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Editorial

- Nicholas Hildyard Development: No Cure within the Market 2

Feature Articles

- Val Plumwood and Richard Routley World Rainforest Destruction—The Social Factors 4

The rapid growth of population in the Third World has led to increased pressure on agricultural land in the tropics. The number of landless peasants has burgeoned and many governments have sought to solve the problem by colonising tropical rainforests. Such colonisation is frequently singled out as the major cause of deforestation. But are the peasants really to blame for the destruction of the world's rainforests? Or are they being used as scapegoats to divert attention from the damage being wrought by ranchers and loggers? Behind the destruction lie social problems which will never be solved whilst we adhere to current models of development. Blaming overpopulation and landless peasants simply obscures the issue.

- Carl H. Moneyhon The Environmental Crisis and American Politics 1860-1920 23

Many of the fears voiced by today's environmental movement—in particular concern over resource depletion—were being vociferously raised by Americans at the turn of the century. Although these early environmentalists had a powerful ally in President Theodore Roosevelt, splits within their movement stymied his efforts to impose conservation measures. Divided into three main factions—those who sought a radical overhaul of society, those who wished minor reforms and those who thought industry was best left to put its own house in order—the movement was deprived of an effective voice by internal squabbling. Today's environmental movement would do well to learn the lessons of that period.

- Denys Trussell History in an Antipodean Garden 32

New Zealand provides a vivid illustration of the environmental and social destruction that results from abandoning one's fate to the whims of the world market. Settlers came to a paradise—and within a century and a half had transformed it into little more than a factory, vulnerable to the vagaries of economic forces and suffering all the ills of other industrialised countries. Will New Zealanders change the direction of their society before it is too late?

- Books 43

- Letters 48

Digest

Cover photograph: Robin Hanbury-Tenison

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Apologies: *The Ecologist*, Vol. 11, No. 6

The article on page 298, *Nuclear Energy Costs—the US Experience*, was written by Charles Komanoff whose name was unfortunately omitted from the title page. We would like to apologise to Mr. Komanoff for this error.

Both Mr. Komanoff's article and that by Amory and L. Hunter Lovins (*Energy: What's the Problem?*) were first presented at the Groupe de Bellerive's meeting on Energy and Society in September 1981. We would like to thank the Groupe de Bellerive for permission to reprint both papers and apologise for omitting the credit.

Errata: *The Ecologist*, Vol. 11, No. 6

Page 256 para. 6, line 19. For 'advantage' read 'disadvantage'.

Page 257 para. 8, lines 26-27. For 'rather than a coal-fired station of similar capacity' read 'rather than maintaining an existing coal-fired station of similar capacity'.

Page 259 para. 1.7, lines 10-11. For 'rather than a coal-fired station of similar capacity' read 'rather than maintaining an existing coal-fired station of similar capacity'.

Page 290, para. 11.0, lines 4-5. For 'more than the cost of building and operating an equivalent coal-fired power station for the same period of time' read 'more than the cost of operating an existing coal-fired station for the same period of time'.

Development—No Cure within the Market?

In the last few years, 'eco-development' has become something of a catch-phrase amongst those concerned with the problems of the Third World. To be sure, it is not an idea which has been generally practised: nonetheless, the very fact that Third World governments feel obliged to pay lip-service to it is an encouraging departure from the days when 'West' was indubitably 'Best', and development was seen almost exclusively in terms of importing the necessary technology to build a competitive industrial base.

Not that 'eco-developers' are against all things Western, let alone all things technological: their gripe is with 'inappropriate' technology. Alarmed by the social and ecological effects of industrialism — all too obvious in the West — the 'eco-developers' argue that the Third World must pick and choose its technology in order to avoid the mistakes that the West has made. Above all, it has been taken as axiomatic that development should be based on local cultural traditions.

Small wonder, then, that alternative technology is frequently seen as a God-send for the Third World. It doesn't (at least in theory) pollute. It is accessible to all. It doesn't alienate. It uses few resources. It provides renewable energy. It provides cheap jobs. And it can be afforded by all. Indeed, on the face of it, alternative technology is a sure means of developing without destruction — of having our cake and eating it. In a word, it is 'appropriate'.

But is it? By and large, the 'appropriateness' of alternative technology has been defined in terms of its environmental and economic impact. So long as it doesn't cause ecological problems and can be produced cheaply enough, few question its value. Its impact on society, however, is largely ignored. Yet that impact is of critical importance.

If one wants to see an 'appropriate' technology at its best, then one has to look no further than the traditional technology of a traditional society — technology which has been developed over the years to meet the social needs of the society in a way which is perfectly adapted to its environment. I give one example — that of the Maziara, the traditional water cooling and purification system used in rural areas of Upper Egypt. The problem for the villagers has always been a simple one: the water they collect from the Nile is unfit for drinking and often carries such dangerous pathogens as the 'bilharzia larvae' — a problem exacerbated by the development of the Aswan High Dam. Once collected the water is stored in the Maziara, large unglazed ceramic jars. The porous nature of the unglazed ceramic means that water seeps through the walls of the jar and is then collected in a bowl. What is interesting is the purity of the filtered water: a team from the Development Workshop, for instance, did a series of tests and

found that polluted Nile water after filtering through the Maziara was pure enough to meet the Egyptian Government's drinking water standards, (see *The Ecologist* Vol. 6, No. 2). And the Maziara has an additional spin-off: as the water seeps through the ceramic, so evaporation occurs — thus absorbing heat and acting as a highly sophisticated air-conditioning system. As air passes over the jars, it becomes cooled and the difference between the temperature inside and outside the home means that cool air is sucked out — maintaining a constant circulation. The Development Workshop calculated that five or six water jars are able to do the equivalent work of a 1200 watt mechanical cooling system.

As an example of a technology that is environmentally and socially 'appropriate', the Maziara is hard to beat. But in admiring the technology, one is in danger of missing the point. The Maziara is an Egyptian technology, appropriate to Egyptian society. Would it be appropriate elsewhere? And even if it were, could it solve the real problems of 'development'. In fact, can any society develop 'appropriately' — however appropriate its technology — so long as it is enmeshed in a market economy? Is technology the problem? Or is it the market system — a system which, as Susan George so succinctly puts it, values "American cats over West African people because the former can pay for their food whilst the latter frequently cannot"?

First, the problem of technology transfer. All too often, technology is described as a 'neutral tool' — that is, one which in itself cannot affect society. Yet, however simple a technology might be, its introduction into society inevitably changes the nature — and frequently the stability and viability — of that society. Willy nilly, it raises or lowers the constraints on society. And it *always* imposes its own set of constraints. Indeed, it is not for nothing that it has been said that if one wants to destroy Eskimo culture, one only has to give the Eskimo a pair of Wellington boots or a gun. Thus, once an Eskimo has a rifle, there is no longer any need to hunt caribou in groups of related families: instead, each family becomes independent, able to hunt by themselves. The group structure breaks down, the nuclear family is all that's left — and the Eskimo's culture has effectively received a death-blow.

So too, we can see the effect that the introduction of the steel axe — let alone the chain-saw — has had on the cultural lives of forest people. Not only can a man with a stone axe cut fewer trees (and thus do less environmental destruction) than a man with a steel axe or a chainsaw, but the introduction of steel axes and chainsaws irrevocably changes his society. He is no longer separate from the market system. The saw or the axe has to be produced, the steel it is made out of must be smelted, a distribution system

must be set up to get the saw to those who don't live near the factory where it is manufactured. All of which entails a very different society from that in which a man can fashion an axe from materials readily available to him for free.

Once a society is enmeshed in the market economy (whether it is run on capitalist or socialist lines), the use of technology inevitably becomes subject to economic forces — forces which can render the most 'appropriate' technology totally inappropriate. It has been calculated, for instance, that the 60,000 biogas plants currently in use in India have probably saved over 160 million dollars in foreign exchange — largely through cutting down imports of chemical fertilisers. But, despite its technical advantages, the biogas plant has failed to benefit those whom it was intended to benefit. As Joseph Hanlon put it in the *New Scientist*: "Widely touted as a truly appropriate technology, biogas plants have so far been used only by rich farmers because of the high capital costs required and the fact that even the smallest plant requires the dung from two cows. Furthermore, biogas plants mean that dung, which was previously free, now has a cash value and landless villagers can no longer pick it up easily off the road." A.K.N. Reddy, the Indian scientist, goes further: "The villagers are in no position to buy biogas plants so they will end up with no fuel at all — in other words, their position will be worsened by the introduction of the biogas plants."¹

Indeed, such is the nature of the market economy that I am bound to wonder whether there is a single ecological problem that can be solved so long as we remain within it. Take for instance the influence that the market wields over our nutritional health. Until recently, the peasants of Tabasco in Mexico were virtually self-sufficient in food. Convinced that the peasants in the region would be better fed if they were absorbed into the cash economy, the Mexican government established a series of collective farms. The result has been a nutritional disaster: as one woman put it to Kathryn Dewey of the University of California, "Before we didn't suffer — it was better to produce what we needed — there was always food to eat. Now it is no longer possible — only when there is money is there food to eat." Whereas previously the peasant farmers of Tabasco had grown a wide range of foods for their own consumption, today they eat what they can buy — and more often than not it is of poor nutritional quality. The highly nutritional local drink (known as Pozol) has been replaced by soft drinks; tortillas have given way to sweet rolls, white rolls, crackers and biscuits: meat which used to be produced by most families is now only sold once or twice a week — this despite Tabasco being a cattle raising area. Malnutrition is on the increase: meanwhile most of the beef produced in Tabasco is exported to central Mexico. Such is the nature of the market system.

But if the market economy creates problems, can it solve them through technology? I fear not. Take the problem of soil erosion. A recent report by the Comptroller General of the United States points out that "More than one-third of US cropland is suffering annual soil losses in excess of the limit at which soil productivity can be sustained over time." Indeed soil erosion in the USA is now worse than it ever was in the worst years of the dust bowl era. I quote again:

"The United States is losing 4 billion tons of soil a year through water erosion, as compared to 3 billion tons in 1934. It would take a train of freight cars about 633,000 miles long to move 4 billion tons of soil — a train long enough to circle the earth 24 times."

It is a major problem. But it cannot be solved in a market economy. Time and again, farmers have been asked to improve their farming methods — and time and again they have told soil conservationists that they cannot afford to do so. And this despite some 15 billion dollars spent in subsidies since 1936.

If money can't solve the soil erosion problem of the US so long as farmers must deal with the vagaries of the market, still less can it deal with the social collapse of society. One in every ten British children now belongs to a one parent family. The divorce rate has increased by 400 per cent over the past twenty years. One in every four marriages ends in divorce. Traditional communities have been scattered by urban developments — and with them have gone the bonds that held society together. In their stead, we have a society where each individual must forge his own identity — regardless of the effect on his family and community obligations.

So long as the market exists, can we really expect any better fate than the long-term collapse of our society and the wholesale degradation of our environment? I doubt it. History has proved all too often that the market has little to offer the Third World; it must trade the indispensable for the superfluous — its forests for cars, its food for nuclear power stations. Nor is the West any more favoured: it too must make its sacrifices at the market altar. Just as it is economic for Sri Lanka to export its topsoil to Saudi Arabia, so it is economic for the West to pollute its seas with chemical and radioactive waste, to destroy its communities and to desecrate its cities.

And therein lies the flaw in 'eco-development'. Trade has indeed proved itself to be the 'invisible hand' of Adam Smith fame — but it is a murderous hand and one that cannot but destroy the basis of a sustainable society. That sustainable society will not come about whilst the Third World remains enmeshed in the market economy. Quite the reverse. If development is to mean anything, the Third World must 'delink' from the First; the First must 'delink' from the Third; communities must 'delink' from central government; and all of us must unravel ourselves from the market. One cannot, after all *buy* development. One can, however, buy slavery to economic forces — and dressing up those forces in terms of 'eco-development' solves nothing. The Third World has it in its power to break the shackles of the market. I only hope that it has the courage to do so.

Nicholas Hildyard

1. Both quotes are from David Burch's excellent study of the political problems associated with technology transfer, *Appropriate Technology for Third World Development: Problems and Policies in Implementation* by David Burch, Griffith University, Brisbane, Australia.

This editorial is an edited version of a speech delivered to the Consumers Association of Penang, 27 Kelawei Road, Penang, Malaysia. Subscribers who wish information on the ecological problems of Malaysia are strongly advised to contact the Consumers Association.



World Rainforest Destruction — The Social Factors

by Val Plumwood and Richard Routley

'Shifting' cultivators — landless peasant farmers — have had the blame for the destruction of the world's tropical forests heaped upon them. It is their encroachment on the forests, say the experts, which is the major cause of deforestation. But is it? Are the peasants just a convenient scapegoat? And can the problem ever be solved while we still cling to the present model of 'development'?

Imagine the world without its tropical jungles. It would be a world without the present richness of brilliant tropical butterflies, of lianes, orchids, palms and hummingbirds, without wild-living orang-outangs, a world in short without the immense variety of animals, plants and the myriad wild-life forms which can survive only in the rainforest; a world in which some surviving rainforest species eked out a precarious and temporary existence in zoos or botanical gardens, while a vast number, unknown and undescribed, were lost entirely—a world immeasurably impoverished.

It would be a world which had lost much of mystery and excitement, a world in which nature, tamed, defeated and bent almost entirely to human purposes, had lost its most exuberant and richest expression. It would be a world too which lacked not only much natural but also much human diversity, since many of its most important remaining indigenous tribal and hunting peoples and cultures—the Indians of Amazonia, the Dyaks of Borneo and many other peoples of the outer islands of Indonesia, the tribal people of West Irian and New Guinea, the pygmies of the great Ituri Forest—are closely associated with their forests and depend upon them for survival.

It would be a world in which many areas of land, stripped of the precious, age-old cover of rainforest which is so uniquely adapted to the often poor soils and high rainfall of much of the moist tropics, would become waste. Some would be abandoned, after perhaps a year or two of cropping, to become 'red

deserts', with soils baked hard by the tropical sun, as has already happened in parts of South America. Many others would become wastelands of eroding soil or of "alang-alang" grass in which little lives, as in parts of S.E. Asia and Melanesia.

It would be a world also with a major part of its banks of genetic diversity direly depleted or destroyed, and with them the potential for the development of many greatly needed future food and other crops—especially those suited to the underdeveloped, tropical world. The destruction of the tropical moist forests is thought to be likely to lead to the extinction of at least one million species, or about one eighth of the planet's biota, and more than that of all the other habitats combined. This would represent the greatest wave of planetary extinctions since the Pleistocene.¹

An Impending Reality

Is the vision of such a world a desolate and unthinkable fantasy or gloomsday prediction? No, it is an impending reality. Extrapolation of existing trends shows that almost all of the world's richest forest type, the tropical lowland rainforests, will have been destroyed by the turn of the century if present rates of forest destruction continue. Highland rainforest, so important for soils and watersheds in tropical areas of intense rainfall, is also being destroyed at an alarming rate. Much of the primary rainforest—the rich, diverse forest which results when the forest remains undisturbed for long periods—is unlikely ever to return. The destruction and impoverishment will be, in most

cases, permanent and irreversible—and the tragedy is compounded by the fact that most of it is unnecessary and wasteful. For example only about 2 per cent of the soils of the Amazon Basin, whose forests will at current rate of clearance be gone in 20 to 30 years, are suitable for sustainable agriculture,² and a similar situation can be found in many other areas where rain-forest is being destroyed.

Virtually all the destruction is taking place in the less developed world, but its effects are unlikely to be confined to these countries. Not only does the likely loss of genetic and biological diversity mean a general loss to everyone in the world, but the loss of tropical forests raises the spectre of widespread climatic change through disturbance of the earth's CO₂ balance,³ something that would be likely to affect both poor and rich countries alike. Nevertheless the main losses in the process if tropical deforestation continues will be to the peoples of the deforested areas themselves. First, despite a much higher population, the people of the Less Developed Countries (LDCs) will by the year 2000 have available to them less than half the area of forest available to the people of the Developed Countries, and only about half their present area of forest.⁴ This massive raid on the LDC's forests will be very much to the disadvantage of their future populations, not only with respect to the availability of forest products such as timber and firewood, but also because massive extinction of species and disruption of primary forest will mean a great loss of germ plasm and genetic resources. This will affect all people and countries on earth, but especially those from the tropical areas. With the destruction of the tropical rain forests will go the chance of improving or maintaining many important tree and other crops; so too, the source of many as yet unused crops will disappear. The planet is believed to contain 80,000 edible plants, yet only about 150 have ever been cultivated on a large scale, and less than 20 produce 90% of the world's food. Yet while many tropical crops are unimproved and major improvements remain to be carried out, which are of great importance if the expanding populations of the tropical world are to be fed, areas which are crucial for this purpose are being destroyed.⁵ For example, the lowland rainforests of Kalimantan (Indonesian Borneo) which are currently being destroyed largely by logging, have the richest gene pool for the maintenance and improvement of important tropical fruit crops such as mangoes, durian and rambutan, and are the richest Indonesian source of rattans, resin gum and other products.⁶ Deforestation carries many other penalties also for local populations, for example, the loss of soil due to erosion and the destruction of the water balance resulting in alternating downstream flooding and dessication (both only too familiar from many tropical areas).⁷ Moreover, forests often make other vital contributions to local economies, providing the main source of energy and materials for building, as well as valuable plants and animals for food and for local industries (e.g. rattans).⁸ There may be increased health risks due to modification of the forest,⁹ and loss of areas of cultural or religious significance to local populations. For many indigenous peoples too the

destruction of the forests means, at a minimum, destruction of their culture and way of life.¹⁰

Is Overpopulation the Cause?

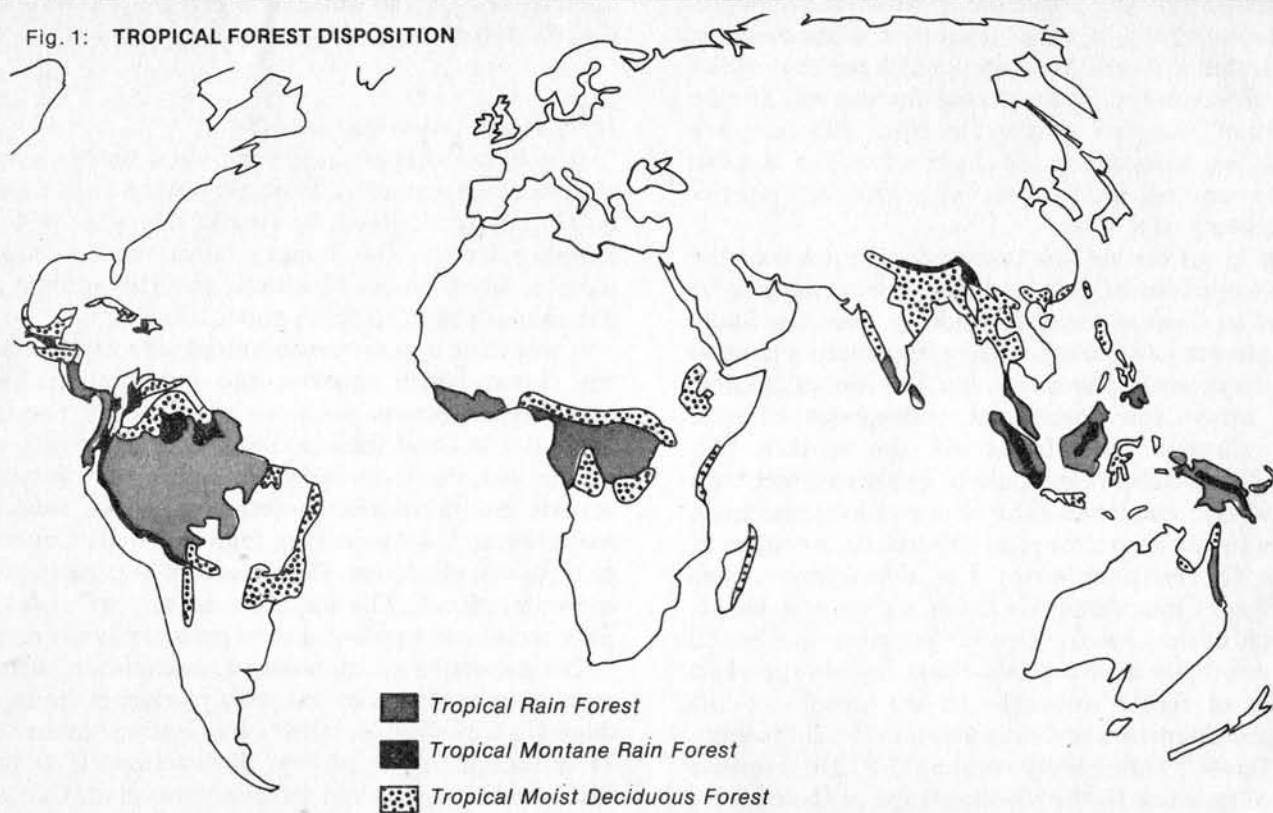
Why is it all happening? The conventional answer is simple: overpopulation. More people put more pressure on already scarce land, leading to clearance of the remaining forest. The hungry world needs food not forests, bread before blossoms, and the hungry peasant cannot afford to think about tomorrow.

It would be a rash person indeed who would dismiss the threat which existing and potential unchecked population growth poses to the world's remaining natural areas and forests. Yet a detailed examination of the world's major areas of rainforest destruction reveals that population growth itself is not usually the main reason for the *existing* high rate of destruction of the tropical rainforest. Other factors are nearly always more important. The main causes appear to be complex social ones, rather than simple biological ones.

The pervasive overpopulation explanation, although superficially plausible and widely taken advantage of, does not withstand detailed examination of most cases of contemporary rainforest destruction. It is important to stress, to avoid misunderstanding, that to reject the current focus on overpopulation as the cause of rainforest destruction, is *not* to discount population as a serious problem. It is not to say that the world would be a satisfactory or livable place with 40 billion people. It is not to say either that it is better to have a few more humans than the last orang-outang, or that human interests must inevitably prevail over those of all other species. Nor is it to say that human populations, unlike those of other species, are somehow prevented from exceeding their resource base, which, however socially or technologically expanded and manipulated, must still ultimately place *substantial constraints* upon the numbers of people who can be supported at a biologically minimum level. Nor is it to say that there are never any cases where the population explanation is correct—clearly there are some—or that population growth is not a factor.

Population growth is *one* factor in rainforest destruction, but, contrary to contemporary heavy or exclusive concentration on this factor, often a relatively *minor* one, and its emphasis occurs at the expense of recognition of other major *much more controllable* social reasons for the world wide tragedy of rainforest destruction. Our theme is then that the simple overall population growth picture, especially in the LDCs, has in the case of rainforest destruction been used as a scapegoat, and to obscure the real factors which usually lie elsewhere. In particular, the proponents of the simple biological population explanation have tended to ignore the overall social context of development and land distribution in which rainforest destruction occurs. The environmental movement is increasingly realising that many of the problems it initially saw as largely biological in character are in fact often largely social, or have a major social dimension. It is time this awareness was applied to the problem of rainforest destruction.

Fig. 1: TROPICAL FOREST DISPOSITION



Source: Poore & Allaby (IUCN)

A map of the tropical moist forests shows three *main* areas of tropical moist forest and rainforest: (1) The Amazon basin (Brazil, Peru and Columbia); (2) West Africa (Congo, Zaire, Cameroon and Gabon); (3) South-East Asia (especially Indonesia and Papua New Guinea).

Proponents of the population thesis rarely present any data for this assumption, or consider any alternative explanations for the phenomena of environmental destruction they so rightly deplore.¹¹ They often point to growth in human numbers (and human aspirations) since 1960,¹² the decades which have seen growing forest destruction. But growth in human numbers is not the only thing which has happened since 1960—another major thing which has happened, for example, in the last two decades, is the institution of the post-colonial development model and the opening of the tropical forest regions, which have become part of the resource frontier of the advanced capitalist nations, to the pressures of international markets.

The Population Fallacy

The main case for the population thesis appears to be based on a methodological fallacy. It is observed that agricultural expansion is the major factor in forest destruction, and it is concluded, quite incorrectly, that expansion of agricultural lands must be due to population growth, to the overwhelming of existing cleared land by swelling numbers of subsistence farmers. But very often expansion of *subsistence* agriculture is *not* the main factor, but rather the cause lies in various kinds of corporate or business-based development, whether for forestry, agribusiness, or mining. Even where land clearance for subsistence agriculture *is* the major factor, it may not be due simply to population growth. Usually other factors are at work, for even when there *is* sufficient agricultural land to provide for

everyone, the poor may not be able to obtain access to it. This is a major cause of agricultural expansion into forested areas in Latin America, as we shall see, and in parts of S.E. Asia.

Initial suspicion of the population thesis should be raised by the fact that the rainforest is increasingly threatened even in areas where there is no serious population pressure on the forest. The bulk of the West African rainforest for example, is found in the Cameroons, the Congo, Zaire and Gabon, which according to the World Bank “are all timber-rich countries with comparatively low population densities”.¹³ Similarly, in Papua New Guinea, despite absence of any serious population pressure on the forests, a number of large-scale export-oriented forestry projects are predicted by the PNG forest department to be likely to eliminate lowland rainforest there by the year 2000.¹⁴ There is evidence too that much of West and Central Africa and the Amazonian region supported higher populations in the sixteenth century than they do today, and without the same level of forest destruction.¹⁵

Who's Destroying the Forests?

In the case of Brazilian Amazonia, which has something like half the tropical evergreen rainforest in the world, much attention has been paid to Brazil's high rate of population growth and to its peasant cultivators, landless people (not to be confused with traditional ‘swidden’ agriculturalists) who clear areas of forest for short-term crops, moving on after a few years when the soil is exhausted to clear more forest.

However more careful examination shows that the real destroyers of the Amazon in recent years have been the highway builders and large cattle ranchers and corporate developers whose activities are encouraged by large fiscal incentives, and not the peasant colonists upon whom so much attention has been lavished. According to official figures issued in Brazil¹⁶ for the years 1966-75, the state colonization program involving peasants cleared 17.6 per cent of the total area deforested, whereas deforestation by large-scale cattle raising projects (3,865,271 ha) and the highway construction program of the Brazilian government (3,075,000 ha) accounted for more than 60 per cent of the total. This probably overstates the level of responsibility, since the peasant colonization program has been wound down, whereas that of the large corporate ranchers has been stepped up, partly due to a successful effort by them to lay the blame for deforestation on the peasants.¹⁷ Other sources put destruction by peasant colonists at much less, concluding that colonization during ten years destroyed less than half as much forest in the entire Amazon region as cattle ranching did in just one state in three years.¹⁸ The beef produced by the cattle ranches is, of course, not for the consumption of the poor and landless, but for profitable export to affluent western markets, especially North America and Europe. Considerations of population growth appear to have played almost no role in the historical decision to develop Amazonia, the main push coming from the military and from corporate development.¹⁹

The peasant colonists in the Amazon are in any case not there because of population growth. Most shifting cultivators are in fact peasants who have been expelled from the lands they have cleared and occupied by the large corporate enterprises, often by fraudulent or violent means, and who move in a wave of dispossession before the advancing latifundia.²⁰ They are not forced to clear new land because there is insufficient cleared land to go round elsewhere in Brazil, but because for social reasons they do not have access to it. With a ratio of 2.3 acres of already cropped land per person—a better ratio than that of the world's largest agricultural exporter, the USA—and potentially 10 acres of cultivable land per family even without the Amazon, Brazil has no need for the destruction of the Amazon in order to feed its people. Shifting cultivation and colonization or resettlement schemes are both frequently products of highly unequal land distribution. In Brazil one per cent of the farms take up over 43 per cent of the total farmland, including the best land. In contrast 50 per cent of the farms have less than 3 per cent of the farmland, and 7 million families have no land at all.²¹ Inequality of land distribution is increasing despite the clear evidence of the environmental destructiveness of large-enterprise activities in the Amazon, and despite the evidence that the large-scale farms are much less productive; more oriented to export crops for western consumers; provide much less employment; and are more wasteful of scarce capital resources than the small peasant farms.²² Landless peasants destroy forest for shifting cultivation because they are excluded from cultivating existing

cleared areas for *social*, not biological, reasons, while for *social* reasons much already cleared land lies idle, is non-intensively cultivated and produces much less than it could or is devoted to export crops for the affluent west. The situation in Brazil is not untypical of that in Latin America; most forest clearance in Central America for example is for beef cattle farming.²³ Exclusion of the poor from access to highly unequally distributed agricultural land occurs widely throughout Latin America and is a major cause of marginalisation and shifting cultivation.

South-East Asia

When we turn to the other major theatre of rain-forest destruction, S.E. Asia, the population thesis can be equally seen to involve a great oversimplification. Shifting cultivation is a major factor in forest destruction but again cannot simply be attributed to population growth. In Java, half the households who own land possess less than half a hectare, yet the top one per cent of landowners account for about one third of the land. Roughly half the rural households own no land at all. The larger farms, in Java as in the case of Latin America, are cultivated less intensively, produce less per hectare and are more extravagant with capital resources and provide less employment.²⁴ As in the case of Latin America, inequality of land distribution is increasing.

In S.E. Asia too logging companies and allied governments have been equally successful in turning attention onto deforestation caused by the landless and away from their own activities.²⁵ In Indonesia, the other main area of current tropical rainforest destruction, appeals by logging industry spokesmen for protection of 'their' forests from shifting cultivation have become common. However, botanists and others who know the forest situation well believe that the logging carried out and planned by the government and logging industry does far more damage than shifting cultivation, which is relatively, a moderate cause of damage.²⁶

FAO figures confirm this assessment, estimating that shifting cultivation in Indonesia affects yearly only about a quarter (200,000 ha) of the area affected by logging (up to 800,000 ha).²⁷ Much of the area affected by shifting cultivation is already roaded and logged, and many shifting cultivators are people displaced from other areas already affected by logging or other development²⁸ or whose balance with the ecosystem has been disrupted as a result. The main cause of forest destruction in Indonesia is logging. Official condemnation of shifting cultivation on alleged "environmental" grounds appears to be in part a pretext for destructive governmental moves against cultural minorities and tribal peoples such as the Dyaks of Kalimantan and the indigenous people of West Irian, and is a consequence of the existing regime's aggressive and homogenising nationalism and contempt for tribal cultures, as well as of its ruthless drive for economic exploitation of traditional lands.

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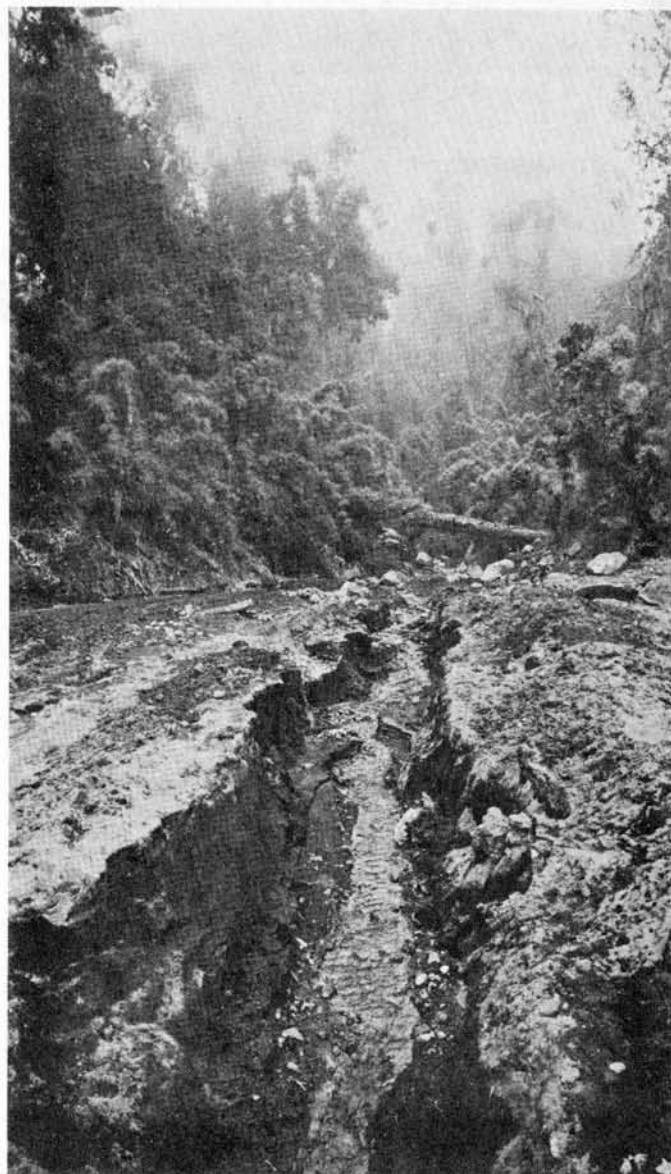
Resettlement Schemes

Another factor in the destruction of tropical forests is planned, government-controlled resettlement schemes. Resettlement schemes affecting rainforest have been in operation in Brazil, and more recently in Colombia and Peru and other Latin American countries, and also in Indonesia, which has ambitious, but usually only partly realised, schemes for resettlement, of logged-over areas. The justification given is usually high-sounding—that of providing for the landless poor, or in the case of Indonesia, that of providing “sound entrepreneurship for the people”. The real motivation, especially in Latin America and Indonesia, is that of providing a political alternative to the redistribution of existing cropland along more egalitarian lines. As Gerardo Budowski, former director of IUCN, puts it for the case of Central America:

Why should new land be opened when food production on much of the presently settled land could be considerably increased at much lower cost? First we must admit that it is politically expedient to promote new colonization schemes. It provides a heroic ‘pioneer’ image. Moreover, financial support is likely to come from banks and international organisations, and one can surely count on the wholehearted support of the large landowners, who fear the obvious “land reform” on their huge properties. “Why divide my land for those hungry farmers” they claim “when there is plenty of virgin territory that is only awaiting man’s technology to be opened?” Some of the best soils in Central America are presently the most poorly used. Large tracts of alluvial and level lands are still too frequently managed for beef cattle for the benefit of a few people.²⁹

As Budowski correctly states, planned resettlement in ex-rainforest areas is a very expensive way of providing land for a relatively small number of the landless. In one resettlement scheme in Sumatra affecting rainforest for instance, the cost of development is estimated as between \$400 and \$1000 per hectare in 1976, for opening land whose development, soil scientists have warned, is extremely risky, which even with careful development can produce only *one* crop per year, and where there is a prolonged dry period causing serious health hazards, and so on. Furthermore if the settlement scheme should fail due to soil problems, as appears quite likely as such problems have already been encountered, the settlers will move into the surrounding forest, adopt shifting cultivation, and destroy more forest.³⁰ The figures cited were regarded as a relatively moderate cost for new land opening. Moreover even with such costs, such resettlement schemes have a high record of failure.

Another major motivation for Indonesia’s ambitious resettlement programs is security. Large settlement schemes are planned for the Sarawak border area for example, largely motivated by security considerations. Resettlement of the outer Indonesian islands and other areas with Javanese is motivated too by the spirit of homogenising nationalism which characterizes such military regimes. In Brazil too nationalism and alleged ‘security’ considerations play a major role in plans for resettlement and development, as revealed in the recent remark of a member of the ruling Brazilian junta:



Land scarred by logging operations. Although many countries insist on selective logging, this is rarely enforced and clear-cutting is still the order of the day. And even selective logging can cause considerable destruction: cutting down just ten per cent of the trees in an area can destroy more than half of the forest canopy, damaging the remaining trees beyond recovery.

“When we are certain that every corner of the Amazon is inhabited by genuine Brazilians and not by Indians, only then will we be able to say that the Amazon is ours.”³¹

If simple population growth does not explain destruction for agriculture or resettlement, it and the increased demand resulting from it does not explain either the increased destruction of tropical forests from logging. For example world demand for wood has increased at a much slower rate in the last two decades than the extraction of timber from S.E. Asia over the same period.³² The bulk of the increase has gone to the affluent west and especially to North America, which has expanded its consumption of tropical hardwoods at a rate far above its growth rates and living standards. Developed world imports of tropical hardwood timber have increased ten times since 1950, and the total surpasses consumption by all tropical countries combined. The United States consumes more than 70 per cent of all tropical plywood and veneer in world



Landless peasants are a convenient scapegoat for tropical rainforest destruction. Yet in Brazil, between 1966 and 1975, peasants cleared just 17 per cent of the total area deforested: 60 per cent was destroyed by ranchers and the Brazilian Highways programme.

trade.³³ The fact that the developed world not only supplies most of the capital and technology for the raid on the forests but also consumes a great deal of the resulting commodities cannot be explained simply by appeal to "rising human numbers and/or human aspirations".

Social Reasons for Deforestation: The Current Development Model

To understand why the tropical forests are disappearing at such an alarming rate, why Third World governments are allowing and even promoting the destruction of forests their own people often need desperately, we must look at the social reasons for the pattern of destruction. In part the problem arises from the capacity of international markets to create and supply needs which are entirely out of balance with the continued ability to supply them in ecologically sound ways from particular areas. Historically 'market forces' have stripped many areas of the world. But we must also ask *why* such forces are allowed to prevail over the welfare of the people in the regions concerned, and to understand this it is necessary to look at social factors within the tropical areas concerned. The social factors at work *appear* to be complex and diverse—shifting cultivation, logging and land clearance by agribusiness, resettlement schemes, and so on. But *all these apparently separate factors spring from a particular kind of social situation and development model in the underdeveloped world*—one which in some cases may have roots in the colonial past³⁴ but in all cases has intensified in application in the last two decades, those which have seen the main onslaught on the tropical forests. The current development model exacerbates the problem of the forests in temperate areas, which generally arises from the fact that they (and the wealth of species and environmental values they protect) provide a collective good in an economic and social system which emphasises private interests

and provides no adequate means for the expression of collective needs or for control and protection of collective assets.

The prevalent development model has operated in several ways to place heavy and increasing pressure on the tropical forests, to the great detriment of the bulk of the present and future inhabitants of these areas.

□ In this model the emphasis is primarily on private capital accumulation and elite-creating, export-oriented development (of a kind requiring no widespread social development and compatible with great inequality), and on rapidly turning any available natural resources, such as forests, into exportable commodities for foreign exchange, for private capital accumulation and for a type of development which enriches the governing elite, maintains it in power (via arms spending) and provides an appropriate westernised lifestyle.

□ The production of much of the best land is often oriented to cash crops for export, rather than to providing for the basic needs of local people, especially poor people, and there are highly concentrated patterns of land ownership, excluding many from agricultural production and forcing them to become 'marginal people' who have to clear new, often unsuitable, land for marginal agriculture.

□ There is pressure for clearance of the forests for 'resettlement' often as a means of avoiding the redistribution of existing land.

□ Most technology and capital for resource exploitation is imported. Governments, usually strongly repressive in character, are highly favourable to development via foreign investment and subservient to or closely connected with domestic capital and international corporations, who have almost unhindered access to the exploitation of profitable natural resources such as forests.

□ Many projects affecting the forests, especially forestry projects, have been heavily promoted by international economic and technocratic agencies such as

FAO and the World Bank, who although acknowledging that due to unregulated and unsupervised cutting, such forestry is usually a disaster for the forests, continue to see them as the key to western-style development and economic 'take-off'.³⁵

□ Internal inequality and resistance and the repressive and militaristic character of the national governments concerned creates an obsession with strategic and 'national security' considerations (which favour removing large natural areas which could serve as a base for organised resistance) and also increase emphasis on the exploitation and subjugation of nature.

'Internal Security': The Fear of Insurrection

This last 'security' and strategic factor is quite important but often overlooked. The destruction for security and strategic reasons of large areas of forest, which can serve as a haven for forces of resistance to existing regimes, is not new. As is well known, Vietnam lost some 44 per cent of its rainforests to herbicide defoliation during the Vietnam war. The Vietnam war was not just a war against the people, it was also war against the forest. The strategic and security reasons behind many resettlement schemes and highway development schemes have already been touched upon and some are explicit in the case of Brazil.

In Malaysia for example there are proposals to clear, for security reasons, a one mile swathe on either side of the highway from Penang to Kota Boru, which will involve the destruction of some 350 sq. miles of forest.³⁶ It is significant that both the destruction of Indonesian forests and that of the Amazon by highway development, which was largely a military affair, began in earnest in 1968, and that the latter had heavy involvement from the U.S. department of state, the U.S. and Brazilian military, and funding from USAID. (More details of its funding will be provided later.) Certainly strategic considerations, as well as financial gain, play a role in the apparent determination of the Indonesian military that no large areas will remain unlogged or unroaded, as well as considerations of improved access to and control over existing indigenous populations in remote areas. What we are seeing in many areas then is, in effect, advance 'defoliation'.

The Case of Indonesia

The factors outlined are at work in most parts of the world where the tropical forests lie, but differ in importance in different areas. Many of them are perhaps most vividly illustrated in the case of Indonesia, where the destruction of the forests by foreign concessionaires, (replacing earlier small-scale logging), began in earnest after the 1965 coup which brought to power a government which has closely followed the current development model. Concession areas for timber extraction cover nearly all the accessible primary forest of Sumatra, West Irian and of Kalimantan (Indonesian Borneo)—the latter, despite extremely poor soils, carried the best and tallest forest in S.E. Asia. The cutting cycle is envisaged as 35 years, which itself is far less than is needed for sustained yield, but concession agreements are set for 20 years,³⁷ and observers who have seen the scale of logging believe that the forests of Kalimantan (the main logging area) will have been

largely exhausted well before that. There are very few nature reserves, despite the genetic importance of the areas subject to logging,³⁸ and those there are tend to be in the less valuable mountain areas³⁹ or their best forested parts are subject to logging on the order of 'the highest authorities'. For example in 1977, ten thousand hectares of high quality forest in Sikundur Nature Reserve in Sumatra was given out for logging⁴⁰ and earlier 60 per cent of the East Kutai Nature Reserve in Eastern Kalimantan—one of two remaining lowland reserves there—was given out for logging, in both cases vastly reducing their conservation value and threatening rare species such as the orang-outang.⁴¹ Both were considered to be among the most important nature reserves in S.E. Asia.⁴² Concession agreements are supposed to insist on selective logging, but this is neither enforced nor observed and a great deal of logging is virtually clear-cutting, with almost the whole of the forest canopy destroyed.⁴³

Bribery and Corruption

The timber industry relies heavily upon foreign capital, and concessions have been awarded amidst widespread reports of political favoritism and bribery.⁴⁴ One major logging operator is the U.S. timber giant Weyerhaeuser. They moved to Kalimantan after the exhaustion of the Philippines forest resource and their Sabah concession, and their 1.5 million-acre concession in Kalimantan is estimated to be amongst their most profitable, returning 33 per cent on capital invested.⁴⁵ To fulfil local partnership requirements, Weyerhaeuser took as partner an Indonesian company, which is in turn owned by a foundation created by the Indonesian army. (The 'partnership' privilege was reportedly granted by Suharto to 73 army generals to maintain their continued loyalty.) Since the partners brought no capital or expertise to the venture—indeed they appear even to have been provided with money by the company to buy in—but syphon off 35 per cent of the profits, the 'partnership' is in effect a form of payoff to the military elite.⁴⁶ Other concessionaires also have such local 'partners'. For example, Georgia Pacific (also active in Amazonian deforestation) has as its local partner a Chinese businessman who is reported to be a close friend of Suharto's.⁴⁷ Other large concessionaires utilise the capital of wealthy local Chinese and include Jayanti Jayi, a big timber company reportedly closely connected with forestry and other high ranking officials, which has a two million hectare concession in Central Kalimantan.⁴⁸ Many of the royalty payments levied for the resettlement of hilltribes and other purposes are unspent and are rumoured to be unaccounted for, and a substantial part to have been used for construction of an expensive mausoleum built by Suharto's wife.⁴⁹

The devastation of the forests has obviously been very advantageous to many foreign companies and to many in the military and governing elite of Indonesia, both through 'joint ventures' and through the sale of licences and concessions, a fact which makes any serious attempt to control it or scale it down to sustainable levels unlikely, despite mounting criticism.⁵⁰ But how has it helped the local people? In Kalimantan

Because few tree species are exploited in tropical forests, logging does not directly destroy forests. It just selectively cleans the forest . . . The shifting cultivators, who are using the roads built by the logging companies, enter and destroy the forests for agriculture.

Dr. Louis Huguet, Director, Forest Resource Division, Food and Agriculture Organisation.

nearly half the local population of six million people are classed as Dyaks, which refers to all the indigenous Malay or proto-Malay peoples of the interior of Borneo. They practice hunting and gathering as well as some agriculture for gardens with some settled agriculture along river banks. In Kalimantan in 1977 and again in 1979, flooding of exceptional severity followed the denuding by big logging firms of the catchments of the Barito and Kahayan Rivers, flooding rice fields and resulting in disaster for tens of thousands of local inhabitants on each occasion.⁵¹ As well as destroying forests whose 'minor' products involve such an important contribution to traditional economies, logging firms have abrogated traditional rights to collect rattan, honey, bamboo and ironwood for house tiles, to use customary land for gardens and rice paddies, and have even tried to evict local tribespeople whose traditional agricultural areas were within their concessions. Fishermen have complained of siltation, of sawmills and bark dumps polluting rivers and killing their stock,⁵² and of nets destroyed by logs floating down rivers (not much perhaps unless a net is a large part of what you own). According to local newspapers, ten thousand people lost their employment after the close-down of the ironwood tile-making industry in south Kalimantan.⁵³

Suppression and Acculturation

Although logging has disrupted traditional economies and destroyed traditional labour-intensive industries, it appears to have provided little alternative employment for local populations in Kalimantan. There has been little investment in processing plant which provides employment and other benefits.⁵⁴ Many workers are imported and their presence has created conflict with local populations. For example in 1975 there were some 7,000 Filipinos working in Indonesian forests, and many others from Malaya, Korea and Java itself.⁵⁵ Working conditions are reported to be poor, with reports of substandard wages and conditions in camps, of wages collected only after a successful shipment and other abuses,⁵⁶ and evidence also of the use of political prisoners (tapols) as labour in remote areas.⁵⁷ Although the Indonesian government defends the logging by saying that the revenues alleviate poverty and create opportunities, most government revenue from the projects is reinvested in capital-intensive projects such as mining and petroleum extraction whose benefits are not spread widely, rather than in the desperately needed rural development.

For the tribal people of the logging areas, logging and the social disruption, planned and unplanned, that goes with it, has been a disaster. The assault on local economies and ways of life begun by the loggers, has been accompanied by a government-led campaign against the Dyak people, who are subject to forced resettlement and whose traditional long-houses are reported to have been destroyed by a government which sees them as 'communist' and as 'leading to sexual promiscuity'.⁵⁸ Other reasons for long-house destruction, which was engaged in by the Dutch administration as well as the Indonesian, are nuclear-family proselytism and the all-pervasive 'security' considerations, most notably the increased ease of keeping a check on people in single family dwellings in what is essentially a highly repressive police state.⁵⁹ As roads penetrate their territory and the land is either taken from them or its forest cover destroyed, the future for the Dyaks looks bleak.

Destructive moves against tribal peoples are greatly facilitated by the increased access and control provided by logging. A good example is provided by the Mentawai people of the island of Siberut, off the coast of Sumatra. According to an observer working in 1975, on this island logging has provided access which enabled the police to forcibly move the population out of their traditional areas to the coast, where they succumbed to disorientation and boredom. The police were active, treating long hair, tattooing, the wearing of beads and the observance of traditional religious rites as criminal acts and punishing offenders. Only those living in isolation in the interior avoided such forced changes, but lumber companies were moving into these areas too.⁶⁰ The increased access can be a disaster for the wildlife as well as the people, for example in the southern Sumatra swamps, which were the last stronghold of the rare Sumatran rhinoceros and the even rarer Java rhinoceros as well as many other species, virtually all the larger wildlife except monkeys and pigs is reported to have been virtually exterminated by the Indonesian military using sophisticated weapons and travelling by jeep and boat in the wet season.⁶¹

Destruction of the Local Economy

Logging also destroys the economic basis of these societies. The Mentawai people use sago as their main staple and grow tubers, bananas and coconuts; they keep pigs and chickens but these are normally eaten only on special occasions and for the rest of their diet they are dependent on hunting in the forest and fishing.⁶² Every bit of land belongs to some individual or clan and the boundaries are well established and known, yet timber concessions which will destroy the forest have been granted over virtually all the island.⁶³

The physical impact of logging on this island has been described by one observer as follows:

I visited one of the Filipino camps, walking inland from a beach where (my friends) wept to see the total destruction of a place they said had once been the most beautiful spot on the island. An idyllic coral reef and sandy beach . . . had been totally destroyed by bulldozers and

dynamite to make a landing stage. Huge tree trunks lay strewn around the bay. We made our way for mile after mile through a nightmare landscape which looked as though it had been hit by a gigantic bomb. Although the loggers are only allowed to export trees over 60cm in growth, this does not unfortunately mean that the rest of the environment is left undisturbed. The crawler tractors have to reach the trees and to do so they have to make roads. Much of the rest of the vegetation is smashed in the process and since the roads soon turn to rivers (in areas with rainfall exceeding 120" p.a.) little is left standing except for a few trees of slightly under 60cm across rising up out of the mud. The soil is very weak and leaches rapidly under the immense rainfall so that the destruction is permanent.⁶⁴

The observer, Robin Hanbury-Tenison, goes on to provide details of other indirect adverse impacts of logging on the Mentawai people and on the island, which include the dynamiting of fish by Filipino lumber camp workers, the export of large numbers of gibbons in timber ships to dealers in Singapore, and effects on local populations which included alcohol, prostitution, forcing people into unfamiliar work patterns and movement, often forced, from clan houses to villages and labour camps. Other indirect effects of logging included numerous cases of rape of local women by lumber camp workers (unpunished even after being reported) and the introduction of venereal disease which was becoming widespread but which no effort was made to treat among the local population.⁶⁵

It is not unreasonable to see this as a foretaste of what lies in store for the indigenous people of West Irian now that major logging is commencing there. Past experience in West Irian indicates not only the same forced acculturation, but also that past concessions have been allocated with almost no regard for village land rights or the welfare of the village people by an Indonesian state elite which treats all resources as its own.⁶⁶ Already use by the Indonesian military of trees planted by villagers for their own use has created conflict in the Baliem Valley, and in other regions of West Irian foreign lumber companies are planning to take timber resources which represent almost the sole valuable asset of the people and their only chance to found an economy, in this case using small scale cooperative sawmills.⁶⁷ The indigenous people of West Irian have suffered a great migration of people from Indonesia who have taken over the economy and the jobs, even the unskilled jobs, and who now outnumber them.⁶⁸ The tribal people will suffer nearly all disadvantages from the timber projects, which include newly commencing woodchip projects, which are likely to have a much more destructive and widespread effect on traditional lifestyles and economies than any other type of resource extraction project. Logging is part of an exploitative pattern already well established and the social disruption it brings appears to be used deliberately by the Indonesians in their attempt at the cultural destruction of such indigenous people and in their search for 'development' and 'modernisation' as well as to increase 'security' in areas of potential resistance such as Kalimantan and West Irian.

"The peasant colonists in the Amazon are not there because of population growth. They are there because they have been expelled from lands cleared by large corporate enterprises."

Impoverishing the Future

It is not surprising that the devastation of their forests has already been the subject of protest and, in some cases direct confrontation, on the part of local people and independence movements in Kalimantan, Sumatra, West Irian (and also Papua New Guinea and other parts of Melanesia). The situation will grow worse as more woodchip projects become established, as investors in pulp projects will doubtless demand that their investment security be protected by appropriate government measures, i.e. to exclude local populations from their concession areas and to repress any further local opposition to their activities.

Although advocated by some western economists,⁶⁹ logging in such rainforest areas appears to be an excellent example of a type of resource exploitation which enriches a few at the expense of further impoverishing the bulk of the local inhabitants and provides no permanent useful social development. What doubtfully beneficial development is provided will largely evaporate with the loss of the resource, leaving traditional societies worse off than before. As the observer, quoted above, notes:

"If an attempt is made to assess the social and cultural costs involved (in the timber industry in Indonesia), the potential for development and the scope for secondary industries once the timber has been removed and the cost of rehabilitating and maintaining the resident population, it may well be found that far from bringing benefits to the people, the eventual effect of the lumber business has been to lower the standard of living and remove their ability to be self-supporting."⁷⁰

Such logging represents the kind of development which redistributes wealth upwards. The collective-type benefits provided by the forests—the necessary protection of species and biological diversity, of catchments, soils and rivers, and of fertile land for gardening under suitable forest fallow systems, the provision of items for food, for building, for energy and for labour-intensive local industries—are available generally to all people or broadly to all local inhabitants using the land, including the poorest who have no market power and little but their own labour. These benefits are liquidated in favour of a set of benefits from western-style logging which are distributed in a highly concentrated way and which fall mainly to existing elites and to affluent groups, usually in the west, who have the market power to purchase the resulting products of logging. Thus permanent broadly distributed benefits are exchanged for temporary highly concentrated benefits, in a way which

both illustrates and reflects the distribution of power in the societies concerned.

Growing Opposition

A usually less extreme but otherwise similar situation can often be found elsewhere in South and S.E. Asia. For example in Malaysia, which is one of the few countries where forestry cutting is subject to some supervision and control and where forest industries are not totally destructive of the forest, logging and sawmill licences which are highly profitable are used as a reward for political and party supporters and it is anticipated that the peninsular's timber resources will be depleted by the end of this decade, leaving an excess of plant.⁷¹ In the Philippines, where cutting according to the World Bank was almost entirely uncontrolled,⁷² log exports declined after 1976 to a quarter of the pre-1976 export total, largely due to depletion of the high quality accessible forests.⁷³ The Philippines has, notoriously, highly concentrated land distribution patterns and, largely in consequence, large numbers of peasant shifting cultivators. Deforestation in the Philippines due both to this source and to logging leaves an annual legacy of severe erosion, flooding and loss of life. In Sarawak, despite provision for national parks which is more generous than usual, logging and destruction of the forests from other sources is reducing the area available to indigenous hunting people and to wildlife and seems likely to squeeze them, in a now classic fashion, between the exploited areas and the park areas.⁷⁴

Even in cases where forest projects are relatively well managed and planned by a forest service which is able to provide some supervision, as in the case of the Madang project in Papua New Guinea, they can have a substantial effect on the lives of local people. The Madang project has roused considerable local opposition. Although Papua New Guinea projects are again financed by foreign multinationals, primarily Japanese pulp and paper companies, local people may receive some (often dubious) benefits such as roads and small direct financial returns for the logging on customary land. It is very doubtful, however, that this is enough to compensate for the loss of those economic products from the forest which supplemented village economies, let alone either the threat posed by logging to the environment, to cultural links with the forest, and to future garden areas where the soil has been compacted and generally impoverished, or the increased incidence of disease and the disruption to social structure caused by logging.⁷⁵ Little employment is provided for local village workers, and most benefits appear to accrue to the national elite via some government revenues from logging and contracts negotiated by urban business interests. Such projects again appear to be a way of transferring wealth from the rural villages where 97 per cent of the population lives to the urbanised national elite. This squares with the way the village people, who have a relatively high living standard by subsistence standards, and who are adopting an increasingly critical stance towards development, have perceived the situation. Local people have felled trees across logging roads and pushed tractors into the sea,

but the central government and bureaucracy remain enthusiastic about and continue to promote such projects, as do foreign corporations and international agencies.⁷⁶

In the Solomon Islands we see again the by now familiar alliance between the national governing elite and a foreign multinational joining together to exploit the rainforests, to the detriment of local village people who make up the great bulk of the population. The governing elite of the Solomons has acted in collaboration with Levers Pacific timber, in the case of resources such as fishing, to promote export-oriented development projects which are to their mutual advantage. As in the other cases, the harvesting of rainforest on customary land and its expensive replacement by plantations of eucalyptus, undertaken with inadequate consultation with the traditional owners, appears likely to have a severe adverse impact on village economies and on the local environment, and to provide a foreign multinational with a hold on customary land, reducing both the independence and autonomy of village people and their opportunities for genuine sustainable village-based development.⁷⁷ Local people have mounted a campaign against these developments.⁷⁸

Similarly, organised local opposition can be found in the Himalayan ranges of northern India, where commercial forestry operations, sponsored by government, have in the last three decades reduced the forest cover of the Himalayan watershed by as much as 40 per cent.⁷⁹ In this area most of the deforestation is reported to have been caused by forestry, and *not* by wood collecting to meet basic energy needs as sometimes asserted.⁸⁰ Deforestation in this area has caused serious flooding and whole mountainsides have slipped away causing changes in river beds and clogging Uttar Pradesh irrigation canals. According to one report on the area:

As the thick broad-leaved forests on the mountain tops were slowly sold away, the humus sponge, that earlier held the monsoon water back, disappeared. The little perennial streams now dry up a few months after the monsoon. Fetching water and firewood has become a major preoccupation of the hill women.

Receding forests have also meant increased soil erosion and decreased productivity of the little plots of the poor villagers. But, most frightening of all, as one villager put it: "The terror of the tiger has now been replaced by the even more awesome terror of the landslide."⁸¹

In this area villagers have organised a non-violent resistance movement, Chipko Andolan, hugging trees about to be cut to prevent them being felled, and have also organised replanting of felled areas with the broad-leaved trees necessary for soil and water catchment protection.⁸²

The FAO Apologists

Commercial logging and other kinds of corporate-based development appear to play a major role in the destruction of tropical forests, probably a much more major role than is usually claimed. The individual governments and logging companies (usually multinationals) fostering or carrying out logging have not



A traditional 'swidden' clearing in Columbia. Because the roots of the trees have been left undisturbed to protect the soil from erosion and laterization the forest can recover when the plots are abandoned after two years of cultivation. By contrast, modern farming techniques have turned whole areas into virtual deserts.

surprisingly been concerned to argue that logging is really harmless or only minor in its impact, and that the real culprits in forest destruction are the poor, the landless peasants and other categories of forest farmers. (These people have few representatives at international conferences and few opportunities to present an alternative picture of what is happening, and so can usually be blamed with impunity.) Supporters of the harmlessness of corporate development have received a good deal of support from western technocratic organisations such as FAO, which has worked closely with the forest industries and which has been strongly concerned to foster western-style development and industry based on the tropical forests. FAO thus has acquired a strong interest in logging apologetics. For example, according to Dr. Louis Huguet, Director, Forest Resources Division, FAO;

Because few tree species are exploited in tropical forests, logging does not directly destroy forests. It just selectively cleans the forests, with the possible consequence that some species may disappear — but it does not destroy forests. The shifting cultivators, who are using the roads built by the logging companies, enter and destroy the forests for agriculture.⁸³

In the same vein, a forestry consultant says:

It should be emphasised that except for certain situations, a large majority of commercial logging operations in the tropical forests have not resulted in deforestation. Despite the many thousands of different species in the humid and sub-humid tropics, no more than 2 or 3 per cent presently have commercial acceptance on the world market. About two-thirds of the world's total hardwood exports are derived from S.E. Asian countries. The trees used commercially are cut from relatively small areas, and the results of the degraded timber stands may be termed economic rather than environmental deforestation.⁸⁴

However the argument that logging does little damage is faulty. The distinction between selective

logging and clearcutting, which is significant in the case of supervised logging in temperate forests, is much more blurred where cutting is uncontrolled and unsupervised, which is the usual situation in tropical forests. In Indonesia as we have seen, even though regulations exist on size of trees to be taken, slope limits and so on, they are not policed, and much logging amounts to virtual clearcutting.

Clearcutting and the Woodchip Industry

A development which has been strongly promoted by FAO and other agencies in recent years is that of the woodchip industry based on tropical forests, which of course involves clearcutting of the forests.⁸⁵ This development is apparently designed to cope with forest depletion and poor regeneration within commercial time-spans.

Indonesia for example plans some five major pulp mill projects in the next five years, both for the internal market and for export. Two plants will be located in East Kalimantan, and one each in northern Sumatra, Central Java and South Kalimantan. Rotations will apparently be very short, and materials will be drawn mainly from the tropical hardwood forests of Kalimantan, Sumatra and West Irian⁸⁶, although there will be some use of material from short-term monocultural plantations of pine to provide the desired mix.⁸⁷ There are plans for a number of similar plants in Sabah and Malaya and Papua New Guinea and some have already started production, the Sabah plants apparently plan to use 6-10 years rotations.⁸⁸ Foreign participation (including Australian) is being sought. One of the Indonesian plants will involve Weyerhaeuser, which is similarly involved in one of the Sabah plants. Such ventures will enable the loggers, for a few decades anyway, to employ to an even greater extent large-scale clearcutting of the rainforests and also to use the secondary growth and non-commercial species ('the run-of-the-



Axe...

bush' mixture) left after the first extraction of sawlogs. But this industry involves clearcutting or virtual clearcutting of the forests. In the tropical forests between 75 and 90 per cent of the nutrients are thought to be tied up in the biomass, so that clearcutting or virtual clearcutting destroys the nutrient basis of the forest, and is condemned by responsible foresters.⁸⁹ In the poor soils and extreme climatic conditions of these areas such projects seem likely to result in the loss within a few decades of most forest cover, and to spell eventual disaster for both the natural and human communities dependent on the forest.

Damage of Selective Logging

Even the damage done by 'selective logging' in tropical conditions can be considerable. In the often very wet conditions (areas of Sarawak, subject to logging, for example have a rainfall in excess of 200" p.a.) more than 30 per cent of the area can be compacted by machinery, and the multiple roads and snig tracks can result in massive soil disturbance. Several studies have shown that extraction of even 10 per cent of the trees results in loss of a further 55 per cent of the canopy, leaving only 35 per cent remaining.⁹⁰ Much of the remainder then dies due to exposure, and the resulting forest, if forest returns at all, is quite different and much impoverished in character. Even if the effect of logging roads in opening the forest to hunting of wildlife is ignored, there is considerable evidence which points to the great relative impoverishment of the

secondary forest which normally appears after logging, as compared with the primary forest which existed before logging. For example logged forest has been found in several studies to contain only about 40-50 per cent of the mammals of the primary forest⁹¹ and a study of PNG birds found that 65 per cent of the endemic birds were confined to primary rainforest, and that less than a third of the birds recorded in primary forest were regularly found in secondary forest.⁹² This considers numbers only: if distribution and rarity of species were considered the situation would be much worse, since most secondary species are widespread. Nevertheless promoters of forestry projects often continue to maintain that logging 'enriches' these forests.

Primary evergreen rainforest has also been shown to have the highest value for watershed protection, whereas certain types of secondary forest have comparatively low value.⁹³ Primary rainforest is poorly adapted to recover after widespread disturbance such as is caused by logging, especially where this comes close to clearcutting. Many primary rainforest species have poor dispersal mechanisms and short life times for seed, and take a very long time to reach seeding, and there are a vast number of poorly understood interdependence relationships between plants, insects and pollinators.⁹⁴ There is staggering diversity and low concentration of species; in New Guinea, for example, 120-150 species of trees 10 cm or thicker per hectare is not unusual; 200 (and 600 species of vascular plants) is not uncommon in Malaya; and in an enumeration of canopy trees on 23 hectares of lowland dipterocarp forest in Malaya, as many as 157 out of the 381 species present occurred *only once*.⁹⁵ This means that very large areas would need to be permanently preserved from interference in order to maintain even a modest part of this diversity, that some species will certainly be eliminated and areas will be irreversibly modified as a result of logging. In any case the rate of return of the primary rainforest even assuming soil conditions and other factors have not been made unsuitable is usually extremely slow. For example the rate of travel of *Dipterocarp* species (the main economic species in the Indo-Malesian areas being logged) is estimated to be one kilometre a century *across protected land*.⁹⁶

Regeneration practices cover only a small part of the affected area and usually substantially modify the forest, for example by girdling and poisoning of unwanted species, destruction of vines, and so on. Soothing talk of 'forest renewal' is a euphemism which usually covers a reality of plantation of a small part of the area to some high yielding species, often exotic. This is what is occurring in those parts of Indonesia which are being 'regenerated' (e.g. Weyerhaeuser's plantation of a small part of its Kalimantan concession area to *Pinus caribaea*, almost certainly intended for use in the woodchip industry) and in the Madang project in Papua New Guinea and in the Solomons. Very few forest values are renewed under such treatment and large areas of land remain denuded of the many-layered forest so essential to maintain soils in areas of intense climatic activity. There are huge monocultural problems in the plantations of exotic species, which in

poor soil conditions can probably be maintained for only a few decades before rotational decline and other problems cause their eventual abandonment.⁹⁷ This is what forest renewal usually provides in place of the rich, diverse and balanced forests which existed before logging 'cleaned' them.

No Renewable Resource

For all these reasons many scientists believe that the tropical rainforest cannot in general be regarded as a renewable resource.⁹⁸ Western-style industries and technologies based on the assumption that they are renewable and upon the temperate experience appear to be quite inappropriate. Rather the forests should be regarded as a stock of capital which if properly maintained will provide *in perpetuity* a small steady interest, in the form of what western technocrats call 'minor' products — which however are often not minor in terms of the needs of local community — and of widespread benefits such as soil and watershed protection. If this is correct then agencies who promote the setting up of western-style commercial forest industries employing western-based technology which treat the forests in the fashion of the temperate forests, are employing the wrong model and exporting an inappropriate and western-centred approach, just as western technocrats have so often done with agriculture. Soothing remedies such as 'selection silviculture', 'better planning and more forestry training' — especially where this is training to see the forests primarily as a timber resource — do not face the facts.

FAO: 'The World's Forestry Conscience'?

Many projects affecting the tropical forests have been promoted by agencies such as FAO, the IMF and the World Bank in the past, and despite an increased attention to village forestry in recent years, a high proportion of World Bank funds are still devoted to such export projects and to establishing the pulp and paper industry.⁹⁹ FAO has also been active in this area.

What is FAO, 'the world's forestry conscience' as it calls itself,¹⁰⁰ doing about the problem of destruction of the world's rainforest? FAO now has a forest inventory program again (which however does not distinguish the highly valuable primary rainforests in any satisfactory way from other types of forest cover). There are other activities also. According to its Director, Forest Resources Division,

We are now studying the rate and pattern of the degeneration of the tropical forests. We are also devoting part of our program to plantation improvement because we think that eventually many destroyed forests will have to be replaced by planted forests . . . Activity in the field of forest industries is another of our priorities. . . . We are trying to promote forest projects by organizing discussion about the use of various species and preparing statistics about existing and possible market strengths . . . We are also active in strengthening and modernizing forest administrations in numerous countries.¹⁰¹

Places where projects are being promoted include New Guinea, the Congo, the Cameroon, Zaire, and Gabon, i.e. places where there is as yet no population pressure



... gives way to Chainsaw. But has modern development brought 'progress' to the tropics?

on the forests, and where they might otherwise be preserved.

It is not surprising that FAO is anxious to maintain the myth that logging in tropical rainforests does no damage, otherwise it would be apparent that much of its activity centred around trying to make minor compensation for a disaster it had helped to produce. But it seems that the world's forestry conscience has really given the tropical forests up — their loss will have to be accepted as inevitable because they cannot be exploited for sustainable commercial forestry in the style western forestry technology and industry determines, and they will have to be replaced by plantations. 'It's sad, but . . .'. The rainforests seem to have been surrendered by the forestry conscience with no noticeable struggle. Similarly the *Global 2000* report appears to write the demise of the tropical forests off as a sad but inevitable or unstoppable process.¹⁰²

The Need for Social Change

But once the exclusive focus on apparently uncontrollable population growth as the source of the problem is abandoned, it can be seen that there is nothing inevitable or unstoppable about what is happening to the tropical forests, any more than there is anything inevitable about world hunger and poverty. There is nothing inevitable about the elitist and repressive social structure, the governments with their close connections with multinationals, and the highly unequal access to existing agricultural land, which

helps ensure the destruction of the forests. There is nothing inevitable either about the major factor of corporate-based exploitation of the forests for export, which could and would be stopped in societies where power was more equally distributed. Nor is there anything inevitable about the overall development model, which demands the selling off of the forests as well as other resources in an effort to obtain concentrations of capital for capital and energy intensive, western-style industrial development. All these things are the products not of biology but of a particular sort of social system.

A necessary condition for a strategy which stood a chance of saving the forests is that it should be one which would effect an immediate improvement in the lot of people of the relevant areas largely within the limits set by existing agricultural land and without the need for a high immediate level of capital accumulation or rapid industrialisation. The only strategy which seems to satisfy these conditions involves major changes in social structure towards more egalitarian and libertarian societies in the third world. Within a framework which rules out such social alternatives the problem will indeed appear to be intractable, and the best that could be hoped for would be a minor amelioration of the biological disaster which is looming (e.g. through the creation of more national parks).

Alternative social strategies which would go a long way towards taking the pressure off the forests would include:

□ The intensification of use of existing agricultural land, to be achieved primarily through the redistribution of existing cleared land and by provision of appropriate assistance for self-provisioning farmers rather than by the energy and capital intensive Green Revolution style of farming recommended by some writers (e.g. Myers¹⁰³). The Green Revolution, as has now been shown extensively for the Third World, often increased poverty, inequality, and exclusion from the production process and continues to create pressure on the forests both through such marginalisation and through pressure to sell off the forests as a source of development capital, thus creating a vicious circle.

□ An alternative development model stressing rural and self-reliant community-based development and widespread participatory activity and directly improving subsistence lifestyles.¹⁰⁴ This model is labour rather than capital intensive and allocates resources primarily according to need rather than according to market power.

It is important to note that without major social change in these sort of directions the strategy advocated by Myers for example of attempting to save the forests through development via the 'New Economic Order' is likely to make the position of the forests worse rather than better. Not only is there no reason to believe — in the absence of such social changes — that improvements in the export trading position of Third World nations would really assist the bulk of their people, rather than providing a more luxurious lining for the pockets of their governing elites, but the 'closer economic ties' between developed and underdeveloped

nations envisaged in the New Economic Order would involve tailoring their economies even more closely to the demands of the commodity markets of the affluent world rather than the needs of local people. This means more rather than less clearance of the forests for beef, lumber, palm oil, pulp and paper, and so on.

Change and the State

It is difficult to see how the necessary measures could be carried out while the western-supported military and governing elites which control most of the tropical forest countries today remain in power. Some proponents of the population thesis, notably Garrett Hardin in *The Limits of Altruism*, have argued that, if a viable world ecology is to be maintained and the forests protected for the future, these repressive regimes are precisely the sorts of regimes which are required in underdeveloped countries:

If there is complete equality of position and power in a needy society the interests of posterity are unlikely to be taken care of. Seeds for the future will be used for food today by a hungry people acting egoistically. To serve the future a few individuals must be put in the special position of being egoistically rewarded for protecting the seeds against the mass of people not enjoying special privilege. Well-fed soldiers acting egoistically (to preserve their institutional right to be well fed) can protect posterity's interest against the egoistic demands of today's hungry people. . . . I am not pleading for more special privilege in our own country. So far as posterity's interests are concerned the richer the country the less need it has for special privilege. We are rich. But I do plead for tolerance and understanding of special privilege in other countries, in poor countries . . . If we wish to protect posterity's interests in poor countries we must understand that distributional justice is a luxury that cannot be afforded by a country in which population overwhelms the resource base . . . We will serve posterity's interests better if we give up the goal of diminishing special privilege in poor countries.¹⁰⁵

But the evidence we have marshalled in this paper suggests that this analysis is totally astray. The current tragedy of rainforest destruction is certainly not being caused by an excessive concern for distributional justice but rather by its opposite. The combination of privilege, inequality, and repression which characterizes most of the third world today is a colossal failure as far as conserving the environment and the forests is concerned, just as it is for human values of justice and freedom. Ruling elites which can so readily disregard the claims of their compatriots are not likely to pay heed to those of the future or of other species. The military and governing elites of underdeveloped countries which Hardin believes are necessary to protect the forests from their populations have a heavy measure of both direct and indirect responsibility for forest destruction, and are among the major initiators and beneficiaries of the process.

Global 2000: It's Inadequacies

The necessary social alternatives will however not be considered while the focus remains so exclusively on population growth and while the important role of

western nations is maintaining the social structures which lead to deforestation is ignored. In the *Global 2000 Report*, for example, the ecological and social consequences of the loss of the forests are in the main well assessed and there are many excellent statements of the disastrous effects tropical deforestation is likely to produce globally and in the underdeveloped world. However it is remarkable that in a report which is designed to help determine American policy and actions and serve as a basis for planning there is no serious attempt to assess the causal factors at work in deforestation or the role of the USA and its allies and associated agencies in them. Without evidence or indeed any real *examination* of the issue, the main problem is simply attributed to agricultural clearance resulting from population growth. Other factors, such as logging and corporate development, are occasionally mentioned, but no systematic attempt is made to assess their relative importance in different areas, although this is vitally important for any determination of what can and should be done, especially by the USA. Instead of a systematic assessment of causes, a few cases are examined (e.g. Panama in the case of Latin America) in which agricultural expansion is involved, and without examining alternative explanations such as land distribution, it is invalidly concluded that population pressure is the explanation for *these cases*, then in turn this procedure is invalidly extrapolated to other cases (e.g. the Amazonian region where a very high proportion of tropical deforestation and species loss is likely to occur) for which it is demonstrably false. More generally (p.154) it is invalidly concluded that agricultural expansion (which is

stated, probably correctly in view of the Amazonian situation, to be the major causal factor in Latin America) arises from population pressure — thereby ignoring both the fact of the major role of corporate development aimed at export to the affluent nations and especially the USA itself, and of forest clearance arising from marginalisation and unjust land distribution.

Avoiding Awkward Questions

The advantages of the population explanation are many. The problem can be seen as serious enough, but the population of the Third World countries involved can be seen as inflicting these damaging consequences on themselves ('the poor are literally destroying their own future'). Social alternatives can be ignored and there is no need to ask uncomfortable questions like: why are the governments of so many third world nations allowing the devastation of their forested areas and selling off or destroying resources which local people often need desperately far more than those in the affluent sections to whom they are sold? If such a question were asked one would have to face the issue of the nature of these governments and of their relations with their populations and with the industrialised world.

There is no need either to face the awkward question of US involvement in the deforestation process, which has been quite heavy from the beginning, especially in S.E. Asia and Latin America. In the Amazon region, for example, the US government (especially the State Department, the co-producer of *Global 2000*) and US corporations were heavily involved in the mid-60's in



Brazil's road programme has made massive inroads into the Amazon, destroying much forest.

instigating and planning the disastrous program of corporate and multinational development of the Amazon.¹⁰⁶ The loans for Amazonian highway development came from the Inter-American Development Bank and the World Bank, and in the latter case represented the largest grants ever made for highway construction in its history. Also important were major grants-in-aid from USAID for technical assistance, USAID loans under the Alliance for Progress and direct US Army aid to the Brazilian Army Corps of Engineers engaged in building the highways which are a main factor in opening the Amazon to destruction. USAID was also involved in mineral survey work.¹⁰⁷ As well there are many US based corporations involved in the area, including some of the major landholders and forest destroyers. The plan to flood large areas of the Amazon Basin to provide hydropower, a plan which will destroy huge areas of forest, was thought up by the Hudson Institute. Much of the material being produced on the beef cattle ranches for which so much of the forest is being destroyed is destined for markets in the USA. More generally there is the overall US report for the kind of government, social system, and development model which makes what is happening in the Amazon possible.¹⁰⁸ US involvement in other major centres of rainforest destruction such as the Philippines and Indonesia is no less clear, as is the overall responsibility for the development model. Yet no hint of these unpleasant facts, important though they are for formulating plans of action, reaches the reader of *Global 2000*. While these social structures and conditions of support for them continue, even in mitigated form, there is little hope for the tropical rainforests or the people who depend on them.

Hubris and Rainforest Destruction

The causal account would, however, be seriously incomplete without some mention of the powerful ideology of development and conquest of nature which often seems to lie behind what is happening to the rainforests. This ideology, with its emphasis on the drastic simplification of complex ecosystems and their making over into a form which is more obviously and exclusively tailored to immediate human interest, interacts strongly with the inegalitarian social structure to produce the sort of results described. In this process of making over, it is not only the natural world which loses out, but very often also it is the most powerful human interests which are strengthened at the expense of the less powerful. As Tolstoy put it, "If the arrangement of society is bad (as ours is), and a small number of people have power over the majority and oppress it, every victory over nature will inevitably serve only to increase that power and that oppression".¹⁰⁹

It is common to encounter the view, associated with the ideology of conquest of nature and expressed frequently and forcefully by technocrats and other powerful figures in places such as Brazil and Indonesia, that the natural ecosystems concerned are really of little or no value, and that their destruction will involve no loss

— and even a gain because it will permit the development of man-made replacements, in the form of 'high value' planted monocultural forests or other similar systems. (In fact these 'replacements' seldom materialise, but their alleged possibility clearly serves as an important rationalisation for the destruction.) Despite the fact that the world's richest, most stable and biologically productive ecosystems are being replaced by some of the simplest, most unstable, and in the long term least productive, there is an unshakeable conviction that the world is being improved, amounting in some quarters to a conception of the goal as an almost sacred mission. These attitudes of nature-domination, expressed usually by the official or technocratic westernised elite, not infrequently contrast strongly with those of the non-westernised indigenous peoples, usually at the bottom of the social power-scale, who are closely associated with the forests and whose society, culture and relation with the natural world is increasingly disrupted or destroyed by the aggressive, proselytizing ideology of development, conquest of nature and technocratic 'modernisation'. Both in terms of its origins and in terms of the social allegiances of its promoters, this ideology is a manifestation (if often a strident one) of dominant western attitudes to nature, in which the non-human is perceived as valueless, except to the extent that it can be made to serve human interests, and the world can only be improved by humanization. This aggressive technocratic ideology appears to precede the opening of remaining large tracts of land and forest to the markets and influence of the advanced industrial nations in much the same way as proselytizing Christianity preceded western economic and political penetration of the region during the colonial period.

This paradigm of nature-domination has now, of course, become repugnant to many in the advanced industrial nations, where a major and historically significant paradigm shift appears to be under way, and where it is increasingly seen as an expression of western arrogance vis-a-vis nature. It continues to be very important, however, in the thinking of many of those involved in the deforestation process, particularly technologists such as foresters.¹¹⁰ There is good ground, then, for seeing the destruction of the rainforests as an exercise not just in the dominance of the short-term interests of a powerful elite which gains from the destruction, but also a particularly vast and disastrous expression of the contemporary human *hubris* concerning the natural order, which is so characteristic of the modern western technocratic paradigm. That it is such an expression of *hubris* perhaps helps to explain the otherwise surprising fact that although this vast program of biotic simplification is being carried out in the name of improving the productivity of the land and its usefulness for human purposes, its likely results will in the main be entirely the opposite, that large areas will be rendered useless for human and non-human purposes alike, and what potential they had will be destroyed.

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See also N. Myers, *The Sinking Ark*, Pergamon Press, 1979 and Gerald O. Barney, *The Global 2000 Report to the President of the US: Entering the 21st Century*, (Hereafter *Global 2000*), Pergamon Press, 1980, vol. 1, p.153.
2. *Global 2000*, vol. 1, p.150.
3. G. Woodwell, 'CO₂ — Deforestation Relationships', *US Strategy Conference*, op.cit., p.34. Some scientists estimate that 55% of the stored carbon occurs in the tropical forests.
4. G. Barnes, *US Strategy Conference*, op.cit., p.16.
5. T. Whitmore, *Tropical Rain Forests of the Far East*, Oxford, Clarendon Press, 1975, p.235.
6. M. Jacobs, *Flora Malesiana Bulletin*, 29 (1976), p.2588-9.
7. On the importance of rainforest in preventing erosion and levelling stream flows see E. F. Brünig, 'The tropical rainforest — a wasted asset or an essential biospheric resource?', *Ambio* 6(4) 1977.
8. According to Jacobs (op.cit p.11), so important are the rattans that "it is correct to speak of a bamboo-and-rattan culture, for the whole of S.E. Asia and Malesia". Primary rainforest is the main source of rattans, and although efforts are being made to cultivate them, knowledge of how to do so has not yet been developed. Other rainforest products are also important, with one third of the species of the Malay Peninsula classified as useful.
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10. On the appalling situation of South American Indian tribes affected by forest destruction, see especially Shelton H. Davis, *Victims of the Miracle*, Cambridge University Press, 1977.
11. A good example of a major focus of attention on population growth which is out of proportion to its real causal responsibility is *Global 2000* op.cit. See also numerous articles in *US Strategy Conferences*, op.cit., especially those by spokesmen for international agencies and forest industries.
12. N. Myers, op.cit. In the latter case the causal hypothesis is fairly confused and inconsistent, with various different explanations being advanced at some point in the text, but the most frequently repeated thesis is the population thesis, attributing responsibility to 'growth in human numbers and human aspirations'. (e.g. p.4), p.23-24, p.48 and so on.
13. In the case of these countries the forest is mainly threatened by export forestry projects being promoted by FAO and the World Bank. R. Fyshwick, *US Strategy Conference*, op.cit., p.30.
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20. Bunker, op.cit., p.36.
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26. M. Jacobs, 'Forests for People — Once?' *Tiger Paper*, vol. v, No. 4 October 1978, (FAO regional office for Asia and the Far East), p.27.
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28. For example, many hill tribe people from Sulawesi have been affected by leasing of their forest area to the Japanese-based company Kebonsari and the associated establishment of a national park there. People displaced from neighbouring Sulawesi have become a major source of destructive shifting cultivation in Sumatra and Kalimantan. George Y. Adicondro, 'The Jungle are Awakening', *Kogai* No. 22 Tokyo, 1979, p.61. and Hanson and Koesoebiono, op.cit.
29. Budowski, op.cit., p.370.
30. See Arthur J. Hanson & Koesoebiono 'Settling Coastal Swamplands in Sumatra', *Developing Economies and the Environment, The Southeast Asian Experience*, Colin MacAndrews and Chia Lin Sien (eds.), McGraw-Hill Southeast Asian Series, Singapore 1979.
31. *Newsweek*, Oct. 20, 1980.
32. T. Whitmore, op.cit., p.220-221.
33. *UNEP Overview Document*, Experts meeting on Tropical Forests Libreville, 25 February - 1 March 1980, p.11.
34. As argued in Bunker, op.cit. Bunker shows — what is not inconsistent with the thesis advanced here — that the exploitative and destructive development model itself extends into the colonial past in this region, but the thesis that the major focus of explanation must be sought in historical trends within the Amazon region itself is not thereby demonstrated and is convincing only if the closely analogous contemporary situations elsewhere on the resource frontier of capitalism (e.g. S.E. Asia) are overlooked.
35. See *Forestry, a Sector Policy Paper*, World Bank, Washington, D.C., February 1978.
36. K. Das, 'Pressure on Park Loggers', *Far Eastern Economic Review*, December 2, 1977, p.56.
37. C. Chandrasekharan, *Report on the Forestry Situation in Indonesia*. Bangkok, May 1977, p.95.
38. M. Jacobs, *Flora Malesiana Bulletin*, 29 (1976), p.2588-9.
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40. M. Jacobs, *Flora Malesiana Bulletin*, 31 (1978) p.3029-33.
41. M. Jacobs, *Flora Malesiana Bulletin*, 29 (1976) p.2587-9.
42. Whitmore, op.cit., p.237.
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44. Dan Morgan 'Timber Firm Bucks Trend in East Borneo', *Washington Post* November 26, 1978. Award of concessions for political reasons is also common in Sabah and Malaya. See Anthony Rowley, 'Forests: Save or Squander', *Far Eastern Economic Review*, 2 December 1977, p.48.
45. Rachael Grossman and Lenny Siegel 'Weyerhaeuser in Indonesia', *Pacific Research*, Vol. ix, No. 1, Nov-Dec. 1977, p.5.
46. Grossman & Siegel op.cit., p.3.
47. Dan Morgan, op.cit.
48. Adicondro, op.cit., p.58.
49. *Tempo*, December 3, 1978, p.8-9, and Adicondro, op.cit., p.63.
50. Adicondro op.cit., Criticism was voiced in 1979 from many sources, including Dr. Emil Salim (see e.g. *Tempo*, June 9th, 1979, p.54), and even the East Kalimantan provincial parliament has voiced anti-logging sentiments.

51. *Tempo*, July 1977, p.49, and *Banjarmasin Post*, May 3, 1979.
52. Adicondro, op.cit.
53. Adicondro, op.cit.
54. Laureat & Sacerdoti, op.cit., p.65.
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59. R. Hanbury-Tenison, *A Pattern of Peoples*, Angus & Robertson, 1975, p.79.
60. Ibid, p.44, p.40.
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70. R. Hanbury-Tenison, op.cit., p.82.
71. A. Rowley, 'Forests: Save or Squander?', *Far Eastern Economic Review*, December 2, 1977, p.46-48.
72. World Bank, op.cit., p.19.
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74. See R. Hanbury-Tenison, *Mulu: The Rainforest*, Weidenfeld & Nicholson, 1980.
75. On these points see articles in J. Winslow, (ed.), *The Melanesian Environment*, ANU Press, Canberra, 1977, especially D. S. Liem, 'Wildlife Management in the Proposed Garu Wildlife Management Area', J. D. Waiko, 'The People of Papua New Guinea, their Forests and their Aspirations', and R. and V. Routley, 'Destructive Forestry in Australia and Melanesia'.
76. On the resistance in the New Guinea case see W. Jonas, 'The Papua New Guinea Timber Industry: some aspects of capitalism at the periphery', 1979, University of Newcastle. On the promotion of such projects see R. and V. Routley, op.cit.
77. See R. Waddell, 'The Effect of National Development Plans on the Village: A Case study of the Western Solomons', paper presented at ANZAAS 1979.
78. On the opposition in the Solomon Islands see Ann Wigglesworth, 'Logging the Islands', *Chain Reaction*, Vol. 5 No. 4, August 1980, p.10-11.
79. *Global 2000*, op.cit., p.143. Although briefly dropping this piece of information, *Global 2000* predictably goes on to attribute the problem in the area almost entirely to subsistence agriculture.
80. S. K. Chauhan, 'Tree Huggers Save Forests', *Development Forum*, vol. 6, No. 8, September 1978, p.6.
81. Ibid.
82. Ibid.
83. US Strategy Conference, op.cit., p.32.
84. Ibid, p.43. Although the Sierra Club proposed that curbs be placed on the activities of US Corporations abroad, there seemed to be little interest in this proposal and much of the remainder of the conference consisted of corporate apologetics, combined with the familiar emphasis on destruction by the shifting cultivator and on population growth. Even environmentalists were of the opinion that 'low intensity forest harvesting is not a villain in the process of tropical deforestation'; participants passed a resolution concerning the need for curbs on population growth, but paid little attention to the need for curbs on western logging and agribusiness companies involved in the clearance of tropical rainforest or on the role of the western consumer, by far the main consumer of tropical hardwood products and of the other products of corporate-based development.
85. See for example K. F. S. King, 'It's Time to Make Paper in the Tropics', *Unasylva*, vol. 27, no. 109, 1975.
86. *Australian Forest Industries Journal*, February, 1980.
87. As in the Weyerhaeuser plantation of *Pinus caribaea* in its concession area in Kalimantan reported in Morgan, op.cit. Although the fact that it is doing some replanting is reported as making the firm 'an environmental good guy', the planting of exotic monocultures and repeated clearcutting of what is left of the rainforest hardwoods are likely to prove a disaster for the local environment, and can only be seen as satisfactory if the extraordinarily low standard for being an 'environmental good guy', of temporarily maintaining some kind of tree cover, is adopted.
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94. On the short seed life-time and poor dispersal mechanisms, see A. Gomez-Pompa, C. Vazquez-Yanes and S. Guevara, 1972. 'The tropical rainforest: a non-renewable resource', *Science* 177 (4051): 762-5. On the flowering, seeding periods and rate of spread of primary species, especially the important Dipterocarps, see M. Jacobs, 'A Plea for S.E. Asia's Forests', *Habitat*, Vol. 7, No. 4, August 1979.
95. M. Jacobs, 'A Plea for S.E. Asia's Forests', *Habitat*, Vol. 7, No. 4, August 1979, p.8.
96. M. Jacobs, ibid., p.10.
97. For some details in the New Guinea case, see R. and V. Routley, 'Destructive Forestry in Melanesia and Australia', *The Ecologist*, Nos. 1/2, vol. 10, Jan/Feb. 1980.
98. For example see Gomez-Pompa et al, op.cit., and M. Jacobs, 'Forests for People — Once?' *Tiger paper*, vol. v, No. 4, October 1978.
99. See World Bank, op.cit.
100. US Strategy Conference, op.cit., p.32.
101. Ibid, p.32.
102. *Global 2000*, op.cit., vol. 11, p.333.
103. N. Myers, op.cit.
104. For some details of how subsistence life-styles may be improved in the specific instances of the Solomons, New Guinea and Indonesia respectively, see R. Waddell op.cit., J. D. Waiko op.cit., and R. Hanbury-Tenison, op.cit., p.62. In the latter the author suggests simple measures which would help improve sources of domestic protein, reducing hunting pressure on the forest.
105. G. Hardin, *The Limits of Altruism*, Indiana University Press, Bloomington, 1977, pp.80-81.
106. As Davis, op.cit., p.38 and p.129, makes clear.
107. Davis, op.cit., p.64 and p.89.
108. On US support for the Brazilian regime see N. Chomsky and E. S. Herman, *The Political Economy of Human Rights*, vol. 1, Black Rose Books, Montreal, 1979.
109. L. Tolstoy quoted in S. Bedford, *Biography of Aldous Huxley*.
110. There are honourable exceptions of course, but it is nevertheless remarkable that so few in the forestry profession have raised their voices in public protest against the massive contemporary destruction of the natural forests. The forestry record of objection compares quite poorly with that of other professions affected by the same process such as anthropologists and botanists. There are of course many in the profession also who are actively assisting the deforestation process and the associated ideology. At least one reason for this seems to be in the tree-farming mentality and the associated belief that forestry technology and know-how can produce 'superior' planted forests, so that the loss of the natural forests, provided a few reserves are retained to provide genetic stock for forestry manipulation, is not a matter for great concern.

The Environmental Crisis and American Politics, 1860 — 1920.

by
Carl. H. Moneyhon

At the turn of the century, many Americans were aware that the destruction being wrought upon their environment could not continue. But splits amongst the infant environmental movement — splits which are still evident today — prevented any effective action being taken. Ecologists fought preservationists; preservationists fought conservationists; and conservationists fought conservationists. Ultimately, it was those whom the environmental movement sought to control who won the day.
Is history repeating itself?

Few people would question the proposition that a society's survival depends upon its ability to relate to the environment. The physical world provides the building blocks necessary not only for biological survival but also for development of complex social institutions typical of human life. Because of the inter dependence of people and their organizations with the environment any change in the latter requires necessary alterations in the former. The dilemma posed by the relationship of men to the natural world has not generally been the survival of humans as a species, although individuals may be destroyed in the adjustment. Mankind has survived past crises. The problem has been what form society would take under different conditions.

Modern communities have been unwilling to accept naturally imposed change. More typically they have accepted the ideal that the human will can be imposed on nature. Rather than be tossed about by natural forces, peoples in the nineteenth and twentieth centuries have sought to limit or control change through the use of science, technology, and planning. We have believed that society and its values could be protected in the face of environmental change. If the status

quo could not be maintained, at least destruction of the existing order could be minimized. But is such control possible? Can change be regulated for "social" purposes? The American experience in the late nineteenth century may offer us insights into dimensions of an ecological crisis for a modern community. Its response to a perceived crisis provides us with ideas about the forces that operate in a modern community to preclude or complicate a planned response.

A Land of Boundless Plenty

The idea of environmental limitations on American society is not one usually associated with the country's past. The pervasive view of our national history is the story of rapid and steady expansion, of growth based upon almost infinite natural wealth. This view grew out of the colonial and early national periods when Americans felt unbounded optimism about their country and its practically limitless resources. Benjamin Franklin was typical of early observers when he noted that he believed Americans would for generations escape the constant struggle for survival that characterized European life. He believed that the American continent would provide the base for a

society that would escape the pressures of population on resources that condemned the majority of peoples to mean lives. Instead of causing struggle and restrictions, the American environment would not act as a limiting factor.

This attitude persisted into the nineteenth century, expressed in popular magazines and travel literature. A typical expression was that of a visitor to the Mississippi Valley who wrote:

Our inheritance is beyond our comprehension, our climate superior, our country bounded by oceans and transversed by noble rivers and lakes Our country—the great nation—we boast of our greatness—she is emphatically the great nation. Where can we find our country's equal in geographical and natural advantages, in material progress, or in general prosperity? As a united and free people, the United States presents to the nations of the world a spectacle that must excite the grandest wonder and admiration.¹

And if America's possibilities amazed its inhabitants, it exercised an equally profound impact upon Europeans. They shared local wonder at the country's bounty. The possibilities afforded by the wealth of the natural environment were



Early American settlers found a country of almost boundless plenty. But, by 1864, George P. Marsh—one of the founding fathers of the ecological movement—was sufficiently alarmed by the scale of environmental despoilation to warn Americans: "We are even now breaking up the floor and wainscoting and doors and window frames of our dwelling, for fuel to warm our bodies and to seethe our potage, and the world cannot afford to wait until the slow and sure progress of exact science has taught better economy."

almost incomprehensible within the context of the European experience. In his *Democracy in America*, Alexis de Tocqueville wrote that in the struggle between men and the world that made life possible Americans had little concern for nature other than as a resource to be exploited for their benefit. He observed that they were oblivious to the awesomeness of the wild. Instead he suggested:

(They) never think about them: they are insensible to the wonders of inanimate nature and they may be said not to perceive the mighty forests that surround them till they fall beneath the hatchet. Their eyes are fixed upon another sight: The American people views its own march across these wilds, draining swamps, turning the course of rivers, peopling solitudes, and subduing nature. This magnificent image of themselves does not meet the gaze of the Americans at intervals only; it may be said to haunt every one of them in his least as well as his most important actions and to be flitting before his mind.²

In short, Americans were incredibly homocentric in their approach to their surroundings. They did not see nature as a limiting force. The persistence of this view throughout the century may be seen in the writing of a British visitor to the United States, James Muirhead. In 1901 he saw the same prevailing optimism. Muirhead looked at Americans and found an "almost childlike con-

fidence in human ability, fearlessness of both the present and future, and a sense of illimitable expansion and possibility for their country."³

Danger Signals

By the middle of the nineteenth century, however, danger signals had appeared that suggested the resources necessary for a lasting and prosperous civilization were playing out. Sportsmen noticed that after several decades of commercial hunting, various forms of wildlife that had always appeared to be unlimited had begun to disappear. Herds of buffalo, which had once roamed the prairies in great number, were near extinction. Deer, turkey, and elk, once common throughout the United States, appeared in smaller ranges, and in settled areas they disappeared almost completely. The passenger pigeon, which had been so plentiful that they darkened the sky for days as they flew over, became extinct. On the coast, commercial fishermen witnessed a deterioration of offshore fisheries. In the 1870s, the number of fish harvested drastically declined in coastal waters and fishermen had to move into deeper waters to make their catch. This decline cut into industry profits and caused concern among fishermen who feared that the more desirable food fishes might be on the way to extinction. At the same time people in the timber industry

noticed a decline in the forests, the resource that had always been considered America's richest. A paper presented to the American Association for the Advancement of Science in 1873 suggested that unless existing timber harvesting practices were halted immediately the nation's forests would be destroyed within the century. From the West, Americans received government reports that the undeveloped territories were not the promised land once supposed. John Wesley Powell's report on the western country indicated that it had great potential, but capital requirements would virtually exclude small entrepreneurs from its development.

The picture was darkened even more as businessmen perceived shortages of energy and ores necessary for the industrial economy. At the turn of the century the National Conservation Commission presented evidence that indicated coal reserves, still a trillion and a half tons, would be gone by 2050 at current rates of use. It further predicted the depletion of petroleum and high-grade iron and copper ores by the same time. To cap the growing concern, the Bureau of the Census announced that the unsettled frontier on the continent no longer existed. Perhaps more than other shortages and resource problems, the end of the frontier symbolized for Americans the appearance of limits on growth.

For a society based upon growth the imposition of environmental limitations presented a terrible challenge. There would be no easy wealth to be acquired on new frontiers. Shortages, perhaps even famine, now might appear. The economy faced potential stagnation. Indeed, basic social and political values might no longer work. Frederick Jackson Turner, historian of the American frontier, warned that the country's basic democratic system of government was threatened. Turner argued that the broad distribution of political power in the United States had been made possible by the existence of free lands that gave all Americans a chance to secure a competency and economic independence. But with the disappearance of the frontier competency would no longer be possible for all. Americans in the twentieth century, he warned, faced a problem, "not to create democracy, but to conserve democratic institutions and ideals."⁴ How could they protect their society in the face of changing environmental conditions?

Four Schools of Thought

Assessments of the proper course to take in this situation developed slowly. In addition, no single analysis emerged to gain general acceptance. Instead, the late nineteenth century saw four major ideas concerning society and environment develop, each with a wide following. These major modes of thought may be characterized as conservation, preservation, ecology, and *laissez faire*. While adherents to each concept recognized the general problem, their goals varied, indeed were often contradictory, and, therefore, a general reform movement to solve environmental problems was virtually impossible. Even within these groups general agreement concerning goals and means to ends proved difficult. For Americans, therefore, there was a general perception of a crisis, but little agreement on its definition or on measures to alleviate it.

Conservationism

Of the four major ideologies, conservationism received the greatest publicity during this period. Its spokesmen were the most vocal and

political. The concept promised to meet the crisis with minimal modification of existing American society. Conservationists emphasized the role of scientific and rational institutions in achieving a solution. Proper application of these techniques, they believed, would abate the problem by providing new resources to avoid shortages and making more efficient use of the natural wealth that was already available. This particular approach found its strongest adherents among scientists, professionals such as physicians and scholars, and some industrialists—men who possessed the technical knowledge that they believed would save the nation. Elements of conservationist thought were found in a host of programs developed during the late nineteenth century. Typical was the effort of Bernhard E. Fernow and Gifford Pinchot to bring scientific methods of tree farming into currency in the timber industry. Through careful cultivation, development of new kinds of timber, and proper harvesting, they believed the nation's timber resources could be preserved practically intact for future generations as well as the current. Perhaps no better statement exists of the kind of thought that embraced the conservationists than that of the economist Simon Patten. In *The New Basis of Civilization* he indicated his belief that science and technology would provide the ultimate means for man to overcome the limits of environment. He wrote:

Artificial culture and experimental science have already fundamentally altered the elemental relations existing two hundred years ago between population and environment. Yet to say that the methods which have made man physically independent of the local food supply are artificial is to underrate the powers of the new forces by implying that they are constantly opposed by fundamental natural forces which in the end must again triumph. The final victory of man's machinery over nature's materials is the next logical process in evolution, as nature's control of human society was the transition from anarchic and puny individualism to the group

acting as a powerful, intelligent organism. Machinery, science, and intelligence moving on the face of the other may well affect it as the elements do, upbuilding, obliterating, and creating; but they are man's forces and will be used to hasten his dominion over nature.⁵

The conservationists believed that promised shortages could be avoided, that the social status quo could consequently be maintained, with the innovation made possible by science and technology.

Government adopts Conservation Measures

As a practical program, a variety of governmental agencies designed to apply the conservationist solution to problems appeared after the 1870s. The first of these was the United States Fish Commission created in 1871. Congress created it specifically to discover what was happening to the coastal fisheries and what might be done to prevent their destruction. Its first commissioner, Spencer Fullerton Baird, was a scientist who pushed the commission into a general study of marine biology and fish culture. As a result of these studies, Congress funded programs to replenish fish stocks and also moved to restrict fishing. Conservationism was also apparent in the work of the Division of Forestry created in 1881 within the Department of Agriculture. Under Franklin B. Hough, Bernhard E. Fernow, and Gifford Pinchot the division collected information on scientific tree culture and disseminated that information throughout the United States. At the request of the nation's chief foresters, Congress passed laws to preserve timber resources. Typical of these was the 1891 legislation allowing the President to set aside parts of the public domain for forest reserves. The most encompassing legislation passed through Congress in 1897, and authorized a system of management for these national forests under the direction of the Department of the Interior.

The Conservationists Dilemma

By 1900, however, conservationists confronted a dilemma. Their piecemeal approach to conservation

provided only limited results. While they could respond to problems as they arose, the number of crisis situations continued to mount. Further, they became aware of the interrelationship of environmental problems. Realizing that the situation required a broad approach, conservationists, encouraged by the leadership of President Theodore Roosevelt, attempted to expand their ideal into a general reform. Roosevelt became the centre of this movement when he brought to his administration prominent advocates of conservation, such as Gifford Pinchot, W.J. McGee, and Charles Van Hise. In 1908 the President called together a conference of governors to secure broad support for various conservation measures that he hoped to push through Congress. The general thrust of these measures would be to create a general conservation policy, the first step of which would be the organisation of a National Conservation Commission to inventory resources that would allow better planning. Roosevelt further envisioned annual conservation conferences in Washington to help develop a broad national policy. Emphasizing his concern, Roosevelt told the assembled governors that the conservation of natural resources was "the weightiest problem now before the Nation." He warned them that without quick measures, the nation's natural wealth was "in danger of exhaustion."⁶

What would a general conservation policy have involved? Since one was not implemented it is difficult to say. However, some insight into the possibilities may be gained from an examination of Charles Van Hise's *The Conservation of Natural Resources*. Van Hise was a geographer at the University of Wisconsin, a prominent advisor to Roosevelt on conservation matters. His study appeared after the meeting of the North American Conservation Conference in 1909 and proposed a general attack upon the problem of wasted resources, the waste not only of material but also human wealth. Van Hise believed that the most pressing problem was the exhaustion of fossil fuels and metal ores, and he urged as a solution the creation of more efficient methods of

using these resources and greater efficiency in using their products. In addition he suggested that science's resources had to be directed towards the development of a more efficient technology and also to the discovery of alternative sources of power and raw materials. But Van Hise also thought a human dimension existed in the crisis. He feared that depletion of resources and the growing pollution produced by industrialization threatened the quality of life for most Americans. Here again he advised the application of science. Scientific medicine and public health, for example, could make possible a quality of life in an environment that might previously have killed people. Of course people complicated the situation by their reproduction. Van Hise urged that people be managed in much the same way as other resources, even advocating the application of knowledge gained from stock breeding to human populations so that planned rather than prolific procreation might be achieved.

The Conservationists Split

The move to a general policy split the conservationists for development of a program raised major questions as to means and ends. All could agree that the environment must be managed, but they could not agree as to who should do the managing and whose purpose should be served by it. In short, there was no agreement as to who constituted society or what defined social interest. As a result two major groups emerged among the conservationists. The first, consisting of Roosevelt, Pinchot, Van Hise and others, came to believe that planning and definition must be in the hands of society through government. The second pushed the view that the response must be by society through individuals and private interests of the community. As a result, the conservationists, even though they agreed on the nature of the environmental problem and the solution to the problem, split over the question of social welfare.

A Challenge to Traditional Values

The conservationist tradition developed by Roosevelt and his

followers represented a marked challenge to many traditional American values, although it reaffirmed others. In the case of the latter it pronounced the soundness of the egalitarian concepts that had typified the American ideology. Pinchot argued that natural resources had to be developed and utilized for the use of the many, not the profit of a few. W.J. McGee, another of Roosevelt's advisors, expanded this view when he provided a definition of the ethical doctrine he believed should typify conservation. It should involve, he believed:

A nobler patriotism, under which citizen-electors will cleave more strongly to their birthright of independence and strive more vigorously for purity of the ballot, for rightness in laws, for cleanness in courts, and for forthrightness in administration; by a higher honesty of purpose between man and man; by a warmer charity, under which the good of all will more fairly merge with the good of each; by a stronger family sense, tending toward a realization of the rights of the unborn; by a deeper probity, maturing in the realizing sense that each holder of the sources of life is but a trustee for his nominal possessions, and is responsible to all men, and for all time for making the best use of them in the common interest; and by a livelier humanity, in which each will feel that he lives not for himself alone but as a part of a common life for a common world and for the common good.⁷

The concept suggested by McGee and the others promised a better life for the individual, but it also hypothesized a national or social interest within which the individual's well-being could be secured. Government would be the mechanism through which the broader interests of the community would be enforced and defined.

Individualism Attacked

In proposing a greater role for government in ordering society's relationship to the environment, these conservationists attacked two major concepts: individualism and laissez faire. They particularly singled out individualism as an archaic idea that worked well within a boundless society but worked to

the disadvantage of society as a whole in a limited community. Laissez faire was simply the means through which individualism was allowed to run rampant. McGee condemned the two as major producers of waste throughout the history of the nation. He concluded:

In all the world's history no other such saturnalia of squandering the sources of permanent prosperity was ever witnessed! In the material aspect, our individual liberty became collective license; the balance between impulse and responsibility was lost, the future of the people and the Nation was forgotten, and the very name of posterity was made a by-word by men in high places: and worst of all the very profligacies came to be venerated as law and even crystalized foolishly in decisions or more questionably in enactments—and for long they were not to stand in the way of the growing avalanche of extravagance.⁸

Such individualism was no longer possible, indeed it was dangerous, and Van Hise reiterated the theme of the Roosevelt conservationists when he urged its abandonment. "He who thinks not of himself primarily, but of his race, and of its future," he wrote, "is the new patriot."⁹

Laissez-Faire or Government Intervention?

The attack upon such cherished traditions and on the interests supported by them quickly promoted a response. Hostility toward the idea of government planning had always existed within the movement; now it became a revolt against the President's leadership. We can see the idea that planned response should be in the hands of individuals and private enterprise rather than the government in the proposals of John W. Powell for the western lands that he published in 1890. Powell believed that it would be tempting to allow the government to establish control over development there, but he argued against it. Rather, he urged that government confine itself strictly to the development of water resources in the area and the provision of a legal framework for their effective and efficient utiliza-



In 1908, President Theodore Roosevelt told state Governors that the conservation of natural resources was the "weightiest problem now before the Nation". Without quick measures, he said, the nation's natural wealth was "in danger of exhaustion". Despite this his conservation programmes were constantly thwarted—not least by in-fighting within the environmental movement.

tion. Once the ground rules had been provided, free enterprise should be allowed to enter the field. Laborers should employ themselves and those with the genius to organise the endeavor should control the land. The money for development should come from private enterprise. After establishing the framework, he advised, "I say to government, Hands Off!"¹⁰

After the introduction of Roosevelt's ideas for general conservation reform, the opposition to government planning expanded. At the National Conference of Governors in 1908, Edmund J. James, representing Illinois, attacked the conference's organizers for putting too much emphasis upon the destruction of resources and exaggerating that facet of the problem. He believed more attention needed to be paid to the development of replacement resources. But his primary concern was that the conference's focus was being used to persuade the American people to adopt unnecessarily restrictive

governmental policies. The result, he believed, would be the stifling of genius that had made possible many of the country's greatest advances in mining and agriculture. James revealed a general distrust of the idea of government intervention and restriction. That inability to decide who should provide planning, who should decide the social good, made a common approach to the crisis practically impossible. The power of those opposed to the intervention of the national government was finally felt when William Howard Taft became president. Taft proved reluctant to push forward the power of the nation at the expense of individuals or states. In the end the schism made a general national policy untenable.

The Preservationists

Divisions within the conservationist camp created problems, and these were further complicated by the opposition of people who saw the crisis but had an alternative solution—the preservationists. This

Do you know these people?

If so, then you understand the need to preserve our natural resources for future generations. For your own children and for theirs. They will need the same things we do—clean air and water and a healthy place to live. We can provide them for our children only if we're smart enough now not to spoil what we have. Remember the future. Your kids may need it someday.



SIERRA CLUB

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group represented a large number of Americans who viewed the environment somewhat romantically. Some were outright reactionaries. They believed that physical development did not always lead to progress. They argued that the best in life might be found in nature rather than in the words of man. Preservationism was not a new idea in the United States; in fact, it had a long tradition that could be traced in the ideas of Thoreau, George Catlin, and others. By the late nineteenth century men like Frederick Law Olmsted, Charles W. Eliot, and John Muir had become its carriers. They believed that nature possessed a spiritual quality necessary for the survival of mankind and argued for wilderness, for the preservation of the undeveloped. Muir wrote, "Everybody needs beauty as well as bread, places to play in and pray in, where nature may heal and cheer and give strength to body and soul alike." Eliot, president of Harvard and chairman of the National Conservation Congress in 1909, cooperated with the conservationists but believed nature was more than a resource for human utilization; it was worth preserving for itself. To him the city and the factory system created evils too great for the human body to endure and which only a resort to nature could cure. Frederick Law Olmsted, whose career included laying out natural sanctuaries in the heart of cities, suggested that the contemplation of nature was necessary for the health and vigor of mankind. Without it man had, "softening of the brain, paralysis, palsy, monomania, insanity, mental and nervous excitability, moroseness, melancholy or irascibility, and incapacitation of the individual for proper exercise of intellectual and moral forces."¹¹

The preservationists' position was not an easy one for an individual at the turn of the century. To adopt it usually involved serious problems, for many could appreciate the advantages made possible by urban and industrial civilization. Yet at the same time they feared it and looked to the past, to a natural order for solace in the face of the upheaval of the industrial age. The paradoxes involved in the preservationist view appear prominently in the thought

of John Burroughs. In *The Summit of the Year* he criticized the conservationist approach, the scientific way of looking at the world. It provided a mixed blessing:

Well, we can gain a lot of facts, such as they are, but we may lose our own souls. This spirit has invaded school and college. Our young people go to the woods with pencil and notebook in hand; they drive sharp bargains with every flower and bird and tree they meet; they want tangible assets that can be put down in black and white. Nature as a living joy, something to love, to live with, to brood over, is now, I fear, seldom thought of. It is only a mine to be worked and to be through with, a stream to be fished, a tree to be shaken, a field to be gleaned. With what desperate thoroughness the new men study the birds; and about all their studies yield a mass of dry, unrelated facts.¹²

However, Burroughs could not see a way out of the dilemma. He did not like what was happening, but he did not believe the world could forget what it had now learned. He concluded that men ultimately "must face and accept the new situation. . . . We shall write less poetry, but we ought to live saner lives; we shall tremble and worship less, but we shall be more at home in the universe."¹³ All preservationists were not as willing as Burroughs to accept compromise with "progress." In political battles of the Roosevelt and Taft years they would frequently stand against the conservationists and their opposition, as the internal split with conservationism, would work to preclude the development of a broad approach to ecological crisis.

The Rise of the Ecological Approach

A third approach to the apparent crisis of the late nineteenth century embraced elements and values of both conservationism and preservationism but had its unique elements. Its uniqueness would make its adherents uncooperative with those of the other two ideas. This approach may be called ecological. The concept of ecology involved the idea that man was integrally involved with nature in an interdependent relationship. Ecologists, therefore, argued that the demands of nature

must play as great a role in determining a proper course for society to follow as the needs of man. The earliest spokesman for this view in the United States was George P. Marsh, a diplomat who had served in Europe and witnessed first-hand the devastation that resulted from ignoring the demands of nature. In 1864 he published *Man and Nature* in which he warned Americans that they were creating problems for themselves by destroying their environment and cautioned them not to interfere with the "spontaneous arrangements of the organic and inorganic world." Marsh believed that nature possessed a natural balance and that man, if he dealt unknowingly with it, could destroy that balance and make the world unfit for life. Looking at what Italians had done to their mountains, the destruction of timber and the resulting erosion and flooding, Marsh saw ample proof of his view's validity. He told Americans that they must stop. "We are even now breaking up the floor and wainscoting and doors and window frames of our dwelling, for fuel to warm our bodies and to seethe our pottage, and the world cannot afford to wait till the slow and sure progress of exact science has taught better economy."¹⁴

Marsh presented a strong challenge to the entire American concept of life and nature. He suggested that man might not have the right to do with nature what he wanted but rather that he needed to understand what nature wanted. Perhaps it was too radical a departure for the time; consequently its adherents remained a small group, generally confined to the academy. Still, it was a point of view important among a potentially influential group of people. Unfortunately, it provided another approach to the American environmental problem and thus fragmented social response. The ecologists, because of their definition of the problem, had to move slowly. They had to discover what the correct relationship with the world should be. Nathaniel Shaler argued for education, for only through the study of nature would an answer to environmental problems be discovered. Shaler, however, found this goal hindered by the very

institutions designed for study. He wrote of scientific education in the United States:

We now present the realm to beginners as a group of fragments labeled astronomy, geology, chemistry, physics and biology, each, as set forth, appearing to him as a little world in itself, with its own separate life, having little to do with its neighbors. It is rare, indeed, in a very considerable experience with youths to find one who has gained any inkling as to the complete unity of nature. Seldom it is, even with those who attain mastery in some one of these learnings, that we find a true sense as to the absolute oneness of the realm, or the place of man as the highest product of its work.¹⁵

The ecologists perceived themselves in an adversary relationship with the rest of the community, including conservationists and preservationists, and believed that they had the only answer to the situation.

Ecologists as Heretics

But if the ecologists felt they had the truth, to outsiders this particular approach must have bordered on heresy. It attacked not only traditional religious views but basic ideas about life. Edward Evans categorized the points of conflict between the ecologists and traditional society; they challenged the Judaic and Christian views of man's dominant position in the world; they attacked man's conceit, his belief in himself as the lord of creation; and they criticized man's relationship to the plants and animals around him which he had too readily destroyed for his own convenience. Instead, the ecologists proposed a new relationship. The horticulturalist Liberty Hyde Bailey summarized the ecological approach in *The Holy Earth* when he wrote:

A constructive and careful handling of the resources of the earth is impossible except on a basis of large cooperation and of association for mutual welfare. The great inventions and discoveries of recent time have extensive social significance.

Yet we have other relations than with the physical and static materials. We are parts in a living sensitive creation. The theme of evolution has overturned our attitude toward

this creation. The living creation is not exclusively man-centred: it is biocentric.¹⁶

The Advocates of Laissez-Faire

Conservationism, preservationism, and ecology represented activist approaches to environmental pressures. A fourth approach was the adoption of a wait-and-see attitude, a belief in laissez-faire—let the situation develop and find out what happens. Accompanying this point of view was a basic optimism, a trust that nature or God would work things out. Its exponents adopted basic hostility toward those groups seeking to intervene in the process. George L. Knapp condemned the conservationists as "unadulterated humbugs" who sought to undermine the best in American life. In an article for the *North American Review* he wrote:

That the modern Jeremiahs are as sincere as was the older one I do not question. But I count their prophecies to be baseless vaporings, and their vaunted remedy worse than the fancied disease. I am one who can see no warrant of law, or justice, nor of necessity for that wholesale reversal of our traditional policy which the advocates of "conservation" demand. I am one who does not shiver for the future at the sight of a load of coal, nor view a steel-mill as the arch-robber of posterity.¹⁷

While there might be immediate shortages, existing institutions would meet the crisis. The optimism of the advocates of laissez faire was strikingly expounded by Congress man Martin Dies of Texas before Congress on August 30, 1913. Dies strongly opposed efforts to prevent the construction of a dam across the Hetch Hetchy Valley in California, and speaking to the point he said:

I sympathize with my friends in California who want to take a part of the public domain now . . . I am willing to let them have it.

That is what the great resources of this country are for. They are for the American people. I want them to open the coal mines in Alaska. I want them to open the reservations of this country. I am not for preservations or parks. I would have the great timber and mineral and coal resources of this country opened to the people . . . Let California have

it, and let Alaska open her coal mines. God Almighty has located the resources of this country in such form as that His children will not use them in disproportion, and your Pinchots will not be able to controvert and circumvent the laws of God Almighty.¹⁸

The ideology of the advocates of laissez-faire appear clearly in the statements of both Knapp and Dies. It represented, at least in part, a reassertion of two traditional American ideas. The environment existed for man to subdue and develop, and to be subdued and developed by private initiative, by the individual whose pursuit of his own interests worked in the interest of the American people. In addition, God has a special concern with the people of the United States, and he would not allow anything bad to happen. While a crisis might exist, there was no need to change American ways.

Laissez-Faire Wins the Day

Resources were diminishing. Wild life was disappearing. Everybody

could see that something was happening. Something had gone wrong. But no consensus emerged as to what should be done. If planning was to be done, who would be responsible? If technological innovation was necessary, who would sponsor it? What approach should be taken? The problem raised by the crisis was no longer one of science. What had emerged was a political dilemma in which a variety of views contested for acceptance and no one could claim majority support. Everyone claimed to speak for public interest, for the national good and welfare, but the various groups proposing solutions offered different definitions of both the public interest and how to secure it. Consequently, reform efforts ran into trouble in the national political arena. In one episode after another environmental reformers found themselves unable to cooperate with one another. As a result, perhaps, the forces for laissez-faire won the day. It was better not to change than to move into areas that even the experts could not agree about.

During Roosevelt's administration measures went to Congress proposing national planning. Each was rebuffed. When the President created the Inland Waterways Commission to develop a comprehensive plan to merge local water projects into a national program, state and local opposition built up enough opposition in Congress to defeat it. Private interests in the western states achieved the removal of Frederick H. Newell from the Bureau of Reclamation after Newell attempted to use the powers granted in the Newlands Act to take federal revenues derived from the sale and rental of western lands and put them into the construction of federal dams and reservoirs. Newell's transgression was interference with local individual rights and economic opportunities. The government proved more responsive to strong private interests than to a theoretical national concern which lacked clear definition or articulation. Individuals could demand legislative action, the nation and the future had little voice.

RESEARCH SCIENTIST IN ORGANIC AGRICULTURE

The Progressive Farming Trust, a charitable trust engaged in research into organic agriculture, requires for its Research Centre, based near Newbury, an experienced scientist, preferably a PhD, with special interest in Soil or Plant Science. A sound practical knowledge of agriculture on a day-to-day basis is preferable, but not essential.

The successful applicant must be capable of initiating and supervising research projects. He/she would be required to assist the Trust's Co-ordinator in following up contacts with Government and other research establishments, the preparation of budgets, the securing of funds and the recruitment of staff for specific projects.

Salary negotiable according to age, qualifications and experience.

Please write, with full c.v. and references, to Lawrence Woodward, Co-ordinator, Elm Farm Research Centre, Hamstead Marshall, near Newbury, Berks., RG15 0HR.

Conservationist vs. Conservationist

While Roosevelt fought battles with the forces hostile to an active response to the crisis, he also had to fight with other activists. It was a struggle that was suicidal and that polarized opinions rather than forging a holistic view. In 1909, conservationists split into public and private planning groups when President Taft named Richard A. Ballinger to head the Department of the Interior. Ballinger favored local and private development of resources over federal. Subsequently he loosened federal controls over these operations and restored public lands to the private sector for the development of power sites. Ballinger's efforts provoked a struggle between him and the Roosevelt conservationists. The specific issue was a problem of conflict of interest in the disposition of Alaskan coal lands, but it must also be seen as one over basic approach. Indicative of the broader nature of the conflict was the general attack following the Ballinger affair upon Roosevelt's supporters in the government. Taft complained of the "jesuit guile"

used by Chief Forester Gifford Pinchot in undermining Ballinger, and ultimately even Pinchot, the most powerful of the Roosevelt conservationists, was removed from office. Politically the battle was a disaster for Taft, but for conservation it was also a tragedy. The struggle over Ballinger split conservationists into two uncooperative camps and ended efforts to secure joint action from them.

While the conservationists fought one another they also encountered the opposition of the preservationists. In 1913 they split over the development of the Hetch Hetchy Valley, a battle won by the former but which worked to worsen relations between the two groups. When the City of San Francisco sought to create a reservoir within the boundaries of Yosemite National Park, the preservationists, led by John Muir, worked to stop it. Muir condemned those who would destroy the natural beauty of the valley. "Dam Hetch Hetchy!" he wrote, "As well dam for water-tanks the people's cathedrals and churches, for no holier temple has ever been con-

secrated by the heart of man".¹⁹ The conservationists, however, argued in favor of the reservoir. In the end the dam was built, but preservationists and conservationists had demonstrated their lack of common goals or an ability to cooperate.

The Crisis Postponed — but not Solved

What was the result? No broad reform plan emerged, no directed solution to the problem. Instead the nation met crises as it had in the past piecemeal and responsively. This placed adjustments in each case in the hands of those directly tied to specific shortages. Thus, power companies developed waterways, steel companies sought new sources of iron ore, and so on. In the short run this probably averted the crisis. Private industry and enterprise was interested in efficient utilization of resources. It also managed to develop alternative sources for the energy and raw materials whose destruction had been feared.

But in the long run what took place? The discovery of new sources of diminishing materials spurred American growth, and the American population quickly expanded to consume whatever could be produced. Thus, society was still tied to the same pattern of utilization of resources that had created the initial crisis. That portion of the problem has only been delayed. However, in addition the crisis had prompted less visible change in the American community. The status quo had not been maintained: change had not been stopped. In fact, Americans confronted the very crisis feared by Frederick Jackson Turner. By the success they achieved in solving the immediate problems, private entrepreneurs secured greater control over the resources that they needed and, consequently, greater economic and political power. Within this situation the chance of the individual either to gain economic power or to exercise power outside of those corporations was diminished. The crisis forced change, whether Americans planned for it or not.

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History in an Antipodean Garden

by
Denys Trussell

The environmental history of New Zealand is a sorry tale of destruction. One ecological blunder has followed another. Behind the destruction lies a blind commitment to market forces.

Early in 1981, officers of the New Zealand Forest Service performed a bizarre exercise. Bringing extreme war to the kingdom of plants, they napalmed thirty-nine hectares of ancestral forest in the great southern alpine basin of Oparara. We may wonder whether they imagined unseen enemies or vistas of a recent war in Asia as they hovered in their sky-splitting helicopters. Explanations were simple, prosaic: it was a new technique to get a 'burn' going quickly and had been used elsewhere in New Zealand.¹ But the symbolic nature of the act is difficult to efface. The pillar of smoke and ash climbing skyward stood for a psychopathic need in this society to use the utmost technological force in destroying the sensuous, mythopoetic substance of creation.

This slender remnant of the Gondwanaland continent, an eloquent sculpture lying deep in oceanic space, has long been believed to be a natural paradise; an Eden for the spiritually emaciated Europeans

flocking to its coasts in a great escape bid from an original sin whose workings they suffered in their industrialising homelands. To this day brochures speak of the journey to paradise from the glass facades of innumerable travel agencies. At a sanitised distance, tourists are shown spectacular works of the earth — geysers and glaciers, snows and rainforest. It is a paradise seen, not by Adam, shaken in his nakedness under the eye of God, but by molly-coddled victims of mechanical travel who barely have time to click the shutters on their instant print cameras before being hustled on to the next scenic wonder.

Voyeuristic tourism is one of the more innocuous symptoms of an alienation from nature and ourselves. New Zealand is a ravaged country, and its people suffer all the usual ills of spirit associated with societies in the developed world. Having all they need, they commonly suffer a lack of deeper fulfilment.

The simpler, most crucial wisdom of living has been sacrificed to obtain a 'standard of living' — a commodity-based recipe for heaven on earth. Because there are so few of us — three million inhabit an area of roughly one hundred thousand square miles — our inner impoverishment does not immediately strike observers used to the multitudinous emptiness of larger industrial populations.

Great spaces still exist, but they are surveyed avidly for commercial and industrial potential. Every soil-type, slope and geological configuration has been recorded. At an inch to the mile this largely uninhabited terrain is known, not for its brooding isolation, its subtle flora, the blue space of its ocean and massive repose of its mountains. It is known for titanium oxides, for coal lost in geological time, for pounds of butterfat to be squeezed from each acre and for rivers to be choked by hydro-schemes. Such 'knowledge' is of course ignorance; fact stripped of

significance, nature identified as matter, unanimated by mind or imagination. This is the dangerous falsification that informs our recent history. Yet, such metaphysical ignorance is the key to the white man's tenancy of New Zealand and other colonies. We have been a people dealing in fact brought down to a debased level. Grocers in Paradise, we parcel and sell what we cannot comprehend over the counter of multinational greed.

Everywhere the primate *Homo sapiens* despoils continents and seas. In New Zealand the industrialised sub-species carried out this exploitation with exceptional speed. Here the destructive power of a small society armed with the precepts of a cash economy and machine techniques has been fully revealed. That is not to say our history has lacked courageous social experiment and a richness of life. But this is the more ironic as it points to what might have been, and has modified only slightly the real drive of the society to acquire wealth over and above its reasonable needs.

A Land of Ecstasy and Terror

Arriving here when industry and the bourgeois fable of progress were gathering momentum, the more utilitarian colonists found a world unrelated to their vision. The indigenous Maori people had not hesitated to infuse matter with a rich human and spiritual significance. Stone could be sacred, the tree a Promethean ancestor. The land itself was a great fish — 'Te Ika a Maui' — alive and quivering in light, brought up from the sea by a demi-god. And amidst the incalculable heights of huge mountain ranges none could assume that humans had wisdom at an inch to the mile. They had awe and were immediately susceptible to forces in the macrocosm that provided life or capriciously withheld it. A community of ecstasy and terror, its extremes of experience were not encompassed by puritan Europeans hoping to make a society of safety, predictability and comfort.

Colonial development has been in part an effort to bend circumstance into security, limiting the development of human character until it

could be fed through social security and vocational guidance computers. Despite the many colonists of sensibility — botanists, explorers, observant women on lonely pioneer farms, painters, diarists and those who simply loved what they found here — the overwhelming energy of Europeans was directed to destroying a fascinating human and natural world.

So thoroughly did they do this that the extent of our loss and the resulting impoverishment of our social milieu is only now fully known. The destruction must be recorded, interpreted, if we are to nurture in ourselves the seed of its antithesis: that consciousness of human culture as part of nature, of the individual as part of creation.

Geological History

Slow, tectonic shifts of seabed and continent built, dismantled this landmass repeatedly. Theories of origin abound, but the record of stone and fossil suggests that land in some form has been in this vicinity for at least five hundred million years. The material of our present plains and hills was deposited in a geosyncline or geological womb, marginal to the antique continent of Gondwanaland. This planetary furrow was continuous possibly with the west Antarctic and Andean geosynclines; though as a distinct geophysical entity, New Zealand is quite young. Most of its surface rocks are less than a hundred million years old, and it was only sixty million years ago, in the Cretaceous epoch, that the New Zealand child drifted from its parent continent to begin evolution as a biogeographically isolated domain.

Isolation and intense geological activity are crucial factors in the fate and evolution of New Zealand ecosystems. The isolation has never been absolute. A proto-land was intimately related to Gondwanaland, so rock and fossil remains here are not just types endemic to recent New Zealand. The oldest of our plants are members of the *Glossopteris* flora that inhabited Gondwanaland, a fact that has been interpreted as evidence of our close association in the continental complex during the Permian epoch.²

But it is the marine solitude of

post-Gondwanaland New Zealand that has determined the very high proportion of species endemism in these islands. Four-fifths of our angiosperm plants are endemic, having emerged here as separate species from common ancestors. A high incidence of specific and generic endemism accounts for the singular character of our vegetation, and for its irreplaceability if destruction of our ecosystems by man persists. While a major plant family may, through its many species, continue to manifest its characteristics, a species too unique in its distinctiveness to be printed again in time once it has been destroyed. The fact that the speciation occurred here in high proportion means it can likewise be destroyed in such proportion. A singular efflorescence of genetic material is here to be annihilated or nurtured at the whim of *Homo sapiens*.

The Arrival of Man: Moa-Hunters

Evolution proceeded here for sixty million years, down through the recent ice ages, a native flora and fauna being enriched by migratory plants and birds borne on currents of wind and sea. Approximately a thousand years ago man arrived, equipped with a technology of stone and fire. These earliest Polynesians found an environment with no grazing mammals or mammalian predators. There was a varied avifauna and a rich sea fauna. Virtually all the country was forested, except the high tussock grasslands of the South Island and the volcanic interior of the North Island.³

In this landscape man early established an identifiable culture: the society of the Moa-hunter. These were hunter-gatherer groups, based on seasonal campsites, and there was little war over defined territory. The culture was centred in the South Island, though its influence and habits were not absolutely restricted to this region. It hunted the Moa — *Dinornis* — of which there were approximately twenty-two species. The largest of these flightless birds, the giant *Dinornis maximus*, stood twelve feet high, and was capable of eating as much in a day as a bullock. In prehistoric New Zealand *Dinornis* would have been a considerable modifier of vegetation. Grazing on

the savannahs and along the forest fringes of the South Island, it possibly helped tussock-grassland plant associations to intrude on originally forested areas.⁴ Thus, this great southern hunting ground of the Moa-hunters was probably a mosaic of grasslands and podocarp forest descending from the eastern side of the Main Divide and extending to the Pacific coast. It would have been very different from the virtually unforested vista that greets the observer today.

The Moa-Hunters and the Environment

The extent to which this environment was altered by Moa-hunters and/or climatic change is in debate, but in the seven hundred years separating the arrival of Polynesians and that of Europeans this vast tract of land underwent the largest single transfiguration of any New Zealand ecosystem in the prehistoric period. The Moa-hunters used fire to drive great herds of their prey, and they left it, possibly still alive, in the embers of abandoned campsites. The fires of 'Tamatea', a mythological incendiary of Polynesian traditions were probably significant in reducing the South Island's primeval forest cover. Along with the heavy grazing of the Moas, fire would have accelerated the invasion of previously forested land by tussock grassland.⁵

The argument has been advanced that climatic change — a slight decrease in temperature — would also have been significant in making the eastern region of the South Island inhospitable to podocarp forest associations.⁶ But the logs of fallen trees are still to be seen in areas susceptible to this day to colonisation by podocarp forest. These forests also regenerate vigorously on old Moa-hunter campsites, cleared by fire and abandoned during the seventeenth century. Such evidence suggests that our climate is still favourable to the survival of primeval vegetation patterns in areas that are arid today, and points to fire, to human culture as the chief cause of this great change in the landscape.⁷

But the difference between the fire-stick of neolithic man and the napalm-carrying helicopter of

modern man is great. The one was a tool, carelessly used for immediate survival. The other was manipulated by well-fed men living in an economy that already provided materials and commodities far in excess of their needs. The different quality of damage done by Europeans to the ecosystems here originates partly in the abstract nature of their reasons for action. Unlike neolithic man, modern man burns for profit or for some long-term growth strategy, far more destructive than gratuitous acts of the Moa-hunter. And if primitive man was careless, his actions took effect only slowly. Seven hundred years of human occupation still left huge forests quite untouched in the South Island. Two hundred years of cash economics has all but destroyed them.

The Classic Maori Culture

The Moa-hunters, an 'archaic' phase of Polynesian settlement here, gradually disappeared before a recognisably different culture, based on cultivation of the kumara (Andean sweet potato). This society became the 'classic' phase of Maori culture in the North Island, and dominated New Zealand at the time of Cook's arrival here in 1769. The 'classic' Maori also used fire, burning and clearing land for the cultivation of kumara. Thousands of acres were cleared and gardened in the North Island under a shifting system of horticulture that involved the use of long fallow periods. Like the Moa-hunter, the 'classic' Maori depended heavily on fish, shellfish, marine mammals and birds. It has been estimated that some forty species, all of which had survived the climatic upheavals of the Pleistocene and thrived in the post-glacial era were made extinct by the hunting activity of the 'archaic' Moa-hunter and the 'classic' Maori cultures here.⁸ These extinctions occurred however over nearly a millenium; a rate of destruction insignificant in the light of subsequent development. While cleared land was politically important to the 'classic' Maori, his kumara growing made no significant incursions into the dense forests of the North Island. The response to population pressure was more often to resort to warfare or migration, rather than ex-

tending cultivable land:

"Clearly the Maoris could have increased their population had they cleared the whole country. They never did this, presumably being acquainted with the law of diminishing returns."⁹

The metaphysic of the 'classic' Maori reveals no alienation of man from nature, no intervention of culture as an abstract, unassimilable element by means of which man mediates with nature. Nature and culture flowed into one another. Stone and wood tools required none of the thermodynamic imbalances that industrial smelting causes, and exchange was by means of goods. There was neither cash, nor the abstract view of resources that the use of cash promotes. Capital was immediate, tangible — an adze, kumara safe in the food-pits for the winter, a good harvest of shellfish. Notwithstanding the fires of 'Tamatea', the white man found on his arrival, a country whose bird and sea life was still prolific, whose protective mantle of vegetation was fairly intact. With a seaman's eye open for spars, James Cook looked around him in the northern sounds of the south island and was able to describe a land that was, as far as he could see, still one entire forest.¹⁰

The European Invasion: Cultural Shocks?

European culture as a 'classic' phase of human development was already on the wane when the English stepped ashore here in 1769. Their arrival was therefore that of a new and little understood phenomenon — industrial man. Europeans did not bring culture here in the inner sense of the word — a mythopoetic interpretation of destiny that fused the 'human' and the 'natural'. Instead they brought a technology that was to isolate them increasingly from nature, and a moral code derived from the already abstract notion of the one God, separate from his creation. They wished to progress beyond their own rich and exuberant heritage. Future-haunted, destroyers of the past, finding grace in the present only with difficulty, the white man here was often a shocked and de-cultured creature.¹¹

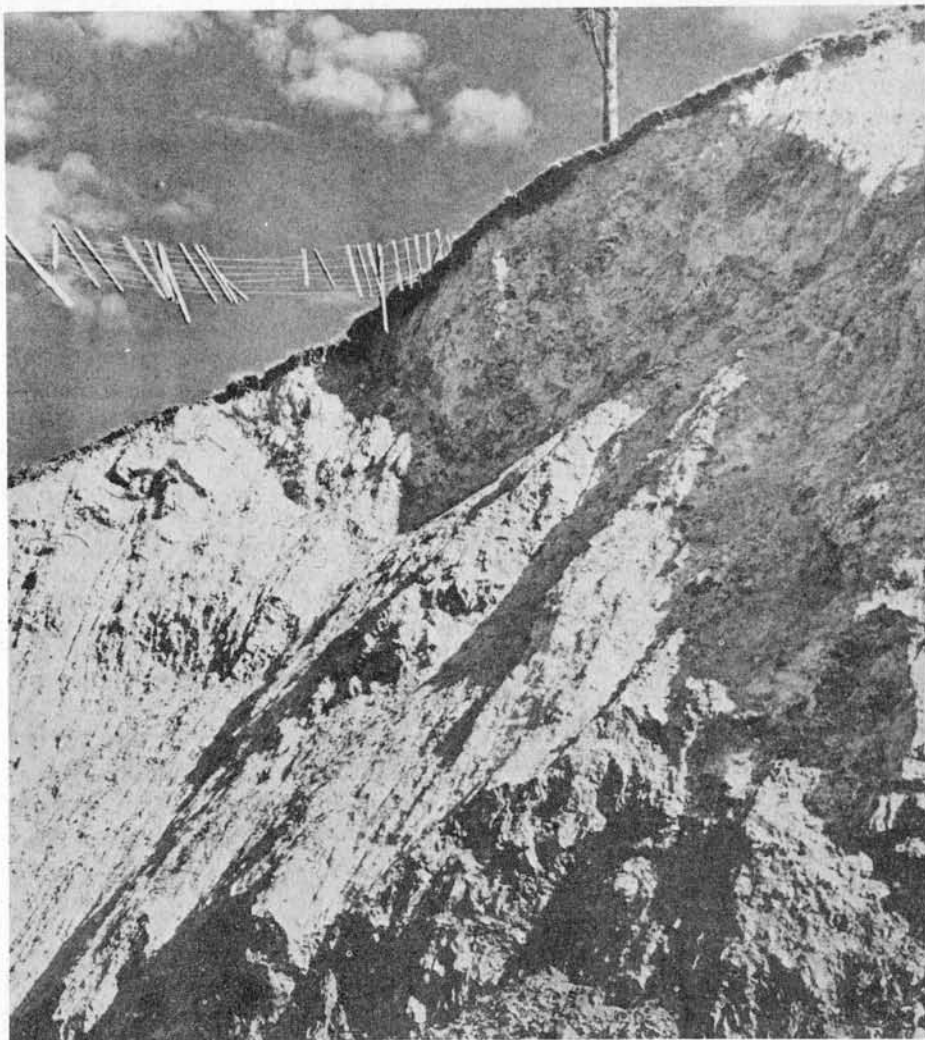
The collapse of European culture and the onset of a deprived industrial swarm was accompanied by

a great wave of criticism and protest, sustained mainly by artists and philosophers. People as disparate as Karl Marx, Beethoven, William Blake, Tolstoy and Nietzsche reacted implicitly to a human alienation from the cosmos that they sensed developing around them. Their reaction travelled, and has been an influence with the more thinking of the colonisers, the basis of a social and ecological conscience expressed by artists and thinkers here. Criticism in fact counterpoints the mercenary and destructive aspect of new world development, and can sometimes even modify its worst excesses.

The Beginning of the Timber Industry

Initially though there were virtually no constraints on white exploitation here. The first period of European contact, 1769-1840, saw almost no systematic settlement. It was a phase of reconnaissance during which outrider groups of white civilization made varying impacts on the environment. Missionaries were firmly settled here by the beginning of the 1820s, but their ecological impact was negligible. Eventually their effect on Maori culture was to be profound, but their work was preceded by decades of uncontrolled economic exploitation. Cook felled a little timber for the immediate purpose of repairing his ships, and, in doing so apprised the world of the importance of New Zealand forests in an age when wooden navies and merchant fleets were the basis of power.¹²

A timber industry began to consolidate during the early years of the 'contact' period. In 1794 a cargo of spars was taken from the Thames Valley, Coromandel, by the ship 'Fancy'. In 1801 two more cargoes of flax and timber were harvested. These earliest shipments were probably used in Sydney, canvas, rope and timber being much in demand there.¹³ Milling at first was centred on the northern harbours, in particular the deeply indented waterway of the Hokianga on the west coast of Northland. There, tiny ship-building and milling towns such as Horeke were launching wooden vessels of up to 400 tons in the 1820s. Export of indigenous timber



Erosion is a serious problem and has been greatly accelerated by overgrazing and deforestation.

inevitably decreased the area of land under indigenous forest, since milling was never on a sustained yield basis, and the forests could only mature to a climax phase over periods of time that are still unknown. Kahikatea, the superb native white pine, was the first species to be systematically harvested. As a forest type it is now virtually extinct, though individual regeneration is vigorous.

Whaling and Sealing

Marine mammals suffered most in the contact period. Whalers first appeared in Australian waters in 1791, and in 1792 a sealing party was landed at Dusky Bay in the south-western South Island. Whaling boomed until the late 'thirties, but fell away as decimation of breeding stock in these seas began to make it uneconomic. It was conducted by ships and shore whaling stations which, along with the timber settlements, were the earliest European

communities to turn natural capital into abstract capital in New Zealand. The fishery was

"still beyond any enforceable law, still the happy hunting ground of those who had no roots in the past of the area and felt no interest in its future. With so many vessels, each having several boats, the competition became extremely keen, and the result was the virtual extermination of whale cows and calves. Seventy or eighty boats are known to have put out after a single whale".¹⁴

Sealing followed a similar pattern, though the extinction of a commercially viable breeding stock was far swifter. Both the Moa-hunters and the 'classic' Maoris had hunted sea mammals. Neither brought destruction to the breeding stock in the way the sealers did. The seal was not slaughtered by them for food, but for its fur that could be exchanged for cash. Temporary camps were set up, centred on Dusky Sound and

Foveaux Strait. Working out of these the sealers had cut out their resources by 1820. Up to 1825 a few sealskins were still harvested, but the extermination of the breeding stock had taken just two decades in New Zealand waters.¹⁵

The Impact of the Cash Economy

The contact period shows too the impact of a cash economy on a subsistence culture. Whalers, sealers and traders introduced the Maori to a technology that was incompatible with their communal processes, and destroyed their subsistence economy. The need for muskets, and the willingness of the European traders to exchange very small numbers of inferior guns for very large quantities of prepared flax destroyed the social ecology of many Maoris. Muskets conferred a technological advantage that meant the survival of a given tribe was virtually synonymous with owning them. But the cultivation and treatment of flax on the scale required by avaricious traders forced the Maori to neglect his gardens, his fishing and gathering. Even the hill-top *pas* (fortified villages) were deserted while tribespeople laboured in the swampy ground where flax grew. Damp, the breakdown of hygiene practices of the *pas*, the neglect of subsistence processes, combined with rapidly spreading European diseases, decimated the Maori populations. For these Polynesians it was the first experience of what Marx might have described as 'alienated' labour — a disastrous bondage to an industry that had nothing to do with their immediate wellbeing in order to purchase a commodity that was in itself inimical to their survival. This desperate transaction involved neither the love nor the deep skill that had gone into the creation of their prehistoric technology.

Early Colonisation: Missed Opportunity?

Annexation of New Zealand by Britain in 1840 initiated the next phase of ecological exploitation. The arrival of Europeans for permanent settlement in large numbers was an overwhelming force for transfiguration in the landscape. The

rapidity of settlement and destruction of the local ecosystems is explicable finally in terms of social failure in the old world. Three million people left Britain in the years 1820-50. Of these 220,000 came to Australasia: a tidal wave of the poor and deprived.

"There was some artisan skill and some agricultural experience in this migration, but it was very thoroughly diluted in the large mass of unskilled labourers and the very great numbers of discharged soldiers and sailors who swelled the ranks of relief recipients in the post-war years. They were very raw material for the peopling of pioneer regions, being often not only underskilled, but underfed and disease-ridden as well One of the virtues of such a population however was

**"Grocers in Paradise, we
parcel and sell what we
cannot comprehend over the
counter of international
greed."**

that it had little to unlearn. A dead weight of peasant prejudice which might have blocked the rapid development of new techniques was largely absent. On the other hand, judging from the experience of North America, Australasia has been very much the poorer for its failure to attract large groups of small farmers and peasants from the continent of Europe. A much different attitude to the land itself and its use and misuse might have been present there today had they come and brought with them the peasant's instinct for conservation of those resources of the countryside which are potentially permanent. They did not come however, and all contemporary records suggest the overwhelming urban and unskilled character of the Australasian labour force"¹⁶

It was hoped by some that this mass of humanity might transform itself into an acquiescent community of artisans and labourers working to re-establish the rural hierarchy of eighteenth century England. This at least was the ambition of Edward Gibbon Wakefield, a scheming and brilliant mind behind the New Zealand Company settlements here.

Conservative, perspicacious and hoping to recreate a world that was fast disintegrating even in its English homeland, Wakefield promulgated ideas that were a peculiar mixture of commonsense and class selfishness.

He could see clearly that huge-scale frontier farming was a poor basis on which to establish his ideal community. A scattered population occupying large tracts of land was not the way to create a close-knit hierarchy of landed gentry and landless labourers. Wakefield was a sufficiently acute social geographer to know that land had to be intensively settled and cultivated to avoid the sprawling and democratizing process of frontier squatting. He postulated therefore a sufficient price for colonial land; one high enough to ensure that a class structure could be maintained and that there would be plenty of landless labour available to work the antipodean estates.

Much of Wakefield is obnoxious in our supposedly egalitarian era, but it is ironic that, had his schemes worked as he intended, they would have resulted in much better land-use practices in New Zealand and Australia. Intensive, mixed farming on smaller land areas, employing a lot of human labour directly in the rural environment implied a husbandry that to this day has failed to establish itself here.¹⁷

Land Becomes a Commodity

Settlement in New Zealand is in large part the story of the abandonment of the sensible land-use practices implicit in Wakefield and the retention of his class pretensions by a squatter class who wanted to transform itself into a landed aristocracy by means of frontier farming and the rapid returns to be gained from it. Land came to be seen as a commodity in New Zealand, not as the irreplaceable sustenance of mankind. To this day New Zealand farmers invest in land, rather than putting down psychic roots in it. And they farm it unwisely on a monocultural basis, producing butterfat or wool, spreading of 'stock units' in the manner of a managerial elite, running a food factory rather than using the language of people holding in trust the living organisms

that their farms should be.

The operation of capital, the concept of a maximum return on investment is what decided land-use patterns. Ecological concerns did not figure:

"Since the price of wool almost guaranteed a rapid increase in capital, such enterprises were preferred to the sinking of capital in a slow, methodical development of agricultural possibilities in a difficult country"¹⁸.

Thus it was that running sheep on the tussock grasslands of the South Island came to be the first major land-use the Europeans practised in New Zealand. The techniques of pastoralism in this often high, steep landscape were those that came to dominate all subsequent agriculture here, and they are largely unmodified, even in the present era.

Vulnerability

Few countries could have been more vulnerable to the sprawling and often careless farming that spread through the South and then the North Island. In 1840 the pioneer walked into a landscape so tall and sheer that it was quite outside any experience he might have acquired in England, or even in other colonies. Fifty per cent of the country was high and 'intensely dissected', twenty per cent was lower, rolling, moderate hills. Only thirty per cent was flat, and this was largely alluvial outwash plain with soils susceptible to flooding and leaching.¹⁹

"Instability of the surface, both in steep areas of rapid erosion and in flat areas of continued deposition, has not in general allowed the particular local complexes of soil-forming processes to achieve their ultimate result of a mature soil. The resulting immaturity has meant, among other things, a great local variability and prevailing thinness."²⁰

These soils were recent, formed mostly in the last million years, and often in the last ten thousand years. When shifted or damaged by erosion they could not be easily rehabilitated or replaced.²¹

The Destruction of the Forests

Stability in such a landscape depended above all else on the forest

cover being retained in catchment areas. A protective attitude to vegetation and severe constraints on grazing by herbivorous mammals were essential if the land surface, intersected by volatile and flood-prone waterways, was to remain undamaged. It is hard to imagine a more disastrous technique than the burning of such country, but burning is just how the pioneers approached it. In theory the 'burn' released new tussock growth, which was good feed when young and tender. But tussock grassland was a complex ecology involving many plants in niches between the grass itself. There was also a layer of dead organic material, at times more than a foot deep, lying over the tussock slopes. This was the basis of high

"Future haunted, destroyers of the past, the white man was often a shocked and de-cultured creature."

country fertility and erosion control. Fire destroyed the association and was a major cause for the declining number of sheep able to be carried on a given acreage by the late 1870s.²²

The attitude that underlay this 'get rich quick' style of farming was epitomised by Samuel Butler who arrived in Canterbury for a brief sojourn as a high-country sheep-farmer in 1860. An acute social critic, he noted:

"The fact is that people here are busy making money; that is the inducement which led them to come here in the first instance, and they show their sense by devoting their energy to the work."²³

He then went on to farm his run at the headwaters of the Ragitata River with a thoroughly typical ecological insensitivity.

The Enormity of the Destruction

Only by scaling one of the awesome passes overlooking Butler's landscape can one see the enormity of destruction wrought by the pioneers' fire. Huge ranges, over nine thousand feet high and stretching to the edge of vision are crumbling. Mountainsides, with wounds in

them that are often a mile high, disgorge masses of shingle into the riverbeds far below them. Hills are split open and gullied on a scale that leaves any human figure standing amongst the debris quite invisible. Though erosion has always been part of the geological process in these big mountains, the intervention of man, grazing and the annual tussock burn has increased it immeasurably.

The ruthless clearing of any vegetation not edible by stock became the basis of our agriculture and was carried out in the densely forested North Island as soon as the land wars against the Maori released large tracts of it for sheep, and later, dairy farming. Settlers were often so desperate to get their stock grazing that they would even burn standing forest without getting the timber out. North Island pasture was hacked and burned out of frequently dense podocarp forest, much of which was utterly wasted in this way. So austere and denuded are some of the hills of the North Island King Country now, that it's hard to believe that they ever had rainforest on them. And though the North Island hills were not nearly as big as the southern mountains they were steep and very broken up.

The process of converting such terrain to monocultural pasture was graphically described by Edwin Fairburn, a surveyor born to a missionary family in the 1820s who had learned to love this country of his birth:

"The steep hillsides are cleared of timber which is burnt to the ground. Then grass is sown in the ashes. The grass flourishes for a year or two, by which time the ashes and vegetable mould are swept into the gullies and streams, nevermore to be recovered. The grass dies out and is succeeded by dandelion, and in a year or two more the roots of the trees which previously held the soil together having decayed the hillsides slide down in immense landslips . . .

It is melancholy to see the way in which the surface of the best part of the country is destroyed, never to be restored again except at great expense, through the ignorance and short-sightedness on the part of the settlers."²⁴



A Pioneers' settlement in the 1870s. The Europeans brought a technology that was to isolate them increasingly from nature.

Acclimatization Fever

The colonists also indulged an acclimatization fever during the last half of the nineteenth century which meant numerous species of feral browsers were introduced into wilderness areas that had evolved their cover of vegetation without developing any defences against hungry, herbivorous mammals. The most disastrous was the rabbit, present in parts of New Zealand in great numbers as early as 1844. They were released again in the 1860s as part of a deliberate acclimatization programme, and by the 1870s had become a recognizable menace, doing enormous damage to the tussock grasslands where they flourished spectacularly. Their feeding exacerbated the erosion problems caused by men and sheep, and though great efforts have been made to exterminate them since the 1870s, control of their populations is a continual problem.²⁵

Acclimatization of several deer species, thar, chamois, goats, pigs and opossums has meant these animals are still present in large numbers, particularly in the higher 'protection' forest zones — those remnants of the forested wilderness that are now preserved for the well-being of the catchments. From time to time there have been major drives to control the various feral grazing species, the latest being a helicopter

campaign against deer in mountainous country under the aegis of the Forest Service. But extermination of these carelessly introduced and now unwanted animals is probably impossible. The most that can be hoped is that their numbers can be limited to a point where indigenous forest and tussock country can regenerate. This commits the country, probably for all time, to an unremitting and expensive exercise of controlling the populations of many introduced species.

Probably the forest structure has suffered most from the herbivores, particularly deer:

"The chief damage, attributed to deer, is threat of profound alteration which is occurring in the character of the forests, especially towards their higher borders. Much of this damage is not immediately apparent because the upper tiers of the forest have remained largely unharmed. But the deer are preventing the growth of seedlings, as they clear away, by browsing or trampling, the lowest tier, and the age distribution among the members of the constituent species of the forest is becoming more and more heavily weighted towards late maturity...

Above the tree-line the damage is not so discernible and probably not so serious, but mountaineering enthusiasts suggest that shingle slides

may be increasing in the area, and that herb fields are decreasing in size and variety of plant population".²⁶

In an effort to make New Zealand an England where Everyman could enjoy hunting and the sight of familiar species, the acclimatizers made some of our worst ecological blunders. Stoats, weasels, ferrets and wild cats all took their toll of native bird species that hitherto had virtually no natural enemies. Exotic plants brought in by the colonists often grew so uncontrollably that no less an observer than Charles Darwin believed introduced species would eventually prevail against the native flora and fauna:

"From the extraordinary manner in which European productions have recently spread over New Zealand, and have seized on places which must have been previously occupied, we may believe, if all the animals and plants of Great Britain were set free in New Zealand, that in the course of time a multitude of British forms would become thoroughly naturalised there and would exterminate many of the natives."²⁷

It is too soon to say whether Darwin will prove to have been correct, particularly as the situation is always complicated by the intervention and policies of human beings, but it did seem, by the end of the nineteenth century, that indigenous plants in the long run would occupy most successfully the niches in which they evolved, and that exotics would give place to them in such niches. Nonetheless, a considerable and permanent change in the indigenous vegetation was observable in areas of European occupancy by the 1920s:

"The distinctive character of the native flora has disappeared from nearly all closely settled portions of the country, and what may be called a cosmopolitan type of vegetation has taken the room formerly occupied by the displaced species."²⁸

The most obvious change has been the drastic reduction of areas under continuous native forest of any kind. By 1868 a quarter of the indigenous forest in existence when the European arrived had disappeared. At the end of the nineteenth century

forest reduction for timber reached its fastest rate, and in 1968 less than a third of the eighteenth century forest cover remained, some 13-14 million acres.

Erosion reaches Crisis Point

Other pioneering activities such as gold mining and gum digging contributed to the damage of the country's fragile surface. Fields probed for the gum that drained from ancient Kauri forests in Northland are still sterile and partly man-made deserts to this day. Sluicing and dredging for gold left scars and mountains of discarded shingle on the South Island alluviums that are desolate and unproductive.

The erosion problem reached crisis point just before the Second World War. In 1938, the Esk Valley, a catchment in the eastern district of the North Island, experienced severe landslides that buried farmlands under mud up to ten feet deep. This focused attention on the century long war of attrition that white society had conducted against the plant kingdom. Legislative attempts to undo some of the damage were initiated. The 1941 Soil Conservation and Rivers Control Act set up the organisation empowered to control erosion, but in practice the Act was not as ecologically sound as it should have been: it resulted in more engineering works to contain floods downstream rather than the ecologically vital programme of rehabilitating the catchments at the sources of rivers.²⁹ Since the Act of 1941 many individuals have fought within soil protection institutions, such as the local catchment boards, to achieve enlightened measures against erosion, but all too often the thrust of the political economy overrides the spirit of good law, good institutions and good individuals.

Politics vs. Reality

This political reality has itself been enshrined in legislation. A National Development Act, passed in 1979 and now in the process of amendment, expresses in law the principle that big development has the right to override the environmentally protective provisions of other laws such as the National Parks Act and soil and water conservation laws.

Indeed, it is very difficult to change the pattern by which the country has been developed; a pattern whereby natural fertility and the soil structure of the country has been seen as a commodity to be exchanged for cash, in particular, foreign exchange. Timber, wool, meat and dairy produce can all be seen as metamorphoses of our topsoil leaving the country for good.

New Zealanders, however, have a technique for offsetting this depletion of nutrients in the soil: the application of trace elements and inorganic fertilisers. But this in itself creates ecological problems. Superphosphate may be damaging to microscopic soil fauna, and cannot by itself replace soil structure. It also runs into waterways and causes excessive blooms of plant life there. Expensive to apply, it uses foreign exchange itself, as it must be purchased abroad. So far no widespread change in the monocultural phosphate-dependent farming has become established, and legislation such as the National Development Act indicates a strong political influence in the community against experimenting with ecologically sensitive policies.

Industrialisation: Surrender to the Market

It was more with industrial development in mind that the 1979 Act was passed however. And the style of industrialisation that has prevailed here is nearly as important in understanding the ecological disruption of the country as our rough and ready style of land use. Given the fact that industrial man will probably not live in an Arcadian age, needing neither engines nor metallurgical technologies, we must accept that some form of manufacturing is necessary to complement our agricultural activities if we are to escape dependence on far larger industrial concerns abroad. The white man failed to become a husbandman here and disfigured his agriculture as a result. A century before Fritz Schumacher wrote *Small is Beautiful* the colonists might have established, gradually but thoroughly, the capital and plant required to achieve self-sufficiency in manufactures and high quality of production in

consumer goods.

This was not to be. Farming had obeyed the dictates of a maximum quick return on capital invested. Unless the New Zealand migrant was prepared to use his labour as capital in the sense that inhabitants of the undeveloped world have had to, gradually establishing a truly useful technology rather than technology just for profit, there was little prospect of the country developing independently of the world market. Yet the patience, the sense of craft, the virtually 'Buddhist' style of economic thinking required by such a scheme of development were quite foreign to a high proportion of our migrants. Dispossessed by economism and materialism at home, they were determined to turn these things to their own account in the antipodes. As Samuel Butler perceived — here Everyman wished to be his own capitalist. The gradual evolution of a balanced economy based on modest consumption, shrewd use of local resources and 'intermediate' technology was not for him.

In the sphere of manufacturing this has meant that New Zealanders have sacrificed piecemeal their much vaunted independence, their capacity to improvise with the minimum of resources, and have surrendered themselves to the vagaries of the world market. Ironically this parallels what happened to the Maori, desperate for a musket, at the beginning of the nineteenth century. More and more, the contemporary New Zealander, desperate for a motor-car, petrol and colour TV, sells his labour in an alienated context so that the country can pay for its massive import demand.

It need not have been so. Though manufacturing was never specifically encouraged here before the First Labour Government in the 1930s, the country had gone through a period when self-sufficiency and high quality in manufactures seemed achievable. As early as 1850, steel was being made out of Taranaki ironsands. In the 1870s, the manufacture of locomotives began, and by 1900, all locomotives needed in New Zealand were made here. Circumstances before the development of the refrigeration industry in the 1880s were such that

the country could have become a manufacturing one, with its factories and plant owned by its own people. The limitations of its extractive industries, the perils of relying so heavily on wool production, made this seem inevitable until refrigeration, by making it possible to send perishable foodstuffs to Britain, gave scope for more monocultural farming in dairying and meat production.³⁰

Cars for Soil

Had the trend to industrial self-sufficiency continued its possible that manufacturing here would have remained comparatively 'small' and 'beautiful'. Instead it has become a thermodynamic nightmare, out of all scale with the three million people in whose landscape it exists. Possibly the motor car was the single greatest factor in all this, since it seemed easier to import cars, and all the ecologically disastrous infrastructure they required, paying for them with fertility, sold as wool and refrigerated farm products.

"The motor car sellers, the emerging road transport firms, the foreign oil companies, the engineers and the gradually increasing number of car owners all exerted pressure for a high quality roading system . . .

The acceptance by the state of the main cost of building highways and the use of special taxes to contribute to their cost have had enormous repercussions in New Zealand. They have given highways too great a portion of expenditure on development, ultimately created difficult transport and traffic problems, and adversely affected town life . . .

At the same time important railway links were being completed. These may not have paid in the accountancy sense — nor have roads — but they were good value, and remain good value for the development of New Zealand's economic resources".³¹

The motor car and its fuel became the basis of our dependence on imported manufactures, and of our need to export fertility and energy on a scale larger than our own needs would justify. The railways that should have been the way to our independence in internal transport are run down, and the state hydro-system has long ceased to be a

socialised energy network for the benefit of the populace, having been expanded instead so that governments could 'export' energy by selling it at below production costs to multi-national metal and forestry companies.

Think Big: Borrow Big

So self-sufficiency in manufactured goods has proved during most of this century to be a will-o'-the-wisp, pursued without real understanding of its long term rationale by Labour governments, and ignored by National, which has been in power for 26 of the last 32 years. Despite the promising, small and variegated industry that sprang up here in the nineteenth century — enterprise that could be contained within the framework of local need and ecological horse-sense — contemporary development has gone over to a pathetic imitation of Ruhr-style industrialism, epitomised by the National government's 'think big' policy.

'Think big' simply means 'borrow big' in a country as small as this, a deepening commitment to multi-national finance. Physically it is the manufacturing equivalent of the most maverick frontier farming, even more harsh in terms of its energy demands, its pollution and its bad land use practices, such as open-cast mining and short-rotation pine forestry. It has always been inherent in development by the white man here, since it expresses what is a metaphysical truth for industrial society: that economic activity must be founded on a good rate of return for investment, not on any social or moral value.

'Think big' was made possible because of the originally sensible establishment of hydro-electric power generation. Our first station was built at Lake Coleridge in 1911.³² The planting of *Pinus radiata* on a large scale from early in the twentieth century was also a sensible move insofar as it enabled us to have sawn timber without making further unsustainable demands on indigenous forests.³³ But the pine became the feedstock for other, more dubious developments. Wood fibre and renewable energy meant that New Zealand could launch itself into the

heady world of large-scale wood processing, which it did with the establishment of Tasman Pulp and Paper's plant at Kawerau in the 1950s.

The Pulp and Paper Industry

The pulp and paper industry illustrates just how lost to 'small' and 'beautiful' development New Zealand has become. There are now five wood-processing complexes operating, with another three planned for the immediate future. These are both capital and energy intensive enterprises, but insignificant as creators of work-places. They also require large areas of land, some of it converted from indigenous forest, for the planting of exotic pines. There are now over 700,000 ha. of exotic forest here, a significant portion of which is wasteful, low quality pulp forest.³⁴ Ideally, wood-processing plants should be supplied by waste wood arising from the pruning, thinning, harvesting and trimming of high quality sawlogs. In practice private forestry companies indulge in the wasteful land-use of pulp forestry.

The theory is that by exporting pulp and paper on a big scale New Zealand gains foreign exchange, creates jobs for its labour force and obtains the kudos of being a 'developed' nation. In fact it is doubtful, given the high content of imported fuels, plant and capital required to establish these industrial leviathans and to supply the infrastructure that they require, whether there is any net gain in foreign exchange for the country at all. Whatever the case, the taxpayer subsidises these operations to a significant degree.³⁵

What is certain is that ecological disruption arises, firstly from the unforgiving short rotation forestry regimes that are still being established solely to supply pulp mills — regimes whose ultimate effect on soil structure and fertility may be as disastrous as those of our burn and bust agriculture. The technique of handling the land is essentially the same. The second source of disruption is the need to establish ever more generating plants, hydro and thermal, to supply the processors. There are virtually no major river systems in New Zealand that are not

either harnessed for generation or being surveyed with that use in mind. New Zealand households do not use a phenomenal amount of power, but the New Zealand economy is in thrall to multinational companies, and the New Zealand government is intoxicated by the machine gigantism those companies stand for.

Policies for Disaster

Invariably big industry here has a high content of foreign ownership and control. The aluminium smelter at Tiwai Point in Eastern Southland, an enterprise established ostensibly for the benefit of New Zealanders, is wholly foreign owned: Showa Denka KK (25 per cent), Sumitomo Chemicals (25 per cent) and Comalco, Australia (50 per cent). Comalco (Aust) is in turn almost wholly owned by Conzinc Rio Tinto of Australia and the Kaiser Aluminium and Chemical Company.³⁶ The country actually has a surplus of generating capacity, which the government found so embarrassing that it went out to find multinational investors who will soak up the spare power, and create the need for more. The powerful Clutha River in Otago is about to be ruined in its upper reaches by a high dam hydro-scheme whose only real justification is that more megawatts will be required to supply another aluminium smelter at Aramoana, near Dunedin. Fortunately, this particular scheme has been abandoned by its huge multinational backer, Alusuisse, but the other partners are still hoping that another backer will be found, and the earthworks on the banks of the Clutha are continuing.

The ordinary New Zealand taxpayer subsidises these multi-billion dollar gambles with his landscape by means of direct and indirect taxation, subsidy and higher electricity bills. In addition he puts up with on-site pollution from pulp mills and smelters, with rivers degraded by superfluous hydro schemes, and with an employment situation in which work-place creation is monopolised by capital intensive industry. Around him pine plantations encroach on lands that may be of unique aesthetic and ecological value. Instead of having self-suf-

ficiency in metals and paper, the New Zealander has become enmeshed in a world-wide scheme of resource exploitation that is conducted to the detriment of non-investing human beings, whether they be black South African miners, dial-watchers at the Kawerau pulp mills, or Japanese producing Toyota cars. All are victims of economism and live in environments being damaged by the requirements of the market. All experience the alienation of their labour, and are offered commodities for consumption as a kind of saccharine compensation.

Growing Ecological Awareness

An ecological conscience has burgeoned in an attempt to stem the new style of industrial development. Large scale national protest against big industry was first heard over the Tiwai Point aluminium smelter whose inordinate power demands were going to result in the destruction of the Lake Manapouri shoreline by the raising of the water level. The National government probably lost critical support in the south in the 1972 election as a result of its insensitivity about Manapouri that year. It lost office that year. Ecologically brutal indigenous forestry 'management' schemes such as the plans for the utilisation of the South Island beech forests, first promulgated in 1971, also resulted in widespread protest, the establishment of the Native Forests Action Council and Friends of the Earth in 1973 and 1975 respectively, and one of the largest petitions presented to parliament in the country's history — the Maruia Declaration.

Government agencies such as the Commission for the Environment, the Nature Conservation Council and the Environmental Council have varied in effectiveness throughout the last decade. None have statutory powers, and in recent months the government has made it quite clear that it does not like robust or meaningful criticism of its development policies by such organisations. Definite attempts have been made to curb the Commissioner for the Environment and limit the Commission's role of to superficial, on-site critiques of developments such as the Aramoana smelter, when it was

fully known that its off-site effects were by far the most significant ones.

A stalemate exists now between two states of conscience — the one for development that simply obeys the dictates of the market, the other an attempt to transcend the barren economism of our history and make a community where development serves people. The stalemate has arisen, not so much because of the tremendous effort by many New Zealanders to resist the claims of economism and reaffirm the mythopoetic dimension of existence, though that has been important. It has arisen also because of a crisis within economism itself. The abandonment by Alusuisse of its role within the South Pacific Aluminium smelter project happened firstly because the power price was not going to be low enough to be worthwhile for the company to take the risk of investing in a contracting market for aluminium. But it would be wrong to ignore the role that public opinion played in the power price negotiation. If we had not just passed through a decade of intensive environmental campaigning and education Alusuisse and its partners may have been negotiating with a government that would have been prepared to give them the power for even less.

Too Little too Late?

The crisis of industrial man is deepening in this country as elsewhere. So also is a countervailing will to explore alternative ways of development. The present New Zealand landscape symbolises the contradiction. Evidence of misuse, dating back to the late eighteenth century is everywhere visible: erosion scars, oversize scree slopes, forests sterilised by wild and domestic grazers, oceans of pine planted on land that probably cannot sustain repeated harvestings, big, ugly industrial developments, acres of car salesyards and a business community that styles itself visibly on the money-bin architecture of multinational finance.

But the legendary beauty and power sensed by the Mao-hunter and the classic Maori is still here, even in areas mutilated by phosphate pastoralism and open cast

mining. I instance the Kawhia Harbour and its hinterlands, an area of great spiritual significance for the Maori people, as an example of this. Now the younger Maoris often realise that it is unwise to leave the remnants of their lands and be drawn into the cash vortex of the cities. And a handful of white farmers are beginning to experiment with mixed farming concepts that integrate the best in the European peasant tradition with the subtle ecological knowledge that the contemporary physical sciences offer us.³⁷

The New Zealand poet, Charles

Brasch, spoke of a long apprenticeship to be served by the European arriving in these islands:

"Man must lie with the gaunt
hills like a lover,
Earning their intimacy in the
calm sigh
Of a century of quiet and
assiduity,
Discovering what solitude has
meant
Before our headlong time broke
on these waters,
And in himself unite times
dual order,
For he to both the swift and
slow belongs,
Formed both for a hard and
complex history."

It was his hope that:

So relenting, earth will tame
her tamer,
And speak with all her voices
tenderly
To seal his homecoming to the
world."³⁸

Such a reconciliation between a driven people and a country of the most poignant beauty could produce a real culture. Only time will tell whether this fertility will flower, or whether it will be consumed by the economic processes that have already done so much damage.

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Books

Dr. Pangloss Meets Cassandra

THE ULTIMATE RESOURCE. Julian L. Simon. Princetown University Press; \$14.50.

If the reception of *The Limits to Growth* and *The Global 2000 Report* taught us nothing else it should have taught us that the Greeks were right. In the public relations game only optimism sells. Cassandra spoke the truth, but she was not believed. As Teiresias in Euripides's *The Phoenician Women* says: "A man's a fool to use the prophet's trade. For if he happens to bring bitter news he's hated by the man for whom he works."

In an engagingly frank introduction to *The Ultimate Resource* economist Julian L. Simon tells us that he used to be a Malthusian. At a particular well-remembered moment in 1969 he had a revelation that turned him into a born-again optimist. He is now making a very good thing out of his salvation, selling optimism by the bucketful to newspapers, magazines and television.

The ultimate resource, Simon says, is people, and no limit can be set to what people may accomplish. What we usually call resources are mere phantasms. Simon's conclusions are highly palatable to budget evaders, car salesmen, realtors, advertisers, land speculators, and optimists in general; scientists find them appalling. According to Simon, natural resources are getting less scarce; pollution is decreasing; worldwide, food per person is increasing; the faster the population grows, the greater the prosperity; every additional person born into the population is a boon; larger is better than smaller; the more immigrants we take in the better off our economy will be; diminishing returns is a meaningless concept; and there are no diseconomies of scale.

This is not optimism, this is euphoria. There has been nothing like it since the Marquis de Condorcet wrote his hymn to hope in 1793, *An Historical Picture of the Progress of Human Mind*, while hiding from the French Revolution (which he had supported from the beginning). Condorcet made a grand survey of the history of humanity. The succession of stages—tribalism, pastoralism, agriculturalism, the Greek experience, the Dark Ages, the birth of science, etc.—he divided into ten epochs of which nine had been completed. Humanity was now moving into the tenth and last (Utopians apparently cannot free their dream worlds from the illusion of finality). Affiliating his persona to the panorama of time, Condorcet was, despite the bleakness of his prospects, intoxicated with the future of history. Speaking of himself as "the philosopher," i.e., the lover of wisdom, he concluded his book with this paean: "How admirably calculated is this picture of the human race (to console the philosopher) for the errors, the crimes, the injustice, with which the earth is polluted, and whose victim he often is!" We cannot but admire his courage in writing so optimistically of mankind when his personal situation was so hopeless. Shortly after finishing his book (which was published two years later), Condorcet left his refuge and immediately met the fate he foresaw—death at the hands of the Revolution.

That alarms should breed euphoria may seem strange, but on closer examination it makes sense. Nature has her own dialectic: when the future looks really hopeless you might as well be euphoric. Since no future is ever absolutely determined, psychological denial puts you in the best shape to seize whatever opportunities fortune may throw your way.

The parallel between Condorcet and Simon is more than superficial. The revolution that threatens Simon's peace is not political but intellectual. The simpleminded concept of progress (largely technological progress) that governed most policymaking during the past 200 years is now under severe attack, and the bitter news of real limits is more than the naive devotees of progress can bear. Denying reality, they embrace euphoria. Simon gives them an intellectual base for being born again as optimists.

Simon's first problem is to exorcize the terror of the finite, which he does by trend analysis and theory. Since the price of refined copper and wheat, in real dollars, has (ignoring short-

term fluctuations) been on a downward trend for the past 200 years, it follows (he implies) that these commodities will forever become cheaper. But, as René Dubos has said, "Trend is not destiny." The last two centuries are only a moment in the life of the human species. What does the future hold?

The most important unknown in the future is the rate of development of new technology. Unfortunately there is no simple way to measure this rate. For a variety of reasons, the number of patents applied for and the number of scientific papers published per year do not give us the answer. For one thing, the "publish or perish" policy of universities encourages a cancerous growth of scientific papers. A measure of true progress has not been devised, but that does not stop Simon from pronouncing, "The pace of development of new technology in general is increasing." The Pope is not the only one who can speak *ex cathedra*.

That there might be theoretical limits to the supply of resources or the development of technology Simon denies on the most general grounds. The method he uses to establish the essential limitlessness of the world was exactly prefigured by Condorcet. In Simon's words:

The length of a one inch line is finite in the sense that it is bounded at both ends. But the line within the end points contains an infinite number of points; these points cannot be counted, because they have no defined size. Therefore the number of points in that one inch segment is not finite. Similarly, the quantity of copper that will ever be available to us is not finite, because there is no method (even in principle) of making an appropriate count.

The translation of this statement is simple: anything that is infinitely divisible is infinite in quantity. So Simon says.

If this is the proper way to analyze resource problems Simon should, as a licensed economist, also tell people: Don't worry about the small size of your bank account. You can always divide the dollars into cents, and if you still don't have enough divide the cents into mills. If that still isn't enough we can create a yet smaller unit so that you can have as many units as you want. You're rich!" Had Simon illustrated his argument with the appropriate economic example he would surely have seen his error.

Or would he? Possibly sensing the preposterousness of his position he falls back on two other arguments. As concerns our copper resources we must consider "the possibility of creating copper or its economic equivalent from other materials." Create copper from other materials? This is sheer alchemy, which science abandoned three centuries ago. True, nuclear physics furnishes a mar-

ginal—to use a favourite word of economists—defense of this possibility. With high energy radiation it is possible to produce a tiny amount of copper from other metals, but this yield is so slight that no one has ever bothered to calculate the cost. This is hardly the way to create what a responsible economist would call an infinite supply of copper.

As for the “economic equivalent” of copper, this raises the popular thesis of the “infinite substitutability of materials.” It is true, of course, that as copper becomes higher in price we find that we can substitute aluminium for the copper. What happens as aluminium becomes scarcer? Presumably we could substitute some other metal—perhaps silver or gold. But each new substitute also exists in finite supply. There can hardly be an infinite number of substitutes, and in any case the mass of the earth (or of the solar system, or of the Milky Way, if you wish) is limited. The substitutability game is a game of musical chairs. Substituting one element after another for copper eventually brings us back to copper itself. We cannot transcend a finite supply.

Simon's other attack on the concept of finitude can only be called jesuitical. Discussing the petroleum situation he says: “The number of wells that will eventually produce oil, and in what quantities, is not known or measurable at present and probably never will be, and hence it is not meaningfully finite”. One can only conclude from this that whatever is “not meaningfully finite”—whatever that may mean—is infinite. I am sure mathematicians will be delighted with this new insight into the meaning of the infinite.

Important though Simon considers his theoretical approach, he mostly relies on empirical facts to beat the reluctant reader into submission. “Information overload” is endemic in our time so every expositor has to choose only a fraction of the published material available. As one might expect, Simon chooses optimistic reports. For instance, he bases his rosy view of the future of petroleum resources on the pronouncements of Vincent McKelvey, a longtime director of the U.S. Geological Survey. McKelvey spoke from a prestigious platform, but it is astonishing that Simon does not realise how thoroughly McKelvey's pronouncements have been discredited. For nearly a quarter of a century there was a running battle between McKelvey and his fellow geologist M. King Hubbert. In effect Hubbert said: “The end is nigh,” while McKelvey said, “Don't worry—there's plenty for everyone.” Like Cassandra, Hubbert was not believed. Then as the 1973 oil crisis approached, other geologists re-examined the arguments of

McKelvey and Hubbert and concluded that Hubbert was right, noting that his projections had been uncannily accurate for two decades. Director McKelvey had been talking through his hat—his political hat. For the past ten years everyone who follows energy closely has known that M. King Hubbert is right, but his name is not to be found in Simon's book. Neither is there any recounting of this analysis. This is a pity because Simon, who leans heavily on the most simpleminded trend analysis, could learn much by a careful study of the sophisticated, ingenious, and open-minded methods of analysis used by Hubbert. Leaving Hubbert and his work out of a book-long discussion of resources is like omitting the names and works of Adam Smith and John Maynard Keynes from a treatise on economics.

Simon is, he admits, a “cornucopist”, a person who thinks there's always plenty more in nature's cup. In his idiosyncratic view agricultural productivity will increase forever. Is water scarce? Drill more holes in the ground. The fact that water secured in this way is mined water and hence subject to depletion (as are all mined substances) goes unmentioned by Simon. Anyway, if water becomes more expensive we can resort to trickle irrigation. The fact that the benefits of this will soon be eaten up by the exponential growth of demand is never considered.

Discussing the stock of agricultural land under the pressure of population growth, Simon, like the fast change artist at a county fair, befuddles the reader with rapid rhetorical interchanges of “arable land” and “cultivated land”, whereby he “proves” that the amount of agricultural land is increasing in the world. To Simon, as to a legion of economists, an acre is an acre, and a table of figures is the ultimate reality. Such economists are unable to see the difference between the rich glacial soil of Iowa corn land and worn-out tobacco land in Georgia. True, it is astonishing what a farmer can do with generous amounts of fertilizer and irrigation, but every corrective costs money (and energy). Agriculturalists are appalled when rich glacial till or fertile alluvial soil in an old flood plain is covered over by shopping malls, factory buildings, and highways. As M. Rupert Cutler, formerly Assistant Secretary for Agriculture, said: “Asphalt is the land's last crop.” So it is in the rich countries; in poor countries the last crop is desert.

The Department of Agriculture estimates that the U.S. is losing a million acres of prime farmland each year to urban sprawl. Does this bother Simon? Not a bit! The paragraph in which he demolishes

this bugaboo of the environmentalists is worth quoting in its entirety for it gives the flavour of the entire book.

The idea that cities devour ‘prime land’ is a particularly clear example of the failure to grasp the economic principles. Let's take the concrete (asphalt?) case of a new shopping mall on the outskirts of Champaign-Urbana, Illinois. The key economic idea is that the mall land has greater value to the economy as a shopping centre than it does as a farm, wonderful though this Illinois land is for growing corn and soya beans. That's why the mall investors could pay the farmer enough to make it worthwhile for him or her to sell. A series of corn-y examples should bring out the point.

Note the sleight of hand by which the economist substitutes “prime land” for “prime farmland”, thus preparing the reader to evaluate the land solely in terms of price on the open market. At a particular moment an acre may indeed be more “valuable” (more revenue-producing) as a part of a shopping mall than a grower of crops. A purely economic decision focuses on the moment. In practice, economics makes no allowance for future shifts in relative values. In the future the price of corn *relative to* the price of such competing economic goods as the stuff stores sell may rise precipitously. It certainly will if population growth gets out of hand.

A change in relative prices calls for a change in the economist's definition of “prime” and “highest use”. If economic calculations could allow for such quite likely future changes then society could safely put the future in the hands of free-market economists. But the standard technique of “discounting” the future with a negative exponential function lays waste to the real future. With the high rate of interest prevailing now, the future—as the economist anticipates it—virtually disappears. When money is earning 20 per cent interest, land anticipated to be worth a million dollars as farmland a generation from now (30 years) would command only \$1,238 of today's money. What counts most is what income the land can bring in right now. High interest has the effect of virtually destroying the future—in the economist's calculations.

The professional inability of the economist to deal adequately with the future has an equally unfortunate corollary: economics is blind to the irrevocable. Thirty years from now a change in the relative prices of grains and commercial gewgaws may make land more valuable as farmland than as shopping malls; but the cost of clearing millions of tons of concrete, asphalt, glass, and chromium from what was once prime farmland can make the correction of the earlier error in judgement economically impossible. A society that listens only to economists ratchets its way to

destruction.

Economic libertarians and doctrinaire free-market economists who concede no limits to the simple-minded method of discounting the future are today's providentialists. Pure economics will, in their view, create the best of all possible worlds. We need another Voltaire to write a new *Candide*.

Only political restraints (which are unacceptable to libertarians) can keep a laissez-faire system from destroying itself in a limited world. It is probably their inchoate realization of this truth that leads so many libertarians to deny the reality of limits. If limits can be set aside as some sort of unreality, then growth can continue forever without an increase in the price of money. Everyone can then forever prosper in a free market. The specter that haunts the minds of libertarians and cornucopists is the specter of material limits.

The exorcism of this specter has been greatly aided by a recurrent confusion between material and immaterial resources. Condorcet's book was an account of the progress of the human *mind*; he said that "nature has assigned no limit to the perfecting of the human faculties." This is perhaps true; for the sake of argument let us grant that it is. But where does "mind" fit into the scheme of things? Science deals with three kinds of reality: information, matter and energy. The second and third are material and are bound by conservation laws. The first, information, is immaterial and is not constricted by conservation. Mind operates in the realm of information.

From Condorcet to Simon, compulsive optimists have shown the utmost ingenuity in confusing information with the material aspects of the world. A thesis proved in one realm is surreptitiously transferred to the other. Where nonconservation holds sway limits may not be terribly important; but in the conservative world of matter and energy, limits are central to all disciplined thinking and planning. Economics professors love to tell their students that "there's no such thing as a free lunch", thus expressing an orientation that aligns economics with the natural sciences as a conservative discipline. But the usefulness of economics to commerce, which thrives on providential thinking, corrupts some economists into denying limits and abandoning conservative thinking. Pollyanna becomes the patron saint. Intoxicated with the progress of technology during the past two centuries, some economists now say there must be a free lunch somewhere.

The literary world has long realized that the putative subject of a work of fiction may not be the real subject. It

is not so widely recognized, however, that economists and scientists, when they set forth what they conceive to be the policy implications of their disciplines, may also be trying to free themselves through psychoanalysis. Simon puts his confession at the beginning of his book, and he frankly uses the first person. The source of his anxiety is not external, as was Condorcet's, but internal. Simon's mind used to be caught in the Malthusian mode and he was "in the midst of a depression of unusual duration." He escaped this depression by freeing himself of the Malthusian belief that material limits are real. Now he wants to free others—and to find companions. "Some others hold a point of view similar to mine. But there are far too few of us to provide mutual support and comfort. So this is a plea for love, printer's ink, and research grants for our side."

Malthus, a devout and practising Christian, would not begrudge Simon the love he seeks. But would Malthus—or should we—grant him his other requests? Observation shows that printer's ink and research grants (publicity and power) are bestowed in abundance on the Pollyannas of this world. Simon is being greedy when he asks for more than the plethora he has been receiving since he became a born-again optimist. Cassandra is the one who needs support. If the limits of the material world are real—if Cassandra is right—continued denial of those limits will be disastrous for our descendants.

Garrett Hardin

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The Perils of Iatrogenesis

THE CLAY PEDESTAL: A Re-examination of the Doctor-Patient Relationship by Thomas Preston. Madrona Publishers, 2116 Western Avenue, Seattle, Washington 98121, USA, \$12.95.

If it's only in the last fifty years, since the discovery of sulpha drugs, that physicians have had any effective remedy for infectious diseases, how can it be that they have enjoyed such high standing for so long, in so many different societies? And if, even today, only ten per cent of patients who consult a doctor have a condition that will benefit from treatment by drugs or surgery, while another ten per cent have complaints for which there is no known treatment, why are medical practitioners regarded as powerful custodians of health? Part of the answer to these questions is that

doctors are generally given the credit for the remaining eighty per cent of cases, where complete recovery can be assured by nothing more complicated than, in Thomas Preston's phrase, "a vacation, a pay rise, or relief from emotional stress."

Himself a doctor, Thomas Preston charges his peers with arrogance, with a less than Hippocratic susceptibility to financial inducement, and with widespread abuse and neglect of the scientific method.

The arrogance is evident to anyone who has spent a night in a metropolitan teaching hospital. The influence of financial considerations can be discerned, for example, in that in the United States, where surgeons are paid by the operation, an estimated 2.4 million unnecessary operations are carried out each year, at a cost of \$4 billion, and with the loss of 11,900 lives. In London, more coronary by-pass operations, currently the most lucrative form of surgery, are performed on fee-paying patients from the Middle East each year than in Great Britain as a whole under the National Health Service.

Abuse of the scientific method is evident in the typical therapeutic cycle that begins when a new treatment appears: there is an initial period of euphoria, when the creators of the therapy become celebrities within the profession, the press hails the new advance, and testimonials accumulate from specialists who have used it; there follows a phase of gradual disillusionment, lasting months or decades; and finally, a new treatment is discovered, and seemingly overnight the old is abandoned as worthless and the new one adopted. The cycle then begins anew.

Many of these therapies are worthless, or even harmful: examples include pure oxygen for premature babies, the intestinal bypass operation for obesity, radical mastectomy for breast cancer, electroshock therapy for mental illness, diethylstilbestrol (DES) for pregnancy problems, and routine tonsillectomy. More than half of the new operations introduced between 1964 and 1972 were no better than, or worse than, those they replaced. The Vineberg operation, popular in the 1960s for patients with coronary artery diseases, is now considered useless by medical consensus, and yet between ten and fifteen thousand people underwent the operation, and an estimated 1,000 people died from it. What has happened is that the personal authority of the physician has taken the place of scientific verification by controlled testing and statistical analysis.

These professional traits of medical practitioners lead to a pattern of unnecessary intervention in the healing process, and so to iatrogenesis, or

injury induced by doctors. Preston notes that, in those rare cases in recent history where there has been a doctors' strike (in Israel in 1973; in Bogota, Colombia, in 1976; and in Los Angeles in 1976), the death rate for the corresponding period has fallen. Risk of iatrogenic injury does not only attend surgery and drug treatment; a high incidence is also associated with test procedures intended to aid diagnosis.

The medical profession constitutes a self-regulating subculture. Those desiring admission must pass through medical school, where they are socialised into the accepted practices and values of the culture. It is here that students learn to put loyalty to the profession before loyalty to the patient; to view patients biophysically, as a diseased organ or a set of case notes; to establish a parent-child relation with patients, concealing information from them, and denying them the opportunity to participate in decisions that affect their wellbeing; to regard preventive medicine as an inferior calling, fit only for drop-outs and failures; and to distance themselves from the uncertainty and imponderability that necessarily pertain to medical decisions by cultivating an authoritative manner: "it has been said," Preston observes, "that the difference between a general practitioner and a consultant is not in knowledge, but in the conviction with which it is spoken."

The power of the medical subculture extends not only over those individuals who fall ill, but also over the extent and direction of public expenditure on health: on surgeons' salaries and high-technology equipment in hospitals, for example, rather than on research and prevention programmes, which presently account for only five per cent of medical spending in the USA. It even determines such nonmedical issues as whether a person shall die in hospital or at home. By defining what constitutes sickness, doctors are able to set the limits to their own jurisdiction; and legal safeguards against injury through medical practices are practically nonexistent, since the legal view is generally to afford the medical profession autonomy in setting standards of conduct.

The Clay Pedestal presents a lucid account of what is wrong with the medical profession, and why. Preston's aim is to make the public aware that medicine does not exist in some pure realm of scientific endeavour, and that medical policies should be a matter for informed, democratic decision; and he looks to the formation of strong consumer groups to lobby politically for medical accountability. His vagueness on this subject is the only seriously dis-

appointing aspect of the book.

For the individual trying to deal with the medical establishment, he has more specific advice: essentially, to practice self-care; to be circumspect in choosing a physician; to insist on an equal relationship, with free access to all the information necessary in making therapeutic decisions, including alternative treatments and probabilities of success; and to be sure that the best treatment isn't a vacation, a pay rise, or relief from emotional stress.

The Clay Pedestal is a book of narrow focus. It does not purport to be about health, and has nothing to say about the urgent need for legislation curbing the release of life-threatening chemicals into the environment. Nor does it present a clear political programme to remedy the situation it describes. But as an account of medical practices, it is invaluable, both demystifying and genuinely appalling: what doctors do is outrageous.

Bernard Gilbert

A Note of Good Cheer

CELEBRATIONS OF LIFE, by Rene Dubos. McGraw-Hill, New York. \$12.95.

Celebrations of Life is part philosophical essay and part autobiography. In his latest book, Rene Dubos sketches his understanding of what it means to be human, and illustrates how this has been reflected in his eighty years of active life.

To Dubos, the human individual is born with a genetic endowment that offers innumerable possible paths of development; which of these will be expressed depends on the shaping influence of environment, and in particular of the specific local culture or cultures in which the individual grows up, lives and works.

Emphasis on the importance of differences in culture and experience leads to one of the book's major precepts: think globally, act locally. Depending on local conditions, drastically different responses to the same problem may be appropriate. Taking land scarcity as an example, Dubos points to a striking contrast: Manhattan's response was to expand vertically; in the Netherlands, expansion was horizontal, by draining swampland and lakes, and the windmills built for this purpose are as characteristic of Dutch landscapes as skyscrapers are of Manhattan.

Having acknowledged the importance of both nature and nurture, Dubos goes further, and stresses that to be human means to have the

power of choice. From this conviction follows another key phrase: trend is not destiny. While the trend may be to environmental calamity, it is within the power of human ingenuity, resilience, and good will to accomplish a change in direction: biological evolution may be irreversible, but cultural evolution, the process by which human societies develop, is not.

Boldly stated, such optimism seems facile: synopsis cannot convey the qualities of *Celebrations of Life*. As the title asserts, it celebrates the diversity and richness of human experience, encompassing, among much else, the minutiae of village life in the Ile de France at the turn of the century, the mood expressed by Chicago's 1933 World's Fair, the cultural significance of the international airport, and the pleasures of La Fontaine's fables. The breadth of vision and tolerance that infuse the book are all the more powerful for being knit into a coherent and self-consistent view of the world.

There are many books that address practical issues more directly than this; there are even, let it be said, many books that are better written; but, to anyone who has been worrying about the ailing state of this planet and the people who live on it, *Celebrations of Life* can be recommended both for its tonic properties, and as a stimulus to reflection on the values that must shape the necessary remedies.

Bernard Gilbert

An Alternative to Positivism

SCIENCE AND CULTURE by J.P.S. Uberoi. Oxford University Press, 1979. £2.25.

This book is a concentrated attack on positivism which, the author argues, not only constitutes the dominant philosophy of the sciences, but also the general outlook of our culture as a whole. Positivism has many distinctive features, the most important of which may be listed as (1) the separation of subject from object, which characterizes the onlooker consciousness of the detached scientific observer, (2) the separation of fact from value, which is a first consequence of the standpoint of detached neutrality of the onlooker consciousness, and (3) the negation of the priority of the whole over the parts of which it is composed, which is a second consequence of (1) in so far as the vision of the priority of the whole requires a degree of subjective participation in it. The extent to which these three salient features of positivism underly science is perhaps more clear than the extent to which

they inform our culture generally. But Uberoi's thesis is that because the sciences are not subordinate to any higher principles, either in theory or in practice, the positivist approach has come to dominate the outlook and activities of our culture as a whole.

Uberoi is a professor of sociology at the University of Delhi, India, and his book has arisen from a dilemma which must surely torment many academics in the third world. The dilemma is between accepting the prestigious methodology and philosophy of Western science, which would entail rejecting his own cultural traditions (which include altogether different approaches to knowledge of reality than the positivist method) or taking the much more difficult path of challenging the claim of Western science to exclusive knowledge and asserting the integrity both of non-Western culture and non-Western science. In taking the latter course, one takes the personal risk of losing academic respectability, but one also risks for one's culture the inevitable disdain bestowed upon anything non-Western as being something inferior. The difficulty is aggravated by the fact that positivism has now become an international force, that cuts across boundaries of East and West, North and South.

In his book, Uberoi analyses how the positivist ethos has come to dominate first European consciousness, and then impose itself on the rest of the world. The positivist regime, he argues, arose primarily as a result of the religious Reformation and counter-Reformation of the 16th century, which produced an unbridgeable schism between the realm of spiritual truth and physical facts. Whereas in medieval times these two realms were mediated by an awareness of the world as having a symbolic dimension, so that scientific investigation of physical reality was always at the same time the pursuit of a transcendent reality reflected in the physical world, after the 16th century the world became ever more dumb, unable to speak of anything transcendent. Instead of the symbol, which provided a medium between man and God, post-Reformation Europe came to revere the instrument, through the medium of which man would increasingly relate to nature. This can be seen especially in the development of the sciences, which depended on the invention of more and more complex instruments to aid observation; but also in industry, where more and more complex machines transformed natural materials into artefacts. Whereas the symbol was the vehicle of the truth but practically useless, the instrument is practically useful but valueless in any metaphysical sense.

The extension of this double process of desacralizing nature and de-symbolizing science has not, however, gone unchallenged. And in finding the solution to his dilemma provided by an outstanding figure of Western culture, Uberoi is, at one and the same time, able both to lessen the risk of his losing academic credibility and also to strengthen the appeal of his alternative to positivism for Western readers. The man to whom Uberoi turns is the German poet and observer by nature, Goethe, who used to say that he valued his scientific work much more than his poetry. Goethe expressed his general approach to nature in the following words: "In observing the cosmic structure from its broadest expanse down to its minutest parts, we cannot escape the impression that underlying the whole is the idea that God is operative in nature and nature in God, from eternity to eternity". Goethe's scientific method, which he pursued in many different fields — from colour theory to plant morphology — is therefore sensitive to the three principles which positivism denies. The whole is deemed superior to the parts, which it organizes into comprehensive structures and forms, and thus Goethean science is a science of qualities rather than quantities, organizational wholes rather than disparate parts. The task of the scientist is to gather together individual facts into meaningful patterns, an activity which requires aesthetic sensibility as well as scientific accuracy, and which can only be done through a participative awareness of the object, in which the separation between observer and observed is to some extent overcome. The intervention of instruments between the scientist and the thing he is investigating only serves to distance him from the object and so, according to Goethe, should be kept to a minimum. Rather, one should try to cultivate a living awareness of each observed thing as the representation of a greater whole, an archetype, which manifests in and through it. In this way the particular thing assumes the aspect of a symbol, and by developing what Goethe called an "exact, sensuous imagination" or "concrete vision", it is possible to regain an awareness of the spiritual aspect of physical reality, the God operative in nature and nature in God.

For Uberoi, the creation of an alternative society goes hand in hand with the creation of an alternative science. The two go together, and can only be established on the basis of an alternative philosophy. He argues that the positivist outlook has already passed its zenith, which he locates in the manufacture and experimental explosion of the atomic bomb in 1945. This, he maintains, was the

ultimate achievement of positivist science, an achievement made possible by the division of the realm of facts from that of values. If we are to build up something new, we must overcome this division with a philosophy that perceives the world as something intrinsically sacred, to be honoured with the symbol rather than manipulated with the instrument. Within such an outlook, a new science of forms and qualities may emerge as successor to the analytic and quantitatively oriented science of positivism. I strongly recommend this compact and forcefully argued book to all who are working towards such an alternative.

Jeremy Naydler

Nuclear Energy: The Real Costs

Does Nuclear Power generate the cheapest electricity? To answer that question the Committee for the Study of the Economics of Nuclear Electricity (CSENE) has published a special report. In its analysis the Committee has primarily used the published figures of Britain's Central Electricity Generating Board. The Committee concludes: "The CEB's economic case for nuclear power fails to stand up under close scrutiny. A programme of ten nuclear power stations—as proposed by the British government—could well bankrupt the CEB."

At a press conference to launch the report, Tony Benn, former Energy Secretary, called the CSENE Analysis 'a very important document' which he describes as enough to 'scupper the board's plan to build an American-style pressurised water power station at Sizewell, Suffolk.'

Individual copies of the CSENE Report are available from Worthyvale Manor Farm, Camelford, Cornwall, PL32 9TT. Please enclose cheque (made payable to *The Ecologist*) for £2.00 plus 35p postage with your order.

The full text of the CSENE Report also appears in the December issue of *The Ecologist*, together with articles on the cost of nuclear energy in France and America.



Letters

The Scientific Straightjacket

Dear Sir,

Brian Martin (*Ecologist* 11 (1) 1981) has obviously not been fully informed of the situation about some university scientists whom he attempts to defend. I refer to Mr. P. Rawlinson and Dr. P. Keane of Latrobe University who were found to be distinctly lacking in scientific objectivity and accuracy in their public criticisms of the Forests Commission, Victoria, in 1977.

The facts of their misrepresentation and inaccurate reporting were quite correctly drawn to the attention of Latrobe University (not in 9 separate letters as inferred). The article by Dr. Keane in the *National Times* on the subject of phytophthora die-back to which Brian Martin refers, contained several serious errors to which the Editor's attention was drawn, and which were subsequently corrected. Rawlinson in particular then raised this matter to a political level when with a group of environmentalists he cultivated the Socialist Left within the Victorian Opposition, resulting over a period in a long series of repetitive questions in the Victorian Parliament followed by attacks on, and a motion of no-confidence in, the then Minister of Forests on this same subject of phytophthora. The motion was easily defeated and was stated to have been the weakest case for a no-confidence motion in the Victorian Parliament for many years. The Socialist Left mover of the motion was supported by only one Opposition speaker. Hansard and other correspondence and transcripts record these facts.

An attempt was made to silence the Forests Commission by means of using the Ombudsman. This misfired however when the Ombudsman, after examining the situation, together with all relevant correspondence, transcripts and reports, ruled that the Commission and the then Chairman in particular were simply and correctly defending the Commission's scientific staff and its integrity.

The next attempt at silencing was to try to get the Victorian Premier to prevent the Chairman of the Forests Commission from answering back against continuing unfair and inaccurate public statements about the Commission and its staff, much of it originating from this same source at Latrobe University. This too failed when the Premier wrote to the effect that the Chairman of the Commission was quite entitled to act as he was doing under the

circumstances. This is all documented. There is little doubt that the Commission could have proved that personal attacks and claims made against it of a "cover-up" etc. were libellous.

So much for at least one of these researchers 'shunning publicity'. The facts show otherwise.

The real point at issue was that of inaccurate, non-objective and apparently politically-motivated reporting emanating particularly from Mr. Rawlinson of Latrobe University—not suppression of scientific discussion. The only attempts at suppression, as far as I am aware, were those made against the Forests Commission. They rightly failed.

Thank you for the opportunity of correcting the record of these two cases of alleged injustices to Dr. Keane and Mr. Rawlinson. I had hoped that these matters were dealt with and closed. I had no wish to revive them, but I am sure you will agree that academic freedom and freedom from criticism is not a one-way street. It cannot be allowed to apply only to some specialists who happen to be in University employment.

I should add that Brian Martin could easily have found out that the Timber Promotion Council (his ref. 44) is a Government-appointed body operating under Government regulations; it is not an industry body; also that, since my retirement from the Forests Commission, I have worked for Universities and for Governments, not only industry, as his reference infers.

Yours faithfully,
Dr. F.R. Moulds,
Former Chairman of the Forests
Commission, Victoria.

Brian Martin Replies

Dear Sir,

In response to Dr. Moulds' letter, there are several points which I would like to make.

(1) Dr. Moulds simply has not demonstrated any 'misrepresentation and inaccurate reporting' by Mr. Rawlinson or Dr. Keane, or any other behaviour which justifies using terms such as 'lacking in scientific objectivity and accuracy'. For example, the only clearcut errors in Dr. Keane's article about the spread of cinnamon fungus in Victorian forests (footnote 5 in my article) were due to editing of his article by staff of the *National Times*, as noted by Dr. Keane's letter (also footnote 5). This has been pointed out before to Dr. Moulds, so it is hard to understand how he justifies continuing to hold Dr. Keane responsible.

(2) According to documents in my possession, Dr. Moulds did write at least ten letters to chief officers of La Trobe University about Mr. Rawlinson and Dr. Keane. For example, a letter to the Acting Vice-Chancellor of La Trobe University included the following: "... it is necessary for me to refer again to the activities of Mr. P. Rawlinson of the School of Biological Sciences ... concerning some irresponsible, completely inaccurate and abusive public statements made by this person ... he has continued to show complete irresponsibility as a scientist with clear departures from the truth and known facts ...

... one can only assume that his position as senior lecturer is a most non-demanding one ... in this quite exceptional case of Mr. Rawlinson, I would appreciate your advice as to the extent to which the La Trobe University accepts an obligation to ensure adequate performance by its scientific staff." This is just one example of what I consider to be 'great pressure' on the officers of La Trobe University to take action against Mr. Rawlinson. Considering that at the time of the offending radio and television interviews Mr. Rawlinson was the Conservation Council of Victoria's spokesperson on forestry issues, and gave the interviews in that capacity—not in his capacity as an academic—Dr. Moulds' statement that his concerns "were quite correctly drawn to the attention of La Trobe University" is hard to sustain. At no time did Dr. Moulds, in his pursuit of 'scientific discussion', contact either Mr. Rawlinson or Dr. Keane, who thus had no way of quickly or properly defending themselves from Dr. Moulds' attacks. It would seem that it was the officers of La Trobe University who vigorously defended Mr. Rawlinson's and Dr. Keane's right to speak out who were 'quite correct' in their stances.

(3) Dr. Moulds' conspiratorial interpretation of the actions of those who question Forests Commission viewpoints is obvious. But despite the implications of his letter, Dr. Moulds provides not a single bit of evidence to show that Mr. Rawlinson was responsible for what Dr. Moulds calls attempts to suppress the Forests Commission.

(4) Dr. Moulds confirms that he has worked for industry since retirement, supporting the information in my footnote 44. It is also true that many government and university bodies are subservient to commercial interests. The Timber Promotion Council fits this pattern exceptionally well.

In summary, Dr. Moulds' letter—especially in its attack on the credibility and motivations of critics rather than its attention to the scientific issues—is a good example of the type of response that often has greeted those who offend powerful interest groups by speaking out about threats to the environment or public health.

Yours faithfully,
Brian Martin
Department of Mathematics
Australian National University
Canberra.

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CONFERENCES & COURSES

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Mind-Body-Spirit Festival 1982. Olympia, London 19th-27th June. For further information contact the organisers: 159 George St., London W1H 5LB (Tel. 01-7237256).

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The International Society for Research on Civilization Diseases and Environment is holding a congress in Vienna, 17-20 November 1982 with the theme: **INFLUENCE OF ENVIRONMENT ON MAN**. For further information and programme please write to: Kongress Sekretariat Wien, Hofrat DDR, Maruna, Spitalgasse 23, A-1097 Wien IX, Oesterreich (Austria).

OUR LIVING PLANET—THREATS TO SURVIVAL. Conservation Society Conference and Discussion weekend, 17-18 April. Details from Barbara Dawton, 66 Copt Elm Road, Cheltenham. Tel: 26204.

Institution of Environmental Sciences (Chairman Sir K. Spencer) hold a conference on **THE NUCLEAR ENERGY DILEMMA: PROS AND CONS**. Wednesday, 21st April, 1982 at Baden-Powell House, Queen's Gate, London SW7 5JS. Details from: Dr. J. Rose, 14 Princes Gate, London SW7 1PU (Tel: evenings only 0254 55307).

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