

• Dismal Green Economics

• The False Promises of Genetic Engineering

• The International Politics of Breastfeeding

 Australia's Millennial Cargo Cult





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The transnational corporations which are in control of the development of genetic engineering claim that the new biotechnologies are an essential part of the solution to the problems of modern agriculture. In fact they will both add to these problems and create entirely new ones. The international green movement needs rapidly to strengthen its campaigns in this fast-developing area.

Breastfeeding is Politics: The International Baby Milk Campaign 206 Annelies Allain

The International Baby Food Action Network have for 12 years been using boycotts and national and international lobbying techniques to force changes in the marketing practices of the baby milk transnationals. Their experience holds lessons for other campaigners in issues which involve individuals, transnationals, governments and UN agencies.

Technopolis in Australia: The Rise of a Millennial Cargo Cult 214 John Harwood

The Australian government and business élites are promoting the construction of a "multifunction polis" or science city near Adelaide. The Japanese-inspired megaproject is indicative of the Australian faith in imported high-technology as a solution to both economic and ecological problems.

The now much-discussed idea of "environmental security" is based on a fundamentally military concept. While responses to environmental threats are framed in a military manner, and rely upon nation states to carry them out, they will only lead to further global militarization. As military-industrial complexes are a major source of global pollution, they need to be dismantled, not given new reasons to exist.

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Dismal Green Science

For environmental economists, these are boom times. Ever since the Brundtland Report, everybody who is anybody seems to be learning their language. Industry and international agencies are announcing that trees need economic growth to survive and vice versa. Think tanks and consultants are busily "pricing ecosystems" and doing cost-benefit analyses. Publishers' lists are bulging with titles like *The Green Economy* and *Valuing the Environment*. Even some environmentalists, stung by the accusation that they favour "trees over jobs", have offered to sit down with the bad guys who run the world and show them how to rehabilitate themselves by "redirecting the global economy onto a sustainable path".

Probably none of this should come as a surprise. Those who see modern economies as *the* social reality and source of livelihood worldwide are bound to assume that if there is a practicable solution to environmental problems, it must lie largely in economics. For them, the only question is, "What *sort* of economics is necessary?"

The answer increasingly heard among progressive élites in the North is "a pretty radically revised one". The modern economy's tendency to eat away the natural and cultural surroundings which have given it life is finally coming home even to the world's privileged. By prodding the South into economic expansion, the North has stimulated competition for the resources and waste sinks it needs to maintain its own extravagant lifestyles. Modern agriculture is defeating itself by destroying the traditional agriculture it relies on for genetic material. In ripping apart peasant livelihoods to free up labour and resources, economic development has threatened its own foundations by creating a sea of unrest and waste and rendering local care and attention to nature impossible. In the industrialized world, too, as Fred Hirsch points out, the market economy's initial "successes" increasingly appear to be the result of its having stood "on the shoulders of a premarket social ethos" which it is steadily disintegrating.1

The Economy as Parasite

Societies, of course, have evolved many ways of mitigating the economy's corrosive effects. Population growth and the development of an investing and regulating state are only two examples. All too often, however, the general result has been a quickened rhythm of destruction. Like a parasite, the modern economy has hollowed out so much of the innards of its debilitated social host that it is threatening its own future.

Enter environmental economics. Its aim, according to one advocate, is to regulate the economic parasite's metabolism by finding

"... the best estimate we can make of the costs of ... acid rain, global warming, loss of species or whatever is associated with economic activity. Once we have estimated these costs, we can bring them back into the economy in the form of environmental taxes ... that is how I think we can get the world onto an environmentally sustainable path."²

If calculating the "costs" of such large-scale phenomena turns out to be too difficult, an alternative is simply to fix in advance the "... resource flows that are within the renewable biospheric capacities of regeneration and waste absorption... Imposing sustainable biophysical limits as a boundary on the market economy will lead to changes in market prices that reflect these newly imposed limits... These new prices would have 'internalized' the value of sustainability."³

Alternatively, "natural capital" can be regulated so that it does not "decline through time", while a part of it is set aside as "critical", or barred from tradeoffs entirely.⁴

Summarizing Wisdom

At its most ambitious, environmental economics is thus supposed to do for national or global modern societies what culture, conceived more broadly, does for many more traditional local ones: summarize for them the wisdom they need to get through the generations. Instead of the variety of cultural norms and taboos of traditional societies, environmental economics suggests "environmentally correct" market prices. Rather than compelling people to ask permission of local woods and streams for subsistence, it allows the exchange economy free rein until it comes up against its national or global "biophysical limits" or starts dipping too deeply into "natural capital". In place of a conception of livelihood as bound up with social and ritual acts, it proposes instrumental reasoning based on the threat of global holocaust; instead of local-level mutual scrutiny and reciprocity, high-level economic management.

The vital question for this enterprise is: How are these new norms and prices to be determined? Lester R. Brown of the Worldwatch Institute gives the impression that it is no less an authority than Nature Herself who will be contributing such information:

"The world's agenda [under the organizing principle of environmental sustainability] will be more ecological than ideological, dominated less by relationships among nations and more by the relationship between nations and nature."⁵

Since it is presumably not Nature Herself who will be attending G-7 economic summits and whispering in the ears of presidents, however, it is hard to fight down the suspicion that this mystical union will in the end be mediated by the usual fallible individuals in three-piece suits. The limits supposedly set by "nature" to a national or global economy are thus unlikely to turn out to have any more intrinsic weight than, say, the limits set by a peasant leader in a small village in Asia on woodcutting in a local watershed forest.

Indeed the truth is that they will have a good deal less. Whereas traditional village elders have a pretty good idea of what will offend the spirits in their local areas, no one has much of a notion of what "biophysical limits" to an evolving national or global economy might consist of, or what terrifying "tradeoffs" at the local level the pretence of setting such limits could legitimate. ("Optimizing" the scale of species loss, emissions, or human appropriation of the products of photosynthesis within any region will inevitably put disproportionate pressure on its weakest communities to sacrifice their cultural adaptations to so-called "systemic needs".) As modern resource management failures accumulate, the convenient image of nature as a store of capital from which one may withdraw the interest without touching the principal is crumbling. As historian Donald Worster points out, academic ecologists are becoming less and less willing to talk about "maximum sustained yield" or "optimum yield", even on a local level. Relying on such notions as a way of "containing" the global economy looks more and more like a way of authorizing its current destructive course.

Economic Culture

If "nature" can't be said to be capable of setting prices which will ensure a future for the economy, what can? Many environmental economists are looking at currently unmarketed "environmental benefits" as well as people's values and beliefs about the environment and trying to measure them on a monetary scale. Incorporating this procedure into economic planning, they hope, will make the economy "sustainable". This practice, however, exposes an even more fundamental difficulty for environmental economics, one connected with the very idea of translating diverse beliefs and values into prices.

The problem is similar to one described by Orwell in 1984. Suppose someone tried to translate the American Declaration of Independence into Newspeak. Inevitably it would become either a mass of criminal thoughts ("crimethink") or a "panegyric on absolute government". Neither translation, needless to say, would have struck the Declaration's framers as particularly satisfactory.

Economics, happily, has no totalitarian intent. But, like Newspeak or any other language, it has evolved in particular historical circumstances (mainly the last two or three centuries) around a particular set of purposes (providing a rational framework for a capitalist type of social organization). Thus it is hardly surprising that problems arise when economists try to "translate" ideas which have evolved in other historical contexts into the language of prices. Many ecologists, for example, bridle at the translation of their concerns about pollution into demands that polluters pay, since in their terms no payment can be said to be "equivalent" to a change in the course of evolution. Many laypeople, similarly, refuse to say how much compensation they would be willing to accept for hydroelectric dams or polluted air in their region, pointing out that for them the issue is one for political debate, not for market bargaining. The only way of "translating" this refusal into economic language is to say that for these people, conservation has "infinite" monetary value - an interpretation which is satisfactory neither to them nor to the economists.

Environmental economists often seem baffled by this state of affairs. Many of them view all humans as speaking essentially the same language and as constantly comparing alternatives along a single scale. What could be wrong with regarding this scale as one of price? Surely the problem, they insist, is just that economic illiterates fail to understand how well economists have translated their views. One author, for instance, suggests that to refuse to give wilderness a monetary value and yet to recommend that it be preserved rather than developed:

"... is to exhibit confusion and inconsistency. For to recommend preservation is simply to say that it has been in some way compared with development and found to be preferable. Cost-benefit analysis is a way of making the comparison explicit."⁶

The confusion, however, is all on the part of the economist. First, unless there are well-established practices for exchanging or ranking two alternatives, it is difficult to see how even implicit comparisons between them could be made along a single yardstick. Second, even where such a yardstick has evolved, people may not always want it to be used to make decisions. To demand preservation may merely be to value social relations and obey moral imperatives that have developed in historical circumstances distinct from those which have resulted in the modern market. It may even be to reject the notion that a choice between scarce alternatives *should* be involved. It does not follow from the fact that people choose wilderness over development that they have implicitly or explicitly compared the two along a single yardstick any more than it follows from the fact that courts make judgments that they have followed a set formula for doing so. In sum, it seems unlikely that environmental economics will be able to assimilate into prices the rich variety of views it would need to make the economy "sustainable".

A Foothold in the Rough Ground

Many observers would shrug off this conclusion. After all, whatever its limitations, hasn't environmental economics at least offered a rationale for more environmental taxes and better costbenefit analysis? As prominent English green Jonathon Porritt suggests, isn't it good to learn to "measure the value of the natural resource base in the same way as we measure the value of the financial capital base"? After all,

"... when you are talking to the people who are really in the business of destroying the environment, you have to use concepts that will allow them to begin to understand what we're saying."⁷

It's difficult to be sure who this "we" refers to. One thing is certain, though: if people who are trying to protect their rivers against pulp mills in Sumatra or their children's health against toxic waste in California want economic policy-makers to understand what they are saying, the first prerequisite is that their words *not* be replaced by the language of "financial capital". As Mark Sagoff observes, it is only by protesting against such translations that these people can begin to make their views known to those in power.⁸ In the real world, a great many more rivers and forests are saved by those who force economic leaders to learn *their* language than by those who allow their views to be phrased in consultants' cost-benefit terms.

Economic policy-makers are perfectly capable, in any event, of understanding what they are told by chanting demonstrators and irate lobbyists and of making their own translations of what they hear. And if they use the results to formulate just and effective environmental taxes and cost-benefit analyses capable of halting mega-projects, by all means let them get on with it. Those whose interests cannot be fully defended by such measures, however, will have to be pardoned for wanting to keep a foothold in the rough ground which still remains outside the grasp of the industrial economy.

Larry Lohmann

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Spraying cotton in California. The proponents of genetic engineering claim that the new technology will reduce the use of chemicals in agriculture. The billions of dollars the biotech industry is spending on developing crop strains which can resist high dosages of herbicides shows that the opposite is more likely to be the case.

The Flawed "Sustainable" Promise of Genetic Engineering

by Richard Hindmarsh

The use of genetic engineering in agriculture is now on the brink of widespread commercial application. The chemical corporations which control the development of the technology claim that genetic engineering will be a linchpin of sustainable agriculture. In fact, not only will it exacerbate the problems of conventional agriculture, but it will also undermine ecological methods of farming. Furthermore, numerous large-scale releases of genetically engineered organisms risk eroding genetic diversity and distorting natural ecological processes. The green movement should be demanding a halt to the research and development of all ecologically unsustainable aspects of genetic engineering.

Genetic engineering is the most significant modern biotechnology. It emerged in the 1970s, at the same time as in-vitro fertilization (IVF) techniques, and is a radical departure from "classical" biotechnologies such as traditional plant breeding (where genetic modification is done at the level of the organism) and fermentation science. A simple definition of genetic engineering (also known as recombinant- or r-DNA technology) is the scientific manipulation of organisms at the cellular level in order to produce altered, or novel, organisms that carry out "desired" or "programmed" functions, invariably to facilitate industrial production processes. Technically, genetically engineered organisms (GEOs) are organisms whose genetic construct has been altered by the insertion or deletion of small fragments of DNA. In the case of insertion, genetic material may be from a different strain of the same species or from a strain of a foreign species, or be synthetic

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(that is, designer genes engineered in the laboratory). In this way, not only can totally unrelated species share each other's genetic material, but totally novel organisms can be constructed.

In agriculture, genetic engineering is applied to the three major categories of plants, animals and microorganisms (bacteria and viruses). While genetic engineering experimentation that involves animals is highly contentious, the ecological consequences of genetically altering the plant realm are more far-reaching than those of altering animals.

THE TECHNOCENTRIC PROMISES OF GENETIC ENGINEERING

The genetic engineering industry is promoting a technocentric version of sustainable agriculture with increased productivity achieved through improved crop varieties, as well as decreased input costs and declining environmental problems. The proponents of the technology centre their claims on four major promises:

- The capability of herbicide-tolerant (or herbicideresistant) crop research to replace hazardous herbicides with "environmentally-benign" ones;
- The capability of pest-resistance research to reduce agrochemical usage, to counteract the growing resistance in insects to conventional pest-control methods and to offer more precision than broad-spectrum insecticides;
- The capability of nitrogen-fixation crop research to reduce the use of chemical fertilizers;
- The low risk of environmentally adverse consequences from releasing genetically engineered organisms into the open environment.

Herbicide-Tolerance

Highest on the agricultural genetic engineering research and development agenda is the herbicide-tolerant plant variety. It appears that 30-50 per cent of the industry's resources are directed at this product.1 Through herbicide-tolerance R&D, crops can be genetically adapted to so-called "environmentally benign" herbicides. They can also be desensitized to withstand non-selective herbicides, more toxic herbicides and increased dosages of herbicides. Contrary to industry claims, herbicide usage is thus likely to increase. For example, cotton plants genetically desensitized to withstand the contact herbicide bromoxynil will allow much greater amounts of bromoxynil to be applied to cotton fields. Jane Rissler and Margaret Mellon of the US National Wildlife Federation estimate that "if current uses of bromoxynil are maintained, the adoption of bromoxyniltolerant cotton on only half the cotton acreage would more than double the use of bromoxynil in [the USA].2

Proponents argue that bromoxynil is one of an "environmentally-cleaner" group of herbicides that are targeted for priority development. However, there are other R&D programmes and recent data that contradict such claims. For instance in Australia, the Division of Plant Industry of the Commonwealth Scientific and Industrial Research Organization (CSIRO) was recently successful in producing a transgenic tobacco hybrid that survived spraying with dosages of the phenoxy herbicide, 2,4-D, four to eight times the recommended field application.³ Although CSIRO scientists claim that 2,4-D is environmentally benign, numerous concerns have been expressed over its safety.⁴ Moreover, US ecologists have found that crops exposed to just the recommended dosages of 2,4-D became much more susceptible to insect infestation and disease, thus implying an increased need for higher dosages of complementary pesticides like insecticides and fungicides.⁵ Beneficial insects like bees have been found to suffer adversely from 2,4-D usage,⁶ and detectable levels of 2,4-D residues have been found in the tissues of stressed and dying coral colonies.⁷ A developing resistance in weeds to 2,4-D has also been confirmed,⁸ which questions the efficacy of employing scarce public sector resources to develop crops tolerant to the herbicide.

CSIRO researchers have now spliced the gene expressing high 2,4-D tolerance into cotton, which is extremely sensitive to

Worldwide, more than 79 research programmes are developing over 23 herbicide-tolerant crop lines.

this widely used herbicide.⁹ The CSIRO project, which is funded partially by the cotton industry, aims to desensitize cotton to the annual problem of spray-drift from 2,4-D being applied to other crops (2,4-D easily evaporates and can be carried by wind up to 30 kilometers away). Desensitized cotton is advantageous not only to cotton farmers, but also for wheat farmers as restrictions can be eased on using the relatively cheap 2,4-D in proximity to cotton crops. CSIRO scientists have indicated that if the cotton industry wants cotton varieties that can tolerate direct application of 2,4-D in the future, then CSIRO research can cater to that requirement.¹⁰

While CSIRO intends only to develop desensitized cotton, chemical manufacturers could hardly be expected to pass up the commercial opportunity to develop seed which could withstand the direct application of 2,4-D. Indeed, there are indications that by 1985 Dow Chemicals had developed 2,4-D resistant tobacco, and Rhône-Poulenc 2,4-D resistant carrots, and that both corporations were competing, along with Union Carbide, to develop other resistant crops including maize, rice and barley.11 This seems to contradict industry claims that companies will not develop a plant resistant to a herbicide if that herbicide is no longer protected by a patent. As CSIRO scientists state: "The introduction of the gene for 2,4-D monooxygenase into broadleaved crop plants, such as cotton, should eventually allow 2,4-D to be used as an inexpensive post-emergence herbicide on economically important dicot crops",12 such as rice, maize, and most fruit and vegetables. This indicates a wide market for both 2,4-D herbicide-tolerant seed and 2,4-D. The Swiss pharmaceutical conglomerate Schering-Plough already holds a patent in the USA and Europe on the gene that expresses 2,4-D tolerance.13

Chemical companies are moving quickly to develop plants resistant to herbicides still under patent. Rhône-Poulenc, in collaboration with biotech company Calgene USA, has initiated that trend in the USA with bromoxynil-tolerant cotton. In Canada, atrazine-tolerant canola (a high quality rapeseed which is Canada's second most valuable crop and the third highest source of vegetable oil worldwide) is already on the market,¹⁴ even though over 55 species of "weeds" are now resistant to the triazine group of herbicides to which atrazine belongs.¹⁵ A herbicide like atrazine may also lead to an increased sensitivity in maize to Dwarf mosaic virus; as with 2,4-D the symptom worsens with an increase of dosage.¹⁶ Moreover, atrazine breaks down very slowly in the environment and is one of the two pesticides found most frequently in contaminated groundwater in the USA.

Even if herbicide tolerance research were limited to newer supposedly "environmentally-benign" chemicals, this would still pose environmental problems. For example, in 1989, the US Environmental Protection Agency cancelled and restricted various formulations containing bromoxynil on the grounds of potential birth defects in the children of persons handling the products, as well as the induction of carcinogenic effects. Ecologically, it threatens most broadleaf plants as well as vegetation in wildlife habitats adjacent to crop plantations if misapplied, and is also highly toxic to some aquatic species.¹⁷

Sulfonylurea, chlosulfuron and imidazole are also among the newer, low-dose (or more concentrated) herbicides, but there are indications that their persistence in the environment harms subsequent crops. Sulfonylureas are also toxic to plants in minute quantities. While glyphosate, another recent herbicide, degrades quickly in most soil types, it persists in run-off water and can be carried downstream in aquatic ecosystems.¹⁸ Some formulations of glyphosate contain so-called "inert" ingredients that are acutely toxic to some aquatic organisms.¹⁹ Significantly, the full range of ecological impacts of these herbicides is unknown due to limited research and evaluation.²⁰ Even so, plants that resist glyphosate and the sulfonylureas have also been field tested.²¹

The rapid evolution of weeds resistant to some of the newer herbicides makes it unlikely that the older, more toxic herbicides could in fact be easily replaced. It is more probable that the emerging biotech pesticide "package" will be a mix of older and newer herbicides.²² For instance in Australia, ryegrass is already cross-resistant to most sulfonylureas, among other herbicides.²³ At least 100 herbicide-resistant weed species have been identified, and weed populations tolerant to almost every known herbicide have been discovered.²⁴ Such problems illustrate the flawed promise of biotechnology, or what Jane Rissler calls a promise betrayed.²⁵

Further problems may arise with the possible transfer of herbicide tolerance from GEOs to weeds, for example, through hybridization.²⁶ Herbicides considered environmentally "safer" would no longer be effective against weeds that had captured a gene for herbicide-resistance. Consequently, weed populations would increase causing the pesticide treadmill to accelerate.

Worldwide, more than 79 corporate/state research programmes are developing over 23 herbicide-tolerant crop lines, including cotton, maize, corn, potato, rice, sorghum, soybean, wheat, tomato, alfalfa and sugar cane.²⁷ These will further entrench the chemical approach to agriculture, which in turn will further increase soil and water pollution, pest resistance and chemical residues in food. In the process, natural ecological processes will be further distorted and the erosion of biodiversity accelerated.²⁸

The Transgenic Biopesticide

The development of "transgenic biopesticides" brings still further



Electron micrograph of the bacterium Bacillus thuringiensis (Bt). The bacterium is an important insect pathogen causing toxaemia and septicemia in the larvae of butterflies and moths. The gene in Bt which expresses the biotoxin has been spliced into bacteria which colonize plants. The plants are thus made toxic to harmful larvae.

ecological risks. Such biopesticides confer plants with a builtin resistance to insects by transferring a gene that expresses a naturally occurring toxin (a biotoxin) into their cells. This is achieved by genetically splicing the gene into bacteria that commonly colonize the plant. The toxin is then either expressed through the leaves and stems or through the vascular system of the plant, and attacks the intestinal tracts of target insects. It is widely claimed to be harmless to non-target insects, birds and higher animals. The indications are that 20-30 per cent of corporate R&D involving genetic engineering is spent on such products, which are optimistically forecasted to reach the marketplace sometime between 1992 and 1995.

Because this technique does not rely on chemical insecticides, it is claimed that it will be both environmentally clean, and more effective than existing insect control strategies. However, again there are hidden costs.

One problem is that just like chemical pesticides, transgenic biopesticides can be expected to exert strong selection pressure in favour of pests with a resistance to the natural biotoxins that are used. Over 500 species of insects have developed resistance to one or more chemical insecticides; many of these are major pests.²⁹ In the US, despite a tenfold increase in the use of insecticides from 1945 to 1988, annual crop losses to insects rose from 7 to 13 per cent.³⁰ Worldwide that loss is about 15 per cent overall.³¹

Bacillus thuringiensis (Bt) is the primary bacterium being genetically manipulated for the transgenic biopesticide, with an enormous projected market for its insect-resistant crops. Bt is a soil bacterium possessing a gene that produces natural protein insecticides. It has been used restrictively for over 30 years as a commercial biological control agent and is especially important for many organic and other "alternative" farmers. Yet when applied more intensively, as has been done in laboratory experiments, ten insect species developed rapid resistance to Bt strains. Even more significantly, populations of Indianmeal moth and diamondback moth in the field have developed resistance to Bt,32 even as the new Bt-adapted varieties are being field-tested. Unlike the manual application of Bt, where crops are dusted with dormant spores of Bt which then multiply and cover the crops with toxic bacteria, a farmer who cultivates a genetically engineered Bt plant cannot limit the amount of toxin expressed, except by not growing the plant. Insecticide dosages are genetically locked into the plant regardless of the season or levels of infestation.

Where crops are grown in monocultures, crop geneticists estimate that 5-15 years after they introduce a new form of genetic resistance into a crop strain, that resistance collapses in the face of a newly evolved form of disease or pest.³³ As insects develop resistance to a strain of Bt, another strain will be used and then another one and so on — a biological treadmill will parallel the chemical one. Even proponents of genetic engineering believe there is some validity to such claims. CSIRO is currently undertaking research to develop cotton varieties resistant to the *Heliothis* caterpillar using the Monsanto Bt-toxin, and has stated: "Given the chance, the *Heliothis* caterpillar will develop resistance to the Monsanto Bt-toxin, just as it is now doing to the chemical pesticides being used to control it".³⁴

To counteract this eventuality, and to "ensure that the usefulness of the genetically engineered plants remains for many years to come", CSIRO are attempting to produce cotton plants containing multiple biotoxin genes (stacked genes), and argue that there is only a small probability of insects gaining resistance to those genes simultaneously.³⁵ Yet, in the case of synthetic chemicals, "the coexistence of several resistance mechanisms, referred to as multiresistance, has become an increasingly common phenomenon". Seventeen insect species can now resist five classes of chemicals simultaneously.³⁶

Making Bt More Deadly

A strategy proposed to extend the longevity and effectiveness of the biopesticide, is to modify the Bt gene with a range of biotoxin and virus genes from other species. Although numerous Bt strains exist, only a few have been found to be toxic enough to kill insects. This strategy again invites the question of how long it will be before insects gain a resistance to the wider pool of naturally occurring biopesticides.

Widespread insect resistance to biotoxins would not only have repercussions for conventional agriculture, but also would have serious consequences for "alternative" agriculture, undermining its more ecological methods of insect control through appropriate application of biopesticides, companion planting or intercropping, predator traps and so on. Resistance to Bt, "would reduce the efficacy of new resistant crops, and the efficacy of current uses of the toxin, and it could also change the role that the insecticidal protein plays in the natural ecosystem".³⁷

The extensive use of Bt and other biotoxins could also cause a dramatic change in insect population dynamics which would disrupt pollinator and natural plant communities, both locally and regionally. Furthermore, some strains of Bt have been found to be detrimental to beneficial earthworms. Another potential hazard is the transfer of genes that express biotoxins from modified crops to weeds, making the latter less susceptible to their usual herbivores. Mutations could also occur. If Bt mutated, it could switch from attacking caterpillars to attacking beneficial beetles, which act as predators in controlling pests.³⁸

Finally, there is another problem which impinges directly on human health. Naturally occurring toxins can be extremely dangerous and genetically engineering plants for resistance to pests may produce metabolites in food that are more toxic to people than the pesticides being replaced.³⁹ With the accelerating pace of biotechnology development, new gene transfer techniques may allow a more rapid changing of toxin levels, the introduction of totally new toxins, or the creation of a secondary situation that invites the creation of a toxin.⁴⁰

Despite the above concerns, Ecogen, a US agricultural genetic engineering company, has been able to licence rights to certain Bt-derived insecticidal genes to the US seed multinational



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Payment by cheque, postal order or credit card to WEC Books, Worthyvale Manor, Camelford, Cornwall PL32 9TT, UK. Tel. (0840) 212711. Fax. (0840) 212808. Pioneer Hi-Bred. The multinational, which controls around 34 per cent of the US\$1.33 billion seed corn market, plans to use the genes in new corn hybrids.⁴¹

Engineering Nitrogen-Fixation

Much lower on the corporate R&D agenda is the genetic engineering of cereal crops to express nitrogen-fixation. While anticipated profits in this field are enormous, many theoretical research problems exist. As a result, most initial research has been left to public sector researchers — the corporate sector will step in when more substantial progress has been made.

Yet, there are several long-term ecological risks involved in genetically engineering nitrogen-fixation. Nitrogen-fixing bacteria, once only able to infect monocotyledonous plants, could infect species other than cultivated cereal crops, conferring advantage to weeds, for example.⁴² This is important to consider now that Australian researchers have produced a wheat plant that fixes its own nitrogen.⁴³ If more nitrogen is removed from the soil by successive crops through enhanced fixation, soil fertility may decline and require expensive restoration.

More ominous is the development of crops capable of utilizing synthetic fertilizers more effectively, or absorbing greater quantities of synthetic fertilizers. Either development would be highly favoured by the chemical companies as farmers' dependence upon these fertilizers would be increased.

Environmental Releases

The genetic engineering industry has persistently claimed that the risks of releasing genetically engineered organisms are negligible. However, critics fear the possibility of pandemics caused by newly created pathogens, and the triggering of significant ecological imbalances.⁴⁴

The Mismanagement of Genetic Engineering

A number of incidents have been revealed which demonstrate the mismanagement of genetic engineering and biotechnology, and the failure of weak regulatory structures. These include:¹

- In November 1986, the Wistar Institute of Philadelphia, in collaboration with the Pan-American Health Organization, conducted field tests of a genetically engineered viral vaccine on 20 cows in Azul, Argentina without the approval of Argentine or US officials. The viral vaccine was conveyed from the USA to Argentina in a diplomatic bag, thus evading Argentina's import laws. Wistar maintained that it was not legally obliged to disclose anything because Argentina had no law on the subject, and no regulatory mechanism for the field-testing of potentially harmful biotechnology products.
- In May 1987, a researcher at the University of Bayreuth, West Germany, carried out a release of genetically manipulated rhizobia onto a pea field. In order to comply with the national regulations on genetic engineering any experiment involving the release of genetically manipulated organisms had to be approved by the Central Committee for Biological Safety. But, genetically engineered organisms were defined to include only those created *in vitro* using r-DNA techniques. Much to the consternation of critics, the *rhizobium* released did not fall under this rubric and thus did not need official approval.
- In June 1987, a researcher at Montana State University released genetically engineered bacteria on Dutch Elm trees without the approval of EPA or the Department of Agriculture. At the same time, it was also disclosed that the same researcher had also released genetically engineered rhizobia in California, Nebraska and South Dakota during 1983 and 1984. Throughout, he chose to ignore the regulations.
- In 1987, an accidental release of gaseous protein dust from the a factory near Leningrad caused widespread cases of bronchial asthma. The resulting

nationwide environmental protests forced the closure of the Soviet microbiological industry.

- In 1988, over 50 transgenic pigs were taken to an abattoir in South Australia from facilities run by Metrotech, a joint venture between Metro Meats and the University of Adelaide. The transgenic pigs were slaughtered for human consumption. It appears that neither the University's Institutional Biosafety Committee nor the national Genetic Manipulation Advisory Committee were notified. The managing director of Metrotech has asserted that Australia's voluntary code of conduct applied to the university but not to companies.
- In 1990, the US EPA granted Mycogen an experimental use permit for large-scale field testing of a biopesticide containing gene-altered bacteria. Mycogen was able to sidestep the laws because the bacteria were killed before they left the factory (prevailing laws pertain only to *live* releases). Yet, there is still the possibility that live bacteria or viruses in the field can interact with the dead bacteria and so alter live organisms.

What is particularly disturbing about most of the illicit releases which have been revealed is that the authorities learnt of them from the action of concerned individuals, not the regulatory agencies. In this context, Jack Doyle presents a most important question: "If these releases can occur without the government knowing and accounting for them, who's to say what other releases may have already occurred, and what imprudent practices may continue?" According to the newsletter *geneWATCH*, by 1988 there had been almost as many unauthorized as sanctioned releases of GEOs in the USA.

Reference

 This is part of a longer list compiled for Burch et al. Biotechnology Policy and Industry Regulation: Some Ecological, Social and Legal Considerations, Submission to the House of Representatives Standing Committee on Industry, Science and Technology Inquiry into Genetically Modified Organisms, Australia, September 1990.

There are several reasons for this difference in risk perception. Most scientists responsible for low-risk statements are either molecular geneticists, microbiologists or biochemists who specialize in biology at the molecular and cellular levels. Often, they are directly involved with the genetic engineering industry. By way of contrast, many critics are ecologists who specialize in biology at the organism-ecosystem-biosphere levels of interaction, and who are independent of the industry. The real world cannot be simulated in the limited scope of the laboratory and due to a limited understanding of many aspects of genetics, ecosystems and ecological processes, scientists cannot yet predict with any reasonable degree of certainty how altered organisms will "behave" once released. At the same time, new evidence continually surfaces that indicates the dangers of experimenting with GEOs. For example, it was recently reported that from 1000 to 10 million times more viruses occur in unpolluted water than had been expected.45



In both Britain and the US, the public has been unwittingly sold meat and milk from cattle treated with the genetically engineered growth hormone Bovine Somatotrophin (BST). However the EC has now enforced a moratorium on the import or use of BST. The synthetic hormone has been banned in three Scandinavian countries and parts of Canada, and in the US Wisconsin and Minnesota have enacted temporary bans. BST provides a precedent for the banning of other genetically engineered products.

Densities of 250 million viruses per millilitre of water have been found by one group of researchers, who estimated that one-third of the bacteria in the water would suffer a bacteriophage (virus) attack each day. This has important implications for the potential to transfer genetic traits, such as resistance to biotoxins, from waterborne GEOs into the indigenous bacterial population of aquatic ecosystems and elsewhere.

Biotechnologists consistently advocate the *precision* of gene alteration using genetic engineering, claiming that the insertion or deletion of a single gene will result in a specific outcome. Yet a recent article in *Science* reported that a single gene can control two totally unrelated processes.⁴⁶ In this instance, the gene for cytoplasmic male sterility was associated with Southern Corn Leaf Blight disease sensitivity in the 1970 US hybrid corn epidemic. While this eventuality may appear unusual to biotechnologists, it indicates the real need to proceed with extreme caution. Indeed, Bruce Pollock of the Science Mediation Service in Colorado suggests that it "seems to make it impossible to guarantee the safety of biotechnology".⁴⁷

The effect of inserting a single gene into the genome (all the DNA of an organism in a single set of chromosomes) necessarily has an element of uncertainty associated with it because the biological characteristics of the organism are ordinarily determined by the complex interaction of groups of genes which have evolved together.48 The outcome of a single insertion depends both on the function of the inserted gene and on how it interacts with other genes in the genome.49 If, for example, the gene inserted has a control or regulatory function, it may greatly alter the phenotypic expression (such as leaf size or protein production) of other genes. Furthermore, small genetic changes can have large effects especially if the altered gene affects embryonic development.50 Consequently, it is important that the inserted gene adopts the correct pattern of expression during tissue and organ differentiation, but this is difficult to design.51 For instance, transcription errors in producing a protein from a gene may increase in frequency; small changes in the sequence of amino acids can greatly affect a protein's activity,52 and small

changes in the genome may alter its physiological tolerance to environmental factors such as temperature or salinity, thereby increasing or decreasing the organism's geographical range.⁵³

The Example of Exotic Releases

There is little distinction in ecological terms between the release into the environment of a novel organism (for example, an indigenous organism with at least one gene modified or inserted) and an exotic organism (not indigenous in the environment into which it is released or introduced).54 The environmental effects of exotic releases in the past do not augur well for future releases of genetically manipulated organisms. A study of 850 cases of introduced species in North America found that 104 caused the extinction of indigenous species.55 Similarly, 10 per cent of the species investigated in a study of exotic species introduced into the UK had caused significant ecological effects.56 Therefore, even if the level of risk was in the lower region of around one per cent for the release of GEOs - which some genetic engineers claim is quite acceptable - then that could amount to significant ecological damage given that thousands, of "batches" of GEOs are likely to be released over a long period of time.

Ecological damage from the introduction of novel organisms can only be "guesstimated". There is great uncertainty over whether or not a transfer of spliced-in traits, such as resistance to pests, disease, salt or herbicides, will occur between modified organisms and non-target, naturally occurring organisms. Similarly, great uncertainty exists over whether or not a genealtered organism may adapt to conditions outside the laboratory; in particular whether it may be quickly eliminated, cultivated safely, or encounter no natural controls to restrict its proliferation.

In addition, effects may emerge from GEOs that we may not detect for a very long time, or may perhaps go totally undetected. The dispersal of GEOs, especially genetically altered microorganisms, would be very difficult to monitor, and once released they could neither be seen nor retrieved.

The Risks of Field Testing

To overcome such uncertainties, biotechnologists advocate field tests. But field testing is in itself an environmental release. David Pimentel of Cornell University concludes on the basis of previous experience with introduced pests that "once genetically engineered organisms are released into the environment, the odds of ever controlling them is practically nil".⁵⁷

Despite such risks, there have already been some 250-300 known releases (small-scale field tests) conducted internationally.⁵⁸ So far, there do not appear to have been any "escapes" or adverse consequences, yet serious questions are posed concerning the adequacy of post-release monitoring in field-tests. For instance, in the case of tests with gene-altered microorganisms,



A researcher examining crop seeds in the laboratory. Since 1970, TNCs such as ICI and Ciba-Geigy have bought or otherwise acquired control over nearly 1000 once independent seed companies. With genetic engineering, corporations will tighten their stranglehold on the seed market, displacing traditional varieties and making farmers even more reliant on the agrochemicals on which the new seeds depend.

how far down is the soil-profile monitored, and is underlying groundwater tested for contamination? The indications are that current assessment procedures are extremely inadequate — a case in point being the inadequate controls on the testing of recombinant Bovine Growth Hormone (BGH or BST).⁵⁹

Very soon, the odds of adverse consequences from GEOs will be shortened by the introduction of large-scale field tests. After three years of small-scale testing, Calgene USA has recently applied for permits to field test 2.3 million transgenic bromoxynil-tolerant cotton plants on 55 sites in 12 states,⁶⁰ of which 100,000 are also being tested for transgenic insect-resistance.⁶¹

Clearly, the industry's promises that these uses of genetic engineering offer sustainability are either naive and confused, or just "doublespeak" aimed at deceiving the public in the interests of those who stand to profit from the new technologies. Numerous large-scale releases of GEOs risk lessening genetic diversity, distorting natural ecological processes, and, in the longer term, possibly significantly disrupting the biosphere.

AGRIBUSINESS RESTRUCTURING: THE HIDDEN AGENDA

Attracted by the commercial opportunities presented by agricultural biotechnology (which have been variously predicted to be of the value of \$50 billion to \$100 billion by the year 2000), as well as its potential to overcome environmental limits to industrial growth, transnational corporations began to seek control of the development, application and regulation of genetic engineering from the mid-1970s. Since then, there has been a growing concentration of power in the agricultural sector as new "life-sciences" conglomerates have interlocked corporate capital, seed companies, small biotechnology firms, university and other research facilities, and chemical, pharmaceutical and petrochemical TNCs.

For instance in 1989, Hoechst, ICI, Monsanto, Rhône-Poulenc, Sandoz, Unilever, and the Ferruzzi together formed "The SAGB" (Senior Advisory Group Biotechnology). The group aims to influence and control the development and regulation of biotechnology in the Single European Market, which it believes will promote "a supportive climate for biotechnology in Europe".⁶² Subsidiaries of the SAGB also exist worldwide.

The move to control the development of genetic engineering is the most recent and significant stage in a restructuring of agribusiness that began in the 1960s, when petrochemical TNCs began diversifying from bulk chemicals into high value speciality chemicals like pharmaceuticals and pesticides. The integration of the pharmaceutical and pesticide sectors was followed by the integration of the plant breeding sector.⁶³ DNA technology offers the next step for further integration because of its capacity to forge interconnecting links between chemistry, pharmacology, energy, food and agriculture.⁶⁴

In the view of John Hardinger, director of biotechnology at DuPont, "the increasing application of molecular biology techniques is allowing the various segments of the world's largest industrial sector to form logical linkages that were never before practical... To win the game in the end, you have to be able to manage biotechnology."⁶⁵ DuPont now collaborates with Holden's Foundation Seeds to combine DuPont's genetic engineering skills with Holden's classical corn breeding expertise to develop "improved" hybrid corn varieties which can resist disease, insects — and DuPont's herbicides.⁶⁶

Food processing corporations are also using genetic engineering to integrate the food chain from the supermarket *back* to the seed (otherwise known as backward integration). For instance, Nestlé has a joint venture with Calgene USA to develop a new soyabean variety and Campbell Soup has contracted Calgene to develop high-solids tomatoes. Meanwhile Calgene is funding its own research into engineering other traits like herbicide tolerance into the tomato.⁶⁷

Ownership of the Seed

The seed underpins the corporate agenda for genetic engineering — it is the "vector" for biotechnological change. As the

Opposition to the Commercial Agenda

The ecological and social risks presented by genetic engineering have given rise to calls for the strict regulation of the industry in many countries. Environmental groups, however, have come late to the sector, and are opposing corporations whose influence is such that many of their genetic engineering policies are now reflected in national laws and regulations.

The German Green Party has called for a five-year moratorium on the commercial release of genetically engineered organisms. Similarly, the UK Genetics Forum is campaigning for a partial moratorium on releases and a ban on environmentally irresponsible applications of biotechnology. The Genetics Forum is particularly concerned about the secrecy surrounding much genetic engineering R&D, and the lack of public debate on the social, environmental and ethical issues raised by the technology. In the USA, a number of groups have been formed which strongly oppose deliberate releases of GEOs.

The Australian Conservation Foundation has also called for a moratorium, pending the establishment of stringent laws to replace the existing system of voluntary self-regulation and "until a much fuller understanding of our complex and fragile environment is achieved". The ACF's basic criteria for assessment of any release proposal is "the maintenance of sustainability and biodiversity in both agricultural and natural environments". The ACF has already singled out herbicide tolerant plants for an outright ban.

Herbicide tolerance was a major issue at the Second European Network Meeting on Genetic Resources and Biotechnology, held in Barcelona in June 1991. The 70

president of Agrigenetics (a US biotech-seed company purchased in 1985 by chemical giant Lubrizol) observed: "The seedsman, after all, is simply selling DNA. He is annually providing farmers with small packages of genetic information".⁶⁸ Through the seed, chemical conglomerates can thus genetically engineer the seed's DNA to the goals of their own research programmes.

In this way, corporate seed ownership will intensify the dependency of farmers and society on chemical pest-control, create a new corporate dependence of farmers on pest-control agents like the transgenic biopesticide, and increase the competitiveness of the transnationals over the independent seed companies. To consolidate such growth, chemical corporations have spent more than \$10 billion buying up seed companies during the last decade.⁶⁹ Now, an estimated ten TNCs control 50 per cent of the pesticides market and the major part of the international seeds sector, thereby creating a new industrial sector — the genetics supply industry.⁷⁰

The ultimate danger of increased reliance on corporate r-DNA crop regimes is that eventually there will be few alternatives to genetically engineered seed. Farmers who want to use bromoxynil as a cotton herbicide will have to buy a "package" of bromoxynil and bromoxynil-tolerant cotton seeds from Rhône-Poulenc — a major manufacturer of bromoxynil and a leading international seed manufacturer. On the other hand, farmers participants, representing NGOs in 15 countries, agreed to coordinate a campaign against the research and production of herbicide resistant plants in Europe.

A priority for European NGOs at present is the European Commission's proposed directive on the patenting of genetically manipulated lifeforms. The European Parliament will probably vote on the Commission's proposal in the autumn of this year. It was agreed at the Network meeting in Barcelona that NGOs should step up their lobbying for the rejection of the proposed directive.

In the UK, Patent Concern, a coalition of consumer, animal welfare, environmental and Third World groups, have demanded a moratorium on life patenting. A similar coalition in Germany has presented a 30,000 signature petition to the country's Ministry of Justice protesting at the proposed EC directive.

The international green movement is starting to take up the challenge of corporate biotechnology, but most groups are devoting too few resources to mount an effective challenge — the campaigns lack coordination, and broad grassroots support is grossly inadequate. The broader environmental movement needs to become much more involved and offer appropriate resources and support.

Useful Addresses

The Genetics Forum, 3-4 St. Andrew's Hill, London EC4V 5BY. Australian Conservation Foundation, 340 Gore Street, Fitzroy, Melbourne 3065.

Genetic Resources Action International (GRAIN), Apartado 23398, E-08080 Barcelona.

Gen-ethisches Netzwerk eV, Winterfeldtstr. 3, D-1000 Berlin 30. National Wildlife Federation Biotechnology Policy Centre, 1400 16th St., NW, Washington, DC, 20036-2266.

who want to buy open-pollinated seed will find it increasingly hard to do so. Consequently, the current trend of farmers switching to ecological methods of farming, like permaculture, organic and biodynamic farming, could be seriously retarded.

The state has played a vital role in agribusiness restructuring through the introduction of patents. In the USA, there has been an increasing trend towards the privatization of biological material since the Plant Patent Act of 1930, most importantly through the Plant Variety Protection Act (PVPA) of 1970 (a soft patent system), and the ruling in 1985 by the US Board of Patent Appeals and Interferences that plants are patentable subject matter and are protectable under section 101 of the US Patent Code.⁷¹ Following the passage of the PVPA, corporate acquisitions were so extensive that "the American Seed Trade Association [held a] . . . special symposium called 'How to Sell your Seed Company'".⁷² By 1985, more than 1200 seed patents had been issued by the US Office of Plant Variety Protection, half of them to the subsidiaries of only 15 corporations.⁷³

One result of the widespread patenting of seeds has been the increasing marginalization of public and farmer plant breeding programmes. Plant breeding has become increasingly locked into commercial R&D priorities as the herbicide-tolerant plant indicates. Consequently, the development of diverse lines of plant varieties which offer more opportunity for sustainable agriculture are less likely to occur.

Another strategy for corporate control is to diffuse the new biotechnological "package" onto the market through contract farming. In the USA, "roughly 32 per cent of farm sales are concluded under some form of contract or are vertically integrated by business".⁷⁴ The future sustainability of agriculture will be directly affected by this practice, as Jack Doyle of the Washington-based Environmental Policy Institute points out:

"In the future, biotechnology may give food processors and shippers a greater power of specificity in contracting with, or buying from farmers. And for those companies that supply farm inputs, gene-based products — whether in the form of seed, chemicals, or microorganisms — will certainly add a new dimension to their influence over agricultural productivity".⁷⁵

That potential power was recently signalled in Australia with a field test of a genetically engineered potato plant resistant to potato leaf roll virus, carried out by CSIRO in conjunction with the Queensland Department of Primary Industries.⁷⁶ Significantly, Coca Cola Amatil, a major food processor and contractor for potatoes, partly funded the research. Undoubtedly, Coca Cola Amatil would specify that its contract growers purchase the "blue-chip" variety if it is successful.

The value of current annual global markets for synthetic pesticides is \$20 billion,⁷⁷ and for commercial seed about \$25 billion. It has been estimated that by the year 2000 the global commercial seed market will be worth \$28 billion of which there is a \$12 billion opportunity for genetically manipulated plant varieties.⁷⁸ Sales of herbicide-tolerant plants could be close to \$6 billion.⁷⁹ Seeds engineered to tolerate the herbicide Roundup (glyphosate) could increase Monsanto's annual sales of Roundup by some \$150 million, while seeds tolerant to Hoecht's Basta herbicide could increase global sales of Basta by \$200 million.⁸⁰ The annual global sales of transgenic biopesticides have been projected to reach \$6 billion-\$8 billion by the year 2000.⁸¹

Ecocentrist Concerns

Quite clearly, the corporate version of sustainable agriculture is to continue with conventional agriculture and to attempt to use biotechnology to overcome some of its central problems, such as declining productivity, increasing pest resistance, genetic erosion and widespread public opposition to agrochemicals. In other words, biotechnology is being used as a "technological fix" to circumvent these problems without questioning the flawed assumptions which gave rise to the problems in the first place.

From this perspective, genetic engineering is not addressing the central issue in the development of a sustainable agriculture — the need for an ecologically-sound *modus operandi*. In addition, it is clear that the environmental problems which the industry and its proponents claim they can resolve are simply the outcomes of an earlier round of innovations which themselves were technological fixes attempting to overcome ecological limits. The biotechnological approach will simply come to represent, not an ecologically acceptable alternative to conventional agriculture, but a "new" form of conventional agriculture which will add to our environmental problems. In its capacity to expand synthetically the environmental resource base, r-DNA technology also has the capacity to diminish it ecologically.

The Challenge for Environmentalists

In the short term, the new life-sciences conglomerates will reap major rewards, just as their forerunners did through the introduction of industrialized agricultural "packages" throughout the world. Now, a new and very expensive agribusiness package is emerging. It will comprise brand agrochemicals together with herbicide-tolerant and multiple pest-resistant hybrid seed (as well as any other characteristics that the industry can build-in). Through this biotechnological package, and with continued support from the state, TNCs will expand their hegemony in agricultural production and food supply, and thus sustain and expand their control politically, geographically, economically, socially and ecologically.

The challenge for environmentalists is to ensure that only ecologically-sound aspects of the bio-revolution are researched and developed.⁸² Important and urgent challenges include countering the domination of biotechnological policy-making by corporations, raising public awareness about the implications of biotechnology, developing a stronger network internationally to preserve and use open-pollinated plant varieties, and lastly, demanding a strict regulatory regime over genetic engineering that involves effective and mandatory public monitoring at all levels of research and development. The time is already long overdue for the international green movement to understand clearly and to counter effectively the challenge, and the reality, of genetic engineering.

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The breastfeeding poster sponsored by Nestlé on the wall of this Lagos clinic is an example of one of the many subtle but insidious marketing methods now used by the transnational artificial baby milk producers. The distribution of posters is a cheap way for corporations to get their brand names into clinics and hospitals. One of the main corporate responses to the baby milk campaign has been to increase the sophistication of public relations and marketing techniques.

Breastfeeding is Politics: A Personal View of the International Baby Milk Campaign

by Annelies Allain

The International Baby Food Action Network have spent twelve years campaigning against the marketing practices used by the transnational corporations which sell baby milk. The network's loose, non-hierarchical structure has proved a great asset to its work. By sharing information rapidly and by linking people and groups working on similar strategies, IBFAN has enabled the previously powerless to challenge the power of governments and corporations. Their strategy has relied upon consumer boycotts as well as lobbying at the national and international levels. IBFAN's experience holds many lessons for other campaigners on issues involving transnational corporations, governments and UN agencies.

Governmental and economic power are, increasingly, feeling the pinch of the "third system" — peoples' power. It caused a revolution in the Philippines and throughout Eastern Europe; it was brutally suppressed in Tiananmen Square; it is latent or disorganized in some places and operating quietly elsewhere. Although power is concentrated in the state and the marketplace — the "first" and "second"

systems — by organizing, people can claim their share and thus defy existing structures. The on-going struggle around baby foods shows that such challenges are not easy and not short-term. But it also shows that successes can be achieved.

IBFAN, the International Baby Food Action Network, is the oldest of a range

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of single-issue networks which started in the late 1970s. When IBFAN was set up, there was no discussion of any constitution, head office or directorship. Now, 12 years later, there are still no such things. The people who created the network wanted a new kind of citizens' organization, one where each group and each person could do what they were good at and receive help and encouragement from others who shared the same principles. Nobody was forced to do things but all were committed to do the best they could, and through their linkages with others they grew stronger. The network was held together with a shared aim to protect and promote breastfeeding. The opponent was the baby milk industry which tries to do the opposite.

Bottle Feeding Kills

At the time IBFAN was created, no one expected either the controversy or the network to last for very long. The issue was simple: bottle feeding kills babies, therefore companies should stop promoting it. Medical authorities agreed, even politicians agreed. The network was a poor and disparate coalition of activists, each with their own agendas and very different constituencies, their own politics or non-politics. It seemed bound to fall apart. But, before it did disintegrate, it had to convince the transnational milk companies to change their ways. The simple battle became a long war.

Somehow, IBFAN managed to pull through the many fights, stick together and even multiply without changing its structure, without compromising its principles. The relative simplicity of the issue allowed the activists to develop expertise, to become a force to be reckoned with. From six founding members in 1979, IBFAN now has some 148 affiliated groups in 74 countries.

One thing that has become very clear in the course of the struggle is that even such an apparently innocuous matter as breastfeeding is politics. And politics is about power. For the third system to change the way it is treated by governments and business it has to develop power. The power IBFAN has accumulated over the years is to be measured not just in numbers of affiliated groups but in public awareness and pressure. A difficult but constant effort on the part of the whole baby food campaign has been to keep the issue under public scrutiny, to translate the complexities of campaign demands, marketing subtleties and scientific evidence into simple language and to keep the media informed.

Bushfires and Mirrors: The Network Grows

Ninety IBFAN members met in Geneva in 1981 for the network's first Congress. Six regions were established and regional representatives were elected. IBFAN's structure was puzzling to many who came from more bureaucratic and more hierarchical backgrounds and wanted something less jelly-like. The author Andrew Chetley gave an inspiring talk to the Congress about IBFAN being mirrors: now it's there, now it's not, and next, it's multiplied everywhere. The lack of a formalized structure was IBFAN's strength, Chetley said. By having a flexible system and an increasing membership, eventually all baby food manufacturers and government officials would have to look over their shoulders all the time, not sure if they were being watched or not. Ed Baer spoke of the similar effect of a never-ending spread of bushfires. Putting out one would only lead to another bursting into flames on the next hill-top. Industry would be thoroughly confused, obliged to be on guard at all times, and would eventually give up its unethical marketing of baby milks.

Decentralization, democracy and sharing became the basis for IBFAN's expansion. No fees or membership criteria were established, only adherence to agreed principles aimed at better child health. The more active the affiliates were - however they chose to campaign the more involved they would become in the running of the network. There was awareness of the need to build up some of the weaker groups and create new ones, because like a chain or a fishing net, a network is only as strong as the weakest link. Policy would be set by the IBFAN Coordinating Council consisting of regional representatives, staff of the service centres and some founding members or others who could no longer be actively

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The World of Politics, Power and People

A graphical representation of the politics of breastfeeding is given on this page. The mother and child are placed in the centre, together with health workers. Concentric circles around them represent the local, national and international levels. The circles are divided into three segments representing the "three systems" of government, business and people.

At the local level, consumer habits and family and social pressures all influence the mother. The business world directly affects her through hospital practices and advertising. Hospitals usually have longstanding relationships with specialized commercial suppliers and many hospitals (as well as doctors) are of course in the private sector themselves.

Government policies also have their bearing on mothers' choices. The public health system may or may not encourage breastfeeding. Medical school curricula in nearly all countries are totally inadequate for training in the proper management of lactation. There may be restrictions on advertising or other forms of promotion,

or the government may be committed to "free trade" with no binding limits for the commercial sector.

At the national level, company marketing policies, ministry of health directives and the influence (or lack of it) of national IBFAN and mother support groups, as well as academic, church and media opinionmakers all influence the decisions of health workers and mothers. Transnational marketing practices have a direct bearing on the national sphere but, barring effective legal restrictions, the decisions tend to be made in the international sphere at the TNCs' headquarters. Just as national companies or subsidiaries may be grouped into national trade associations, the TNCs also have their international representative associations.

Health workers, consumers, religious congregations, scientists and baby food activists all have their international linking systems. Ideally, the UN system represents "we, the People," but, in practice, power in that sector is exercised by the collective will of national governments, autocratic and democratic alike. And, in terms of the power they wield, some governments are very

Legal controls

The chart is not complete without showing some of the ways in which one sector affects the others. Political contributions or pledges of investment may reduce legislative restrictions on the activities of corporations. Citizens' pressure on government may be lessened by promises of grants or threats of restrictions. In some cases pressure on companies may result in direct or indirect retaliation against the activist leader or even her or his family.

For international networks like



The Third System - People (NGOs)

much more equal than others. Furthermore, international bureaucrats have ways of pre-shaping decisions by governments. For better or worse, the secretariats of the various UN agencies have become actors themselves.

The media fall between the cracks of the systems; sometimes they are only singing the tune of governments or are owned and to some extent governed by a TNC. In other cases, the media are ferociously independent. However, if the advertising department has giant clients to humour, certain activist stories will not get published. IBFAN, it is indispensable to analyze where power lies, to identify allies and build strategies, to seek maximum leverage and to help the like-minded to construct their own political analysis.

While the chart shows three equal segments, this does not mean that influence is equally divided. In terms of power, it would be more correct to imagine a pie-chart where the first and second systems take up most of the pie, leaving only a thin sliver to the third. IBFAN aims at widening that sliver. involved. The Council would try to meet once a year and keep in touch via bimonthly reports to each other. Twelve years later, this is still the basic IBFAN structure.

Many of the most recent IBFAN groups are nursing mothers' groups. Initially they shied away from IBFAN because they were told it was "political", but IBFAN's staying power and its successes have convinced many of these groups that one cannot remain apolitical in the infant feeding debate. Development action groups and consumers' unions have always been staunch supporters of IBFAN. Health associations and women's groups are joining in more and more. In fact, today, IBFAN is almost entirely run by women.

Information is Power

Possibly the single most important activity of the network has been to gather sufficient hard information to make its case. Although millions of babies have died and thousands of medical experts have testified that artificial feeding was the main cause, IBFAN groups have found themselves repeatedly in the position of having to prove that point. Breastmilk had been studied for decades but nearly all the initial research was carried out for the purpose of improving the competing product based on cows' milk. Companies were delighted each time they discovered a new ingredient to create yet another "new and improved formula". Each time the product would be heralded as the closest to mothers' milk or the most nutritionally complete. Each time, the competing companies would shower doctors and hospitals with free samples and supplies. The well-known historian and nutritionist, Maureen Minchin, soberly calls the artificial feeding of infants "the largest uncontrolled in vivo experiment in human history".1

Truly independent research on breastfeeding was rare until about ten years ago. There is no profit in breastmilk, so there is little money to finance largescale, randomly controlled, double-blind, multi-sectoral research that would stand up against nit-picking by company-paid scientists. Now, some headway is being made although it is not easy to separate the good studies from the bad. Covert financing and other ways of subverting or coopting *bona fide* researchers are widespread.²



IBFAN now has 148 affiliated groups in 74 countries. The effectiveness of their campaign has relied on a two-track strategy of individual targeted consumer action and lobbying of national governments and UN agencies.

IBFAN used to antagonize many medical professionals by putting its finger on the unholy alliance between them and the milk companies - a psychological faux pas which was not easy to avoid. Gradually, however, more and more doctors are saying it for us and are rallying to reduce the often dramatic influence companies have over what medical students learn and what graduates practise. IBFAN representatives have more recently been invited to talk about marketing at paediatric conferences. Reactions vary from silent denial to shocked reflection and the determination to do something about commercial interference.

The First Nestlé Boycott

The formation of IBFAN was the result of a growing international awareness of the horrific consequences of the unethical promotion of baby milk. The first Nestlé boycott began in the US in 1977 and soon spread to Canada, New Zealand and Australia. Nestlé, the world's largest food multinational, dominates the infant formula market.

In 1978, Senator Edward Kennedy held hearings in the US Senate on the problems caused by the inappropriate marketing of baby milks in developing countries. One of Kennedy's key recommendations was that the UN system should be used to help solve the dispute over the transnationals' practices. The following year the UN World Health Organization and UNICEF hosted a joint meeting on infant and young child feeding which called for the development of an international code on the marketing of baby milks.

Strategic foresight, a dose of good luck and a lot of hard work kept IBFAN running on two tracks - boycott and marketing code - rather than a single one. Nestlé hoped that once it was widely known that WHO was drawing up a code to regulate its practices, the boycott would peter out. From 1979 on, the company refused to take part in public debates, stating its confidence that a just and unbiased solution to the controversy would be negotiated under WHO/UNICEF guidance. Many people fell for their propaganda; many genuinely wanted to believe that the UN as an honest broker would defend the right and health of babies and persuade or force the companies to abandon the promotion of artificial feeding.

The transnationals tried many ways to silence their critics: expensive mass mailings, a film, initiatives by the industry association, the cultivation of press contacts and even the direct hiring of senior WHO staff were some of the methods used. However, they were shocked to find that WHO and UNICEF had invited boycott organizers as well as other NGOs to the marketing code drafting sessions.3 The corporations tried to exclude the pressure groups and even threatened to leave the code negotiations altogether. But, governments, health experts and some courageous officials within the WHO Secretariat were sufficiently aware of the competence of the third system to resist industry's efforts to discredit it. By over-extensive lobbying, ultimately opposing the code (as "too restrictive, irrelevant, unworkable") and notorious influence-buying, the corporations managed to harm themselves more than their opposition.

The WHO/UNICEF Code

The final version of the WHO/UNICEF 'International Code of Marketing of Breast-milk Substitutes' was approved by the May 1981 World Health Assembly (WHA) by 118 votes to 1. The sole vote against came from the recently-elected Reagan Administration, which was concerned that the Code would have a detrimental effect on US business. More than 40 IBFAN activists attended the 1981 session of the WHA and lobbied hard to isolate the US vote.4 When the voting started, the presence of the third system meant that delegates knew that their governments would be held accountable for the way their votes were cast. Because of IBFAN, the Code, although a compromise, had more "teeth" than any other UN regulatory document.

Meanwhile, hard work was needed to keep up the momentum of the Nestlé boycott. Boycott demands were different from Code provisions. They were wider and easier to understand. They could be written out in a short leaflet for shoppers. And so, in spite of the development of the Code or, rather, parallel to it, boycott organizers demonstrated, distributed leaflets and collected endorsements from other groups, churches and individuals. Boycotting was educational and contagious. It spread to ten other countries.

Victory for the Boycott

Nestlé managers were not pleased. Unfortunately for the corporations, the lone US vote against the Code gave more prominence to the issue, to IBFAN, and to the boycott than they had anticipated in their wildest fears. The boycott became more strident and more targeted (picking on Nestlé's best-selling but easily-replaceable instant coffee, Nescafé). In December 1983, Nestlé decided to negotiate with the people one of their executives had earlier labelled "fanatic activists,"⁵ and two months later a Joint Agreement was signed. The boycott was suspended for six months. In September 1984 it was called off.

The 7-year, 10-country Nestlé boycott ended in what has been called "the most important victory in the history of the international consumer movement".⁶ The giant Nestlé corporation bowed to pressure from the third system. It agreed to:

- Stop advertising in the mass media;
- Remove pictures of mothers and babies from the labels of infant formula;
- Include health hazard warnings on those labels;
- Include all information required by the WHO Code in literature for doctors and mothers;
- Stop personal gifts to health workers;
- And follow WHO/UNICEF recommendations on "free supplies".

The Corporate Response

Nestlé's reaction to the boycott campaign is illustrative of the corporate response to campaigns motivated by social or environmental concerns. In an address to international public relations executives, Raphael Pagan, President of the Nestlé Coordination Centre for Nutrition in Washington, used the "agonizing infant formula controversy" as an example of how to successfully handle "anti-business groups and concerned critics":

"The infant formula dispute — which lasted from 1970 to 1984, and was described by one journalist as the fiercest and most embittered campaign ever waged against a multinational company — was but the cutting edge of what is now an ongoing effort to require multinational corporations to demarket their presence in Third World nations."⁷

In the face of this hostility, Pagan told his audience, companies should unify their strategies and work at two levels:

"One is the lobbying level — direct behind-the-scenes negotiations between companies and governments or UN agencies. The second is the level of public relations orthodoxy that seeks to communicate a decent company image to the general public in order to gain support, or at least consent, for the industry's objectives."

The "techniques" which a company can use to "gain respect for its essential decency, legitimacy and usefulness" rely on proper "crisis management capability" and "early warning system and political threat analysis capability," and, lastly, a type of "independent social audit committee to monitor marketing practices and suggest improvements". The latter, said Pagan, was "a major factor in Nestlé's gaining the trust of its more moderate and constructive critics". A socio-political understanding of the opposition, good PR, some caution and crisis management would enable companies to operate successfully in the Third World, "the market of the future".

The good news from this advice to companies is that activist campaigns and boycotts will make industry sit up and listen. The bad news is that after listening, they will not act to remove the source of the problem. Instead, they will seek to eliminate or contain the problem by making a minimum of changes and strengthening their links with the "government system".

Who Controls WHO?

Although the United Nations officially express the combined will of all governments (rather than *people* as set forth in the UN charter), some of that common will is shifting more and more to take in corporate concerns. In the last 12 years, the shift at the World Health Organization has been very pronounced indeed.

At the October 1979 WHO/UNICEF meeting which led to the development of the International Code of Marketing, people's organizations were invited to the meeting by WHO on an equal footing with governments. These organizations included seven groups who had considerable expertise on the subject but who did not have "official relations" with WHO. Other parties invited to that meeting were experts and the industry in the form of 14 major infant food transnationals. The Statement and Recommendations produced by the meeting represented a fair and unanimous conclusion by all the participants.8 The same parties met several more times (though not all together) to comment on the various drafts of the Code. The final text was not as strong as the IBFAN groups had wanted, yet was much stronger than industry would have preferred. WHO and UNICEF staff, although badgered by both industry and the third system, managed to keep sight of their ultimate goal: better infant health.

Cut out Nescafé



and join the boycott

Baby Milk Action, the UK IBFAN group, achieved a major success in July 1991 when the General Synod of the Church of England voted to back the Nestlé boycott — the first time the Church had ever voted to boycott a commercial product.

Drugs and Money

In 1979, Primary Health Care (PHC) was an important strategy for WHO, and the protection and promotion of breastfeeding (especially through the International Code) were prominent components of the PHC strategy. Ten years later, both the political climate and the WHO Secretariat had undergone tremendous changes. Pressure for WHO to move away from PHC and from imposing any restrictions on corporations built up over the decade. The United States, the agency's largest contributor, objected to WHO policies, notably the Essential Drugs Programme and the baby milk Code, and had been withholding large chunks of its budgetary assessment, thereby financially crippling the agency.

The Programme on Essential Drugs was a priority for WHO's Danish Director-General, Dr Halfdan Mahler. Global surveys demonstrated that up to 2.5 billion people did not have regular access to essential drugs; and that the world was flooded with tens of thousands of inappropriate drugs which were either ineffective, dangerous or too expensive. The pharmaceuticals industry did not mind WHO talking about "essential" drugs but it objected strongly to any reference to "inappropriate" ones. If it persisted in tackling this issue, the industry warned, WHO would be courting political and

financial problems. While all member states can contribute to setting WHO policy, the funds of WHO come predominantly from a limited number of countries: the world's six major drug exporting countries - the US, UK, West Germany, France, Italy and Japan - account for almost 55 per cent of the WHO budget.

Year after year, IBFAN saw how the US State Department despatched delegates to WHO Assemblies and Executive Board sessions where they threatened to vote against any resolution that might worry the big TNCs. Wanting to

maintain "consensus" and remove fears of financial consequences for WHO, Secretariat members and even many delegates were quick to please the US. Japan, the Federal Republic of Germany and a few other conservative governments helped to set a general trend to the right. Leadership and unity of the Third World governments was lacking. Although there were some brave lone voices in the wilderness, the panic of the drug transnationals had its effect on policy. Dr Mahler decided in 1988 not to run for a fourth term of office, and, to everyone's surprise, an ex-research director for pharmaceuticals transnational Hoffmann-La Roche, Dr Hiroshi Nakajima, was elected in his place. The head of the Action Programme on Essential Drugs resigned in protest after the adoption by the 1988 World Health Assembly of an extremely watered-down drug strategy. The main proponents of the baby food Code had gone long before.

Using and Abusing the UN

Several of the pharmaceutical transnationals also produce baby food and must be pleased with the changes at WHO. Back in 1980, the baby food companies hired a former WHO Assistant Director-General, Dr S. Flache, to become the head of ICIFI, the International Council of Infant Food Industries.9 ICIFI immediately put in a bid to become "a nongovernmental organization in official relations" with WHO. There is rarely much debate about such organizations gaining official relations, but, in 1981, the agency's Executive Board decided that ICIFI's application should be "deferred" for a year due to concerns over the council's attitude towards the then draft baby milk Code. There were two more polite "deferrals" in 1982 and 1983 before Dr Flache admitted defeat and resigned from ICIFI. IBFAN, which had provided evidence to the Executive Board about the policies and practices of ICIFI member companies, had won.

The International Organization of Consumers Unions, one of IBFAN's cofounders, obtained "official relations" status with WHO in January 1986. This status gives an organization the automatic right to receive all the public documents produced by WHO, to request meetings with WHO staff and to make statements to the Board or the Assembly if the respective chairpersons agree.

Meanwhile, a new grouping called the Infant Food Manufacturers' Association (IFM) was formed.¹⁰ With the help of another former WHO staff member, IFM gained official relations with WHO in 1987 and proudly issued a newsletter which described "how companies can gain from NGO status".

Although IFM professes to adhere to the aims and principles of the International Code, it refuses to commit itself to the Code's detailed provisions. One of the weaknesses industry managed to slip into the Code's preamble was a mention that "there is a legitimate market for infant formula". This phrase has been taken out of context and exploited to the hilt by IFM. It serves as a main entry point for consultations with WHO.

IFM minutes of one such consultation reveal that WHO staff in charge of the Code and other maternal and child health matters discussed in detail with IFM the relations between IOCU and WHO. The minutes show that a decision was made for WHO "to take a hard line" on IOCU when their NGO status came up for renewal, and to advise the WHO Executive Board to "suggest to IOCU [that they] look for another spokesman".11 Twelve days after this consultation, the WHO Secretariat issued an Executive Board working paper on IOCU relations with WHO. In it, IOCU was praised for its advocacy role, technical expertise and efforts in health education, but the paper also complained about "confrontational attitudes by IOCU, particularly with respect to the International Code". There was also one mention of "counterproductive activities".

Attempts to Discredit IBFAN

Nestlé (the largest company in IFM) made good use of the criticisms of IOCU which IFM had persuaded WHO to make. The corporation used the phrases from the internal working paper a few weeks later in a widely circulated publication aimed at discrediting its critics. Nestlé twisted the facts by writing that the Executive Board was critical, not of IOCU, but of ACTION, the North-American IBFAN office and principal organizer of the new Nestlé boycott (the boycott was restarted in 1988). After the launch of the new boycott in Norway, Nestlé accused the Norwegian breastfeeding mothers' support group and others of choosing "a confrontational line that WHO itself describes as 'counterproductive'". The Executive Board paper was shown to the Norwegian press as "proof" of this. In Switzerland, when a mother called Nestlé with a question about the boycott, she received an extract from the EB working paper as part of the company's reply. The paper was also mentioned in response to questions from the public in Australia. Following a complaint about the public use of internal EB documents, Nestlé was forced to apologize to WHO, but in July 1989 another IFM member used the same restricted document in a letter to a British politician.

It is clear that Nestlé and other IFM members deliberately misrepresented WHO-IOCU relations in a painstaking effort to discredit the wider IBFAN movement and in particular the boycott campaigns. These industry tactics taught us two important lessons: that IFM would not hesitate to use WHO staff to mislead the Executive Board of WHO in order to upset relations between IOCU and WHO; and that Nestlé and the rest of the baby food industry were very worried about the spread of the new boycott and the extent of international support for it.

The Battle Over Free Supplies.

The 1989 IBFAN Forum did not dwell on the petty aspects of "official relations" with WHO or of IFM scheming. Instead it focused on the issue of "supplies" infant formula given free or at low-cost by manufacturers to health care centres, ostensibly for charity. In fact, they are a clever and insidious marketing device, because they encourage routine bottle feeding and "hook" both consumers and hospitals onto the habit of artificial feeding with the donated brands. These "free supplies" are the most important cause of lactation failure today.

When the first Nestlé boycott ended in 1984, a key element in the Joint Agreement signed by Nestlé was that it committed itself to abide by the International Code and any clarification of it, particularly on "supplies", that WHO and UNICEF should issue. Over the next two years, IBFAN organized hundreds of petitions signed by prestigious paediatricians on the issue of supplies and gradually enough pressure was put on WHO and UNICEF for them to call for a Meeting of Experts to determine when free amounts of infant formula were necessary in health care facilities. The report of that meeting was clear: "Maternity wards and hospitals should not be recipients of free or subsidized supplies of breast-milk substitutes." The conclusions of the Expert Meeting were accepted by a 1986 World Health Assembly resolution.12 It states clearly that member states are urged to: "ensure that the small amounts of breastmilk substitutes needed for the minority of infants who require them in maternity wards and hospitals are made available through the normal procurement channels and not through free or subsidized supplies." In other words, the little that is needed should be bought.

Blaming the Victim

Between 1986 and 1988, industry lawyers tried with all their might to discredit the resolution. First they said it was addressed to governments, not to manufacturers; then, that it did not modify the Code; then, that "normal procurement channels" were the existing ones of donated supplies; also, that it was the responsibility of health workers to accept or not to accept "supplies", and, finally, that eliminating supplies would "create more problems than it solves and would be interference in the health policies of sovereign nations".¹³

The last argument in particular turns the entire issue on its head. All member

states of WHO have recommended unanimously that supplies be stopped because they are harmful, yet transnationals say that they cannot stop because they do not want to interfere with any country's sovereignty. It is similar to the argument these companies use when artificial feeding results in malnutrition and death, namely, that the product was overdiluted, bottles were not properly sterilized, instructions were not followed, clean boiled water was not used . . . In other words, they *blame the mothers* who are the victims of their marketing tactics in the first place.

In the face of industry's opposition to ending supplies, the US IBFAN group, ACTION, gave the two worst offenders an ultimatum: set a timetable for stopping supplies or we shall start another boycott. No timetable was given and the new Nestlé boycott was launched in the US and West Germany on World Food Day, 15 October 1988. Actions against Wyeth and Milupa were also started. In a failed lastditch effort to stop the boycotters, the industry persuaded WHO to issue a press release the day before the boycott was due to start, stating that the International Code had not been "modified" by the 1986 Assembly resolution. IFM sent copies of the press release to many of the potential supporters of the boycott.

The second Nestlé boycott is now in effect in a dozen countries and five other companies are targeted for consumer action. Suddenly, in the middle of 1990, Nestlé announced it wanted to halt supplies and asked for a meeting, especially with the US churches. As it turned out, Nestlé only wanted to stop "inappropriate supplies" and only in developing countries. Neither the American nor the Canadian churches would agree to endorse any plan that would not be universal. Luckily they all stuck to the same platform and yet another divide and rule tactic was defeated.

In May 1991, the UNICEF Executive Board passed a resolution calling on all companies to halt supplies by December 1992. The Infant Food Manufacturers' Association later agreed to try to stop supplies in 12 developing countries by December 1991. IBFAN is not convinced that all IFM companies really will stop supplies even in just these 12 countries. It is a piecemeal approach with many conditions attached but at least IFM now recognizes that supplies are a marketing device. For IBFAN, the companies' sudden apparent willingness to act is proof that boycotting works and there are plans to expand the boycott, nationally and internationally, until full compliance is reached.

Implementation of the International Code

To mark this year's tenth anniversary of the Code of Marketing, IBFAN have published an international survey of the implementation of the Code around the world. Information was analyzed from hospitals, clinics, shops, mothers, doctors and nurses in over 80 countries.14 The survey shows that most companies pay lip service to the Code while concocting new methods of avoiding its provisions. Five producers are highlighted as having the worst records; Nestlé, Wyeth, Milupa, Meiji and Hipp. Despite claims to the contrary, none of the companies surveyed were fully complying with the Code. IBFAN also sent questionnaires on the measures taken to implement the provisions of the Code to 164 governments; the results are summarized opposite.

WHO reports have tended to consider any breastfeeding promotion effort as an indication that a country had taken measures to apply the Code. These added up to some very positive conclusions, such as the claim that over 100 countries have given effect to the Code. In reality, only nine countries have implemented all the International Code provisions as national legislation. Many others have been "studying" the Code for years or have only adopted the easier provisions. By keeping track of the records of governments and industry on implementing and complying with the Code, IBFAN has in effect been doing WHO's work.

Lobbying and Learning

Twelve years after its inception, IBFAN is still at loggerheads with the market leader. Links between the first and second systems seem cosier than ever, in the international and many national spheres. And babies are still dying. The UNICEF Deputy Executive Director, Karin Lokhaug, told the 1989 IBFAN Forum:

"Forty thousand young children will die today, just as 40,000 died yesterday and another 40,000 will die tomorrow, and comparable numbers will be disabled for life, the vast majority of them from causes for



State of the International Code of Marketing by country in 1991.

which we have long since discovered low-cost cures and preventions. A significant number of them would not die nor even become sick if their mothers breastfed."

Yet, every day also, somewhere in the world, baby food marketing managers meet with advertising experts and discuss prospective sales, the most appealing labels, the most successful slogans, useful posters (even breastfeeding posters — as long as the company name appears on them) and the best way to maintain and increase brand loyalty, particularly in hospitals. And they will discuss ways to get around the WHO/UNICEF Code provisions and that nasty 1986 World Health Assembly resolution on the ending of supplies.

The effects of 50 years' promotion of bottle feeding cannot be wiped out in five or even ten years and new products and practices appear before there is a chance for legislation. But within the third system a lot more people know how to organize, how to analyze power relations between systems, how marketing works, how much trust to place in the UN system, how much faith to have in documents and declarations and how much in themselves and each other. This article is an edited version of 'IBFAN: On the Cutting Edge', published in *Development Dialogue*, the journal of the Dag Hammarskjöld Foundation (1989:2). It was revised and updated in November-January 1990-91 and was published as an offprint in April 1991. Copies of the offprint may be obtained from: IBFAN Penang, c/o IOCU, PO Box 1045, 10830 Penang, Malaysia; or IBFAN Geneva, c/o GIFA, CP 157, CH-1211 Geneva 19, Switzerland.

The views expressed are the author's and do not necessarily reflect those of IOCU or IBFAN.

Notes and References

- Minchin, M. Breastfeeding Matters, Allen and Unwin, Melbourne, 1985, p.316.
- To make a dent in this trend IBFAN has opened an Independent Research Fund which welcomes donations.
- 3. Throughout this article, I have preferred to use the term "third system" or "people's organizations" rather than the negative "NGO". The advantage of the term "peoples' organizations", in the words of Anwar Fazal, one of the founders of IBFAN, "is that one can call governments NPOs, or non-people's organizations".
- For details of the many dirty tricks used by industry lobbyists at the Assembly see Chetley, A. *The Politics of Baby Foods*, Frances Pinter, London 1986, p.97.
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- See 'Another Development: Perspective for the 'Eighties', Development Dialogue, 1, 1980.
- 9. ICIFI was largely a result of the baby food campaign. The industry's first knee-jerk response to this was to set up a flimsy international body to deflect criticism away from individual companies. It was a kind of buffer group-cum-PR machine that only really served the least progressive and most aggressive companies.
- IFM operates under the umbrella of ISDI (International Society of Dietetics, including all Infant and Young Children Food Industries). ISDI was admitted into "official relations" with WHO in January 1987.
- 11. IFM minutes, 16 December 1988 (88/502), 'Additional points raised at the meeting with Dr Mark Belsey and Mr James Akre on 22 November 1988 in Geneva'.
- 12. The resolution was adopted by consensus. Although the US voted against it in committee, it saw it was isolated and so kept quiet during the final vote, thus avoiding a repetition of the public outcry which followed its vote against the International Code in 1981.
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Technopolis in Australia: The Rise of a Millennial Cargo Cult

by John Harwood

The "multifunction polis," a Japanese-inspired "technopolis" or science city planned for Adelaide, is being promoted by government and business élites as a means of achieving economic growth at no environmental cost. It has become a central symbol of the Australian government's flight from ecological imperatives towards fantasies of salvation through imported high technology.

In February 1987, Japan's Ministry of International Trade and Industry (MITI) presented the Australian Federal government with an 11-page document entitled A Multifunctionpolis Scheme for the 21st Century (Development Plan for an International, Futuristic and Hi-Tech Resort Through Australia-Japan Co-operation).1 This bizarre proposal was, in part, a peace offering, following closely upon rising tensions over trade imbalances and the Australian government's rejection of MITI's "Silver Columbia" scheme - a plan to resettle large numbers of retired Japanese workers in Australia.² Perhaps to MITI's surprise, its nebulous vision of a futuristic city was taken seriously by Senator John Button, Federal Minister for Industry, and by at least one faction within the Department of Industry, Technology and Commerce (DITAC).

The proposal hooked straight into the cargo cult mentality which dominates Australian government and business thinking about the future. Nobody had much idea of what a multi-function polis (MFP) might look like, but it was Japanese, futuristic and high-tech and smelled of the universal panacea of foreign investment. In September 1987, MITI produced a 65-page expanded version: A MultiFunction Polis Scheme for the 21st Century: Basic Concept.³ A few months later, a Joint Steering Committee was formed with seven bankers, bureaucrats and industrialists from each country, and the Australia-Japan Joint Feasibility Study got under way in April 1988.

The "Fifth Sphere"

MITI's basic concept is, in essence, a prospector's claim for cornering the Australian supply of rare earths, rare metals and biotechnological and software innovation - and for building a vast leisure resort tailored to the needs of Japanese corporations. In exchange it offers (unspecified) assistance with developing a high-density city of the future with a population of around 250,000, centred on the information, leisure, health, education and conferencing "industries". Vague promises of technology transfer have provoked a frenzy of anticipation on the Australian side. All of this is presented by MITI as part of an "MFP philosophy" couched in lifestyle jargon which has since become part of the Australian bureaucratic vocabulary. Human history, for example, is divided into five,"spheres", from cave-dwelling through to the future fifth sphere of the MFP, in which "everyday living, recreation and workplace" will be brought together, supposedly for the first time.

The MFP's Australian promoters claimed, in the face of overwhelming evidence to the contrary, that the project would somehow shift the balance of Japanese investment in Australia away from real estate and resource exploitation towards high technology. Yet, even DITAC gloomily conceded, in July 1988, that, "... from the Japanese point of view a major barrier to such collaboration [in high technology] is their perception of Australia as a vast zoo and quarry with little to offer in the way of research and development."⁴

There was, from the beginning, a gross mismatching of expectations. On the Japanese side, it was construction companies who showed the most interest, including the giant Kumagai-Gumi corporation, which had already demonstrated an uncanny ability to secure huge Australian public-works contracts without the inconvenience of tendering for them.5 Kumagai is now said to be liquidating its Australian assets, and is under investigation by Japanese authorities for building code and other violations. Investors in Japan became increasingly alarmed at the renewed wave of anti-Japanese sentiment resulting from the political furore.6

Gavan McCormack, Professor of Japanese history at the Australian National University, highlights the essential irony:

"The Australian side might have seen the Japanese document as an act of interference in Australia, and such a document coming from any other country would certainly have been rejected, most likely with outrage. Instead, Australia drooled over it; Commonwealth, states and private

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Map of the MFP site from a promotional brochure. Typical of the technocratic jargon and concepts used by the MFP's promoters are the "land/humanity", "water/environment" and "monument/technology" "thematic axes" (see right hand side of map). The axes provide "fundamental links with our pre-European past and European Adelaide". The land/humanity axis links the site to the nearby Mount Lofty; the water/environment axis links it to water; the monument/technology axis links it to Port Adelaide. "The monuments of the new settlement" are its buildings.

business joining in unalloyed enthusiasm over the prospect of inducing Japan to make good the proposal which lay at the centre of the document: the MFP. From 1987 the MFP has been the story, not of Japanese plotting for our subversion, but of the Australian effort to secure a unique Japanese expression of commitment to, and involvement in Australia."⁷

Competing for the Prize

Justifiably nervous about the reaction from an Australian public already hostile to escalating Japanese corporate invest-

ment in coastal real estate, the Joint Steering Committee chose to proceed in secret, occasionally issuing vague press statements which served only to fuel mounting public unease. Throughout 1988 and 1989, the states were competing for the "prize" of the multifunction polis, and leaks were plentiful. The MFP became the butt of cartoonists and satirists around the nation. Press coverage was divided between the largely supportive Rupert Murdoch-owned papers (which, apart from an occasional populist gesture, consistently promote economic growth, deregulation, foreign investment and antienvironmentalism as the solution to all

known problems), and the more sceptical Fairfax-owned Age and Sydney Morning Herald.⁸

The MFP made headlines during the March 1990 federal election campaign when the Liberal Party decided to oppose it. Labor Prime Minister Bob Hawke accused the Liberals of pandering to the racist vote. Since then, the MFP's promoters have consistently branded all opposition to the project as racist - a tactic which has proved highly effective in dividing the green movement and the political left. With the debate inextricably entangled in the explosive politics of immigration, multiculturalism and racism, Victoria and New South Wales lodged submissions which said, in effect, "we don't want the MFP, but we'd like some money for urban redevelopment". In June 1990, Queensland's Gold Coast (favoured by the Japanese side) was predictably chosen as the site. However, the state's Labor Premier, Wayne Goss, rejected the offer a week later after strong public protest over compulsory land acquisition, and the prize was awarded to South Australia.

Gillman, a polluted coastal swamp surrounded by hazardous industries, 10km north of Adelaide's city centre, was chosen by the South Australian government as the 3600 hectare site of "MFP-Adelaide". A planned population of 100,000 would live in high-density "villages" built around artificial lakes at a public-sector cost of A\$6 billion, \$4.8 billion of which was to be provided by overseas governments.9 A series of economic analyses commissioned by the Joint Steering Committee showed that the MFP's "hightech industries of the 21st industry" would also require 80 per cent foreign equity.10 According to the South Australian government's promotional brochure, MFP-Adelaide "will epitomize the 5th sphere philosophy".11

This amazing story is not simply another chapter in the annals of urban development: the MFP has become a symbolic focus of the struggle in Australia between environmentalists and the proponents of a growth-driven "recovery" centred on high technology and fuelled by international capital.

Science City or Peasant Economy?

In March 1990, Prime Minister Hawke declared in defence of the MFP project that: "The future of this country depends absolutely on attracting to this country the very best technology we can from overseas, from Japan, from the United States, from Europe."12 Six months later, John Bannon, Premier of South Australia, claimed that South Australians must choose between the MFP (now a South Australian project) and "a peasant economy".13 The MFP had become, for its promoters, the object of a millennial cargo cult centred on high technology; at the other extreme, it was regarded by some Australians as "a Japanese Trojan Horse" - a way of achieving by economic means what the Japanese Army had failed to achieve in World War II.

The MFP as proposed by MITI is simply a variant on the Japanese technopolis or purpose-built science city. The most notorious of these is Tsukuba Science City west of Tokyo, built in the early 1970s, which has the highest suicide rate in Japan and has given its name to a new industrial disease, Tsukuba Syndrome, a mysterious skin rash afflicting residents of the city.14 Sixty-seven variants on the technopolis concept were under construction by the end of 1988. Shinobu Ohe, Professor of Social History at Ibaraki University in Japan, regards the entire programme as a multi-billion dollar failure, haunted by massive cost overruns, squabbles between competing agencies, social disruption and environmental damage.15 As a direct result of one failed technopolis scheme, the Aomori prefecture was forced to accept a nuclear waste dump that nowhere else in the country would have.16

Irrational Megaprojects

In the view of its promoters, the MFP will be a 21st-century sphere exempt from the ravages of global warming, ozone depletion and ecological collapse.17 It has close symbolic links with other megaprojects on the drawing board like the A\$10 billion Very Fast Train (VFT) connecting Sydney, Canberra and Melbourne,18 the Cape York Spaceport,19 and further luxury resort developments along a 2000km stretch of the north-east coast. The MFP, the VFT and the spaceport were conceived during Australia's boom (or bubble) years in the mid-1980s, when the supply of venture capital seemed unlimited. All have been thoroughly discredited on conventional economic grounds alone, quite apart from the social and environmental objections. As Guy Rundle observes:

"What is most amazing about the MFP and the VFT is not that a broad, public opposition to the proposals has arisen, but that these crazy schemes continue to exist at all. Both are so seriously flawed in their conception, so tainted and besmirched by falsehoods, corruption and secrecy, and so riddled with internal contradictions that it is . . . remarkable that they have not collapsed under the weight of their own absurdity."²⁰

Rundle identifies a deeply irrational element at the heart of these projects:

"It is as if the whole of the south-east is being chrome-plated and the Ausecological collapse outside. From one perspective, the implicit analogy is with a computer network, in which human beings become "information" travelling back and forth along the rail and air connections.²²

The MFP has been promoted in precisely this form; Australian television viewers in 1990 were plied with images of a ghostly monorail passing through transparent coloured buildings dotted with artificial trees. Information technology would combine with the environmental management industry to save us from ecological disaster (a claim taken quite seriously by the Murdoch press).²³ Utopian promises on this level are strewn throughout the vast promotional literature.



South Australian Premier, John Bannon, addresses the MFP-Adelaide International Advisory Board. The co-chairmen of the board are the chief executive of the ANZ Banking Group and the chairman of Keidanren, Japan's most influential business group. Bannon has sought to characterize as racist opponents of the MFP who have raised legitimate concerns over Australia's increasing dependence upon foreign capital. Ironically, increasing doubts over the competence of the South Australian government have deterred foreign investors.

tralian continent is rendered increasingly bionic and cybernetic. The forests become decorative gardens [and] real historical communities become development opportunities."²¹

The Information Society

The new millennial cargo cult turns on visions of a future in which a small privileged class inhabits a different "space" from the rest of the population: a network of "intelligent cities" linked to luxury resorts by super-trains and aircraft, a space "above" or "outside" nature, protected by the magic of high technology from the All of this would be merely a colourful manifestation of bureaucratic insanity, if the professed believers did not include some of Australia's most powerful politicians, industrialists and financiers, together with senior public servants, and if the cult of high-tech salvation had not gone virtually unchallenged by the mainstream media — and by the two major political parties, Labor and Liberal.

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has been in government for eight years), has an agenda of social justice, redistribution of wealth and so on. In fact, Australia since 1985 has been dominated by two right-wing parties (dubbed "the Laborials" by Tasmanian Green Independent Dr Bob Brown), both committed to monetarism, privatization, deregulation and unrestrained growth.²⁴ As with other nations that have gone down the Friedmanite road, the last decade has witnessed a massive transfer of wealth from the poor to the rich.²⁵

The disastrous consequences of deregulation, culminating in the worst recession since the 1930s, and coupled with escalating public awareness of impending ecological catastrophe, have created a favourable climate in which fantasies of salvation through high technology can flourish, or at least survive, despite strong public opposition. Some observers justifiably regard the MFP and the VFT as simply larger versions of the real-estate and banking frauds which wiped out over A\$20 billion in shareholders' and taxpayers' funds over the last five years.²⁶ Millenarian fantasy and corporate greed are inextricably entwined in these huge construction projects.

The claim that economic growth can be achieved at no environmental cost through the "knowledge industries" of the future is evidently fallacious. These new industries are by no means the clean, open businesses described in the sales literature. In Japan, as Masayuki Sasaki observes, toxic substances given off by advanced laboratories and experimental factories have caused serious environmental damage:

"The reality of the pollution of the water table by toxic substances such as trichlorethylene . . . has recently been made clear, but it is not easy to control it due to the thick wall of company secrecy. Furthermore, careful attention is needed because of the likelihood of outbreaks of new kinds of pollution associated with practices such as gene splitting in biotechnology."²⁷

Information and Armaments

Much of the information technology research intended for the MFP would in effect be military research, given the close links between the information and the armaments industries. Adelaide is the weapons research capital of Australia; at business forums and private conferences, South Australia's leadership in this field is consistently used to promote the MFP. Seventy per cent of the cost of a guided missile, for example, can be described for accounting purposes as "communications technology", using a system known as dual purpose high technology.

The system is especially useful to Japanese companies engaged in weapons research and manufacturing, given Japan's constitutional prohibition on the manufacture and export of "war materials". According to Japan's Defence Production Committee, "anything can be exported as long as one can find a single civilian use for it as well".²⁸ Thus, "carbon fibres which began as handles for golf clubs possess such strength and lightness that they will come to constitute

Australian political and business leaders are anxious to confirm their membership of the exploiters' club in the Asia-Pacific region.

50 per cent of the construction materials of future [military] aircraft".²⁹ A coating developed for microwave ovens turns out to be a radar-absorbing material of the kind used on the Stealth bomber.

Japanese industries are "in the front rank of research in several areas which have military applications. These include fibre optics and communications, missile tracking systems and heat-resistant materials".30 Among the industries proposed for MFP-Adelaide are fibre optics, communications, signal processing (which includes missile tracking and military surveillance) and materials research. The assertion that MFP industries would be engaged in weapons research was initially dismissed as "rubbish" by a spokesman, but later officially conceded.31 These links are especially significant in view of the Australian government's recent deregulation of armaments exports.32

"Environmental management" is an equally ambiguous enterprise. An "environmental toxicology unit" proposed for MFP-Adelaide was promoted by way of existing research links with Lawrence Livermore National Laboratory in the US. "The overall goal of this unit is to study the effects and define the mechanism(s) of harmful chemical agents in the environment that threaten human health and the ecosystem."33 In view of Lawrence Livermore's extensive involvement in weapons research, this phrasing is susceptible to more than one interpretation.

Corporate Exploitation of the Asia-Pacific Region

Millions of taxpayers' dollars have been spent promoting the image of salvation through 21st century technology developed by multinational corporations. Why these companies should want to rescue Australia is never explained, but a glance at their activities throughout the Pacific region suggests some answers.

Japan now consumes about 90 per cent of world rainforest timber, much of which is used as shoring for huge construction projects. Its multinational logging companies have allied themselves with corrupt local politicians and businessmen to log rainforests in countries such as the Philippines, Malaysia, Indonesia, and Thailand, as well as in Latin America, destroying ecosystems and displacing local people.

The same pattern appears in Tasmania where, as Dr Bob Brown observes, Tasmanians have actually paid logging companies to destroy their forests.34 In northern New South Wales and Queensland, Japanese-financed resort development has played a similar role, rendering Australian workers increasingly dependent on the associated service and shortterm construction industries. By 1990, Japanese investors were reported to own half the property in the central business district of the Queensland city of Surfers Paradise.35 In Cairns, 1600km to the north, Daikyo International alone controls 35 per cent of the accommodation market, and was able to halt a recent Trade Practices Commission enquiry into its activities by threatening to freeze work on its numerous construction projects.36

Australian political and business leaders are anxious to confirm their membership of the exploiters' club in the Asia-Pacific region. The price, ironically, is increased exploitation of Australia's own natural resources. Within weeks of the March 1990 federal election, the Labor government (which was re-elected on green preference votes) shed its green veneer and embraced the development lobby. A promised policy on "sustainable development" has yet to appear; instead we have "resource security" legislation, which effectively surrenders large tracts of wilderness to international logging and mining companies. In Tasmania alone, a further 1.1 million hectares of publiclyowned native forest will be surrendered to logging companies under this legislation.37

Subsidizing Dependence

Shorn of its salvationist rhetoric, the MFP is a vehicle for increasing Australia's dependence on international capital - at the expense of the country's taxpayers. Japanese corporate spokesmen have already demanded large tax concessions, public subsidies and increased access to natural resources in return for their participation. Even the federal Bureau of Industry Economics estimated that the project would require A\$2.6 billion in subsidies from Australian taxpayers, and warned that the country might "simply become an offshore research and innovation station for foreign multinationals".38

Many Australian academics and political activists have been afraid to oppose either the MFP, or the overall havoc wrought by Japanese developers allied with corrupt Australian politicians and businessmen, for fear of being branded racist, a fear which the MFP's promoters have consistently exploited. Nevertheless, the strength of public opposition to the MFP in Australia forced the Federal government to take the unprecedented step of establishing an 'MFP Community Consultation Panel' with a budget of A\$1.5 million, which has already spent nearly a year touring the nation and taking submissions. (Eight environmental groups in Adelaide recently withdrew from the process, condemning it as a farce).

In reality, "Japan, Inc." is simply following the example of the US in the Asia-

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Pacific region (and in Central and South America) — enthusiastically supported by the political and financial élites in the victim countries. Whereas companies like United Fruit in Guatemala depended on US military intervention,³⁹ their more sophisticated Japanese and European counterparts in the Pacific have left the job of subduing the dispossessed to local armies and police forces, thus maintaining their peaceful image.⁴⁰

Flight From Reality

Planning for MFP-Adelaide continues, even though the polluted Gillman site, surrounded by hazardous industries, was condemned as unsuitable for development in a series of earlier reports which the South Australian Premier's Department ineptly tried to suppress, fuelling public concern over environmental damage and threats to the health of existing residents.⁴¹ Even the government has been forced to acknowledge that the area could not withstand the impact of another 100,000 people; the MFP's projected population was halved late in 1990.

The State government initially tried to present MFP-Adelaide as a "genuinely South Australian" venture (despite the fact that their proposal is strewn with phrasing from the original MITI document) while simultaneously branding all opposition as racist. Not content with MITI's word salad, they coined yet more jargon (the coast, for example, became "the water/environment interface"), some of it so grotesque that even supporters were embarrassed.⁴² A \$970 million taxpayer bail-out of the publicly-owned State Bank of South Australia in February 1991 destroyed what was left of the State government's credibility. Ironically, Japanese investors were increasingly deterred by the antics of the Australian promoters. A string of unsuccessful trade missions to Japan and Europe failed to generate any investor commitment to MFP-Adelaide.

Nevertheless, in August 1991, the technopolis project received federal government approval and \$12 million in public funds for further "development studies". At a critical point in the struggle between the Australian environmental movement and a government increasingly dominated by the demands of international capital, it remains a central symbol of the flight from ecological reality.

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The Ahmadi oil field in Kuwait. The devastation caused by the Gulf War focused attention on the consequences of environmental warfare. However the massive pollution caused by the "normal" operations of the military rarely come under public scrutiny.

The Military, the Nation State and the Environment

by Matthias Finger

The world's armed forces — and the industry upon which they depend — are a major cause of environmental degradation across the globe. Yet, the environmental regulations and agreements now being formulated by nation states (or groups of nation states) rarely apply to the military. On the contrary, with the ecological crisis now confronting us increasingly being defined as a "threat to national security", the military is seen by many as part of the solution to the crisis rather than one of its major causes.

Throughout history, the military has viewed the environment as a tool to be used to deny resources to the enemy and as a potent weapon. In recent years, "environmental warfare" (defined by the leading authority on warfare and the environment, Arthur Westing, as "the manipulation of the environment for hostile military purposes"), was carried out extensively by the US forces in Vietnam.¹ Herbicides were widely sprayed to destroy forest cover and enemy food crops, and apparently unsuccessful

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With the development of military technology and the spread of industrial artefacts such as chemical and nuclear plants, oil wells and large dams, the future potential for environmental warfare is vast. Westing speculates that asteroids could be diverted to strike enemy territory; the electrical properties of the ionosphere could be altered so as to disrupt enemy communications; the ozone layer above enemy territory could be destroyed; and wind, cloud and rainfall patterns could be altered.³ Rivers could be diverted to deny the enemy access to essential water supplies, and both oceans and rivers could be poisoned with chemicals or nuclear materials. The acoustic or electromagnetic properties of the oceans could be altered and seismic sea waves could be used to destroy coastal and other near-shore facilities. The experience of the Gulf war shows some of the other possible mechanisms for environmental warfare; it also indicates that where the means for environmental warfare are available, they are likely to be used.

Even in peace time, however, the impact of the military on the environment is considerable.⁴ The direct consumption of oil by the US armed forces is about 3-4 per cent of the country's overall oil demand;⁵ this percentage could easily triple if indirect consumption of oil is considered, for example in weapons' manufacturing. Michael Renner of the Worldwatch Institute estimates that the military sector's share of oil and energy use worldwide is also about 3-4 per cent and double this if indirect use is included. In some sectors the proportion of oil and energy use by the military is much greater; for example, it consumes about 25 per cent of all jet fuel worldwide.⁶

Non-fuel minerals are also heavily consumed by the militaryindustrial complex. Renner gives an estimate for the use of steel and iron — "the backbones of any military machine" — of about 9 per cent of worldwide consumption.⁷ The percentage of military use of other, more strategic minerals is between 5 and 15 per cent, but can rise to up to 40 per cent in the case of certain minerals used in high technology weapons. Renner concludes that, "the worldwide use of aluminium, copper, nickel and platinum for military purposes surpasses the entire Third World's demand for these minerals".⁸

Land and airspace constitute another form of resources in the service of the military. Renner believes that about 0.5-1 per cent of the planet's land mass is used for military bases alone, a percentage which would be increased if the territory occupied by the arms industry is included. This is comparable to the land area of Turkey or Indonesia.9 This proportion increases still further if indirect land use for manoeuvres and flight exercises is taken into account. Twenty per cent of Canada and 25 per cent of West Germany are covered by such military exercises. These activities usually affect remote or uninhabited areas which are often explicitly set aside as natural wildlife reserves. During periods of war or crisis, whole countries potentially become arms training grounds. On the world's oceans, only coastal territorial limits are respected by naval ships and submarines.

that military operations have considerably lower pollution standards than civilian activities, and that pollution from the military is of a qualititatively different nature than that from other sources.

It has been estimated that the operations of the armed forces may account for at least 6-10 per cent of global air pollution and that military-related activities may be responsible for 10-30 per cent of all global environmental degradation.¹¹ Renner states that the "total military-related carbon [dioxide] release in the US could be as high as 10 per cent".¹² Furthermore, the armed forces of the world are the largest producers of hazardous chemical and nuclear wastes.

Within the United States — where the best data are available — "the military is quite likely the largest generator of hazardous waste ... In recent years the Pentagon generated ... more toxics than the top five US chemical companies combined."¹³ "Everything generates waste. The ships, planes, tanks, rocket launchers, barracks, maintenance yards and storage areas generate solid and liquid hazardous waste and, sometimes, radioactive waste ... In addition to the standard array of toxics, there are toxics that are unique to the military, such as propellant packs, explosives shells, explosives, obsolete chemical weapons, infectious waste."¹⁴ Most military bases worldwide are probably heavily contaminated. The US Department of Defence has found almost 15,000 contaminated sites in about 1,600 military bases within the United States alone.¹⁵ It is likely that the pol-



French nuclear test in Polynesia. The International Commission to Investigate the Health and Environmental Consequences of Nuclear Weapons Production have recently released a report which estimates that nuclear weapons testing by the US, USSR, UK, France and China will eventually lead to around 2,000,000 extra cancer deaths. The global radioactive contamination from the tests will last for thousands of years.

Global Military Pollution

In the opinion of Arthur Westing, "because about six per cent of the combined gross national products of the world's nations is devoted to military expenditures . . . roughly six per cent of the world's environmental pollution could be attributed to the military sector of the global economy."¹⁰ However, this is only part of the picture of military pollution; it neglects both the fact lution problems are even worse on the 375 US bases abroad.

In the US, "99 per cent by volume of all high level radioactive waste and 75 per cent of low level radioactive waste... has come from nuclear reactors operated for military purposes, including ship and submarine pollution."¹⁶ The US General Accounting Office admits that information about low level nuclear waste at its military bases is simply unavailable.¹⁷ With regard to both



Billboard at the Savannah River Weapons Plant in South Carolina. The Plant, built by Du Pont and now run by Westinghouse, has produced more than half of the plutonium-239 and most of the tritium used in US nuclear weapons. The huge amount of radioactive and chemical waste stored and dumped at the the site includes up to 35 million gallons of high-level liquid radioactive waste, 16 million cubic feet of low-level solid radioactive waste and hundreds of thousands of cubic feet of transuranic waste (elements heavier than uranium).

nuclear and chemical waste, "the most severely poisoned areas could prove impossible to 'clean up' or otherwise rehabilitate."¹⁸ Military nuclear pollution, of course, stems not only from the waste generated by nuclear reactors, but also from the mining and processing of nuclear materials.

Weapons tests and accidents have been the most significant military source of global radioactive pollution. From 1945 to 1989, more than 1800 nuclear bombs were exploded in over 35 sites. Roughly one-quarter of the tests were conducted in the atmosphere.¹⁹ About one-third of the US underground tests may have leaked radiation; the proportion may be higher for French and Soviet tests. In addition, more than 230 nuclear weapons accidents involving the USA, the USSR and the UK took place between 1950 and 1988.²⁰

The Special Nature of Military Pollution

Perhaps the most important factor differentiating the military from any other polluter is its special relationship with the nation state. The military has historically played a key role in the development of the nation state by securing access to natural resources for national industrial development. According to Westing, "the rise of the State might not have occurred without a combination of natural resources limitations and the acceptance of war as an appropriate means for achieving societal aims."²¹

This relationship allows the military to shroud its polluting activities in secrecy and largely avoid environmental regulation and monitoring by national environmental agencies. Secrecy covers all military and military-related operations. The difficulty in finding relevant data for this article is an example of the privilege of secrecy granted to the military by the nation state.

The United States is one of the rare countries where environmental legislation does apply to military facilities and operations on its territory. In the name of national security, however, US military activities and facilities overseas are exempt from any environmental regulation. Even within the US, "the military establishment has either ignored or obtained exemptions from laws such as the Resource Conservation and Recovery Act and the Clean Water Act that set environmental and public health and safety standards for private industries, individuals and municipalities in the United States."²² Even when environmental laws do apply to the military they often cannot be enforced. As Renner notes:

"The Justice Department has prevented the Environmental Protection Agency from suing other federal agencies, from imposing cleanup orders on them without their consent, or from fining them. And it has gone to court several times to preclude state agencies from fining federal installations. In consequence, EPA has had to settle for negotiating 'voluntary compliance agreements' of doubtful value with the military."²³

Even privately operated defence contractors can receive environmental immunity by obtaining a "national security exemption".²⁴

In times of crisis or war, the few environmental regulations that have gradually come to be applied in limited areas are rapidly waived. During the build-up to the Gulf War, the White House exempted the Pentagon from the legal requirement to carry out environmental assessments of its projects, thus allowing the military to test new weapons and carry out new activities at its bases without the elaborate public review normally required.²⁵ Obviously, such considerations apply to all nation states; the US has simply been chosen because of the availability of information.

Redefining Security not Society

With the end of the Cold War, one might have expected the power of the military to decrease. This has not been the case. On the contrary, both national governments and the military have seized on public concerns over environmental degradation to give the military a new raison d'être, primarily by defining environmental degradation as a threat to national security.

Literature about "environmental" or "ecological" security has proliferated since 1987 when the UN General Assembly first introduced the concept.²⁶ But the phrase can be and has been interpreted in two very different ways. For those in the peace and development movements, the reference point is the individual. Environmental degradation — like unemployment, poverty, racism, authoritarian power structures and the military are all, it is said, threats to the "security" of individuals.

For others, however, security is defined solely with regard to the nation state.²⁷ In the past, the argument goes, states defined their security in military terms. Now, however, states must recognize that they are all dependent upon the biosphere: the term "national security" must be enlarged to include "environmental security". According to Renner:

"National security is a rather meaningless concept if it does not encompass the preservation of livable conditions on the Earth. Indeed, environmental degradation may imperil a nation's most fundamental aspects of security by eroding the natural support systems on which all human activity depends."²⁸

Historically, this approach is inspired by the threat of nuclear war. As Joe Clark, Canadian Secretary of State for External Affairs, stated before the 44th Session of the UN General Assembly:

"The environment is emerging as the most important international challenge of the remainder of this century and the next. In a very few years the environment will be seen as a threat to human existence in the same way as nuclear war has been regarded in the past. It is now a challenge to *national survival*" (emphasis added).²⁹

What has to be managed, according to this approach, is not so much environmental change and degradation, but rather the risks they pose to the nation state system. Threats to environmental security are thus only addressed when they threaten the core of national security. Concrete examples of "international environmental risk management" include the Partial Test Ban Treaty), The Intermediate Nuclear Forces Treaty, the Montreal Protocol on Substances that Deplete the Ozone Layer, and the Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal.

The implicit model behind this approach is military: states collaborate in reaction to threats and combat them in a militarylike manner. The Club of Rome, for example, has proposed the creation of a "UN Ecological Security Council". It is conceivable that such security council would use military force or other coercive means to force recalcitrant states or other bodies to comply with international risk management agreements.

The basic weakness of this model is that it only becomes applicable once the environmental problem in question has

The concept of environmental security assumes that individuals and states are affected by environmental degradation in the same way, which is demonstrably not the case.

become sufficiently urgent to pose a security threat to more than one state. In addition, it assumes that the common security threat can be isolated in time and space, and that identifiable causes for it can be found. As a result, it tends to deal with symptoms, rather than with fundamental causes. The military, the state, science and technology are not considered as part of the problem: on the contrary, they are considered to be effective tools with which to fight the common environmental security threat.

Two Different Types of Security

The term environmental security seeks to overcome the distinc-

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tion between the interests of the individual and the interests of the nation state. Security, for the individual, is a matter of perception; it is subjective but nonetheless absolute at a certain moment of a person's life and in a certain socio-cultural context. The individual can feel more or less secure, and this feeling of security can depend upon family relationships, economic factors and social, cultural and environmental conditions. The extent to which the nation state is responsible for providing the individual with security varies from one country to another. For instance, in socialist countries "job security" is, or at least until recently was, considered a part of the nation state's responsibility towards the individual.

The security of individuals — even when provided by states — is epistemologically different from the security of nation

The WCED largely ignores the military and reduces the nation state to a single actor comparable to individuals, multinationals and NGOs.

states. States derive their security from their perceived relationship with other states; their security is relative not absolute. It is therefore perfectly conceivable to have an absolute increase in the threats to nation states as a whole (for example from global environmental degradation), but if these threats are equally distributed, and do not affect the equilibrium of the nation state system, this absolute increase in threats will not translate into a decrease in national security.

The Ideological Function of "Environmental Security"

Facing a common enemy — earlier this was another nation state, but now, we are told, the common enemy is the degradation of the environment — individuals and states supposedly have common security interests. In Renner's view, "military, economic and ecological developments increasingly seem to dictate a global community of interests."³⁰ And according to Buzan, "the concept of security binds together individuals, states and the international system so closely that it demands to be treated in a holistic perspective."³¹

This identification of the security interests of the individual with those of the state is intellectually flawed when applied to global environmental change and degradation. There are at least three reasons for this:

- It assumes that individuals and states are affected by environmental degradation in the same way, which is demonstrably not the case. It therefore suggests that states and their citizens have the same interests in addressing global environmental change and therefore can and must collaborate in order to do so;
- It is based on the "American model of democracy", where the interest of the majority of the citizens is believed to be reflected by state policy. But other political systems do not conceive democracy as the articulation of individual interests. How do the national security interests

of a military dictatorship, for example, reflect the interests of the country's citizens?

It implicitly assumes that a worldwide coalition of individuals against environmental degradation would be identical with a worldwide coalition of nation states pursuing the same purpose. Again, because of the different ways environmental degradation affects individual security and national security, coalitions of individuals and coalitions of states - at least in environmental matters - are two different things.

The idea of "environmental security" - the general context within which global environmental degradation is currently approached on an international level - blurs this difference of interests, deliberately ignores the different epistemological nature of individual and state security interests, and treats environmental degradation in a conceptual framework of military defence against environmental threats.

Global Environmental Resources Management

Framing environmental politics within the general context of global environmental security implies that environmental politics must be global in nature, which automatically leads to nation states being cast as the major actors in any solution to the global environmental crisis. Just as self-serving to the interests

The Nuclear Test Ban Amendment Conference voting at the UN on the Partial Test Ban Treaty amendment process in January 1991. Only the US and the UK voted against continuing the process. Countries with strong military-industrial complexes are unlikely to agree to environmental treaties which will protect the biosphere at the cost of restricting the activities of the military.



of

the more likely it is that that nation state will act as a protector of its military rather than as a protector of the biosphere. For instance, the United States, with its huge military-industrial complex, has either vetoed or substantially watered down every major international environmental agreement. As Sand reports, "starting with the 1983 Cartagena Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, the US State Department introduced a new variety dispute-settlement clauses in all UNEP conventions that reserve each party's right to block thirdparty adjudication while leaving open an option to waive the veto right upon signing the treaty."33 The main justification cited for this is "national security".

Unless the military and its special relationship to the nation state is explicitly addressed, global environ-

of the state is the new accent on global environmental resource management. For humanity to have a decent future, the argument goes, development must be sustained and for this to be possible the management of resources must become more efficient and be moved to a global level.

This rather idealistic approach is taken by the World Commission on Environment and Development.32 The WCED conceives of global environmental resources management as a collective endeavour within an organizational structure that is probably best qualified as a "super-state", that is as a nation state on a global level. This global state is modelled after the American model of democracy, where every individual and every collective actor is supposed to have the right and the possibility to lobby for his, her or its interests. It is assumed that national governments, NGOs, corporations, scientists and individuals all have a common interest in managing the worldwide pool of resources; and that all their interests can be satisfied by "sustainable development".

There are several problems with this approach, the most important being that the military is largely ignored and the nation state is reduced to a simple actor comparable to individuals, multinationals and NGOs. Indeed it is likely that global environmental resources management as conceived by WCED would only "work" if (1) resources are available to be exploited; (2) nation states are not restricted in their national development; and (3) the militaries of the world are not threatened either as polluters or as consumers of strategic resources. The more important the military-industrial complex is within a country,

mental resources management can only be successful as long as some sort of global economic growth — and therefore profits for all parties — results from it. But, economic growth in its present form is clearly unsustainable.

Environmental Degradation and Militarization

As the responses to the global environmental crisis described above cannot address its root causes, global environmental degradation will progress, and environmental threats to human society will continue to grow. At certain times, nation states are likely to collaborate in order to manage (in a military fashion and with the help of the military, such as at Chernobyl) specific threats as far as they can be addressed with conventional problem-solving approaches using science, technology and "rational management".

According to Thomas Homer-Dixon, international conflicts will become more likely as increased environmental stress and scarcity make states more unstable.³⁴ Other researchers make similar arguments. Janet Welsh Brown of the World Resources Institute believes that the "accelerating deterioration of the resource base, combined with rapid growth of populations that depend more directly than most on natural systems, threatens the economic and political stability of countries vital to US interests."³⁵ Others believe that the creation of "winners and losers", as environmental change and degradation affect the economic and political stability of different nation states to differing degrees, will be likely to lead to conflicts.³⁶

Daniel Deudney, on the other hand, does not believe that environmental change and degradation will cause international conflicts.³⁷ Although he agrees with Homer-Dixon that declining domestic living standards have the potential to lead to international conflict because they alter the relative power of states, Deudney argues that with modern (especially nuclear) weapons a country can be poor and still have a strong military capability. If it is true that the military of each nation state can be maintained at a relatively low cost, then it is highly likely that some sort of balance of power can be maintained despite continuous environmental degradation. In other words, the nation state system can function relatively smoothly without states necessarily perceiving a need to address global environmental change and degradation unless forced to do so by their own citizens. Therefore the present high degree of global militarization can and will be maintained.

Continued militarization will prevent the global environmental crisis from being addressed other than by "international environmental risk management," where the military can appear environmentally "useful". Thus, environmental degradation, whether or not it leads to more conflict between states, will increase the relative importance of the military-industrial complex within each state, which in turn will perpetuate military pollution, which will raise global environmental security concerns and so further strengthen the military.

Global environmental change and degradation can only be effectively addressed if this vicious circle is broken. The military must be addressed as a cause and not a cure of global environmental problems. In the long run, the industrial-military complex must be dismantled. This is a *sine qua non* for effectively dealing with the entire global environmental crisis. If we delay taking action on this, worldwide militarization will progress, thus diminishing our future options for finding a way out of the crisis.

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See No Evil

THE TRUTH ABOUT CHER-

NOBYL, by Grigori Medvedev, I.B. Tauris, 110 Gloucester Avenue, London NW1 8JA, 1991, £14.95 (hb), 252pp. ISBN 1-85043-3313.

Grigori Medvedev, a leading Soviet nuclear physicist, with many years experience in the construction of nuclear power stations — including Chernobyl — has written one of the two most useful books about the Chernobyl disaster. (The other is *The Legacy of Chernobyl* by Zhores Medvedev, see review in *The Ecologist*, Vol. 20, No. 6. The two Medvedevs are not related).

Two days after the reactor exploded, the Soviet authorities commissioned Grigori Medvedev to find out exactly what happened during the accident and why. As part of his investigation, he visited the damaged reactor and interviewed many of the people directly involved in the disaster. What he found so shocked him that he wrote *The Truth about Chernobyl*, a day-by-day account of the tragedy as it unfolded.

The accident happened during a simple, but unauthorized, test of the emergency systems to be used in case of an electrical power failure. If the electrical power suddenly went off, the turbines' rotor blades would continue to turn for a short time because of their kinetic energy. So long as they continued turning, electricity would be generated. For a while, enough power would be supplied to the cooling system of the reactor to prevent it overheating. The fatal test was carried out to measure how long the cooling system would remain effective after a power cut. At the beginning of the test, the operator in the control room reduced the reactor power for safety reasons. But he withdrew all the control rods from the reactor. This was a terrible mistake. The turbines' rotor blades were by then turning too slowly to supply enough power to the cooling system. The temperature of the reactor core shot up so high that it melted and then exploded, blowing the top off the reactor and spewing out chunks of highly radioactive fuel and graphite from the core.

According to Medvedev, the accident was caused by inherent flaws in the design of the reactor. In his words, the design was "a death sentence waiting to be executed". The Ukraine government apparently agrees with Medvedev — the three reactors still operating at Chernobyl will be shut down within the next four years. In other parts of the Soviet Union, other reactors have been and will be closed down due to public pressure.

Nuclear Tan

The immediate effects of the accident were made worse by a shocking lack of even the most basic safety precautions. Incredibly, senior staff at reactor No. 4 simply refused to face the fact that an explosion had released large amounts of radioactivity. Instead, for many hours those in charge continued to insist that the reactor was intact and that there was no abnormal radiation.

A security guard was on duty about 300 metres from the reactor when he heard explosions:

"Just then came the final, most terrible explosion, a thunderclap as loud as the sonic boom of a jet fighter, and a flash of light which cast a glow into the office where he was standing. The walls shook; the window-panes shattered, and some were blown out; the ground quaked beneath his feet. The nuclear reactor had just exploded. A pillar of flame, sparks, and red-hot fragments ... shot up into the night sky. Bits of concrete and metal structures could be seen tumbling in the air, above the flames."

The security guard stayed at his post for seven hours. By that time he had been exposed to a huge dose of radiation.

"No-one came to take over from him, and no-one called to give him instructions. So he locked his office and set off on foot. He already felt sick and was starting to vomit. In the mirror he saw that he had acquired a deep tan overnight, with no exposure to the sun".

Many others acquired a sinister "nuclear tan" from the radiation they received at Chernobyl. The security guard realized that No. 4 reactor had blown up. But the senior engineers in the control room could not bring themselves to admit it.

Ignoring Previous Accidents

Medvedev lays most of the blame for the catastrophe at the door of the politicians and bureaucrats who refused to acknowledge and so learn from earlier Soviet nuclear accidents (Medvedev describes 11 previous accidents). Instruments to measure radiation were not provided in anything like adequate numbers. The official line was that Soviet reactors did not have serious accidents. Senior staff at nuclear plants were inadequately trained in both nuclear engineering and radiological protection. But, worst of all, senior managers, including government ministers, knew very little, if anything, about the sophisticated nuclear technology for which they were responsible.

Medvedev gives a moving description of a visit he made to the graves of 26 firefighters and nuclear operators from Chernobyl who died agonizing deaths from radiation sickness between the 11th and 17th May 1986. Their bodies were so highly radioactive that they were buried in sealed lead coffins.

"I found that rather sad, as it prevented the earth from performing its eternal and necessary function — that of turning the bodies of the dead into dust. Such is the power of the atom! Even death and burial are not the same as for ordinary people. Ancient funerary traditions are thereby broken, and a human burial is rendered impossible."

The Truth about Chernobyl recounts in graphic detail the experiences of these, and other, Chernobyl heroes. The full horror of the nuclear disaster emerges from the stories of these men and women. Medvedev wrote this book so that at least some of the truth about the disaster will be known: about the arrogance and irresponsibility of leading scientists and officials involved in the development, construction and operation of Soviet nuclear power stations; about the prolonged and unwarranted secrecy surrounding the Chernobyl disaster; and about the failure to protect the lives and health of radiation workers and the general population.

If the facts about Chernobyl are known, future nuclear disasters may be prevented. Medvedev accuses the Soviet nuclear establishment of still hiding the truth. But it is not only in the USSR that the truth has been hidden about nuclear accidents. British Prime Minister Harold Macmillan, for example, sought to have destroyed all copies of the report on the fire at the Windscale (now Sellafield) plant in 1956.

Other factors are conspiring to hide the secrets of Chernobyl. For example, computers and software were stolen which contained the health records of 500,000 people from areas around Chernobyl contaminated with radioactivity. The computers were later found — with the data wiped out.

Reactor No. 4 at Chernobyl is not yet at rest. About 180 tonnes of fuel — 95 per cent of that in the reactor at the time of the accident — is still in the ruins of the core. Nuclear fission is still going on in the core which is at a temperature of about 200°C. This heat is causing the sarcophagus built around the damaged reactor to crack. No-one knows whether or not dangerous amounts of radioactivity will escape through the fissures into the environment. The reactor remains "a death sentence waiting to be executed".

The Truth about Chernobyl is a powerful warning of the dangers of nuclear power. It is essential reading for politicians and all decision-makers. Tragically, few will read it.

Frank Barnaby

Frank Barnaby has written and edited many books and articles on nuclear and military issues.

Electrical Triumphalism

QUESTIONS OF POWER: Electricity and Power in Inter-War Britain, by Bill Luckin, Manchester University Press, 1990, £29.95 (hb), 200pp. ISBN 0-7190-3302.

This fascinating book examines in detail

the electrification of Britain and the public opposition to it. Luckin describes the "electric triumphalism" of the inter-War period which pitted the "modernisers" against the "humanists". The activities of the Electrical Association for Women and the Electrical Development Association reveal clearly the tendency for all new technologies to exploit existing ideological categories in support of their cause. The electrifiers viciously attacked coal and gas for being respectively dirty and dangerous and looked forward to a new clean all-electric age.

Gender stereotypes were exploited to promote the spread of electrical appliances amongst "housewives". Appeals to cleanliness, health and vanity combined to promote an electric solution to a changing social and economic climate where the employment of domestic servants was no longer possible for large sections of the urban middle classes. The truly "modern world" was based on a "new woman" who would achieve freedom by using electrical appliances to keep dirt and germs at bay, giving her time to attend to personal hygiene and beauty.

Electric Farming

As well as its uses for industry, "scientific electro-culture" was promoted as heralding the agriculture of tomorrow. The passage of an electric current through the soil would become a "commonplace part of cultivation" producing significant improvements in germination rates and yields. These uses of electricity were also seen as means of speeding up rural electrification which lagged far behind its urban counterpart.

Progress in electrification was much slower than the enthusiasts wanted. They thought that the public were resistant to the new technology because of unfounded myths spread by an irresponsible popular press. One rumour was that high tension electricity cables produced outbreaks of "nerves": a "myth" which has subsequently gathered considerable substance.

The early electricity pioneers displayed a siege mentality similar to that of the nuclear industry. They were convinced that "agents provocateurs" were responsible for public opposition to pylons. The Commission for the Protection of Rural England were described as "a group of well-meaning but wrong-headed protectors of the interests of a privileged elite" determined to deprive the working classes of cheap heat and light. Opposition was generally cast as irrational and reactionary.

Luckin attempts to explain why individuals and pressure groups opposed electrification so intensely through "an analysis of the ideologies underlying environmentalism and preservationism". However his analysis is less successful than his description. This is mainly due to a narrow reliance on the work of four authors and activists including Patrick Abercrombie, the founder of the Town and Country Planning Association. All four were part of a preservationist tendency and there is little description of the broader basis of environmentalism in Britain with its resonances from anarchist and other traditions.

In the final chapter of *Questions of Power*, Luckin compares industry and public attitudes during the development of the national grid with those prevalent at the start of the nuclear age and concludes that there was a substantial continuity between the two periods. However, whilst the importance of amenity issues and the modernizing claims of atomic electricity "too cheap to meter" do provide strands of continuation, there are also significant discontinuities due to the unique hazards of nuclear power.

Questions of Power provides a powerful account of the recurrent themes in the history of environmental struggles. These underpin the importance of questioning grand modernizing visions whether these take the form of electrical, nuclear or any other form of triumphalism.

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From Rondônia to Buckingham Palace

AMAZON WATERSHED: The New Environmental Investigation, by George Monbiot, Michael Joseph, London, 1991, £17.99 (hb), 276pp. ISBN 0-7181-3428-1.

In Amazon Watershed, George Monbiot has succeeded in the difficult task of

Ian Welsh

writing an entertaining and genuinely informative travel book. His travelogue takes us from the land conflicts in the north-east of Brazil, where ranchers and police conspire to push the impoverished poor off their lands, up into the Parima highlands where the same people, desperate for a living, have invaded the lands of the Yanomami Indians to try their hands at gold panning. From there he journeys to the extreme north-west of Brazil to document the serious problems being suffered by the Tukano Indians as a result of the military's disastrous "northern watershed's" project. He tracks timber from illegal logging operations on Indian lands in Rondônia to England and eventually to Buckingham Palace.

Digging to the Roots

What makes Monbiot's books so valuable is that he digs deep down to the social and political roots of environmental problems. Not content with the superficial explanations for deforestation, Monbiot uncovers the violent social conflicts that cause the land hunger and land speculation that are destroying the Amazon. Monbiot also brings us new insights into the process of forest loss in the Amazon. Now that the tax breaks and subsidies for converting land to ranches have been largely withdrawn, the main source of capital for land "development" in the Amazon is logging. Once thought to be a relatively minor threat to Amazonian forests, logging, Monbiot argues, is fast turning into one of the principal forces of destruction.

While he packs in the information, Monbiot also piles on the excitement and "human interest". *Amazon Watershed* sweeps the reader along, at times pausing to reflect on the frailty of the human spirit and the alienation of modern humanity from its environment, and at others causing the reader to gurgle with laughter at Monbiot's escapades.

Monbiot is already well known for his previous travel book *Poisoned Arrows*, in which he recounted his investigation of Indonesia's Transmigration Programme; a task he undertook after reading *The Ecologist*'s special issue on the theme (Vol. 16, No. 2/3, 1986). Amazon Watershed shares the verve and colour of his previous book, but is undoubtedly a more mature and reflective work, aimed less to shock and more to engage the sympathy of the reader. Yet this is also a didactic book, with some later chapters being based more on reading than travel, and Monbiot does not hesitate to express his opinions on the causes and possible solutions to the forest crisis.

Locating the root causes of deforestation in the Amazon in the inequities between rich and poor within Brazil and in the domination Western economies exercise over the Third World, the real solutions Monbiot proposes are political and macro-economic. Land reform, secure indigenous tenure, agroforestry and strict controls over logging are crucial steps to saving the forests, but none of these is likely to be achieved in the present political framework. Monbiot, however, is no revolutionary. He sees social transformation as being achieved ratchet-like, by the many small and local struggles for control of land and resources that are being played out all over the Amazon.

This is a timely book, much needed in the last few months before the "Earth Summit" in Rio de Janeiro where platitudinous expressions of environmental concern by the world's leaders will provide little more political depth than that we all have "a common future". Monbiot shows how inequity lies at the root of the Amazonian crisis and that the environmental problems are really expressions of social injustice.

Marcus Colchester

Marcus Colchester is an Associate Editor of The Ecologist. He works for the World Rainforest Movement.

Why Aid Does Not Reach the Poor

WHEN AID IS NO HELP: How Projects Fail and How They Could Succeed, by John Madeley, Intermediate Technology Publications, 103-105 Southampton Row, London WC1B 4HH, 1991, £8.95 (pb), 132pp. ISBN 1-85339-077-1.

This concise and powerful critique deserves to be considered by development professionals and lay persons alike. Madeley, editor of the excellent bimonthly *International Agricultural Development*, looks at aid which is aimed at the poorest citizens of the developing world. The book is divided into four categories: the problem; some official aid failures; lessons to be learnt; and a conclusion which includes "twelve guidelines for reaching the poorest".

The problem is encapsulated in Madeley's experience in Mali in 1985, at the site of a scheme funded jointly by the French and Dutch governments, the World Bank, and the International Fund for Agricultural Development (IFAD). Fifteen to twenty per cent of the villages in the target area of this US\$84 million Mali Sud rural development project did not qualify for assistance. Being the most destitute portion of the population, they lacked not only material assets (necessary as loan collateral) but also, significantly, "social cohesion". Only the wealthiest villages had Village Associations and so qualified for the credit available. This problem appears to be pervasive as aid agencies are reluctant to share wealth with those who do not promise (at least in theory) a return on investment. Here and elsewhere Madeley points out that where organized social structures are depleted, an important role of NGOs should be to train groups to meet basic criteria, rather than to exclude them outright.

The planners of the Mali Sud project decided that the local farmers should grow maize. But maize requires large amounts of water: in Mali the rainfall is erratic and there is virtually no irrigation. "Encouraging some of the world's poorest farmers to grow maize without irrigation is taking a huge gamble with their lives, about which agricultural experts might have been expected to be aware."

Madeley also looks at the Indian government's ten-year-old Integrated Rural Development Program, which is intended to provide loans and subsidies to families living below the poverty line. The project is designed to make candidates "productive" and "income generating". Yet, the lion's share of the cash never arrives anywhere near the poorest families, making a mockery of the whole scheme.

Making the right noises about poverty elimination does little to make crucial structural changes. Land reform, for example, receives little political support in India or elsewhere. "While structural changes are needed in India if the poor are to benefit from development, a higher volume of aid if properly directed in small amounts to community-based schemes where there is substantial local participation, could make a significant contribution to improved livelihoods." Unfortunately, Madeley does not deal fully with the substantial problems of large bureaucracies allotting multitudes of small flexible assistance packages.

As a "lesson to be learnt" Madeley champions, among others, the Grameen Bank in Bangladesh. Partly funded by IFAD, the Grameen Bank's origins date back to a 1975 survey of "how poor women lead their lives". The survey team started the bank in an attempt to make small amounts of capital directly available to the poor, in order for them to enjoy the fruits of their own labour. "The bank has broken all of the hallowed rules of conventional banking, and lends only to landless people, aiming to end their exploitation by moneylenders, and to bring the disadvantaged into a structure they can understand and operate." The bank goes to the villages and deals comfortably with illiterate residents. Borrowers have no collateral but 98 per cent of loans had been repaid by June 1988. Yunus, the director of the project, reckons that "if the poor can organize themselves, then no political party can ignore them." Another impressive effort is the ILO's Revolving Fund in the Sudan, set up to help Ethiopian Refugees, which also gives loans to the poor, illiterate and landless.

Madeley contends that the presence of NGOs in the field helps by "giving official aid a lift." He thinks that NGOs can be particularly useful in influencing government policy if allowed in at the imperative design stage. They can help the poor to organize themselves and can pioneer imaginative responses to the dilemma of how to make development assistance work. However, Madeley skims over the difficulties which NGOs have in collaborating with official bodies; the NGO ethos and the way it is expressed in their work is often fundamentally opposed to official beliefs and practices.

The 12 guidelines for reaching the poorest with which Madeley concludes imply investing the poorest with trust and dignity and enhancing their traditional capacity for self-reliant invention. "The how of reaching the poorest is becoming clearer. There is no reason why the task should be delayed."

Sam Connor

Sam Connor worked for several years at an appropriate technology centre in Togo, West Africa.

BOOKS DIGEST

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

 THE EARTHSCAN ACTION HANDBOOK: For People and Planet, by Miles Litvinoff, Earthscan, London, 1990, £7.95 (pb), 337pp. ISBN 1-85383-062-3.

A summary of environmental issues and the personal and political action which individuals can take to counter ecological destruction. Litvinoff emphasizes the social and economic aspects of environmental problems. His chapters cover subjects such as global economics, population and health, "Women: Present Burdens and Future Role", human and civil rights and "A World Without War?"

PLUNDER!, by Roger Moody, People Against RTZ and its Subsidiaries (PARTiZANS), 218 Liverpool Road, London N1 1LE/Campaign Against Foreign Control of Aotearoa (CAFCA), PO Box 2258, Christchurch, NZ, 1991, 195pp. ISBN 0-9517522-0-0. Available from PARTiZANS for £4.95 plus postage (UK £1.05, Europe £1.40, Asia £4.50), from CAFCA for NZ\$25 plus NZ\$10 postage and from Work on Waste USA, 82 Judson Street, Canton, NY 13617 for US\$12 plus US\$8 postage throughout the US and Canada.

With operations in over 40 countries, Rio Tinto Zinc, together with its Australian associate CRA, has uprooted and displaced native peoples, contaminated environments, violated sacred sites and endangered the health of its workers. This unique book has been put together with contributions from communities all over the world. It is described in the foreword as "... not just another academic study or exposé of a large multinational ... but a guerrilla handbook for doing battle with them."

 GLOBAL DUMPING GROUND: The International Traffic in Hazardous Waste, by the Center for Investigative Reporting and Bill Moyers, Lutterworth, Cambridge, 1991, £7.95 (pb), 144pp. ISBN 0-7188-2831-3.

Global Dumping Ground is the result of four years' research into the international traffic of toxic wastes from rich countries, regions and communities to their poor counterparts. The authors' explain that the solution to waste problems is not the development of new ways of disposing of the waste but is not to produce the waste in the first place.

 THE GREEN CASE: A Sociology of Environmental Issues, Arguments and Politics, by Steven Yearley, Harper Collins Academic, London, 1991, 197pp. ISBN 0-04-445751-0 (hb) 0-04-445752-9 (pb).

Yearley analyzes the huge rise in environmental awareness in Western societies at the end of the 1980s and the role which pressure groups, scientists and the media played in it. He examines the social and political implications of this "green wave" and ends with a plea for greater cooperation between social scientists and environmental campaigners.

 DISCARDING THE THROWAWAY SOCIETY, by John E. Young, Worldwatch Paper 101, Worldwatch Institute, Washington, DC, January 1991, £2.75/\$4, 44pp. ISBN 1-878071-02-5. Available in the UK from WEC Books, Worthyvale Manor, Camelford, Cornwall PL32 9TT. Please add 50 pence postage.

Young describes the "soft materials path" which he believes industrial societies must take to solve the "garbage crisis" — "the most visible symptom of profligate materials consumption." The operating principle of the alternative solutions to waste problems Young lists is efficiency: "meeting people's needs with the minimum amount of the most appropriate materials available."

Patrick McCully



Taking the Madness Out of BSE

Dear Sirs,

The article 'The BSE Time Bomb' by Richard Lacey and Stephen Dealler in your May/June issue (Vol. 21, No. 3, 1991) contains some interesting and useful comments upon and criticism of the policies of the Ministry of Agriculture, Fisheries and Food (MAFF), as well as of the food industry. However, there are so many factual errors contained within it that the usefulness of the piece is negated. The authors have treated this group of diseases, in both animals and humans, as if caused by conventional infectious agents obeying all the usual rules; this is not appropriate. Your cover for the May/June issue has the caption 'The Madness of BSE'; this article certainly contributes to that!

Perhaps the most glaring of the errors was the statement that Creutzfeldt-Jakob disease (CJD) "accounts for one per cent of all deaths". Countless epidemiologic studies have shown that the age specific death rate from CJD is minimal under the age of 45, but then rises relatively rapidly to a peak in the 65 to 74 year age group; the rate abruptly falls after this age. Even at its peak, the age specific death rate does not exceed three deaths per million.1 The relative importance of CJD as a cause of death should be seen in context. It is also very unlikely that any underreporting in the elderly would bring the death rate above the figure observed in the 65 to 75 age group.2

The authors state that Creutzfeldt-Jakob disease is an infection that is caught, almost certainly from consumption of infective mammalian tissue. There is certainly a consensus, as they correctly note, that CJD in humans is not derived from sheep scrapie. However, they go on to conclude that because of this cattle products are the most likely source of infection, due to the cluster of CJD in Libyan Jews, who are unlikely consumers of pork, and to the "old age" of cattle when eaten. However, CJD is not, as they imply, a single entity. From 5 to 15 per cent of all cases of CJD are familial,3 and this can cause clustering of the disease. Indeed, it has been shown that the mentioned high rates of CJD in Libyan Jews are due to a cluster of familial cases.4 These patients have been shown to have one of the six defined and sequenced genetic abnormalities that are associated with all investigated familial occurrences.5

The fact that a potentially transmissible agent is found in the tissues of sufferers from CJD (and indeed all the corresponding animal diseases) does not mean that CJD is infectious under normal conditions, or that it is "caught". Over 30 years ago, extensive flock observations led to the hypothesis that the genetic susceptibility necessary for scrapie to occur in sheep (which is unquestionable) leads to the production of an infectious agent, rather than any infection causing disease only in genetically susceptible individuals.6 Further evidence for this has come from laboratory studies in which the defective gene was taken from a patient with familial CJD and inserted into the genetic material of mice. In the absence of exogenous infection, these animals spontaneously died from the mouse equivalent of CJD, and passed on the disease to their offspring in the same pattern as the familial disease is passed on in humans.7

Accordingly, although a transmissible agent is detectable in the tissues of patients of CJD, this does not mean that their disease is necessarily caused by infection. The concept of de novo production of a potentially transmissible agent becomes less outlandish when it is realized that the major, if not sole, component of the transmissible agent is a normal host protein, coded for in normal genes, which has somehow undergone a post-production (that is, post-translational) change that is associated with its accumulation and probably also with its infectivity.8 Lacey and Dealler fail to note that CJD has been seen in a life long vegetarian.9 The evidence presented in the article disregards the substantial body of knowledge concerning the aetiology of CJD that runs counter to the authors' hypothesis.

The Bovine Spongiform Encephalopathy (BSE) epidemic is arguably, as the authors state, the product of a food industry whose main philosophy seems to be the production of cheap food, with other considerations taking the back seat.10 However, to generalize that in the 1980s, "concentrates" or "protein supplements" fed to production animals "are derived from rendering plants which process the offal and bones from farm animals", is extremely misleading. Even though such "meat and bone meal" (MBM) has in the past formed a greater proportion of the diet of UK farm animals than in other countries, fish meal and vegetable derived products would have formed at least an equally large proportion of protein supplements and MBM would have made up an even smaller proportion of concentrates.

Conferring Prophetic Powers

Dealler and Lacey go on to state that, of the farm animals, dairy cattle are the most likely to manifest BSE, which is an infectious disease with an average incubation period of around four years11 as they live longer than sheep and beef cattle. They compare a life expectancy in dairy cattle of 10-12 years - much longer than the six or seven years that is nearer the mark ---with the life expectancy of the sheep and beef that are bred to be eaten. That of the respective beef and sheep breeding stock would be rather closer to the six years age of dairy animals. BSE is seen mostly in dairy animals as it is these animals which were fed the largest amounts of high protein feed containing MBM, the putative infectious feed stuff, in the first six months of their lives. It is during this period that most infection in both scrapie in sheep and BSE in cattle is said to occur.12

To suggest that the BSE epidemic "should have been anticipated" by MAFF seems to be conferring potentially mystical prophetic powers on their scientists, especially given that at that time it was largely accepted that in experimental scrapie the oral route was 109 times less efficient than one of percutaneous inoculation.13 This belief largely influenced the argument that the human infection Kuru had been produced by self inoculation rather than by oral consumption of infective material.14 It is more appropriate to criticize the MAFF policy-makers for not acting more quickly to remove the potentially infectious components from both the animal and human food supplies.15

Lacey and Dealler propose that the inclusion of rendered MBM in animal feed

should be prohibited. In fact, in September 1990 the feeding of specified bovine offals was banned "for feeding to any kind of mammal . . . and any kind of four footed beast which is not a mammal, and any bird." It has been clearly shown for this group of diseases that infectivity is concentrated in some organs, (which are included as "specified offals"), and not in others.16 The combined effect of this prohibition and the earlier (July 1988) prohibition on feeding ruminant-derived protein to ruminants, has the effect of effectively removing nearly all potential infectivity from animal feed. As they rightly state, the risk of disease directly correlates with the amount of infective agent consumed, so this should be a fairly reliable means of preventing future infection.

In recommending that potentially infectious MBM should be used as a fertilizer, one should remember that infectivity can persist in soil,¹⁷ that pastures can transmit scrapie,¹⁸ and that pastures have been implicated in localized scrapie epidemics.¹⁹ Even if used on cereal crops, methods of crop rotation, especially important in organic farming, would mean that at some time animals might be exposed. This measure must therefore be combined with industrial processes that inactivate scrapie-like agents.

It is quite likely that even the draconian measures proposed by Lacey and Dealler would never eliminate BSE. There is a growing body of evidence in the human field that genetics and protein biochemistry rather than infection may determine whether or not an individual suffers from spongiform encephalopathy. It is quite possible that cattle may get a disease indistinguishable from BSE that is not caused by exogenous infection derived from either the consumption of infective feed, or other cattle. There is indirect evidence that a scrapie-like disease of cattle exists in the USA, and did so before the BSE epidemic, 20 and confirmed cases of BSE have been found in home bred cattle in both Switzerland and France. The present epidemic of BSE almost certainly will decline due to the removal of the causal infectious material, and the importance in real terms of a few sporadic cases of BSE, which have very possibly occurred undetected for many years, is likely to be minimal.

Whether any humans have caught or are incubating CJD from infectious cattle material is something that only will become apparent in time. However a several-fold increase in the incidence of CJD, awful and unacceptable as that would be, would still have an effect that would be minuscule in comparison to those wreaked by major diseases such as coronary heart disease and stroke. A large proportion of the latter are preventable at a fraction of the cost of the measures proposed in the article. This is not an argument for doing less, but the importance of the disease should be seen in its correct perspective. It is time to take the madness out of the BSE debate.

Yours sincerely, James Wood

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Lacey and Dealler Reply

Dr Wood's extraordinarily arrogant letter alleging "so many factual errors" must be answered.

First, the incidence of Creutzfeldt-Jakob disease (CJD). It is well known that the numbers of officially notified diseases frequently understate their true incidence. CJD is only diagnosed with certainty by post-mortem examination. Most patients with CJD are not reported because they die of dementia, a condition rarely demanding a post-mortem. We quoted Gareth Roberts, a leading expert in this field, who has produced good evidence that 1500-9000 people (that is, about one per cent) die from CJD annually.

Then, Dr Wood seems to have stumbled on the well known fact that infectious diseases have, to varying extents, a genetic predisposition. May we explain to Wood in simple language: to develop an infection requires the presence both of the infectious agent and also a predisposition to suffer from the effects of that agent which, of course, are genetically determined. Surely all agree that the infectious agent for BSE has been spread to cattle by the feed. Of course the detailed mechanism by which any infection is generated could involve alteration to the animal's genes. It should also be clear to Dr Wood that CJD is not always a precise entity and generally the same clinical entity can be caused by more than one cause. The description of CJD in one lifelong vegetarian signifies very little since the disease could have been acquired from the mother, could have resulted from spontaneous genetic mutation or from unwittingly eating meat products in, for example, soup or stocks.

Wood supports the prohibition of the feeding of "specified bovine offal" since September 1990 and therefore implies that this material contains an infectious agent, and that the distribution of the infection BSE in cattle is the same as in sheep infected with scrapie. In which case the infection will be found also in cattle nerves and therefore throughout the animal.

In conclusion, Wood, like MAFF, has selected published material in an attempt to divert us from the horrible truths which are:

1. BSE is due to an infection of cattle acquired from the feed.

2. Farming malpractices were the cause.

3. There is no evidence against humans acquiring it.

 To clean up the environment will require draconian measures.

Professor R.W. Lacey Professor of Clinical Microbiology University of Leeds

Dr S.F. Dealler Senior Registrar in Microbiology Leeds General Infirmary

Mass Society and the Pheasant

Dear Sir,

The remarkable article by Professor V.C. Wynne-Edwards in your May/June 1991 issue ('Ecology Denies Neo-Darwinism', Vol. 21, No. 3) has implications of the profoundest importance for the economic and political structuring of human societies, yet these are ignored, both by your contributor and editorially, as though they scarcely exist. As the article stands it suggests somebody discovering the tomb of Tukathamen but who is more concerned about the amount of sand that has penetrated his socks.

Of course birds control their numbers by having both a small group identity and a particular area of territory they recognize as their own; of course survival is a group rather than an individual problem (and to be precise, the problem of a small, localized and identifiable group). Over 25 years ago some biologists made a similar discovery relating to animal herds. Around the time that *The Ecologist* was founded I sent Edward Goldsmith an article pointing out the implications of this work for the population crisis and urging that humans too must adopt the principle of division and small group identity if they were ever going to get to grips with the catastrophe of human numbers.

I pointed out that a population crisis could have erupted at any time over the last 8,000 years but that what held such a disaster in check was the extent to which humans lived in small identifiable communities and that human numbers have soared out of control with the virtual abolition of such communities and their replacement with the ugliest, the most dangerous, the most destructive and the most demeaning form of social aggregation history has ever recorded, the MASS society.

I further opined that no attempt to resolve the population crisis by democratic means would succeed if essayed on a mass basis (if only because the very concept of a mass democracy is a contradiction in terms) and that the restoration or creation of localized community power and identity was a fundamental prerequisite to any effort to control human numbers

Goldsmith returned my piece politely observing my theory was too far fetched. Would he do so today I wonder? Today



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the situation is, of course, infinitely worse, infinite in the sense that the real extent of the crisis is not only unknown, but virtually unknowable. Who counts all those people in India's villages, or who live by the million on its city pavements for example? My guess is that India's population today is already over a thousand million. Yet predictions are being bandied about that the global population will double in the next 40 years and one I have seen declares this will happen in the next 14!

Professor Wynne-Edwards has, unwittingly perhaps, done for the 21st century what Karl Marx sought to do for the 19th, he has provided a manifesto for the political needs of the time. If we do not abandon the insensate folly of mass, centralized political and economic institutions, and structure in their place the organic arrangements, ordained both by nature and by the imperatives of our biological survival, of small empowered communities, the blood cells of any civilization, and without which it can scarcely fail to be afflicted with terminal forms of political and economic leukaemia, we are done.

Mass leaders may embark on programmes of mass sterilization à la Sanjay Gandhi, they may ordain public floggings for fathers of more than one child as in freedom-loving China; for all I know when the full enormity of the population explosion comes home to them they may successfully embark on programmes of compulsory mass castration, especially if they take the precaution of castrating the castrators first, but none of this or any other approaches on a mass basis will eventually hold the line against a selfdestructive way of life which denies even the reality of the natural controls implicit in our biological programming.

Small may or may not be beautiful, today it has become imperative for human survival. If we do not soon take a leaf out of Professor Wynne-Edwards' cock pheasants which establish habitats "divided into a mosaic of territories which sets a limit on the density of occupying birds" then no conceivable measures can prevent much more biological chaos and the prospect of civilization drowning in humankind's own uncontrollable MASS propensity to breed.

With respect, John Papworth 24 Abercorn Place London NW8 9XP

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Fourth International Conference: ENVIROSOFT 92. Development and Application of Computer Techniques to Environmental Studies. 1-3 September 1992, Southampton, UK. Abstracts by 30 November 1991 to Sue Owen, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton SO4 2AA. Tel: 0703 293223. Fax: 0703 292853 Third International Conference on ETHICS AND DEVELOPMENT, Universidad Nacional Autonoma, June 21-27 1992, Tegucigalpa Honduras. Abstracts by November 30 1991 to: David A. Crocker, International Development Ethics Association, Dept. of Philosophy, Colorado State University, Fort Collins, CO 80523, USA. Tel: 303 484 5764. Fax: 303 491 0528

Wessex Institute of Technology; Symposium on BOUNDARY ELEMENTS AND FLUID DYNAMICS, 7-9 April 1992, Southampton, UK. International Conference on COMPUTER MOD-ELLING OF SEAS AND COASTAL REGIONS.

Southampton, UK, April 27-29, 1992. Re. information on papers please contact: Miss Sally Croucher, Computational Mechanics Institute, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton SO4 2AA, UK. Tel: 0703 293223 and Fax: 0703 292853.

DIARY DATES

The Centre for Continuing Vocational Education (CCVE) is holding a 2-day course at Sheffield University, UK on ENVIRONMENTAL AIR POLLUTION UPDATE, 21-22 October 1991. Further details from: Mrs K. Wainwright, CCVE, The University of Sheffield, 65 Wilkinson Street, Sheffield S10 2GJ. Tel: 0742 768653

ENVIRONMENT, ECONOMY AND DEVEL-OPMENT: The Earth Summit and After. Green Paths/NEF Conference at Dartington, December 6-8 1991. Manfred Max-Neef, Koy Thomson. Details from Green Paths, 13 Croftdown Road, London NW5 1EL. Tel: 071 485 9981

GROUNDWATER POLLUTION AND AQUIFER PROTECTION IN EUROPE. A two day symposium from 8-9 October 1991 at Palais des Congrés, Paris, France. Enquiries to: The Conference Manager, The Institution of Water and Environmental Management, 15 John Street, London WC 1N 2EB. Tel: 071 831 3110. Fax: 071 405 4967

ENVIRO ASIA 1991 – International Conference and Exhibition on Environment. 7-10 November 1991, World Trade Centre, Singapore. Details from: Times Conferences and Exhibitions Pte Ltd., Times Centre, 1 New Industrial Road, Singapore 1953. Tel: 65 284 8844. Fax: 65 286 5754

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