybe hundreds of years, of collective research, by many individuals or even communities, is treated as irrelevant. The large pharmaceutical, publishing, telecommunications, computer, agribusiness and other corporations specializing in leading-edge technologies stand to gain world-wide monopoly rights.

This has serious implications for education and for access to the technology that carries it. The trade agreements cover interactive computer and audio-visual learning devices, out-of-country cable and satellite transmission of educational programmes, and learning aids. These rights will give transnational education-service companies the power to extract royalties from our public education system that will go to private interests outside Canada.

Universities First

To speculate on the implications for our schools, we should examine our universities, which are already moving down this road. Canada's universities and colleges, like our schools, have a different history than their American counterparts. They were created as public institutions accountable to the public through the government. The United States favours private institutions financed both by foundation and corporate wealth and by governments; even the US public system, set up to serve less-affluent students, has now been forced to chase private sources. The distinction between public and private has blurred.

In Canada, cash-strapped universities are now also turning to business for sponsorship, as governments cut back on funding. This is creating serious ethical questions about who owns the results of research done on their premises and which research gets done. Universities have the researchers and scientists; corporations have the money.

In "Universities for Sale", an article from *This Magazine* (September 1991), journalist John Harris says, "Knowledge that was free, open and for the benefit of society is now proprietary, confidential and for the benefit of business. Educators who once jealously guarded their autonomy now negotiate curriculum planning with corporate sponsors. ... Professors who once taught are now on company payrolls churning out marketable research in the campus lab, while universities pay the cut-rate fee for replacement teaching assistants. ... University presidents, once the intellectual leaders of their institutions, are now accomplished bagmen."

In exchange for free merchandise, universities offer exclusive access to students for corporate sponsors. A professor's ability to attract private investment is now often more important than academic qualifications or teaching ability. Provincial and federal funding to post-secondary institutions is also increasingly tied to commercial considerations. The federal government is giving research grants to individual faculty members whose projects have commercial viability while cutting general transfer payments. Funding-agency mandates now state clearly that grant money should directly benefit business.

Universities now have CEOs, business-liaison officers, and corporate advisers. Fund-raising campaigns are increasingly, of necessity, the highest priority of the administration, the board of governors, and the faculty; and in more and more universities, the arts and humanities, considered "soft" largely because they do not attract corporate sponsorship, are being phased out. Companies footing the bill for the departments that survive increasingly consider the results of research to be their own.

A department will often consider the number of patents it has registered to be more important than the number or quality of its faculty members' publications. Some are establishing their own foundations and companies to license their research for patents in co-operation with the private sector. Many universities now have an intellectual-property office that seeks private enterprise partners.

A convergence of academic and corporate heavyweights has formalized these interlocking interests in the Corporate-Higher Education Forum (CHEF), a national coalition of university presidents and corporate CEOs designed to merge goals and activities. Modelled on the American Business Higher Education Forum, the Canadian group promotes corporate-university interaction by placing members on one another's governing bodies. Like its American counterpart, the forum campaigns against government regulation of post-secondary education and for closer business-university ties. It actually advocates maintaining government underfunding of education so that free-market forces will pick up the differ-

ence and increase universities' dependence on corporate funding. The forum advocates that "activist corporations" set up their own development offices to negotiate deals with universities as part of their business strategy.

Continental Education Superstructure

As post-secondary education in Canada becomes more like that of the United States, the next logical step is to create North American educational institutions that "harmonize" standards, training and certification for education professionals. It is, of course, highly desirable to establish models of educational co-operation across the continent and globally, but it is essential to examine the motivation behind the projects now underway and the form they are taking.

To see what the future of continental education would look like, we must examine the makeup and history of the US-based Business Higher Education Forum (BHEF) and the CHEF (mentioned earlier), the corporate lobby groups behind the education project. The BHEF links representatives of the corporate Who's Who – Ford, AT&T, Pfizer, Eastman Kodak, Johnson & Johnson, Rockwell, Heinz, General Electric, and others – with university presidents in a sustained campaign against government regulations, environmental protection, health and safety laws, and equitable income distribution. BHEF includes many of the same corporate players appointed to former president Bush's New American Schools Development Corporation, established to funnel corporate funds into for-profit elementary schools and to spearhead the privatization of American schools.

The Canadian CHEF, like the BHEF, is made up of the CEOs of many major corporations, including Imperial Oil, Spar Aerospace, Xerox, IBM, Alcan and Du Pont, all sponsors of free-trade agreements. It has close ties to the Business Council on National Issues (BCNI), which is calling for higher university and college tuition fees, the replacement of provincial transfer payments with direct grants to students to enable them to choose public or private institutions, and government cutbacks to post-secondary education. The BCNI was the most influential lobby group behind the Mulroney government's economic and social policies – privatization, the destruction of universal social programmes, massive deregulation, and the disciplining of the workforce through unemployment and competition for jobs. Key players in these groups are represented at the conferences and meetings being held across the continent.

A series of tri-national conferences – in Racine, Wisconsin; Guadalajara, Mexico; and Vancouver, British Columbia – brought together senior North American educational officials and university administrators to facilitate the creation of an "academic common market in North America." Notably absent among the delegates were teachers' organizations, faculty associations and unions.

The United States Information Agency describes the purpose of the conferences: to "promote a North American approach to the development of higher education programs and projects." The Vancouver meeting, in September 1993, called for a North American distance education and research network; a trilateral electronic information highway "to be easily accessible by the academic community, business, and government foundations"; a North American corporate higher education council comprising senior representatives of the corporate and higher-education communities of the three countries "to act as advocates ... for further partnering in the realization of mutually agreed objectives"; and a consortium of North American businesses for trilateral research, development and training to "secure private sector funding, through the membership of

individual corporate citizens of the three countries, to be used to implement research and training initiatives of value to both the corporate and higher education communities."

Canada's participation in the group is co-ordinated by the Department of Foreign Affairs, signalling that a convergence of purpose is being sought between higher education and the free-market model of continental trade and economic development. In other words, the government is collaborating in turning over the future of higher education in North America to the corporate forces behind NAFTA and to their aim of commercialization and privatization of our universities.

Recently, the governments of Mexico and the United States have been meeting to discuss ways to co-ordinate their primary and secondary education programmes. They are focussing on shared curriculum reforms, teacher exchanges and the redesign of teacher education. These meetings signal negotiations under another provision of NAFTA that is of concern. The agreement establishes a process for the "harmonization" of professional standards of teachers across the continent. It calls for the "development of mutually acceptable professional standards and criteria" including "conduct and ethics, professional development and re-certification and scope of practice" (NAFTA, Annex 1210). The Canadian institutions responsible for teacher standards must provide recommendations to a commission set up under the agreement; the commission will review the recommendations from Canada and from the other countries and develop for adoption common standards "within a mutually agreed period".

The intention to override Canadian authority in education isn't even being denied. Trade minister Michael Wilson responded to teachers' concern over certification in May 1993: "Professional services rank as one of the more important components of cross-border trade in services. ... There is every logic to seeing that trade agreements covering cross-border services address matters of licensing and accreditation."

Standards for educators vary widely on the continent and reflect the cultural and societal values of each country. The "harmonization" of these standards, particularly if driven by an economic agenda, would seriously invade the countries' political and educational sovereignty. Under the new process, which Canada is legally obligated to enter, an unelected tri-national commission will have more power over professional standards than the federal government has been given in our constitution.

The "harmonization" of the continent to conform to corporate models is well underway. The process will give Canadians who rarely question the purpose or nature of our schools an opportunity to confront the ideological nature of the attack on public schools and to understand the crucial role education plays in the political life of a nation. The conscious recognition of the role of foreign corporations in the transformation of Canada may provoke the question, How will a Canadian public system, serving our needs and transmitting our culture and social commitment, survive?

To remodel a society, it is essential to influence the hearts and minds of the young. At its most basic level, the assault on Canada's education system is an attack on the history, culture and values of the nation itself.

This article first appeared as a chapter in *The Case Against the Global Economy*, a 550-page book edited by Jerry Mander and Edward Goldsmith, price £20 (US\$28) (hb). It was first published in the US by Sierra Club books, and is available through Random House, 201 East 50th Street, New York, NY 10022, telephone +1 (212) 572 2600. Having sold very successfully in the US, Random House has relaunched the book in the UK. It is available now from Hi Marketing, 38 Carver Road, London SE21 9LT, telephone +44 (0)171 738 7751.

From Reductionism to Holism in Ecology and Deep Ecology

by J. Stan Rowe

It is generally assumed that ecology and even more deep ecology are highly holistic. This is not so, as Professor Rowe shows in this important article. He also explains how the basic principles of deep ecology would have to be modified were they to provide the basis of a truly holistic deep ecology. This is the first of many articles that will seek to question the principle. Stanley Rowe is Emeritus Professor of Ecology at the University of Saskatchewan

In this article, I will turn a critical eye on ecology and on the beliefs of some of its practitioners, thereby illuminating several dubious aspects of Deep Ecological Philosophy. For example, from the perspective of ecology, how are we to understand "life"? Does a concern with "biodiversity" go far enough? What do the terms "ecosystem" and "ecocentric" mean? For that matter, what is "ecology"? The term itself needs clarification because "ecology" can be understood as both a particular way of looking at the world and as field-of-study. Although this starting point may seem irrelevant to some people, preliminary brush-clearing is necessary if questions such as those above are to be examined in the light of an ecological world-view.

Scientific Viewpoints and Ecology

he "what, how, where and when" questions familiar to public speakers have been formalized by biologists into seven incommensurate "points of view" applicable to the study of organisms and other physical objects (Rowe, 1961). These are morphology and anatomy ("what is its form, from the outside and from the inside?"), physiology and ecology ("how does it work, and what are its interactions with what surrounds it?"), chorology and chronology ("where is it in space, and what is its development through time?"), and systematics or taxonomy ("who are its relatives?"). All other queries can be shown to be variants or combinations of the above. For example, questions about structure and composition are anatomical; questions about genetics and genesis are physiological-chronological. The "why" question, positing purpose, is not asked, although it lies hidden in the ecological outlook.

Physiology and ecology are the twin functional viewpoints sometimes referred to as "skin in" (inward-looking) and "skin out" (outward-looking). When questioned, the natural-born physiologist says, "I'll look into it; inquire, investigate;" the natural-born ecologist says, "I'll find out about it; examine, explore." To "find out about" objects in the ecological sense calls up one of two different methodological approaches. In the first, the object to be studied is conceived as largely autonomous, existing in isolation from what is taken to be an unorganized environment of provisions such as light, heat, moisture and nutrients. This is the approach of traditional bio-

logical ecology, focussed on organisms functioning in "resource" habitats. Its mirror image in social thinking is "resourcism", a narrow focus on humans as the centre of a fragmented world, surrounded by stacks of God-given though imperfect assets crying out for development, management, stewardship.

On the basis of the second methodology, the object is conceptualized as an active constituent of larger units which to some extent guide and constrain its activities. The appropriate physiological question is still the reductionist: "How does this thing function?" But the appropriate ecological question is holistic: What is this thing's function (role, niche, purpose) within the larger system that comprehends it? Here the ecological viewpoint places each "system" such as a cell, an organ, an organism, or ecosystem (or any terrarium-like piece of Earth) as a subset of a larger enveloping "system" wherein the relationship is that of part to a whole. This second viewpoint is more recent than the first and less popular in academic circles, its purview being broader than organisms and Biology Departments. Diffused into social thinking, it conveys supportive though nebulous ideas about the importance of "community", "ecosystem" and "biosphere" – concepts that evoke the other dimension of "ecology", viz. its subject matter.

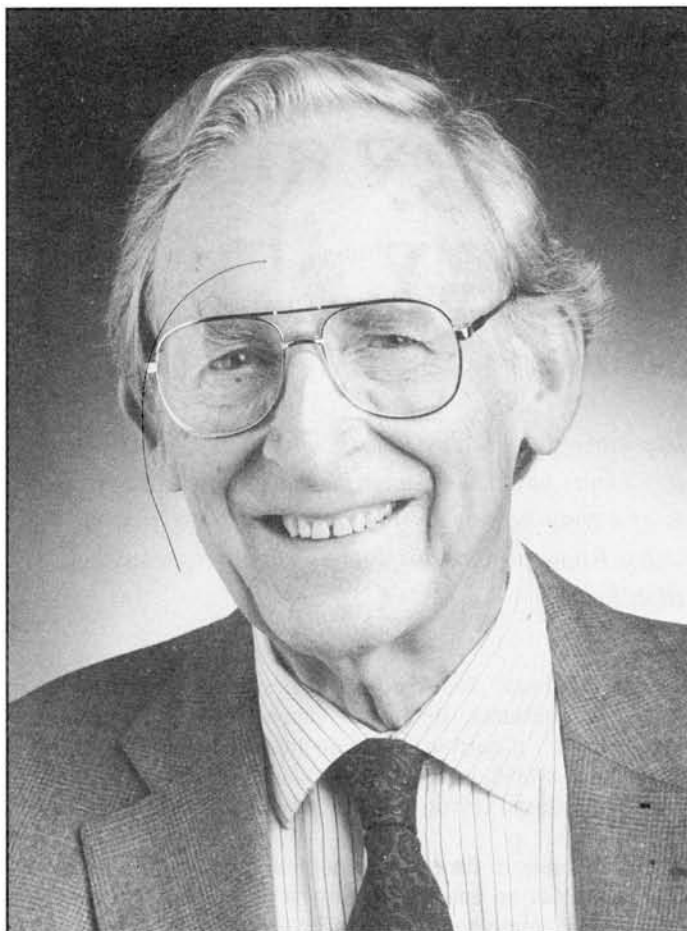
Ecology as Fields of Study

The contents of ecology textbooks make clear what are the subjects considered legitimate for the discipline. Usually first attention is to individual organisms (autecology), then to species and groups of similar individuals (population ecology), then to all organisms found occupying the same milieu (community ecology)² and finally at the end of the book as a summation of what went before, to the ecosystem as "community plus abiotic resources" or "community plus environment."

The textbooks of Eugene Odum³ are an exception. As early

1. a community (in the ecology literature) comprises the organisms within a particular area; it is a spatial rather than an ecological concept.
2. By community is meant "ecological community", i.e. "an association of different living things exclusive of its geological substrate or atmospheric environment."
3. Odum is Professor Emeritus of Ecology at the University of Georgia and author of *Fundamentals of Ecology*, which for decades was the principal ecological textbook used in universities in the US and elsewhere, and which has been revised and published as *Basic Ecology*. (There is an excellent, simplified version, entitled *Ecology*, which is also available in a new edition.)

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Eugene Odum, Professor Emeritus of Ecology, at the University of Georgia – one of the few holistic ecologists in academia.

as 1953 he defined ecology as “the study of the structure and function of nature” and accorded first place to the discussion of ecosystems: “the largest functional units of ecology”. Despite his statement that “the entire biosphere may be one vast ecosystem,” few ecologists accepted the logic of “whole systems”. The sheer complexity of the subject matter, plus the academic necessity of focussing on simple problems that bring quick dividends to the individual in the form of papers judged publishable by peers has ruled against it.

The prevalent concept of ecosystem continues to be that of an extension of the community, “community plus environment”, with research focussed on the utilitarian aspects of organisms, or the effects of organisms on such “resources” as soil and water. Typical subjects of research are: Do the bomb’s radionuclides end up in the food chain and in people? How much photosynthate (net primary production) can be harvested from land and water? What is the sediment load and water yield from forested versus non-forested watersheds and how can water yield be increased by manipulating vegetation? Both Hagen (1992) and Golley (1993) have traced the development since Darwin’s time of the idea of ecosystem as an organism-centred unit characterized by energy flow, nutrient cycling, successional stages and productivity, noting how the practical concerns of the military and various other branches of government spurred the funding of ecosystem research. That ecosystems might be more than serviceable entities consisting of organisms (important) plus an energy-providing and nutrient-providing environment (relatively unimportant) has rarely been seriously entertained.

When arrived at by summation, the ecosystem concept can be anything, everything or, to some academics, nothing. *The error is in the additive approach, building from organism to*

population to community and, finally, to ecosystem which emerges as last in order of importance, a so-called “convenient artifice” or “heuristic device” vaguely complementing and extending the biotic community compared with which it is less “real”. On a more sophisticated level, Lovelock (1988) and Margulis (1995) have attempted to build the largest ecosystem or the “living world”, out of bacteria, rather than bacteria out of a living world. Again the *a priori* biological, organism-centred bias is evident. The planet and its sectoral parts whose air, land and water comprise every creature’s evolutionary source and supportive matrix (matrix-mater-womb-mother) get second billing.

Earth-sector Ecosystems

Suppose that the importance of Earth relative to organisms had been earlier recognized. then 400 years of science might have been devoted to understanding the grandest system with which humans are in direct contact: the planetary ecosphere. Examination from the physiological viewpoint, asking “How does it function; how does it work?”, would have required a mental anatomizing of Earth in order to honour its magnificent complexity and to understand its structure-composition, because anatomy is the clue to function. As the word performance suggests, function is what form does over time; function is literally “read” from things happening. Scientists have today arrived at the global question of Earth’s performance, prodded by the Gaia hypothesis and such research programmes as the International Geophysical-Biological Programme. But the question remains: At the more local level, what natural units are relevant to such air-breathing, water-drinking, food-eating and land-dwelling creatures as we? The logical answer is complete sectors of the ecosphere at any chosen scale: air above land-water, with organisms clustered where the gas, liquid and solid phases interface (Rowe, 1992). This, in the words of Leopold (1949) – with the addition of air-atmosphere that neither he nor the Bible’s genesis story recognizes – is the “land community” to which humans belong. The more inclusive term is “terrestrial ecosystem” and the key to its logical definition and mapping lies in Earth’s landforms and waterforms (Bailey, 1996).

A second line of logic also leads to the idea of ecosystems as variable size-scaled sectors of the ecosphere. Suppose the reality of the world is conceived as systems within systems in a hierarchy of containment, like fitted Chinese boxes or Russian dolls within dolls. One starts at some low level, say a functional cell, observing that its inner structural parts are joined or articulated in such a way that it metabolizes and thus maintains itself (by autopoiesis, literally “self-making”). The cell’s enclosing functional system is the metabolizing tissue, in turn enclosed in the metabolizing organ and this in turn in the metabolizing organism. Note that each autopoietic (self-organizing) level of integration is composed of lower levels and is itself a part of higher levels; *each level has a physiology that refers to its constituent levels below and an ecology that relates it to the levels above.*

Now ask, what is the entity above the organism that analogously shows articulated structure, that functions metabolically and exhibits autopoiesis? Logic points to the place-specific ecosystem. Why not the community or the population? *Because neither is a fully functional (metabolic) entity; neither exhibits articulated structure, physiology nor autopoiesis.* As aggregates, communities and populations can be counted, classified and to some extent studied as interbreeding individuals, but they are more abstract than organisms and ecosystems; they are taxonomic categories based, respectively, on juxtaposition in space and membership of a particular species or sub-species.

If this is so, then the level of integration above the organism is the Earth space that surrounds and includes it singly or with its shared population and community members, i.e. the dynamic ecosystem (Rowe and Barnes, 1994) that miraculously generates and maintains life.

To summarize thus far: the most "real" or least "abstract" fields-of-study that logic reveals are the organism (within its surrounding ecosystem) and the ecosystem (within its larger surrounding ecosystem). Ecosystems so conceived can be esteemed and studied from the seven scientific viewpoints previously listed. Not so for populations and communities. They lack the internal articulation and hence the structural-functional attributes of metabolizing autopoietic beings. Ecological communities of creatures, including humans, are "brought to life" only by including with them the sustaining Earth-matrix of air, landform, soil and water; i.e. by conceiving them as organic parts of the holistic realities that are ecosystems.

Thus human communities, which tend to be human monocultures, are incomplete when conceived as existing apart from the ecosystems that support and sustain them. Tribes, ethnic groups, societies, cultures, all are Earth-dependent. They are not free-standing, and sociology unleavened by eco-logy can never solve their vital problems. Only the human community integrated as part of Earth's ecosystems can constitute an effective unit of autopoiesis with self-regulating behaviour.

Few ecologists accepted the logic of "whole systems". The sheer complexity of the subject matter, plus the academic necessity of focussing on simple problems that bring quick dividends to the individual in the form of papers judged publishable by peers has ruled against it.

Where Does "Life" reside?

The hierarchical series organ-organism-ecosystem-ecosphere represents a scale of increasing complexity and creativity. The last member, the ecosphere, is the leading candidate for embodiment of the organizing principle called "life". What gives life to the cell? The living organ that is its surrounding environment. What gives life to the organ? The living organism within which it is embodied. What gives life to the organism? The surrounding living ecosystem and the global ecosphere.

The October '94 issue of *Scientific American*, titled "*Life in the Universe*", presented a state-of-the-art account of how planet Earth and organic earthlings came to be. Throughout the text the words "organisms" and "life" were used as synonyms. Two contributors made a stab at clarifying what the second concept might or might not mean. Robert Kates suggested that "life is simply organic matter capable of reproducing itself," or "the mix of living things that fill the places we are familiar with." More circumspect, Carl Sagan was content to question current definitions, implying that a satisfactory meaning for "life" has yet to be found.

Organisms can be "alive" one moment and "dead" the next with no quantitative difference. The recently deceased organism has lost none of its physical parts, yet it lacks "life" – an unknown quality of organization (perhaps some aspect of that mystery called "energy"?) but not the organization itself. A still stronger reason exists for not equating "life" and "organisms". The latter only exhibit "aliveness" in the context of life-supporting systems, though curiously the vitality of the latter has usually been denied. By analogy, it is as if all agreed that only a tree trunk's cambial layer is "alive" while its support system – the bole and roots of bark and wood that envelope and support the cambium – stand apart as "dead", or that bones, teeth and hair are dispensable parts of a human's "aliveness".

The separation of "living" organisms from their supportive but "dead" environments is a reductionist convention that is ecologically unacceptable. Both organic and inorganic are functional parts of enveloping ecosystems, of which the largest one accessible to our direct experience is the eco-sphere. To attribute the organizing principle "life" to Earth – to the ecosphere and its sectoral aquatic and terrestrial ecosystems – makes more sense than attempting to locate it in organisms per se, divorced from their requisite milieus. The aquatic ecologist Lindeman (1942), who pioneered the examination of lakes as energetic systems, adopted the ecosystems concept because of the blurred distinction between "living" and "dead" in the components of the Minnesota lakes he studied.

The Biological Fallacy of equating organisms with life is the result of a faulty inside-the-system view (Rowe, 1991). Pictures of the blue-and-white planet Earth taken from the outside are intuitively recognized as images of a living "cell". Inside that "cell", people imbued with the modern view of the world perceive a particulate world separable into important and unimportant parts: the "organic" and the "inorganic", "living" and "dead". Modern religions, philosophies and sciences have been constructed around these misleading taxonomies, perpetuating the departmentalization of the global ecosystem whose "aliveness" is as much expressed in its improbable atmosphere, crustal rocks, seas, soils and

sediments as in organisms.

Important human attitudes hinge on the idea of life and where it resides. If only organisms are imbued with life, then things like us are important and all else is relatively unimportant. The biocentric preoccupation with organisms subtly supports anthropocentrism, for are we not first in neural complexity among all organisms? Earth has traditionally been thought to consist of all-important entities called organisms, living beings – and their relatively inconsequential dead environments. If we ask what should be attended to, cared for, worried about, the usual answer today is "life" in its limited sense of "organisms". Meanwhile, the sea, the land and the air, classified as dead environment, can be freely exploited. In the reigning ideology, as long as large organisms are safeguarded, anything goes.

We demean Earth by equating "life" and "organisms", then proving by textbook definition that Earth is dead because it is not an organism. In this way mental doors are barred against the idea of liveliness everywhere. Certainly Earth is not an organism, nor is it a super-organism as Lovelock has proposed, any more than organisms are Earth or mini-Earth. The planetary ecosphere and its sectoral three-dimensional ecosystems are SUPRA-organismic, i.e. higher levels of integration than mere organisms. Essential to the ecocentric idea is assignment of highest value to the ecosphere and to the ecosystems that it comprises.

Note the use of "ecosphere" rather than "biosphere", the latter usually defined as a "life-filled" (read "organism-filled") thin shell at Earth's surface. The meaning of "ecosphere" goes deeper; it is Earth to the core, comprising the totality of gravity and electro-magnetic fields, the molten radioactive magma that shifts the crustal plates, vulcanism and earthquakes and mountain-building that renew nutrients at the surface, the whole dynamic evolving "stage" where organisms play out

their many roles under the guidance of the larger whole, shaped at least in part by the "morphic fields" of the living Gaia (Sheldrake, 1991:162).

At different times and places the source of life has been attributed to air, to soil, to water, to fire, as well as to organisms. As with the blind me touching the elephant, each separate part has been the imagined essential component of the whole Earth. Now that the planet has been conceptualized as one integrated entity, can we not logically attribute the creative synthesizing quintessence called "life" to it, rather than to any one class of its various parts?

When life is conceived as a function of the ecosphere and its sectoral ecosystem, the subject matter of Biology is cast in a bright new light. The pejorative concept of "environment" vanishes. The focus of vital interest broadens to encompass the world. Anthropocentrism and biocentrism receive the jolting shock they deserve. It then becomes clear that our preservation efforts should be concentrated on whole ecosystems rather than on the individual species that are components of them. This priority guarantees no loss of vital parts.

The implications of locating life where it belongs, of denying the naive "Life = Organisms" equation, are many. Perhaps most important is a broadening of the Schweizerian "reverence for life" to embrace the whole Earth. Reverence for life means reverence for ecosystems. We should feel the same pain when the atmosphere and the seas are poisoned as when people are poisoned. We should feel more pain at the destruction of wild ecosystems, such as the world's temperate rainforests, than at the demise of any organism, no matter how sad the latter occasion, because the destruction of ecosystems severs the very roots of evolutionary creativity.

System Hierarchies and Purpose

In 1950 von Bertalanffy outlined his General Systems Theory, stating that "Reality in the modern conception appears as a tremendous hierarchical order of organized entities ... Unity of Science is granted, not by a utopian reduction of all sciences to physics and chemistry, but by the structural uniformities of the different levels of reality."

Consider now the "structural uniformities" of organized systems-within-systems: the ecosphere, the geographic ecosystem, the organism, organ, tissue and cell. All such hierarchies are abstract conceptual schemes devised by humans and imposed on nature, and the different levels must be coherent and congruous to avoid muddled thinking. The Nobel laureate Medawar (1967) criticized Arthur Koestler for building an illogical hierarchy of "holons" from non-homogeneous elements. Shaky logic of this kind, he said, can be mischievous. Note that the proposed hierarchy is one of containment, and is logically consistent in that it embodies three-dimensional, internally structured entities which are different levels of integration and related as wholes must be to parts. Populations and communities are excluded to avoid Medawar's criticism.

The philosopher Feibleman (1954) attempted to systematize the structural uniformities and inter-relationships of systems in hierarchies. One of his pertinent "laws of the levels":

The mechanism of any level is found at lower levels

(in its parts), while the purpose of any level is found at levels above (in the wholes).

We should feel more pain at the destruction of wild ecosystems, such as the world's temperate rainforests, than at the demise of any organism, no matter how sad the latter occasion, because the destruction of ecosystems severs the very roots of evolutionary creativity.

Begin with an organ, such as the human heart. Its mechanism (how it functions) is found anatomically and physiologically through the tissues and cells of which it is composed and what they do (contract, expand, etc.). Its purpose (which is its function) is found ecologically by reference to the role it plays in the human body of which it is an essential part. In today's society, where mastery and management are prized, mechanism takes priority over purpose because the levers of power over nature lie in knowledge of its "mechanisms" and their controls. The purpose of our activities is no

longer aligned with the purpose of nature but with that of the State and of corporations foreign to the hierarchy of the ecosphere, and therefore the focal question has become: "How does the world work so we can change it?" This is why science – society's chief tool of control – is strongly reductionist, why physics gets the big research grants, why molecular biology is preferred to ecology.

Applying Feibleman's logic to people within Earth's ecosystems, the mechanisms of human beings are disclosed through anatomy and physiology, through internal form and function. Thus medicine promises to cure diseases and set everyone right by manipulations at the organ, tissue, cellular and DNA levels. The purpose of the human being must be found ecologically, in the role played vis-à-vis ecosystems and the ecosphere. The new field of ecopsychology supports this view and its corollary: human health, mental and physical, depends on establishing a right relationship with Earth (Roszak, 1992).

The conclusions in shorthand form: Earth before organisms. Ecosystems before people. Ecosphere not biosphere. Ecocentrism not biocentrism. Ecodiversity not biodiversity. These beliefs are arguably based on "science". I take them to be empirical truths whose implications go well beyond present abilities to put them into practice, yet with power to command philosophical commitment and modify political policies and actions. Perhaps they will never counteract the grandiose self-deception that sets *homo sapiens* apart from all other species. But at the least they should help in subverting the cultural anthropocentrism and individual selfism that plague modern humanity.

Ethics by Extension or Ethical Ecosphere?

As heirs to several centuries of rampant individualism culminating today in the frenetic pursuit of self-esteem and personal authenticity, most of us will be burdened throughout our lives with an indissoluble kernel of egocentrism and, by extension, anthropocentrism. This should not deter people of good will from proclaiming the truth that, relative to Earth, humanity is not the centre. A few centuries ago, with some reluctance, people admitted that the planets, sun and stars did not circle around their abode. One hundred years ago intelligent people likewise admitted that, yes, humans are not specially created but are sister and brother to the animals. In short, our thoughts and concepts though irreducibly anthropomorphic need not be anthropocentric.

Wherever our fundamental values lie – in other words, that which is of the greatest importance to us – will determine what

we take to be the most ethically valuable. The attempt to build ethical concern for the ecosphere from the inside out, by additions starting with our own self-importance and that of the human race, may soothe consciences for a little while but it will be the kiss of death for wild nature. Aldo Leopold has been the influential exponent of ethics-by-extension, rationalized as a Darwinian expedient for assuring human survival. Unfortunately this approach only strengthens anthropocentrism, making it certain that land, air, water and other organisms will always take second place to the welfare of self, family and friends. More sensible, but more difficult, is the ecocentric ethic that confers the highest value to the ecosphere which, by proxy, bestows ethical value to the preservation of its subsidiary contents according to their compliance and co-operation. The self finds its ecological values in the welfare of the non-self. Thus ecological ethics, guidelines for human behaviour here on Earth, are derivative, founded in care for Earth and all its contents (Rowe, 1990).

The argument, in summary, is that, insofar as we can, we must endeavour to imbue with an Earth-first sense the fundamental framework of importance that we bring to all specific ethical questions. This is a strategy to circumvent and subvert the individualistic and anthropocentric ethic with which we in the modern world have been so effectively imbued. I have tried to show it is possible to justify, on scientific grounds, the primacy of an Earth ethic that escapes the selfish human focus, an expanded vision comprehending along with organisms the marvellous, creative matrix that is life's source.

The Deep Ecology Platform

What are the implications of an Earth-ethic perspective? For purposes of discussion the first four articles of the Deep Ecology Eight-Point Platform (Drengson and Inoue, 1995) are rephrased with explanatory comments.

1. "The well-being and flourishing of human and non-human Life on Earth have value in themselves (synonyms: intrinsic value, inherent value). These values are independent of the usefulness of the non-human world for human purposes."

Rephrase: The well-being and flourishing of *the living Earth and its many organic/inorganic parts* have value in themselves (synonyms: intrinsic value, inherent value). These values are independent of the usefulness of the non-human world for human purposes.

Comment: If the idea of the living Earth is stressed, people may in time come to look on "their environments" as alive.

2. "Richness and diversity of life forms contribute to the realization of these values and are also values in themselves."

Rephrase: Richness and diversity of *Earth's ecosystems, as well as the organic forms that they nurture and support*, contribute to the realization of these values and are also values in themselves.

Comment: In ecological parlance, diversity includes richness (number of different things, such as species, per unit area) as one of its dimensions, though the two are usefully paired for emphasis. A "marsh/duck" example may explain the suggested change. Over long evolutionary time, marsh ecosystems brought forth ducks as well as a swarm of other semi-aquatic organisms. From this the argument follows that diversity of organisms can exist without marshes. Similarly, people in today's unconscionable numbers are decreased (qualitatively if not yet quantitatively) as their thoughtless activities ravish the diversity of Earth's ecosystems.

3. "Humans have no right to reduce this richness and diversity except to satisfy vital human needs."

Rephrase: *Humans have no right to reduce the diversity of Earth's ecosystems and their vital constituents, organic and inorganic.*

Comment: The original ending phrase, "except to satisfy vital human needs," might be interpreted as a give-away. Satisfying human needs must be balanced against maintaining ecodiversity. For example, the conventional practices of industrial agriculture destroy ecosystem diversity (destroying richness of species, richness of soil types, richness of minor landforms, richness of water regimes). Such practices can only be justified, if at all, by the preservation of large areas of native grassland, woodland and wetland representative of each agricultural region's natural suite of ecosystems. At reasonable population levels (a world of less than one billion people), vital human needs could be satisfied without obliterating all the sun-powered prairies, rainforests, coral reefs, etc., with their evolving organic/inorganic constituents.

4. "The flourishing of human life and cultures is compatible with a substantial decrease of human population. The flourishing of non-human life requires such a decrease."

Rephrase: The flourishing of human life and culture is compatible with a substantial decrease of human population. *The creative flourishing of Earth and its multitudinous non-human parts, organic and inorganic*, requires such a decrease.

Comment: This is a call for a more responsible attitude to human reproduction worldwide. It should not be construed as inviting inhumane measures to reduce populations at once.

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The Unholy Alliance

by Mae-Wan Ho

Genetic engineering biotechnology is inherently hazardous. It could lead to disasters far worse than those caused by accidents to nuclear installations. In the words of the author, "genes can replicate indefinitely, spread and recombine." For this reason the release of a genetically engineered micro-organism that is lethal to humans could well spell the end of humanity. Unfortunately the proponents of this terrifying technology share a genetic determinist mindset that leads them to reject the inherently dangerous nature of their work. What is particularly worrying at first sight is the irresistible power of the large corporations which are pushing this technology.



"It's perfectly safe Obergurgle. I've advised the Genetic Manipulations Board".

Suddenly, the brave new world dawns.

Suddenly, as 1997 begins and the millennium is drawing to a close, men and women in the street are waking up to the realization that genetic engineering biotechnology is taking over every aspect of their daily lives. They are caught unprepared for the avalanche of products arriving, or soon to arrive, in their supermarkets: rapeseed oil, soybean, maize, sugar beet, squash, cucumber ... It started as a mere trickle less than three years ago – the BST-milk from cows fed genetically engineered bovine growth hormone to boost milk yield, and the tomato genetically engineered to prolong shelf-life. They had provoked so much debate and opposition; as did indeed, the genetic screening tests for an increasing number of diseases. Surely, we wouldn't, and shouldn't, be rushed headlong into the brave new world.

Back then, in order to quell our anxiety, a series of highly publicized "consensus conferences" and "public consultations" were carried out. Committees were set up by many European governments to consider the risks and the ethics, and the debates continued. The public were, however, only dimly aware of critics who deplored "tampering with nature" and "scrambling the genetic code of species" by introducing human genes into animals, and animal genes into vegetables. Warnings of unexpected effects on agriculture and biodiversity, of the dangers of irreversible "genetic pollution", warnings of genetic discrimination and the return of eugenics, as genetic screening and prenatal diagnosis become widely available, were marginalized. So too were condemnations of the immorality of the "patents on life" – transgenic animals, plants and seeds, taken freely by geneticists of developed countries from the Third World, as well as human genes and human cell lines from indigenous peoples.

By and large, the public were lulled into a false sense of security, in the belief that the best scientists and the new breed of "bioethicists" in the country were busy considering the risks associated with the new biotechnology and the ethical issues raised. Simultaneously, glossy information pamphlets and reports, which aimed at promoting "public understanding" of genetic "modification" were widely distributed by the biotech industries and their friends, and endorsed by government scientists. "Genetic modification", we are told, is simply the latest in a "seamless" continuum of biotechnologies practised by human beings since the dawn of civilization, from bread and wine-making, to selective breeding. The significant advantage of genetic modification is that it is much more "precise", as genes can be individually isolated and transferred as desired.

Thus, the possible benefits promised to humankind are limitless. There is something to satisfy everyone. For those morally concerned about inequality and human suffering, it promises to feed the hungry with genetically modified crops able to resist pests and diseases and to increase yields. For those who despair of the present global environmental deterioration, it promises to modify strains of bacteria and higher plants that can degrade toxic wastes or mop up heavy metals (contaminants). For those hankering after sustainable agricul-

ture, it promises to develop Greener, more environmentally friendly transgenic crops that will reduce the use of pesticides, herbicides and fertilizers.

That is not all. It is in the realm of human genetics that the real revolution will be wrought. Plans to uncover the entire genetic blueprint of the human being would, we are told, eventually enable geneticists to diagnose, in advance, all the diseases that an individual will suffer in his or her lifetime, even before the individual is born, or even as the egg is fertilized *in vitro*. A whole gamut of specific drugs tailored to individual genetic needs can be designed to cure all diseases. The possibility of immortality is dangling from the horizons as the "longevity gene" is isolated.

There are problems, of course, as there would be in any new technology. The ethical issues have to be decided by the public. (By implication, the science is separate and not open to question.) The risks will be minimized. (Again, by implication, the risks have nothing to do with the science.) After all, nothing in life is without risk. Crossing roads is a risk.

The new biotechnology (i.e. genetic engineering biotechnology) is under very strict government regulation, and the government's scientists and other experts will see to it that neither the consumer nor the environment will be unduly harmed.

Then came the relaxation of regulation on genetically modified products, on grounds that over-regulation is compromising the "competitiveness" of the industry, and that hundreds of field trials have demonstrated the new biotechnology to be safe. And, in any case, there is no essential difference between transgenic plants produced by the new biotechnology and those produced by conventional breeding methods. (One prominent spokesperson for the industry even went as far as to refer to the varieties produced by conventional breeding methods, *retrospectively*, as "transgenics".¹ This was followed, a year later, by the avalanche of products approved, or seeking, approval marketing, for which neither segregation from non-genetically engineered produce nor labelling is required. One is left to wonder why, if the products are as safe and wonderful as claimed, they could not be segregated, as organic produce has been for years, so that consumers are given the choice of buying what they want.

A few days later, as though acting on cue, the Association of British Insurers announced that, in future, people applying for life policies will have to divulge the results of any genetic tests they have taken. This is seen, by many, as a definite move towards open genetic discrimination. A few days later, a scientist of the Roslin Institute near Edinburgh announced that they had successfully "cloned" a sheep from a cell taken from the mammary gland of an adult animal. "Dolly", the cloned lamb, is now seven months old. Of course it took nearly 300 trials to get one success, but no mention is made of the vast majority of the embryos that failed. Is that ethical? If it can be done on sheep, does it mean it can be done for human beings? Are we nearer to cloning human beings? The popular media went wild with heroic enthusiasm at one extreme to the horror of Frankenstein at the other. Why is this work only coming to public attention now, when the research has actually been going on for at least 10 years?²

The public are totally unprepared. They are being plunged headlong, against their will, into the brave new genetically engineered world, in which giant, faceless multinational cor-

One is left to wonder why, if the products are as safe and wonderful as claimed, they could not be segregated, as organic produce has been for years, so that consumers are given the choice of buying what they want.

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I should, right away, dispel the myth that genetic engineering is just like conventional breeding techniques. It is not. Genetic engineering bypasses conventional breeding by using the artificially constructed vectors to multiply copies of genes, and in many cases, to carry and smuggle genes into cells. Once inside cells, these vectors slot themselves into the host genome. In this way, *transgenic* organisms are made carrying the desired *transgenes*. The insertion of foreign genes into the host genome has long been known to have many harmful and fatal effects including cancer; and this is born out by the low success rate of creating desired transgenic organisms. Typically, a large number of eggs or embryos have to be injected or infected with the vector to obtain a few organisms that successfully express the transgene.

The most common vectors used in genetic engineering biotechnology are a chimaeric recombination of natural genetic parasites from different sources, including viruses causing cancers and other diseases in animals and plants, with their pathogenic functions 'crippled', and tagged with one or more antibiotic resistance 'marker' genes, so that cells transformed with the vector can be selected. For example, the vector most widely used in plant genetic engineering is derived from a tumour-inducing plasmid carried by the soil bacterium *Agrobacterium tumefaciens*. In animals, vectors are

constructed from *retroviruses* causing cancers and other diseases. A vector currently used in fish has a framework from the Moloney marine leukaemic virus, which causes leukaemia in mice, but can infect all mammalian cells. It has bits from the Rous Sarcoma virus, causing sarcomas in chickens, and from the vesicular stomatitis virus, causing oral lesions in cattle, horses, pigs and humans. Such mosaic vectors are particularly hazardous. Unlike natural parasitic genetic elements which have various degrees of host specificity, vectors used in genetic engineering, partly by design, and partly on account of their mosaic character, have the ability to overcome species barriers, and to infect a wide range of species. Another obstacle to genetic engineering is that all organisms and cells have natural defence mechanisms that enable them to destroy or inactivate foreign genes, and transgene instability is a big problem for the industry. Vectors are now increasingly constructed to overcome those mechanisms that maintain the integrity of species. The result is that the artificially constructed vectors are especially good at carrying out horizontal gene transfer.

Let me summarize why rDNA technology differs radically from conventional breeding techniques.

1. Genetic engineering recombines genetic material in the laboratory between species that do not interbreed in nature.

2. While conventional breeding methods shuffle different forms (alleles) of the same genes, genetic engineering enables completely new (exotic) genes to be introduced with unpredictable effects on the physiology and biochemistry of the resultant transgenic organism.
3. Gene multiplications and a high proportion of gene transfers are mediated by vectors which have the following undesirable characteristics:
 - a. many are derived from disease-causing viruses, plasmids and mobile genetic elements – parasitic DNA that have the ability to invade cells and insert themselves into the cell's genome causing genetic damages.
 - b. they are designed to break down species barriers so that they can shuttle genes between a wide range of species. Their wide host range means that they can infect many animals and plants, and in the process pick up genes from viruses of all these species to create new pathogens.
 - c. they routinely carry genes for antibiotic resistance, which is already a big health problem.
 - d. they are increasingly constructed to overcome the recipient species' defence mechanisms that break down or inactivate foreign DNA.

porations will control every aspect of their lives, from the food they can eat, to the baby they can conceive and give birth to.

Isn't it a bit late in the day to tell us that?, you ask. Yes and no. Yes, because I, who should, perhaps, have known better, was caught unprepared like the rest. And no, because there have been so many people warning us of that eventuality, who have campaigned tirelessly on our behalf, some of them going back to the earliest days of genetic engineering in the 1970s – although we have paid them little heed. No, it is not too late, if only because that is precisely what we tend to believe, and are encouraged to believe. A certain climate is created – that of being rapidly overtaken by events – reinforcing the feeling that the tidal wave of progress brought on by the new biotechnology is impossible to stem, so that we may be paralysed into accepting the inevitable. No, because we shall not give up, for the consequence of giving up is the brave new world, and soon after that, there may be no world at all. The gene genie is fast getting out of control. The practitioners of genetic engineering biotechnology, the regulators and the critics alike, have *all* underestimated the risks involved, which are *inherent* to genetic engineering biotechnology, particularly as misguided by an outmoded and erroneous world-view that comes from

bad science. The dreams may already be turning into nightmares.

That is why people like myself are calling for an immediate moratorium on further releases and marketing of genetically engineered products, and for an independent public enquiry to be set up to look into the risks and hazards involved, taking into account the most comprehensive, scientific knowledge in addition to the social, moral implications. This would be most timely, as public opposition to genetic engineering biotechnology has been gaining momentum throughout Europe and in the USA.

In Austria, a record 1.2 million citizens, representing 20 per cent of the electorate, have signed a people's petition to ban genetically engineered foods, as well as deliberate releases of genetically modified organisms and patenting of life. Genetically modified foods were also rejected earlier by a lay people consultation in Norway, and by 95 per cent of consumers in Germany, as revealed by a recent survey. The European Parliament has voted by an overwhelming 407 to 2 majority to censure the Commission's authorization, in December 1996, for imports of Ciba-Geigy's transgenic maize into Europe, and is calling for imports to be suspended while

the authorization is re-examined. The European Commission has decided that in the future genetically engineered seeds will be labelled, and is also considering proposals for retroactive labelling. Commissioner Emma Bonino is to set up a new scientific committee to deal with genetically engineered foods, members of which are to be completely independent of the food industry. Meanwhile, Franz Fischler, the European Commissioner on Agriculture, supports a complete segregation and labelling of production lines of genetically modified and non-genetically modified foods.

In June this year, President Clinton imposed a five-year ban on human cloning in the USA, while the UK House of Commons Science and Technology Committee (STC) wants British law to be amended to ensure that human cloning is illegal. The STC, President Chirac of France and German Research Minister Juergen Ruetters are also calling for an international ban on human cloning.

Like other excellent critics before me,³ I do not think there is a grand conspiracy afoot, though there are many forces converging to a single terrible end. Susan George comments, "They don't have to conspire if they have the same world-view, aspire to similar goals and take concerted steps to attain them."⁴

I am one of those scientists who have long been highly critical of the reductionist mainstream scientific world-view, and have begun to work towards a radically different approach for understanding nature.⁵ But I was unable, for a long time, to see how much science really matters in the affairs of the real world, not just in terms of practical inventions like genetic engineering, but in how that scientific world-view takes hold of people's unconscious, so that they take action, involuntarily, unquestioningly, to shape the world to the detriment of human beings. I was so little aware of how that science is used, without conscious intent, to intimidate and control, to obfuscate, to exploit and oppress; how that dominant world-view generates a selective blindness to make scientists themselves ignore or misread scientific evidence.

The point, however, is not that *science* is bad – but that there can be *bad science* that ill-serves humanity. Science can often be wrong. The history of science can just as well be written in terms of the mistakes made than as the series of triumphs it is usually made out to be. Science is nothing more, and nothing less, than a system of concepts for understanding nature and for obtaining reliable knowledge that enables us to live sustainably with nature. In that sense, one can ill-afford to give up science, for it is through our proper understanding and knowledge of nature that we can live a satisfying life, that we can ultimately distinguish the good science, which serves humanity, from the bad science that does not. In this view, science is imbued with moral values from the start, and cannot be disentangled from them. Therefore it is bad science that purports to be "neutral" and divorced from moral values, as much as it is bad science that ignores scientific evidence.

It is clear that I part company with perhaps a majority of my scientist colleagues in the mainstream, who believe that science can never be wrong, although it can be misused. Or else they carefully distinguish science, as neutral and value-free, from its application, technology, which can do harm or good.⁶ This distinction between science and technology is spurious, especially in the case of an experimental science like genetics, and almost all of biology, where the techniques determine what sorts of question are asked and hence the range of

answers that are important, significant and relevant to the science. Where would molecular genetics be without the tools that enable practitioners to recombine and manipulate our destiny? It is an irresistibly heroic view, except that it is totally wrong and misguided.

It is also meaningless, therefore, to set up Ethical Committees which do not question the basic scientific assumptions behind the practice of genetic engineering biotechnology. Their brief is severely limited, often verging on the trivial and banal – such as whether a pork gene transferred to food plants might be counter to certain religious beliefs – in comparison with the much more fundamental questions of eugenics, genetic discrimination and, indeed, whether gene transfers should be carried out at all. They can do nothing more than make the unacceptable acceptable to the public.

The debate on genetic engineering biotechnology is dogged by the artificial separation imposed between "pure" science and the issues it gives rise to. "Ethics" is deemed to be socially determined, and therefore negotiable, while the science is seen to be beyond reproach, as it is the "laws" of nature. The same goes for the distinction between "technology" – the application of science – from the science. Risk assessments are to do with the technology, leaving the science equally untouched. The technology can be bad for your health, but not the science. In

this article, I shall show why science cannot be separated from moral values nor from the technology that shapes our society. In other words, bad science is unquestionably bad for one's health and well-being, and should be avoided at all costs. Science is, above all, fal-

lible and negotiable, because we have the choice, to do or not to do. It should be negotiated for the public good. That is the only ethical position one can take with regard to science. Otherwise, we are in danger of turning science into the most fundamentalist of religions, that, working hand in hand with corporate interests, will surely usher in the brave new world.

Bad science and big business

What makes genetic engineering biotechnology dangerous, in the first instance, is that it is an unprecedented, close alliance between two great powers that can make or break the world: science and commerce. Practically all established molecular geneticists have some direct or indirect connection with industry, which will set limits on what the scientists can and will do research on, not to mention the possibility of compromising their integrity as independent scientists.⁷

The worst aspect of the alliance is that it is between the most reductionist science and multinational monopolistic industry at its most aggressive and exploitative. If the truth be told, it is bad science working together with big business for quick profit, aided and abetted by our governments for the banal reason that governments wish to be re-elected to remain in 'power'.⁸

Speaking as a scientist who loves and believes in science, I have to say it is bad science that has let the world down and caused the major problems we now face, not the least among which is by promoting and legitimizing a particular world-view. It is a reductionist, manipulative and exploitative world-view. Reductionist because it sees the world as bits and pieces, and denies there are organic wholes such as organisms, ecosystems, societies and community of nations. Manipulative and exploitative because it regards nature and fellow human beings as objects to be manipulated and exploited for gain; life

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being a Darwinian struggle for survival of the fittest.

It is by no means coincidental that the economic theory currently dominating the world is rooted in the same *laissez-faire* capitalist ideology that gave rise to Darwinism. It acknowledges no values other than self-interest, competitiveness and the accumulation of wealth, at which the developed nations have been very successful. Already, according to the 1992 United Nations Development Programme Report, the richest fifth of the world's population has amassed 82.7 per cent of the wealth, while the poorest fifth gets a piddling 1.4 per cent. Or, put in another way, there are now 477 billionaires in the world whose combined assets are roughly equal to the combined annual incomes of the poorer half of humanity – 2.8 billion people.⁹ Do we need to be more "competitive" still to take from the poorest their remaining pittance? That is, in fact, what we are doing.

The governmental representatives of the superpowers are pushing for a "globalized economy" under trade agreements which erase all economic borders. "Together, the processes of deregulation and globalization are undermining the power of both unions and governments and placing the power of global corporations and finance beyond the reach of public accountability."¹⁰ The largest corporations continue to consolidate that power through mergers, acquisitions and strategic alliances.

Multinational corporations now comprise 51 of the world's 100 largest economies: only 49 of the latter are nations. By 1993, agricultural biotechnology was being controlled by just 11 giant corporations, and these are now undergoing further mergers. The OECD (Organization for Economic Co-operation and Development) member countries are at this moment working in secret in Paris on the Multilateral Agreements on Investment (MAI), which is written by and for corporations to prohibit any government from establishing performance or accountability standards for foreign investors. European Commissioner, Sir Leon Brittan, is negotiating in the World Trade Organization, on behalf of the European Community, to ensure that no barriers of any kind should remain in the South to dampen exploitation by the North, and at the same time, to protect the deeply unethical "patents of life" through Trade Related Intellectual Property Rights (TRIPS) agreements.¹¹ So, in addition to gaining complete control of the food supply of the South through exclusive rights to genetically engineered seeds, the big food giants of the North can asset-strip the South's genetic and intellectual resources with impunity, up to and including genes and cell lines of indigenous peoples.

There is no question that the mindset that leads to and validates genetic engineering is *genetic determinism* – the idea that organisms are determined by their genetic makeup, or the totality of their genes. Genetic determinism derives from the marriage of Darwinism and Mendelian genetics. For those imbued with the mindset of genetic determinism, the major problems of the world can be solved simply by identifying and manipulating genes, for genes determine the characters of organisms; so by identifying a gene we can predict a desirable or undesirable trait, by changing a gene we change the trait, by transferring a gene we transfer the corresponding trait.

The Human Genome Project was inspired by the same genetic determinism that locates the "blueprint" for constructing the human being in the human genome. It may have been a brilliant political move to capture research funds and, at the

same time, to revive a flagging pharmaceutical industry, but its scientific content was suspect from the first.

Genetic engineering biotechnology promises to work for the benefit of humankind; the reality is something else.

- It displaces and marginalizes all alternative approaches that address the social and environmental causes of malnutrition and ill-health, such as poverty and unemployment, and the need for a sustainable agriculture that could regenerate the environment, guarantee long-term food security and, at the same time, conserve indigenous biodiversity.
- Its purpose is to accommodate problems that reductionist science and industry have created in the first place – widespread environmental deterioration from the intensive, high-input agriculture of the Green Revolution, and accumulation of toxic wastes from chemical industries. What's on offer now is more of the same, except with new problems attached.
- It leads to discriminatory and other unethical practices that are against the moral values of societies and community of nations.
- Worst of all, it is pushing a technology that is untried, and, according to existing knowledge, is inherently hazardous to health and biodiversity.

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Let me enlarge on the last point here, as I believe it has been underestimated, if not entirely overlooked by the practitioners, regulators and many critics of genetic engineering biotechnology alike, on account of a certain blindness to concrete scientific evidence, largely as a result of their conscious or

unconscious commitment to an old, discredited paradigm. The most immediate hazards are likely to be in public health – which has already reached a global crisis, attesting to the failure of decades of reductionist medical practices – although the hazards to biodiversity will not be far behind.

Genetic engineering biotechnology is inherently hazardous

According to the 1996 World Health Organization Report, at least 30 new diseases, including AIDS, Ebola and Hepatitis C, have emerged over the past 20 years, while old infectious diseases such as tuberculosis, cholera, malaria and diphtheria are coming back worldwide. Almost every month now in the UK we hear reports on fresh outbreaks: *Streptococcus*, meningitis, *E. coli*. Practically all the pathogens are resistant to antibiotics, many to multiple antibiotics. Two strains of *E. coli* isolated in a transplant ward outside Cambridge in 1993 were found to be resistant to 21 out of 22 common antibiotics.¹² A strain of *Staphylococcus* isolated in Australia in 1990 was found to be resistant to 31 different drugs.¹³ Infections with these and other strains will very soon become totally invulnerable to treatment. In fact, scientists in Japan have already isolated a strain of *Staphylococcus aureus* that is resistant even to the last resort antibiotic, vancomycin.¹⁴

Geneticists have now linked the emergence of pathogenic bacteria and of antibiotic resistance to *horizontal gene transfer* – the transfer of genes to unrelated species, by infection through viruses, through pieces of genetic material, DNA, taken up into cells from the environment, or by unusual mating taking place between unrelated species. For example, horizontal gene transfer and subsequent genetic recombina-

tion have generated the bacterial strains responsible for the cholera outbreak in India in 1992,¹⁵ and the *Streptococcus* epidemic in Tayside in 1993.¹⁶ The *E. coli* 157 strain involved in the recent outbreaks in Scotland is believed to have originated from horizontal gene transfer from the pathogen, *Shigella*.¹⁷ Many unrelated bacterial pathogens, causing diseases from bubonic plague to tree blight, are found to share an entire set of genes for invading cells, which have almost certainly spread by horizontal gene transfer.¹⁸ Similarly, genes for antibiotic resistance have spread horizontally and recombined with one another to generate multiple antibiotic resistance throughout the bacterial populations.¹⁹ Antibiotic resistance genes spread readily by contact between human beings, and from bacteria inhabiting the gut of farm animals to those in human beings.²⁰ Multiple antibiotic resistant strains of pathogens have been endemic in many hospitals for years.²¹

What is the connection between horizontal gene transfer and genetic engineering? Genetic engineering is a technology designed specifically to transfer genes horizontally between species that do not interbreed. It is designed to break down species barriers and, increasingly, to overcome the species' defence mechanisms which normally degrade or inactivate foreign genes.²² For the purpose of manipulating, replicating and transferring genes, genetic engineers make use of recombinant versions of precisely those genetic parasites causing diseases including cancers, and others that carry and spread virulence genes and antibiotic resistance genes. Thus the technology will contribute to an increase in the frequency of horizontal transfer of those genes that are responsible for virulence and antibiotic resistance, and allow them to recombine to generate new pathogens.

What is even more disturbing is that geneticists have now found evidence that the presence of antibiotics typically increases the frequency of horizontal gene transfer 100-fold or more, possibly because the antibiotic acts like a sex hormone for the bacteria, enhancing mating and exchange of genes between unrelated species.²³ Thus, antibiotic resistance and multiple antibiotic resistance cannot be overcome simply by making new antibiotics, *for antibiotics create the very conditions to facilitate the spread of resistance*. The continuing profligate use of antibiotics in intensive farming and in medicine, in combination with the commercial-scale practice of genetic engineering, may already be major contributing factors for the accelerated spread of multiple antibiotic resistance among new and old pathogens that the WHO 1996 Report has identified within the past 10 years. For example, there has been a dramatic rise both in terms of incidence and severity of cases of infections by *Salmonella*,²⁴ with some countries in Europe witnessing a staggering 20-fold increase in incidence since 1980.

That is not all. One by one, those assumptions on which geneticists and regulatory committees have based their assessment of genetically engineered products to be "safe" have fallen by the wayside, especially in the light of evidence emerging within the past three to four years. However, there is still little indication that the new findings are being taken on board. On the contrary, regulatory bodies have succumbed to pressure from the industry to relax the already inadequate regulations. Let me list a few more of the relevant findings in genetics.

We have been told that horizontal gene transfer is confined to bacteria. That is not so. It is now known to involve practically all species of animal, plant and fungus. It is possible for any gene in any species to spread to any other species, especially if the gene is carried on genetically engineered gene-transfer vectors. Transgenes and antibiotic resistance

marker genes from transgenic plants have been shown to end up in soil fungi and bacteria.²⁵ The microbial populations in the environment serve as the gene-transfer highway and reservoir, supporting the replication of the genes and allowing them to spread and recombine with other genes to generate new pathogens.²⁶

We have been assured that "crippled" laboratory strains of bacteria and viruses do not survive when released into the environment. That is not true. There is now abundant evidence that they can either survive quite well and multiply, or they can go dormant and reappear after having acquired genes from other bacteria to enable them to multiply.²⁷ Bacteria co-operate much more than they compete. They share their most valuable assets for survival.

We have been told that DNA is easily broken down in the environment. Not so. DNA can remain in the environment where they can be picked up by bacteria and incorporated into their genome.²⁸ DNA is, in fact, one of the toughest molecules. Biochemists jumped with joy when they didn't have to work with proteins anymore, which lose their activity very readily. By contrast, DNA survives rigorous boiling, so when they approve processed food on grounds that there can be no DNA left, ask exactly how the processing is done, and whether the appropriate tests for the presence of DNA have been carried out.

The survival of "crippled" laboratory strains of bacteria and viruses and the persistence of DNA in the environment are of particular relevance to the so-called "contained" users producing transgenic pharmaceuticals, enzymes and food additives. "Tolerated" releases and transgenic wastes from such users may already have released large amounts of transgenic bacteria and viruses as well as DNA into the environment since the early 1980s when commercial genetic engineering biotechnology began.

We are told that DNA is easily digested by enzymes in our gut. Not true. The DNA of a virus has been found to survive passage through the gut of mice. Furthermore, the DNA readily finds its way into the bloodstream, and into all kinds of cell in the body.²⁹ Once inside the cell, the DNA can insert itself into the cell's genome, and create all manner of genetic disturbances, including cancer.³⁰

There are yet further findings pointing to the potential hazards of generating new disease-causing viruses by recombination between artificial viral vectors and vaccines and other viruses in the environment. The viruses generated in this way will have increased host ranges, infecting and causing diseases in more than one species, and hence very difficult to eradicate. *We are already seeing such viruses emerging.*

- Monkeypox, a previously rare and potentially fatal virus caught from rodents, is spreading through central Zaire.³¹ Between 1981-1986 only 37 cases were known, but there have been at least 163 cases in one eastern province of Zaire alone since July 1995. For the first time, humans are transmitting the disease directly from one to another.
- An outbreak of hantavirus infection hit southern Argentina in December 1996, the first time the virus was transmitted from person to person.³² Previously, the virus was spread by breathing in the aerosols from rodent excrement or urine.
- New highly virulent strains of infectious bursal disease virus (IBDV) spread rapidly throughout most of the poultry industry in the Northern Hemisphere, and are now infecting Antarctic penguins, and are suspected of causing mass mortality.³³
- New strains of distemper and rabies viruses are spilling out from towns and villages to plague some of the world's

rarest wild animals in Africa:³⁴ lions, panthers, wild dogs, giant otter.

None of the plethora of new findings has been taken on board by the regulatory bodies. On the contrary, safety regulations have been relaxed. The public is being used, against its will, as guinea pigs for genetically engineered products, while new viruses and bacterial pathogens may be created by the technology every passing day.

The present situation is reminiscent of the development of nuclear energy which gave us the atom bomb, and the nuclear power stations that we now know to be hazardous to health and also to be environmentally unsustainable on account of the long-lasting radioactive wastes they produce. Joseph

Rotblat, the British physicist who won the 1995 Nobel Prize after years of battling against nuclear weapons, has this to say, "My worry is that other advances in science may result in other means of mass destruction, maybe more readily available even than nuclear weapons. Genetic engineering is quite a possible area, because of these dreadful developments that are taking place there."³⁵

The large-scale release of transgenic organisms is much worse than nuclear weapons or radioactive nuclear wastes, as genes can replicate indefinitely, spread and recombine. There may yet be time enough to stop the industry's dreams turning into nightmares if we act now, before the critical genetic "melt-down" is reached.

Organizations dealing with this issue

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The Pure Food Campaign (PFC) is a non-profit, public interest organization sponsored by the Washington DC based Foundation on Economic Trends, whose President is the author and technology critic, Jeremy Rifkin. Current activities of the Pure Food Campaign include, among a great many other things:

1. Ongoing boycott of the recombinant bovine Growth Hormone (rBGH or rBST).
2. Boycott of Monsanto's genetically engineered "RoundupReady" Soybeans and Ciba-Geigy (Nocartis) Bt "Maximizer" corn, as well as other already commercialized or soon-to-be commercialized gene-foods and crops.
3. Campaign to repeal the anti-free speech, anti-activist "agricultural disparagement" or "food slander" laws which agribusiness and the chemical-biotech industry have now passed in 13 US states.

How to Get Involved in the Pure Food Campaign

Individuals or organizations who wish to get involved in grassroots or media activism around these issues should contact the Pure Food Campaign office in Minnesota. Organizations already involved in related activities are also welcome to contact the PFC for advice or consultation. The PFC maintains an E-Mail communications network for "Live Wire" activists across the world as well as a web site.

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CTA is devoted to a holistic examination of the economic, environmental, ethical, political and social impacts that can result from the application of specific technologies or entire technological systems. Over the next several months, CTA will, among other things, be:

1. Initiating a lawsuit in the United States seeking the labelling of genetically engineered foods.
2. On behalf of Greenpeace International (and Greenpeace Germany), filing a legal petition with the US E.P.A. seeking a halt to the regulatory approval of all plants genetically engineered to express bacillus thuringiensis.

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The Genetics Forum provides independent analysis of genetic engineering issues to the public through its bi-monthly magazine, *The Splice of Life*. For information on this and other publications, please send a SAE to the above address.

Notes and References

1. The first time I heard the term "transgenic" being used on cultivars resulting from conventional breeding methods was from Henry Miller, a prominent advocate for genetic engineering biotechnology, in a public debate with myself, organized by the Oxford Centre for Environment, Ethics and Society, in Oxford University on February 20, 1997.
2. "Scientists scorn sci-fi fears over sheep clone" *The Guardian*, February 24, 1997, p.7. Lewis Wolpert, developmental biologist of University College London was reported as saying, "It's a pretty risky technique with lots of abnormalities." Also report and interview in the Eight O'Clock News, BBC Radio 4, February 24, 1997.
3. As for instance, Spallone, 1992.
4. George, 1988, p.5.
5. My colleague Peter Saunders and I began working on an alternative approach to neo-Darwinian evolutionary theory in the 1970s. Major collections of multi-author essays appeared in Ho and Saunders, 1984; Pollard, 1981; Ho and Fox, 1988.
6. Lewis Wolpert, who currently heads the Committee for the Public Understanding of Science, argues strenuously for this 'fundamentalist' view of science. See Wolpert, 1996.
7. See Hubbard and Wald, 1993.
8. This was pointed out to me by Martin Khor, during a Course on Globalization and Economics that he gave at Schumacher College, February 3-10, 1997.
9. See Korten, 1997.
10. Korten, 1997, p.2.
11. See Perlas, 1994; also WTO: New Setback for the South, *Third World Resurgence* issue 77/78, 1997, which contains many articles reporting on the WTO meeting held in December 1996 in Singapore.
12. Brown *et al.*, 1993.
13. Udo and Grubb, 1990.
14. "Superbug spectre haunts Japan", Michael Day, *New Scientist* 3 May, 1997, p.5.
15. See Bik *et al.*, 1995; Prager *et al.*, 1995; Reidl and Mekalanos, 1995.
16. Whatmore *et al.*, 1994; Kapur *et al.*, 1995; Schnitzler *et al.*, 1995; Upton *et al.*, 1996.
17. Professor Hugh Pennington, on BBC Radio 4 News, February 1997.
18. Barinaga, 1996.
19. Reviewed by Davies, 1994.
20. Tschäpe, 1994.
21. See World Health Report, 1996; also Garret, 1995, chapter 13, for an excellent account of the history of antibiotic resistance in pathogens.
22. See Ho and Tappeser, 1997.
23. See Davies, 1994.
24. WHO Fact Sheet No.139, January 1997.
25. Hoffman *et al.*, 1994; Schluter *et al.*, 1995.
26. See Ho, 1996a.
27. Jager and Tappeser, 1996, have extensively reviewed the literature on the survival of bacteria and DNA released into different environments.
28. See Lorenz and Wackernagel, 1994.
29. See Schubert *et al.*, 1994; also *New Scientist* January 24, p.24, featured a short report on recent findings of the group that were presented at the International Congress on Cell Biology in San Francisco, December 1996.
30. Wahl *et al.*, 1984; see also relevant entries in Kendrew, 1995, especially "slow transforming retroviruses" and "Transgenic technologies".
31. "Killer virus piles on the misery in Zaire" Debora MacKenzie, *New Scientist* April 19, 1997, p.12.
32. "Virus gets personal" *New Scientist* April 26, 1997, p.13.
33. "Poultry virus infection in Antarctic penguins" Heather Gardner, Knowles Kerry and Martin Riddle *Nature* 387, May 15, 1997, p.245.
34. See Pain, 1997.
35. Quoted in "The spectre of a human clone" *The Independent*, February 26, 1997, p.1.

Notes, Quotes and Spoofs

Let's get our priorities right!

"Environmental objections, while important, cannot simply be granted a power of veto ... The increasingly effective organization of those arguing for environmental citizens' rights must be matched by a more effective organization of the advocates of change, adaption and growth."

Missing Networks, European Round Table of Industrialists.

"God did a bad job, it's up to our computer experts to improve it"

"The raw brain information would be changed into a form where it could be downloaded onto computer and viewed on a screen or transferred into another person's brain."

Dr Chris Winter, an expert in solid-state physics and biochemistry, and leader of the British Telecom research team, said yesterday: "the potential applications for such technology are virtually limitless. To use an analogy, we have split the atom but the bomb has not yet been built."

He said the memory chips would revolutionize communications. People would be able to relay their experiences via a plastic-coated silicon chip in their body, allowing them to download memories rather than talk about them."

The Guardian, British Telecom Soul Catcher 2025 Project

Symphony Orchestras are hideously inefficient. Treasury economists must clearly re-organize and rationalise them.

"A Treasury economist decided that he should assess the economic efficiency of the Symphony Orchestra as it is funded from taxes. As it happens, when he went to

check them out, they were playing Schubert's Unfinished Symphony. His report observed that for considerable periods the four oboe players were idle. He suggested that the number of players should be reduced and their work more evenly spread over the whole performance. He noted that all 12 violins were playing identical notes and therefore the number could be reduced and the volume required obtained more cheaply by electronic amplification.

He suggested that the skills effort expended in playing so many demi-semiquavers was excessive and by rounding up all notes to the nearest semiquaver and employing lower grade performers and trainees, costs could be reduced.

The repetition of a passage with horns when it had already been played by violins formed no useful function and could be eliminated; in fact, if all redundant passages were eliminated, the performance could be significantly reduced in time.

"If Schubert had attended to these matters, he probably would have finished his symphony," he said."

Anti-Economist League

Applying the right criterion.

"Some time ago I was with Wes Jackson, wandering among the experimental plots at his home and workplace, the Land Institute in Salina, Kansas. We stopped by one plot that had been planted in various densities of population. We pointed to a Maximilian sunflower growing alone, apart from the others, and said, "There is a plant that has realized its full potential as an individual." And clearly it had: it had grown very tall; it had put out many long branches heavily laden with blossoms – and the branches had broken off, for they had grown too long and too heavy. The plant had indeed realized its full potential as an individual, but it had failed as a Maximilian sunflower. We could say that its full potential as an individual *was* this failure. It had failed because it had lived outside an important part of its definition, which consists of *both* its individuality and its community. A part of its properly realizable potential lay in its community, not in itself."

Wendell Berry

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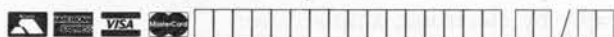
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Reviews

Greenwash and the Marginalization of our Life Support System

**EARTH FOR SALE:
RECLAIMING ECOLOGY IN
THE AGE OF CORPORATE
GREENWASH**

by Brian Tokar

South End Press, Boston, 1997, \$18.00
269pp. ISBN 0 89608 557 0

Our local grade school puts out a monthly publication to let town residents know what's happening with the town's children who attend the school. A recent issue was dedicated to Earth Day in which students wrote about the environment and what this particular celebration meant to them. Besides revealing that the students would like Earth Day a whole lot better if it meant a day off from school, the issue made the shallowness of current environmental education horrifyingly clear.

To their credit, the kids were very honest about what they thought of Earth Day, brutally honest in fact. One boy summed it all up as follows: "Earth Day is the one day of the year that we do something for the environment." While this comment might be refreshing in its honesty, it is downright scary to realize that the corporate takeover of Earth Day and mainstream environmentalism has permeated youth in such a manner. Earth Day to these children is yet another exercise in compartmentalization – one day for the Earth, one day for Independence, one each for mom and dad, etc., and the rest to do whatever the heck you want without any of those dastardly obligations. Just throw the environment into the curriculum somewhere between Columbus "discovering" America and the "valiant efforts" of the United States in the Persian Gulf massacre that some people call a war.

As Brian Tokar explains in his illuminating new book, *Earth for Sale: Reclaiming Ecology in the Age of Corporate Greenwash*, this kind of trivialization of the environment and the environmental movement is neither an accident nor limited to children.

For Tokar, a Vermont activist, and instructor at the Institute for Social Ecology, this popular trivialization of the environment can be traced to three related phenomena: "the absorption of the mainstream environmental movement by the political status quo, the emergence of corporate environmentalism, and the proliferation of 'ecological' products in the marketplace." Tokar proceeds to walk the reader through the very muddy waters of the modern-day environmental movement, taking us back to John Muir's founding of the Sierra Club and up through the 1960s social and ecological radicalism. Then he plops us down in the rude and crude 90s – the decade lauded as the "environmental decade" but which is best characterized by Al Gore's monumental Green façade with which he, like so many major corporations, has tried to convince everyone that he cares.

While the causes of today's shallow environmentalism can be traced to a plethora of factors, Tokar leaves little doubt as to where he puts much of the blame: the greedy worship of global market forces and a ridiculous belief in liberal governmental tinkering. According to Tokar, "neither government regulations nor the capitalist market is capable of providing adequate protection for natural ecosystems or communities affected by environmental pollution." And the "professional" environmentalists who would like us to believe that they have everything under control (provided we all continue to put our cheques in the mail with each obnoxious solicitation) are just that – professionals who often approach their "jobs" with more fondness for the benefits package than for any of the endangered species.

As Tokar points out in one of the book's most poignant chapters entitled "Questioning Official Environmentalism", mainstream environmentalists'

conviction for the very market forces that are causing all the problems they claim to be solving in their circuitous and ineffective manner can be explained more quickly than you can say the word "fundraising". Not only were some of Washington's leading environmental groups specifically created by corporate interests (the Environmental Defense Fund and the Natural Resources Defense Council, for example), but every single mainstream group is inextricably tethered to the lock jawed wishes of the monolithic environmental foundations and the sources of corporate wealth that created them. In fact, Tokar quotes Keene State College political scientist Joan Roelofs, a scholar who has dedicated much of her time to studying the role of foundations in the non-profit world, as saying that mega-foundations such as Rockefeller, Ford and Pew began allocating grants to assure "that radical energies were being channelled into safe, legalistic, bureaucratic and occasionally profit-making activities."

Take the Pew Charitable Trusts, for example, the leading bankroller of the mainstream environmental movement that garnered its nearly \$4 billion endowment from the environmentally destructive Sun Oil Company. Pew doesn't just benevolently hand out cheques to the most effective groups without any strings attached. Far from it. Tokar cites Pew documents that explain the foundation's efforts to dispatch a "team of professionals" who would seek to define "the goals and objectives of these programmes, designing their operating structure, hiring key staff and, in some cases, being directly involved in programme execution." Yes, it's a whole lot more than just handing out a cheque, and, if you want your group to get in line for a ride on the Pew financial gravy train, you'd better match what Tokar describes as Pew's "bland, non-controversial and piecemeal approach", or you haven't got a prayer.

In 1993, Pew decided to jump into the Northwest forest issue by throwing its money and ideology around in their typical "our way or no way" manner. One forest activist, Andy Mahler, said the result was turning much of the

movement into a "money chase" and a "search for the lowest common denominator" kinds of strategy that would please Pew rather than effectively protect the forests. Only later, when the muckraking journalists Jeffrey St Clair and Alexander Cockburn began researching Pew's stock holdings, did the reasons for Pew's activist foot-dragging become apparent: Pew had millions of dollars worth of investments in leading multinational timber corporations, the same corporations that could have been hurt by aggressive forest activism.

Earth For Sale is also sprinkled with examples of hopeful grassroots opposition to both polluting corporations and the bankrupt practices of mainstream environmentalism, particularly in its final chapter, "Ecology, Community and Democracy". Tokar urges us to reject popular culture's efforts to make us feel alienated from our communities and our democracy, so that we do not leave essential decisions to the self-appointed "experts". "Neither democracy nor ecological sanity is well served by a political culture in which most people have withdrawn from the public sphere and look to professional organizers and lobbyists to do their activism for them," warns Tokar.

His vision for a fully realized ecological 21st century is a broad and diverse movement co-ordinated from the ground up, one that is primarily local or regional in its ecological solutions, and rejects conservatism's fanatical beliefs in the market economy and liberalism's futile beliefs in regulatory incrementalism.

"The heart and soul of the ecological movement does not lie with multimillion dollar organizations based in Washington, D.C. nor with politicians who glibly speak environmental rhetoric to disguise their subservience to the agendas of corporate America," writes Tokar. "It lies with millions of people all across the country and around the world, most of whom do not strongly identify with any organization."

Earth For Sale is a fantastic primer for those looking for some historical perspectives on the environmental movement as well as those already ensconced in it and looking for tips on how to stay away from the ideological quicksand of corporate environmentalism. In the well-written and thoroughly researched style that Tokar brings to all his projects, *Earth For Sale* is a clarion call for nothing short of an ecological revolution. And Tokar is not just another pontificating pundit. He's dedicated his

life to the movement about which he writes. That's why this book, and Tokar himself, deserve our attention.

Michael Colby

Michael Colby is the executive director of the grassroots food safety and environmental activist group Food & Water, Inc. based in Walden, Vermont.

Virtual Future

THE ROAD AHEAD

by Bill Gates

Penguin Books, London, 1996, £8.99 (pb)
352pp. ISBN 0 1402 6040 4

Take a deep breath and a stiff drink before daring to enter Microsoft Bill's nightmarish vision of a technological future. If Gates's virtual utopia is to become a reality, assuming it's possible, then we can bid farewell to any hope as a species of restoring the ecological balance on which all life depends. His is a future in which family, community, entertainment, education and all things organic have been reduced to the digital, in which reality can only be 'virtually' experienced.

"The presence of advanced communications systems promises to make countries more alike and reduce the importance of national boundaries," he assures us. "The Internet is going to break down boundaries and may promote a world culture." And what greater conditions could possibly exist for a corporate aberration of the sort Gates and his peers control, than a world of standardized taste and fashion, a world riddled with social instability as a natural consequence of the exportation of a US style economy via what Campbell Soup Company has described as a 'global consumer crusade'? Just as disease cannot survive and flourish in a healthy body, so the likes of Microsoft must by its nature view cultural and biological diversity, self-sufficiency and healthy community as hindrances, obstacles in front of which bowing is not an option.

"Pessimism about the future doesn't seem to be warranted," he says, and within a certain context he is absolutely right. For, as long as we remain religiously blind to the past and as long as we are trained to misinterpret each head of the Hydra as something separate, isolated and unconnected to the whole, then each symptom of the larger problem presents itself as a market opportunity.

"Biotechnology promises astounding breakthroughs that will greatly improve the human condition," he writes with confidence. Thus ocean pollution becomes an excuse for genetically-engineered pollution-eating bacteria, and each new victim of environmental contamination becomes a contributor to the booming cancer industry, and justification for the spending of further millions to isolate the 'cancer gene'.

"Population growth slows as technology increases affluence and improves education ..." he writes with equal confidence. So, technology and modern Western education are the cures, even though initial population explosions have always coincided precisely with major technological changes in our relationship with the natural world, and with the spreading of an educational model which conceals the reality of interdependence and places atomized parts above the whole.

This book is so full of unquestioned assumptions, its author so much a part of the status quo, that he is unable even to see the need for justification of those assumptions. His blindness to the past, the only knowledge of which has been handed down to him, one must assume, by university mathematicians and professors of cybernetics, has wedded him to rampant linear change (or progress, as some would describe it) of a type alien to past experience and to the natural world as a whole. Indeed, for Gates, rapid change is a panacea for all societal ills, regardless, it seems, of what is being changed.

That "we could reach the point where cameras recorded most of what goes on in public," is "unremarkable"; that local 'generalist' doctors and lawyers will be made redundant as people turn to the 'Net' for advice is also nothing to be alarmed about because, of course, "the resources of the network will enable the local lawyer to retrain and become an expert in any speciality of her choice."

Efficiency blind and naked is the rule of Bill's tomorrow: "before mass production everything was made one piece at a time by labour-intensive methods that hampered productivity and kept the standard of living low ... soon computerized shirt-making machines will obey a different set of instructions for every shirt." Local handmade arts and crafts; father and son apprenticeships? Forget it — nothing remains sacred in Bill's vision of the future.

"I used to date a woman who lived in a different city. We spent a lot of time together on E-mail. And we figured out a way we could sort of go to the movies together. We would find a film that was

playing about the same time in both our cities. We would drive to our respective theatres, chatting on our cellular phones. We would watch the movie and on the way home we would use our cellular phones again to discuss the show. In the future this sort of virtual dating will be better because the movie watching will be combined with a videoconference." And now, "a growing number of parents of college students have become regular E-mail users because that seems to be the best way to stay in touch with their kids." Is this not our cue for questioning the type of society we are creating, one in which relationships as fundamental as parenting and courtship must be computerized, or is this merely cause, as Gates would have it, for celebrating the further expansion of industrial niches that can be artificially filled?

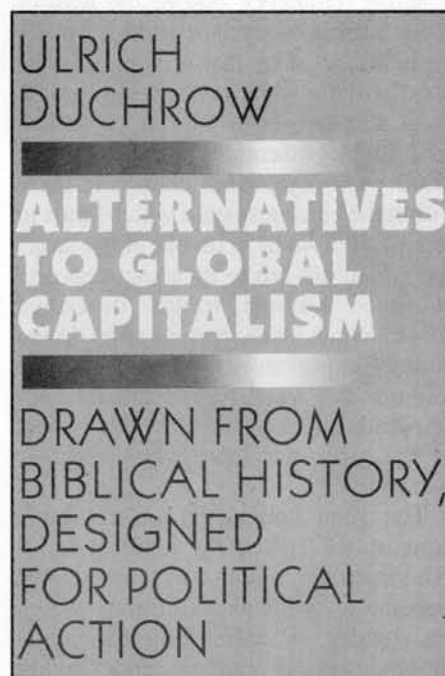
Computerizing and further commercializing those roles which for 99% of our existence on Earth have been wholly fulfilled by community and the natural world, is apparently inevitable: "No one can stop productive change in the long run because the market inexorably embraces it ... progress will come no matter what ... we need to make the best of it – not try to forestall it." That one basic and widely shared assumption is repeated so often that the need for justification has been forgotten. In that one simple statement, Gates has conveniently trivialized, reduced to zero importance, all those government policies that have cleared the way for ever-larger units of production while strangling the small: all the vast tax concessions; the billions of dollars spent on communications and transport infrastructures (again compliments of the taxpayer), and the thousands of tangled regulations spawned with each corporate invasion of another niche of life. Without all these, monsters of the Microsoft variety could never have been born. Gates also conveniently forgets the vast quantities spent on advertising – including by his own company – to ensure that the market embraces the latest 'inexorable' change. The process Gates considers "progress" can no more be described as 'inevitable' than a car function without fuel.

"One way for the advertiser to capture your attention will be to offer you a small amount of money ... if you'll look at their ad ... A record company might ... let you play a song – or an addictive game – ten times free before asking whether you want to buy it. The opportunity to promote the purchase of *Toy Story* and *Aladdin* merchandise might justify Disney's allowing every child in

the world one free viewing." Of course with Gates, there are no limits, no obligations to discriminate between the obviously perverse and that which is healthy for society. For Bill, it's all inevitable. This new tactic of accessing what was until recently a relatively 'untapped' child market, is in his own words, "just another use of the market mechanism for friction-free capitalism."

Bill's *Road Ahead* can only lead to disaster on an unimaginable scale, of this there can be little room for doubt. But his *is*, sadly, an accurate and honest reflection of what is to come should trends be allowed to continue. This book does merit some reference. It will with any luck become a classic – a reminder to our descendants of the chaos and cruelty we almost fully achieved on Earth. We should read it, judge for ourselves, and act now on our primal instincts.

Zac Goldsmith



Back to the Futures

ALTERNATIVES TO GLOBAL CAPITALISM

by Ulrich Duchrow

International Books with Kairos Europa, Utrecht and Heidelberg, 1995, £14.99 (pb) 335pp. ISBN 90 6224 976 0

The writing of this book was driven by two events: the 50th anniversary of the Bretton Woods conference which did so much to create today's world order, and the sec-

ond Ecumenical Assembly of European Churches, which has just taken place in Graz, Austria. This fact, together with Duchrow's background as a German theologian with a long history of involvement in social movements, helps explain the extraordinary nature of this book. It falls into three parts. The first provides an analysis of the history and structure of the world economic system; the second is a biblical exegesis, focussing on the nature of Jewish community; the last is a review of the strategies and movements which may lead to alternatives to global capitalism.

The first part of the book starts from Aristotle's distinction between the need-oriented household economy and the money-accumulation economy. Duchrow reviews the historical development of the money-accumulation economy and shows how it has come to be the overwhelmingly dominant force in the world, progressively eroding the need-oriented economy. Working for money displaces working to satisfy needs: this means that the basis for community self-sufficiency is continually undermined.

His argument draws on many contemporary and historical European sources, ranging from Adam Smith, Marx, John Locke, Francis Bacon and even Goethe. He concludes that the key problem today is that "productive, trading and monetary capital can be trans-nationalised (globalised) while the political instruments of regulation remain either national or inter-national." The role of the Bretton Woods institutions is to regulate nation states in the interests of the free market.

From an ecological perspective, Duchrow acknowledges the adverse impact of such capital-driven economic development not only on those without capital (i.e. the poor), but also on the environment. He quotes a surprising passage from Marx that "all progress in increasing the fertility of the soil for a given time, is a progress towards ruining the lasting sources of that fertility." Yet beyond pointing out that the interests of neither community nor environment are accommodated by capital, he does not describe any intrinsic link between community and environment as, say, Paul Ekins suggests in distinguishing four non-substitutable kinds of capital (manufactured, ecological, social and human) within one overall 'economic' system.

The second part of the book is the most interesting. It traces the history of the Jewish people from about 1200 BC. At that time the disintegration of the Canaanite towns made space for groups

of dispossessed peoples to live rurally and to centre their spiritual life round the god Yahweh – a god originally revered by local nomadic peoples. Yahweh's distinguishing feature was identification with political liberation and the rejection of centralized authority. This fitted perfectly with the small, autonomous communities of the early Israel.

The history of the Jewish people can then be traced as a series of struggles with authority – both in the form of external empires (the Egyptian, Babylonian, Greek and Roman) and also internally in the form of Jewish kingship. Both authority structures exacted 'tribute'. Tribute, as a form of tax, exerts strong pressure to join the money-accumulation economy, and therefore undermines community. A key feature of the money-accumulation economy is the charging of interest on money lent, or usury. Duchrow traces how, contrary to common perception, the rejection of usury forms a key part of biblical tradition.

The Jewish reaction, in the name of Yahweh, was two-fold. One part was a prophetic tradition which tried to subordinate kingship to Yahweh. Duchrow points out how the biblical prophets continually rejected both tribute and usury as ruinous to the people and contrary to Yahweh.

The second part of the Jewish reaction was the formation of breakaway, radical communities which rejected central authority to live independently. This mission for autonomous community is continued with Jesus's 'kingdom of God' and early Christianity, which Duchrow describes in a very community-centred way. It emerges again in the struggles of Luther and Calvin against the monastic church and again in the current liberation theologies of the churches of South America.

While spirituality is firmly linked with small-scale community life, which is shown to be *economically* just, Duchrow does not explore the *ecological* aspects of such a way of life. Why is this? On the biblical side, part of the problem may be the biblical injunction to 'subdue the earth', which does not lend itself well to an ecological awareness. On the economic side, the root Aristotelian distinction between needs-orientation and money-accumulation again assumes an anthropocentric view of the world. For both the biblical tradition and traditional economics, the environment is a given. But the twentieth century has forced us to be aware that neither the social nor the natural world can be taken for granted. The

point, which Duchrow perhaps misses, is that a successful local community will *inevitably* be more ecologically aware than the larger-scale society. It is only possible to respect an environment of any kind if you are linked to it.

In the third part of the book, Duchrow suggests that the biblical experience points to two responses to the domination of money-accumulation economics. One is a global political restructuring and re-regulation – this is the heir to the prophetic tradition. The other is the small-scale community, which can act as the seed for a future, need-oriented society of communities.

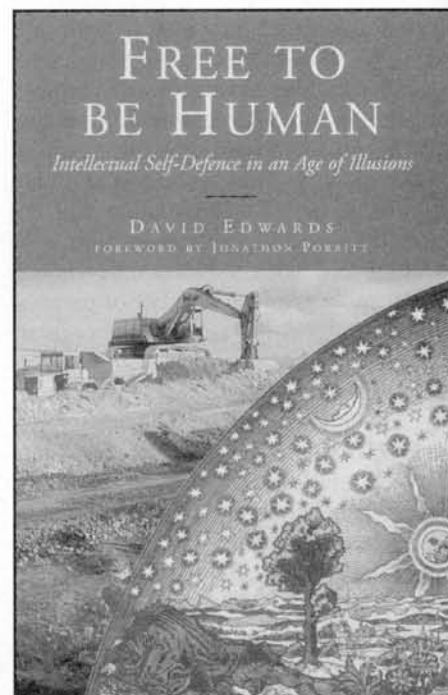
Duchrow's survey of such communities and initiatives may provide a wider than normal perspective on grassroots communities for Anglo-American readers from ecological backgrounds, since it draws on the whole European experience and also includes overtly spiritually-based communities, which are shown to be naturally ecologically sensitive. However, one of the lessons of the biblical analysis, a point not made explicitly, must be that it is going to be very hard for such small-scale, break-away alternatives to survive. If it was hard in the essentially rural world of 3,000 years ago, what chance is there within the current system which tends to sacrifice the small in favour of the large, and which has led to the exact opposite of those biblical trends described above? What are the lessons to be drawn from the experiences of those traditional communities which *have* flourished for thousands of years and which are typical of the way we have until recently always lived?

The final conclusion of the book sums up the task at the political level: "The main aim must be to create global democratic political institutions which are capable of monitoring the transnational capital markets and forcing them to operate according to socio-environmental standards."

In contrast to the fascinating content of this book, its presentation lets it down. Duchrow's style is heavy and the translation from the German is not always elegant. The arguments, while very richly presented, are accompanied by numerous insets in different type-faces and some very complex diagrams, which can be confusing. However, for breadth, commitment and interest, this book has few equals.

Adrian Henriques

Adrian Henriques is an occasional writer on environmental issues.



Silent Propaganda

FREE TO BE HUMAN

by David Edwards

Green Books, Foxhole, Dartington, Totnes, Devon, TQ9 6EB, UK, 1995, £9.95 (pb) 246pp. ISBN 1 8700 9856 0.

This is the *cri de coeur* of a young man (he was no more than 33 when the book was published) who has suddenly discovered that the world is utterly corrupt, that most of the things he had been taught at school and university, through reading the newspapers, listening to the radio or watching the television, bear little relationship with reality and are little more than government and corporate propaganda.

He is understandably very angry about it and his book is strongly worded as well as being well written and well documented. It serves well its purpose of justifying his anger, as well as the anger it cannot fail to induce in all but his most unfeeling robotic readers. The book is meant to be about freedom. He uses the term in its conventional sense. A society is free to the extent to which it permits an individual "to choose his or her own paths"; one, in other words, that applies no constraints on its members. This is the way most of our social philosophers, including Plato, Hobbes, Rousseau, John Stuart Mill and many others saw it. That is the sort of freedom that the French Revolution sought to create. Such a society, however, can only be totally atomized, one whose members must inevitably suffer from acute social and cultural deprivation. Such a society, as

Robert Nisbet never fails to point out, is incapable of running itself. There is no participatory democracy in an atomized society. For it is only at a local level – that of the family and the community, that people can truly participate in running their own affairs – and in an atomized society, by definition, these key social forms have been annihilated.

Freedom is best seen as de Tocqueville saw it as 'self-determination' – at the level of the community. Democracy he saw as fostering freedom, precisely because it enabled people to participate in municipal government, but both the municipality and the community can only survive if its members display solidarity both towards each other and with the community itself, and hence observe its values, traditions and laws. It follows that the cultural constraints applied by the self-governing community on its members (as opposed to the legal constraints imposed on them by an external agent such as the state or corporation) must be accepted. To accept them is in fact a precondition of democracy.

It is only on this point that I differ from the views expressed by the author and hence on the views of those two remarkable men whose writings are his main source of inspiration, Noam Chomsky and Erich Fromm. How indeed can one question the author's contention that if we are to accept the world our politicians and industrialists are creating for us, we cannot possibly be allowed to understand its true nature. Among other things this means that "the news we see and read, like education at school, must consist of a stream of disconnected and disembodied facts, with no context, no coherent explanation of meaning or significance, no background and no logical framework by means of which they could be understood."

Edwards quotes John Taylor Gatto, a famous American teacher who explains all the different ways in which a student is prevented from understanding anything. Among other things he is told not to care too much about the injustices of the world he lives in and to accept the authority of the experts. They alone are qualified to decide what is good for him to know. As Chomsky puts it, the stupid and ignorant masses "must be kept that way, diverted with emotionally potent over-simplifications, marginalized and isolated."

It is also in the interests of the corporations that, in effect, control government policy, to divert attention from the serious metaphysical and religious issues that have always preoccupied traditional Man. Edwards wisely defines

religion in its widest sense as that which "rejoins the individual with the society, world and cosmos." However, religion has disintegrated into little more than a bipolar relationship between an asocial and an-ecological individual and an asocial and an-ecological God. Rather than making us aware of our duties to our society, the natural world and the cosmos, which traditional religion served to sanctify, it serves above all to provide us with cathartic relief from our alienation.

That we are biologically, socially, psychologically and spiritually integral

That we are biologically, socially, psychologically and spiritually integral parts of the natural world seen as an organization or 'cosmos', is a notion that has hardly been entertained by our scientists and philosophers.

parts of the natural world seen as an organization or 'cosmos', is a notion that has hardly been entertained by our scientists and philosophers. The official thesis is still that of Jacques Monod and Richard Dawkins – "Man must realize", as Monod told us, "that like the gypsy, he lives on the margins of the cosmos – a cosmos that is deaf to his music and indifferent to his aspirations, as it is to his sufferings and to his crimes." If this were true, then how could we avoid Bertrand Russell's nihilistic conclusion (quoted by Edwards) that only "on the foundation of unyielding despair can the soul's habitation henceforth be safely built." A more alienating message is hard to convey, but it has great commercial potential for the atheism that this vision of the world engenders, and, as Edwards writes, it has provided "the ideal religious dogma to fuel the infernal fires of consumerism and rampant industrial progress over the last 150 years" and, not surprisingly, "has been powerfully boosted by the propaganda system."

Our alienation is of course further accentuated by the doctrine of "relativity", which is increasingly in vogue today. This doctrine denies the very existence of truth, which is seen to be purely relative. Alternatively, it is seen as a metaphysical concern and hence an unscientific one: yet another nihilistic doctrine that can do little more than further increase our alienation. Under these conditions, what else can the young do than devote themselves to self-gratifica-

tion, which Edwards sees as "a sort of existential life-jacket". "Beyond the neon-lit room of self-gratification", he writes, "there lies only an abyss of dark despair."

In such conditions all our feelings and emotions can only be channelled into personal relationships – among them, romantic love. Thus Edwards notes that "when we listen to the endless stream of love songs, we hear continuous references to 'eternity, truth, dreaming, searching, the promised land' and so on. This is surely the sound of the search for truth banished to the only permissible realm – the personal." The dictum that "all you need is love" is an "economically correct" fiction, which, as Edwards puts it, "serves to divert genuine concern, genuine searching into a harmless cul-de-sac, while appearing to be a genuine message of hope for humanity."

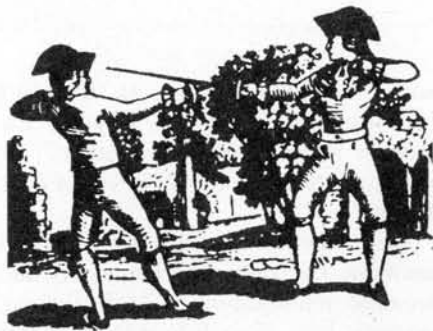
Another apparently harmless cul-de-sac is the sexual revolution. This could not have better suited the requirements of corporations for it has inevitably led to a boom in consumerism. Among other things, corporate advertising has persuaded vast numbers of women that they were unattractive and had to spend increasing amounts of money to make themselves more desirable.

Thus, between 1968 and 1972, the number of diet-related articles in the world's magazines rose by 70 per cent. Massive corporate campaigns were waged to persuade women to devote as much of their spending power as possible to fight fatness, facial flaws and premature signs of ageing. By 1990 the global dieting industry had achieved sales of 32 billion dollars, the cosmetics industry 20 billion dollars and the cosmetic surgery industry 300 million dollars.

By 1985 90 per cent of women regarded themselves as too fat. By 1988, 33 per cent of all American women were strongly dissatisfied with their bodies. With all this has come the present epidemic of anorexia and bulimia, which kills 150,000 women a year in the US and it is getting worse year by year.

Edwards' message is very convincing – it points only too clearly to the necessity of rooting out state and corporate propaganda from the media, from our educational system and from the very world-view with which our youth are imbued. Of course, this would only be possible in a very different sort of society. This, Edwards intimates but does not say. Perhaps we will hear more about it in his next book. This is his first, and a very wise and stimulating one it is too.

Edward Goldsmith



Letter Forum

Not all conservationists are anti-humanist

I read with interest and much sympathy Guha's recent article about the effects of wildlife conservation programmes on local people in the Third World. It is, in my view, an excellent contribution to the quickly growing literature dealing with how traditional conservation programmes contribute towards the "enclosure of the commons". As Indian scholars (for example, Narpat Jodha) demonstrate so well, such enclosures have a particularly devastating impact on poorer rural groups. But, is it not time for the debate about "conservation programmes versus local people" to move on?

One of my concerns is that the article portrays a rather outmoded view of contemporary organizations. If there is one lesson to be learned from an analysis of conservation organizations, it is that (like most others) they are not monolithic actors with single interests. Guha's analysis seems to lump together all people working in conservation organizations under an "anti-humanist" umbrella. In fact, many employees of conservation organizations support the political and economic aspirations of marginalized rural groups as they seek to "reclaim the commons". Organizations, like "communities" can be differentiated along many axes; ideological positions being one. People working in conservation organizations are often part of informal networks and coalitions, with shared policy goals, which cross-cut the formal institutional boundaries. Guha's analysis, while valid on so many points, does great injustice to those who are working extremely hard to transform conservation from within, and work with local communities "from below".

Some brief examples are given here. A recent seminal contribution to WWF's thinking on people and

conservation is contained in the WWF-International Indigenous Peoples and Conservation: WWF Statement of Principles (WWF 1996). It is the first official WWF publication to explicitly endorse and promote indigenous peoples' rights, and is thus a marked departure from earlier conservation policy which failed to address international human rights issues.

Forest conservation policy is another example. The joint WWF and IUCN forest conservation policy states:

"... although IUCN and WWF are principally known as conservation organizations, both are well aware that the needs of the environment cannot be addressed in isolation from human needs. Any forest policy that does not take full account of the needs and desires of local people, including indigenous people, is both unacceptable and ultimately unworkable. The principle of participation of local and indigenous people in forest conservation and management therefore underpins all forest conservation objectives." (WWF & IUCN 1996:32).

Policy development can be a painstaking consensus building exercise between actors within the same organization, and can take months, even years to develop. And, of course, there may be a world of difference between policy intentions and actual implementation. Implementation implies another set of actors who "filter" policies according to their own motives and needs. However, it is largely true that conservationists within international organizations would not dare voice the "fortress mentality" of three decades ago.

On the ground, many conservation organizations are promoting the concept of "community-based-conservation", which according to Murphree (1994:404) is: "by definition, ... of, by, and for the community." CAMPFIRE, a community-based wildlife conservation programme in

Zimbabwe, is often cited as an example. Several projects are developing new forms of participatory protected area management based on local peoples' culture and patterns of resource use, such as the primary environmental care programmes in Indonesia, and wetland conservation in the Uchali Complex in Pakistan. International conservation organizations also support self-mobilized initiatives: giving economic and social support to the Rondonian rubber tappers in Brazil; community conservation in Scotland; community-resource conservation initiatives in the Solomon Islands and Papua New Guinea (to name a few). While there may be various problems to work through on the ground, many of these projects actively support local people against outside commercial (and even state) interests such as loggers or ranchers, helping them defend their rights to the environment.

Although these may be far from mainstream conservation approaches, it is clear that advocates of this approach do have a bureaucratic foothold within such organizations, and work very hard to support local peoples' rights and livelihoods.

In short, there needs to be a more informed view of conservation organizations. As they change, then the meanings we ascribe to them should change also. I am concerned that Guha's article has overlooked some of these creative initiatives, and that by ascribing the meaning of "anti-humanist" to all conservation organizations, his argument may risk being divisive. In moving the debate on, it would be interesting to see more articles reflecting on the opportunities, problems and paradoxes of people-oriented approaches to conservation.

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Guha's diatribe

Ramachandra Guha's recent piece ("The Authoritarian Biologist and the Arrogance of Anti-Humanism", *The Ecologist* January/February 1997) is a not-altogether persuasive blend of politically correct sociological observations with virulent diatribes against the disciplines of biology and ecology. I would like to take the time to unravel these often conflicting strands because I think that many of his assumptions and assertions are spurious and contrived in the interest of argument rather than that of broader ecological comprehension.

Quite clearly it is not necessary to romanticize or embellish indigenous cultures with noble attributes in order to grant them their right to self-determination, cultural continuity and democratically controlled development. No one contests these rights. But the plain hard fact about the laws of nature and ecology is that they apply to rich and poor, powerful and powerless, privileged and oppressed, and that the violation of these laws produces ecological disaster, whether done in the name of social justice and equity, or done in the interests of foreign corporate domination and industrial growth. And today native cultures, modified as they have been by contact with the industrialized world, are often no more or less ethically and ecologically sensitive than any others. For instance, many native American tribes insist on whaling rights even though their tribes now utilize modern technology for the hunts and are fully integrated into a cash economy. In the US, some native American tribal reservations have dived headfirst into the egregious casino gambling inferno; others have welcomed the burial of nuclear reactor waste in exchange for monetary compensation.

While in some cases indigenous peoples have tried to resist the entreaties of industrial development and consumer trappings, they are often unable to. And if such native peoples fall into the industrial model trap, their populations will increase to the point that they will eventually surpass the capacity of their local environment to support their needs, and their activities will become as destructive as ours.

Guha makes a totally specious comparison regarding utilization of species and resources when he states

that Hindus who worship cows do not require others to do so but that "those who cherish the elephant, seal, whale or tiger try to impose a worldwide prohibition on its killing." Needless to say, cows are not an endangered species! While we need not accept what marine mammal and fisheries commissions say about the population size of an endangered species without scrutiny, by the same token we need not accept the unsubstantiated "cultural" opinions of native peoples about the abundance of endangered species they hold sacred as a totem or utilize for subsistence.

In my experience on Long Island, an area reliant on commercial fishing and shell-fishing, I have seen local fishermen on one hand complaining about estuarine pollution and factory fishing causing fisheries depletion (as they have), and then getting up to oppose the imposition of fishing limits, claiming that their own experience and observation "prove" that the depletion is not so bad as to justify such limits. These fishermen need to present their own evidence, not just hearsay or popular culture, to show that fishery limits should not be imposed. When it comes to protection of endangered species and the global commons, there cannot be a double standard regarding scientific evidence. To assume that all indigenous and local cultures have all the correct information all the time, while assuming that ecologists act only in self-interest and do not care about human needs, is a very dangerous and indefensible position.

Incidentally, Guha notes that "tribals and tigers have co-existed for centuries," which may be technically true, and it is a cliché to say that reduced habitat puts pressure on tigers so they become a greater menace. But local communities have always shot tigers and continue to do so but it matters more today because tigers, for whatever reason, are a severely reduced population. To infer that communities should be allowed to shoot tigers now just because they weren't responsible for its decline is precisely the kind of unthinking anti-science reaction that undermines the implementation of land use and settlement planning that could serve human needs as well as those of the tiger. Both the tiger and the community need preservation and protection, not for ecotourism but out of ecological and social justice

exigency.

What is truly amazing in Guha's diatribe is how he blames the conservation biologists rather than the industrial growth society, transnational corporations and compliant Third World governments and élites for the destruction of habitat, species and ecosystems. Moreover, he seems unaware of, or disinterested in, the serious issue of habitat fragmentation, attacking the US belief now taken over by the Third World that wilderness has to be "big, continuous wilderness." Surely he is aware, or should be, of the many biogeography studies that have been conducted that show how fragmentation from suburban development, highways or other factors have reduced the populations of many species. As for human intervention or presence, only a few hard-core groups maintain such a purist stance now because it is both impractical and may not have any ecological justification (though one could certainly justify it in terms of sensitive ecosystems such as tundra, which is threatened in general by global warming).

It is always tempting to set up an extreme example in order to demolish it and promote a personal alternative viewpoint. Guha does precisely this, by inferring throughout that the conservation biology community is uniformly behind the notion of the "punitive guns and guards approach", which he says is "favoured by the majority of wildlife conservationists." I am truly sorry that these are the only ones he has met. Not all revered order systems are appropriate or necessarily ethical – or, more important, ecological. There are many cultural and nature traditions which involve far more intrusion upon Nature than "nature groves". These traditions, insofar as they reinforce both human rights and the rights of non-human Nature, need to be respected and preserved. But they must be judged by the same ethical and ecological criteria that we seek to apply to corporations, developers, hunters, and all the other despoilers.

The only "politically correct" answer we must finally acknowledge, is that which is ecologically consistent.

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Global warming, population and collective amnesia

The Editorial in the January/February 1997 edition of *The Ecologist*, written by David Edwards, was excellent. He illustrated how: "the mass media has, by and large, responded with indifference, scepticism, and a wilful amnesia to warnings about global warming." His reproof gives occasion to note that a similar wilful amnesia affects all environmental organizations, including *The Ecologist*: it takes the form of an unwillingness to face up to the fact that population needs to be a fraction of its current level.

So simple is it to see the truth of this, that the only adequate explanation is wilful amnesia. Here is the arithmetic. In 1990 the average per capita emission of carbon dioxide, worldwide, from burning fossil fuels (and cement production) was 4.21 tons per capita. Just maintaining this level will be difficult, because the undeveloped world is remorselessly increasing its energy consumption – though perhaps not to the extent of increasing its emission levels to those of Europe (10 tons per capita) or the United States (20 tons per capita). If we suppose, hopefully, that the whole world can contain emission levels so as to maintain the 1990 median value of 4.21 tons per capita, world population would need, in order to maintain a safe environment, to be reduced to: 8.9 billion/4.21 tons per capita. Moreover, the numerator, 8.9 billion tons, is based on the more risky end of the range of reductions proposed (for 1990) by the Intergovernmental Panel on Climate Change, as necessary to stabilize the atmospheric concentration of carbon dioxide.

If environmental organizations are willing to publish this letter and provide an editorial response, they will have taken a tiny step in the direction of curing their collective amnesia; but what is really required is that the ecological constraints on population, particularly those which result from the threat of global warming, should become a central theme for environmental organizations.

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NOTE: We will be following through with the previous editors' plans of putting together a special issue on population.

Guha serving the interests of the over-powerful

A reader of Guha's article, "The Authoritarian Biologist" (*The Ecologist* January/February 1997) might be tempted to infer:

- Biologists are the main reason indigenous peoples in remaining wildlands are having hardships

- Conservation biologists ("green missionaries") are "more dangerous ... than their economic or religious counterparts" (including, I suppose, arms dealers, or Hindu fundamentalists willing to nuke Pakistan)

- The current mass extinction is apocalyptic "rhetoric" and is some sort of ploy of privileged biologists to gain more status (as Cassandras perhaps?)

- Conservationists have no place meddling in the affairs of Madagascar and should let it and other cornucopias of biodiversity be exsanguinated by greed and ignorance, be it homespun and/or multinational corporations

- Adding 3 billion people to the planet is of no moment since "the main difference between Verrier Elwin's time (i.e. 30 years ago) and today is the growing influence of wildlifers."

And so on, with his badly misguided diatribe against ecologists who, fundamentally, are merely trying to salvage some of the fabric of life that is being so improvidently shredded. Guha has even gone to the trouble to classify "wildlifers" into five castes who are "united in their hostility" against farmers, herders, and hunters. All very neat and organized, but completely specious. If these wildlifers (led by evil biologists) are so influential, how come the United States spent all of \$50 million for its entire endangered species recovery programme in 1995? That same year one company, Microsoft, earmarked \$200 million to promote one product, Windows 95. (And if Guha knew a shred of history, he'd realize that

farmers, herders and hunters have often been mortal enemies of one another; it's the farmers (US ALL), by feeding the cities and factories, that have helped to obliterate the other life-ways).

America is believed to have lost over 500 species, and has another 5,000 plus at risk. This suggests that our nation's priorities are grossly distorted. Certainly our government and citizens have not adequately heeded the warnings of biologists like Paul Ehrlich and Michael Soule. Am I to believe that other nations like India have gone too far in protecting their natural heritage when most indicators (you know, corals, amphibians, cats etc.) evidence widespread meltdown? Yet Guha rejects the contributions of these men (nay heroes), and instead scorns them as paranoid, wannabe dictators. Meanwhile his neighbours sip tiger penis tea ...

I really do not care if Koreans eat cute little dogs, or if Japanese eat intelligent dolphins – so long as it does not endanger the continuance of that life form (species). To terminate species is not only a violation against that archetype, but also against our future generations, one class of humans Guha seems to forget. Nor did Guha offer a sincere, plausible alternative that might save the tigers from annihilation (tigers are in a very bad way, and Guha's brouhaha almost sounds as if India's proletariat should waste the last tigers just to spite the "ruling élites!?"

It is true that indigenous people are getting stuffed from all sides, but neither are they beyond reproach. For example, when Eskimos use speedboats and rifles to kill walrus just to rip out the ivory tusks to sell for drugs, this is hardly "old ways".) By ignoring technological and cultural changes, and tremendous population pressures, Guha's arguments just struck me as disingenuous. It is his right not to believe, or care about, the reality of the sixth mass extinction (maybe he should form an organization like the Flat Earth Society?) Unfortunately, his cheap shots against ecologists could well stick because it serves the motives of others far more powerful (and who do not give a snort about fourth world people, nor the spectrums of life on their dwindling lands).

Leif Joslyn
E-Mail: ljoslyn@humboldt1.com

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DIARY DATES

1 September 1997: **JURY TRIAL at READING CROWN COURT** of four women of the Greenham Common Women's Peace Camp. **Support** of non-violent men and women would be much appreciated. For further information, write to The Women's Peace Camp, Greenham Common, Berkshire, RG19 6HN, UK or telephone 01635 269 109.

28 September-3 October 1997: **World Futures Studies Federation Conference GLOBAL CONVERSATIONS — WHAT YOU AND I CAN DO FOR FUTURE GENERATIONS**, Brisbane, AUSTRALIA. For more details, contact Sally Brown, Institute of Continuing and TESOL Education, University of Queensland, Brisbane, Queensland 4072, AUSTRALIA. Tel: +61 (7) 3365 6360; Fax +61 (7) 3365 7099; E-mail: <sally.brown@mailbox.uq.edu.au>

30 September-1 October 1997: **FOOD, NUTRITION AND THE PREVENTION OF CANCER**, Royal College of Physicians, 11 St Andrews Place, Regent's Park, London. For further information, contact Bigley Conference Organising Service Ltd, tel: 0171 717 1573; Fax: 0171 717 1574

30 September-2 October 1997: **MAKING THE CONNECTIONS, International Land Regeneration Expo**, Speke Garston, Liverpool, UK. Focussing on the commercial benefits of land regeneration and urban renewal in the North West. For further information, contact Terry Harding, telephone: 01329 280653.

3-5 October 1997: **REFORESTING SCOTLAND ANNUAL GATHERING**, Wiston Lodge, Nr Biggar, Lanarkshire. An opportunity to meet like-minded people, with a mixture of fun, conversation, visits and activities. Contact Sam Murray, tel: 0131 226 2496.

6-10 October 1997: **LANDSCAPE ECOLOGY; THINGS TO DO**. Beurs van Berlage, Amsterdam, THE NETHERLANDS. Contact Ingrid Hoek, Secretariat WLO-25 Congress, Postbus 23, 6700 AA Wageningen, THE NETHERLANDS. Tel: +31 (317) 477986; Fax: +31 (317) 424988; E-Mail: <wlo@ibn.dlo.nl>

8 November 1997: **THE FOOD HEALTH CONNECTION; A DIET FOR OUR CHILDREN'S FUTURE**. Warwick University Art Centre, Coventry. For more information, contact Good Gardeners' Association, Pinetum, Churcham, Glos., GL2 8AD. Tel: 01452 700306; Fax: 01452 750402.

7-8 October 1997: **'GREEN' CONFERENCE WITH A DIFFERENCE**, Burnley, Lancashire. See work in action through linked visits and workshops. For more information, contact Peter Hirst, tel: 01282 439988.

12-15 November 1997: **ECOLOGICAL RESTORATION AND REGIONAL CONSERVATION STRATEGIES**, Ft. Lauderdale, Florida, USA. Contact Society for Ecological Restoration, 1207 Seminole Highway, Madison, WI 53711, USA. Tel: +1 (608) 2629547; Fax: +1 (608) 2658557; E-mail: <ser@vms2.macc.wisc.edu>

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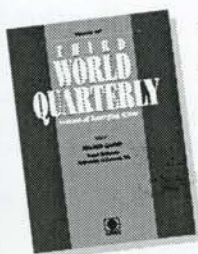
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