

It has been argued in the previous section that the destruction of self-sustaining resources i.e. bacteria and topsoil, is a bigger ecological threat to oomans than the destruction of natural recyclable resources, renewable resources, the greenhouse effect and global warming. Given the fact that topsoil consists not merely of bacteria but a community of wildlife then, in effect, to say that the destruction of topsoil is the biggest ecological threat to oomans is virtually the same as saying that the extermination of animals is the biggest ecological disaster. Although the extermination of macro-wildlife would not in itself cause an ecological disaster, it is a key component of the animal extermination process and thus a part of the process of ecological collapse. The pleasures involved in murdering 'macro-fauna' has triggered off a virtually unstoppable extermination process which threatens all wildlife species - and, eventually, oomans themselves.

EO Wilson's lament over the increasing loss of biodiversity, quoted in the last section, is that animals could eventually be exploited to produce vital resources for oomans. It is, however, this anthropocentric attitude toward animals which is perpetuating the slaughter of wildlife. The belief that something is there to be used implies that sooner or later it will be used up and consumed. If the destruction of wildlife is the biggest ecological disaster facing oomans, it is imperative to stop the animal extermination process not by arguing that wildlife should be protected because they are of some use to oomans but because morally wildlife deserve to survive because they created a fabulously beautiful, and vibrant, planet and because geophysically wildlife are more ecologically important than oomans.

When considering the increasing numbers of animal species being exterminated all over the world something much more critical is involved than mere species loss. By exterminating more and more wildlife species, oomans are committing nothing less than ecocide, ecological genocide.

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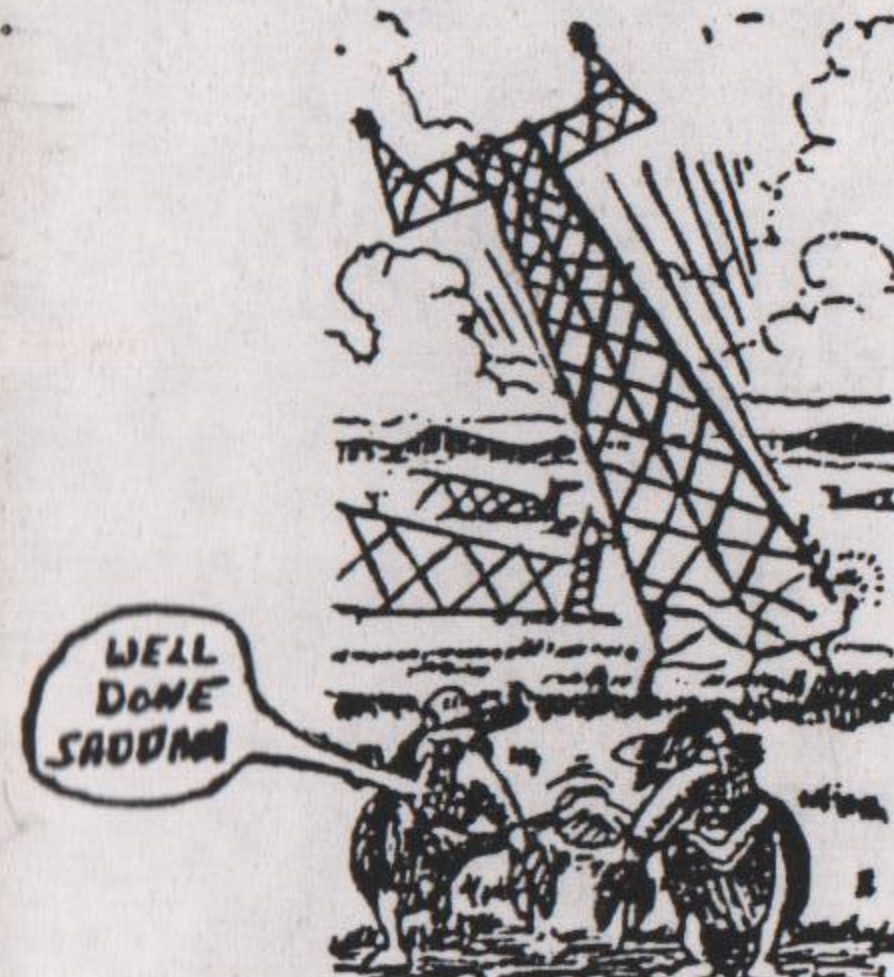
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WHAT IS THE BIGGEST ENVIRONMENTAL DISASTER?



GUARDIAN 18-1-93 p9 Photo: Kyodo

**ACID RAIN
 OZONE DEPLETION
 TOXIC CONTAMINATION
 THE GREENHOUSE EFFECT
 GLOBAL WARMING
 WATER SHORTAGES
 DEFORESTATION
 SOIL EROSION
 LOSS OF BIODIVERSITY**

INTRODUCTION

Humans are disrupting and damaging the Earth's life-sustaining processes to such an extent they now find themselves threatened by a correspondingly large number of ecological disasters. It is necessary to evaluate, as scientifically as possible, the potential of each ecological threat - although it is not yet possible to determine precisely which is the biggest threat, or which one is the catalyst that will trigger a collapse in the planet's life-support system. No policy to protect the planet's ecology will be effective until an ecological analysis has been carried out to ascertain the hierarchy of ecological threats. There is no point wasting huge amounts of time, effort and resources to combat one ecological disaster if there are other, more serious, disasters. This is especially the case if the policies combatting one

1) Pollution.

One of the oldest environmental threats is atmospheric pollution. The dangers of atmospheric pollution were first noticed in Britain in the 19thC but it was the lethal smogs of the 1950s which led to some of the earliest environmental legislation. However, the main outcome of the clean air acts was the construction of huge smokestacks which pushed the pollution high into the atmosphere thereby dumping the problem on other countries. This became a political issue in the late 1960s when Scandinavian countries began to complain about acid rain from Britain. Over the following decades, atmospheric pollution surfaced, disappeared and then resurfaced again with regular monotony on the political agenda - which all too clearly testifies to the environmental movement's political failure to curb eradicate the problem permanently.

I: The Destruction Caused by Acid Rain.

A: The Main Sources of Acid Rain. There are natural sources of acid rain. Volcanoes create acid rain as does marine organisms which create dimethyl sulphide. The main anthropogenic sources of acid rain are fossil fuelled power stations, motor vehicle emissions and metal ore refining. The human sources of acid rain overwhelm those from nature. "In just 10 years the Sudbury copper and nickel smelter in Ontario, Canada emitted more sulphur dioxide than all the volcanoes (the main natural source) in the history of the earth (sic)." (Clive Ponting 'A Green History of the World' Sinclair-Stevenson Ltd, London 1991 p.366).

B: The Effects of Acid Rain. The rain which once used to produce life now promotes death. Acid rain damages, and kills, vegetation, wildlife, humans, and marine plants and animals.

C: The Environmental Damage Caused by Acid Rain. Acid rain eats away at the fabric of most buildings. Whilst it bleaches lakes until they are crystal clear it blackens stone buildings.

D: The Ecological Damage Caused by Acid Rain. Acid rain causes severe damage to crops and reduces the planet's capacity for photosynthesis. "European wide surveys have estimated that 35% of Europe's forests, or nearly 50 million hectares, are affected (by acid rain). In Norway, 35,000 km² of lakeland are affected." (TEST 'Wrong Side of the Tracks, Impacts of Road & Rail Transport on the Environment, A Basis for Discussion' 177 Arlington Road London NW1 7EY 1990, p.71); "Acid rain will cost Europe 118 million cubic metres of wood every year for the next century." (New Scientist 11.8.90); "Acid rain has now affected over 7 million hectares of forest in over 20 countries. It has acidified 90,000 kilometres of brooks and 18,000 lakes in Sweden and severely affected over 50 lochs in Scotland, 700,000 lakes in Canada and many in the Adirondacks in the USA." (Jonathon Porritt 'Where on Earth are we Going?' BBC Books, London 1990 p.12).

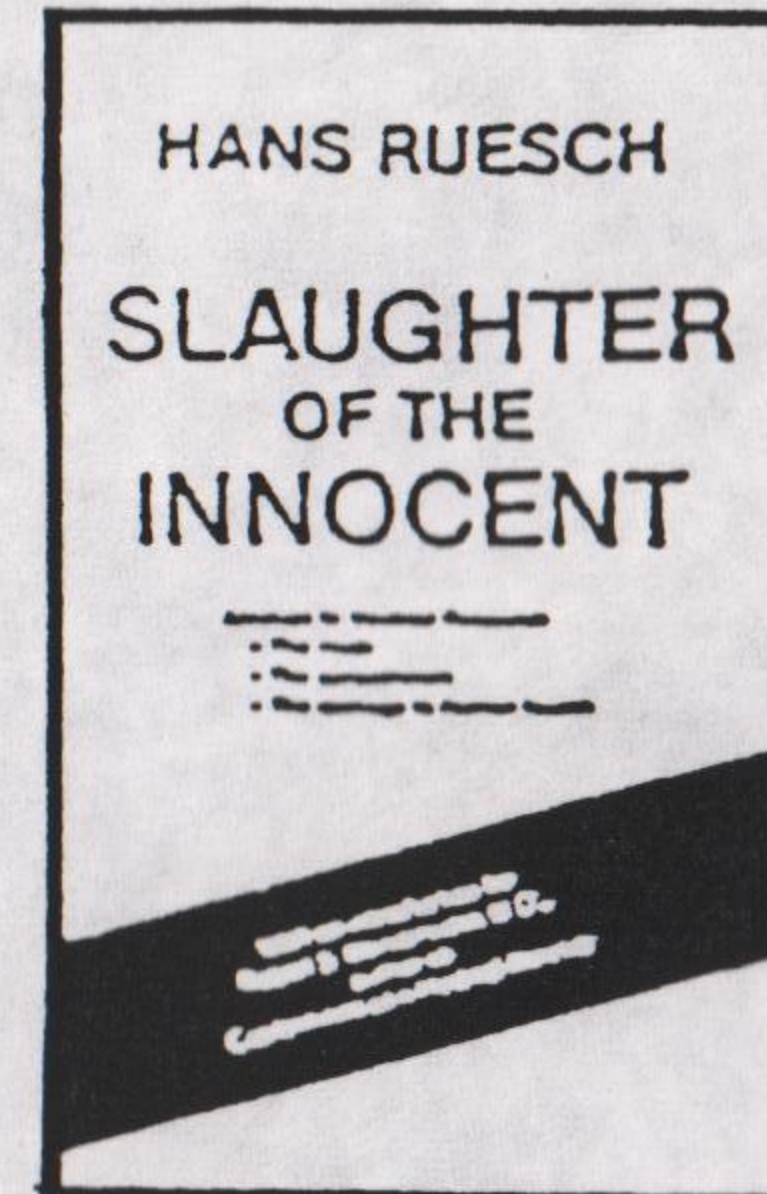
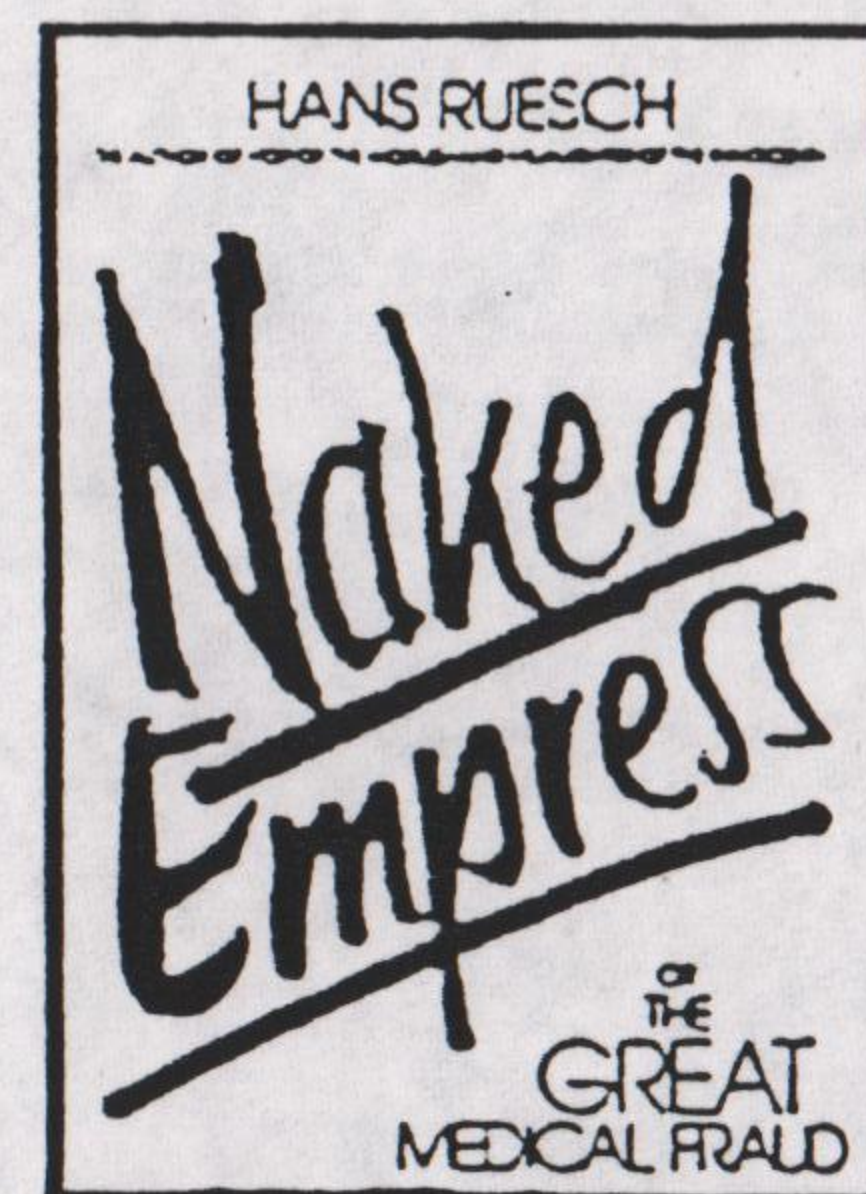
ecological threat exacerbate another, more dangerous, calamity. The determination of the hierarchy of ecological disasters is a matter for science but the remedies will be decided by politicians.

Here, then, is a clear example of the way in which the Earth must be given priority. Firstly, it is necessary to determine the scale of the human-induced ecological threats; secondly, it is necessary to work out what needs to be done ecologically to reduce these threats and prevent an ecological disaster; thirdly, it is necessary to determine the changes which need to be made to society; and then, finally, policies have to be crafted which minimize the social and economic difficulties caused by such changes and which equalize the sacrifices which need to be made.

E: The Damage Caused to Biodiversity by Acid Rain. "In Sweden 18,000 lakes have been acidified, rendering 4,000 of them unable to support fish." (TEST 'Wrong Side of the Tracks' p.71); "Acid rain has eliminated trout in rivers across 35,000 square kilometres of Norway." (Jonathon Porritt 'Where on Earth are we Going?' p.12).

F: The Economic Cost of Acid Rain. Acid rain causes a huge amount of damage in Europe. "A recent study estimated that acid rain pollution causes £200-600 billion worth of damage to Europe's crops, buildings, lakes, forests, and human health." (Guardian 1.11.91, p.34); "Acid rain will cost Europe 118 million cubic metres of wood - worth £16 billion - every year for the next century." (New Scientist 11.8.90).

G: Estimates of the Threat Posed by Acid Rain. Some ecologists do not believe acid rain is a crucial problem. James Lovelock: "Acid rain is, at present, a comparatively minor affliction for Gaia." ('Gaia, The Practical Science of Planetary Medicine' Gaia Books Ltd London 1991, p.161). Lovelock believes that most acid rain derives from natural not human made sources. "The biggest source (of acid rain) is not industrial but DMS released by marine plankton." (Michael Allaby, 'Guide To Gaia' Optima 1989 p.172).



Both of the above publications demanding the total abolition of animal experiments are available from:

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II: The Destruction Caused by Stratospheric Ozone Depletion.

One of the most recent manifestations of public concern about atmospheric pollution is the depletion of the ozone layer. Scientific warnings about the damage CFCs could cause to the ozone layer were first issued in the mid 1970s but very little action was taken until ten years later when an enormous hole was found in the ozone layer over the Antarctic. The Montreal protocols agreed to phase out some CFCs in order to allow alternatives to be introduced. These protocols were widely criticised for being too little too late. "Mr Foreman has warned that (the current agreements on the reduction of CFC emissions) would mean a further 20% of the ozone layer would be destroyed by the year 2000." (Guardian 3.7.90, p.6); "Greenpeace estimate that the volume of ozone depleting gases which would be released between now and 2000 would represent half as much again as the total amount already released in the whole of recorded history." (Guardian 3.7.90, p.6. See also 30.6.90); "A report from Britain's Stratospheric Ozone Review Group shows the ozone layer is being destroyed at a rate of 8% a decade. Even optimistic predictions now say 20% of the ozone above Europe will have disappeared before 1997 prompting a 40% leap in the amount of UV radiation filtering through onto our bodies." Green Magazine Sept 1991 p.7); "Ozone depletion over Europe is now worse than in Australia and New Zealand where people habitually use sun blocks. Dr John Pyle, head of the United Kingdom Stratospheric Ozone Review Group, said, "Take precautions when you go out in the sun, large factor in skin cancer is the past habits of people in exposure to sunlight." The increase in ultra violet light reaching the ground because it is no longer shielded by the ozone layer is about 1% per year since 1980. Each 1% drop in the ozone layer causes another 100,000 cases of blindness worldwide." (Guardian 19.7.91).

As a result of such predictions and continual increases in ozone depletion further measures have been agreed to speed up the phasing out of many ozone-depleting chemicals.

A: The Effects of Stratospheric Ozone Depletion. The ozone layer prevents most of the Sun's life-threatening ultra-violet radiation from reaching the Earth's surface. Ozone depletion damages vegetation; causes eye cataracts and malignant melanomas in humans. "The United States Environmental Protection Agency predicts 210,000 new skin cancer deaths in the United States alone in the next 50 years." (Guardian 1.11.91, p.34). It also causes eye cataracts in animals.

B: The Ecological Damage Caused by Stratospheric Ozone Depletion. Several studies have suggested that ozone depletion damages crops but the scale of the damage has not been estimated. "A 25% depletion of ozone levels would produce a 20-25% drop in soya bean yields." (Fred Pearce 'Turning Up the Heat, Our Perilous Future in the Global Greenhouse, The Bodley Head, London 1989 p.26); "Increasing ultraviolet radiation in the atmosphere is expected to cut by one-fifth yields of vegetable crops such as peas, barley and oil-seed rape. Some tree species will also be badly affected. Scientists studying climate change had said that some crops such as wheat and rice would have growth rates stimulated by increased CO₂ in the atmosphere but tests showed that increased UV-B destroyed that potential." (Guardian 26.9.92, p.7).



C: The Geophysiological Damage Caused by Stratospheric Ozone Depletion. "The United Nations Environment Programme and the World Meteorological Office suggest that depletion of the ozone layer by CFCs may in effect let more heat out through the holes than was thought, making the gases responsible for cooling the atmosphere." (Guardian 20.12.91, p.3).

D: The Damage to Biodiversity Caused by Stratospheric Ozone Depletion. Ozone depletion causes eye cataracts in animals.

E: The Economic Cost of Stratospheric Ozone Depletion. "Scientists have backed... fears that food prices will rise because increasing ultraviolet radiation in the atmosphere is expected to cut by one-fifth yields of vegetable crops such as peas, barley and oil-seed rape." (Guardian 26.9.92, p.7).

F: Estimates of the Threat Posed by Stratospheric Ozone Depletion. Very few commentators have made any assessment of the seriousness of the threat posed by ozone depletion.

ii) Poisoning the Food Chain.

The issue which is credited with sparking off the environmental movement was the poisoning of the food chain. In 1962, Rachel Carson revealed that pesticides had been found in a wide variety of wildlife around the world and had even been absorbed in the milk of expectant human mothers.

Modern technological societies produce an increasing array of highly toxic chemicals. These are either produced deliberately e.g. paints, solvents, pesticides, etc., or accidentally as a by-product of a chemical process or incineration. The poisoning of the food chain can happen either as a result of the legal use of toxic chemicals or as a result of toxic waste being dumped or escaping into the environment. The greater the number and quantities of chemicals produced, the greater the waste products, the greater the chance of a mass outbreak of food poisoning.

Toxic poisons are taken up by plants. These are eaten by small creatures which, in turn, are eaten by larger creatures. In some cases, the toxic chemicals become concentrated everytime an animal is eaten by another animal. The greatest concentration of toxic chemicals is found in those animals at the top of the food chain.

So many poisons have been dumped into the atmosphere and oceans that most biomass and most life-forms are contaminated in one way or another.

I: The Damage to Biodiversity

Caused by Toxic Chemicals. Millions of birds, fish and small mammals have been poisoned by toxic chemicals.

II: Estimates of the Threat Posed by Toxic Chemicals.

Some commentators believe the dangers posed by toxic chemicals are considerable. James Lovelock: "The issue of hazardous chemicals amounts to one of our greatest environmental challenges." ('The Gaia Atlas of Planet Management ed N Myers Pan Books, London 1985, p.124).

Unfortunately, it is simply not possible to evaluate how serious the threat is because very little research work has been or is being done on the chemicals released into the atmosphere. It is highly unlikely, however, that any chemical could invade the food chain to such an extent that it could endanger any one species, let alone humans, and certainly not all life on Earth.

iii) The Exhaustion of Non Renewable Resources.

The next major 'environmental' (but not ecological) fear was the exhaustion of fossil fuels and other non-renewable resources sparked off, in the early 1970s, by OPEC's huge oil price rises, "The OPEC price rise brought into being the phrase 'energy crisis'." ('Malcolm Slesser 'Energy in the Economy' MacMillan Press, London 1978, p.4).

The oil price rise caused many countries severe financial hardship but many commentators focussed on the long term danger that the rapid use of non-renewable resources would leave future generations bereft of vital resources. This led to demands for energy conservation. However, although the demand for oil fell after the oil price rise, within a few years inflation had eaten away the oil price rise and oil was once again being used in prolific quantities.

I: Estimates of the Threat Posed by the Exhaustion of Non Renewable Resources.

The latest estimates suggest that the main non-renewable resources could last anywhere between 150 to 300 years, "No essential mineral resource will run out." (James Lovelock 'The Gaia Atlas of Planet Management' ed N Myers Pan Books, London 1985, p.110).

iv) The Collapse of Ecological Services.

During the 1980s a small number of environmentalists became concerned about the increasing loss of services provided by the planet's ecology e.g. the reduction in rainfall and drought caused by razing forests; swarms of 'pests' caused by the killing off of a particular predator etc. It was believed that more and more of these services would be lost until the planet's entire life support system collapsed.

For some reason or another the idea of the increasing loss of planetary services failed to capture the public's interest and it never became a political issue. At this time, the public were adamantly demanding the provision of local government services such as refuse collection, leisure facilities, meals on wheels, etc., as well as a comprehensive range of health services, etc., and yet it did not seem to be in the least bit bothered about the possible discontinuation of the Earth's services. As the Ehrlichs pointed out, however, "The future of humanity probably depends much more heavily on the health of global ecosystems than on public health in the classic sense." ('The Population Explosion' Hutchinson, London, 1990, p.134).

v) The Greenhouse Effect.

The Earth's greenhouse effect was discovered in the 19thC and explored spasmodically by a few scientists throughout the 20thC. It was only in the 1970s, however, that the scientific profession began to take the phenomenon seriously. Unfortunately, there were considerable disagreements between those who believed the Earth was heading towards another ice age and those who believed the Earth was warming up. This may have been one of the main reasons why it didn't become a political issue until the late 1980s. In the summer of 1988, Jim Hansen, head of NASA's Goddard Institute for Space Studies, attending a United States' congressional hearing stated that, "It is time to stop waffling and accept that global warming is here." This statement was picked up by the media and provoked considerable public interest in the issue.

It wasn't until 1990 with the publication of the report, 'Climate Change', by the Inter-governmental Panel on Climate Change (IPCC), that it became apparent that a scientific consensus had developed about the threat posed by the greenhouse effect. Although there are still a number of scientists who do not believe there will be a rise in global average temperatures, the majority viewpoint is expressed by the IPCC, which had been set up in 1988 by the World Meteorological Office and the United Nations Environment Programme to investigate the greenhouse effect. The IPCC's report predicted that the greenhouse effect could cause an increase in global temperatures of between 1-4C by the middle of the next century and recommended draconian cuts in carbon dioxide emissions of 60-80%. These conclusions and recommendations have since been ratified by some of the most respectable scientific authorities around the world who have suggested that humans have only three decades to prevent a climatic disaster. The IPCC's dire warnings about increasing global temperatures has led many environmentalists to argue that the greenhouse effect is the biggest environmental threat.

The rise of the greenhouse effect as the major environmental threat has resulted in a re-evaluation of earlier environmental threats. It was realized that if the planet's non-renewable resources were consumed too quickly then the greenhouse effect would cause an ecological catastrophe even before these resources had been exhausted. The real danger caused by the rapid consumption of fossil fuels was not so much a world bereft of fossil fuels (let alone one that suffered from acid rain, smog, atmospheric pollution) but the greenhouse effect. "Full use of the world's recoverable fossil fuels could lead to atmospheric CO₂ concentrations up to 10 times the pre-industrial concentration. (The pre-industrial CO₂ level was 270 parts per million by volume whilst the present level is 350 ppmv). It is not possible at present to specify a maximum allowable CO₂ concentration. Nevertheless, it is often assumed that a concentration of 600 ppmv would induce significant climate and other changes that should perhaps be avoided if possible." (Alfred M Perry 'The Changing Carbon Cycle. A Global Analysis' Springer-Verlag New York 1986 p.561). The prospects of an ecological disaster suddenly leapt from the far flung future, when fossil fuels would be exhausted, to a much less distant horizon.

I: The Destruction Caused by the Greenhouse Effect.

A: The Effects of the Greenhouse Effect.
There is already some evidence that the greenhouse effect has led to an increase in global temperatures. "The 1980s were the warmest decade since records began and they also contained six out of the 10 warmest years in the period 1860-1989, 1990 was the warmest on record." (Clive Ponting 'A Green History of the World' Sinclair-Stevenson Ltd, London 1991 p.389).



The increase in global average temperatures will push the tropics towards the poles. There will be an increase in natural disasters such as floods, hurricanes, droughts, etc..

B: The Environmental Cost of the Greenhouse Effect.
One commentator has speculated that the greenhouse effect may have been responsible for the devastating droughts in Africa during the 1980s. "In all probability, the greenhouse effect has already killed hundreds of thousands of people." (John Gribbin 'Hot-house Earth' Bantam Press 1990 p.17).

Paradoxically, the greenhouse effect will also lead to the flooding of many of the world's major cities. "According to EPA estimates, erosion, inundation and salt water intrusion could reduce the area of present day US coastal wetlands up to 80% if current projections of future global sea level are realized." (Jodi L Jacobson 'Holding Back the Sea' in 'State of the World 1990' A Worldwatch Institute Report on Progress Towards a Sustainable Planet' Unwin Paperbacks, London 1990 p.83).

The increase in the number and ferocity of storms and hurricanes will cause considerable damage to buildings.

C: The Ecological Damage Caused by the Greenhouse Effect.
The change in the Earth's climate will cause such an increase in stress to trees and vegetation that many forests may not survive.

D: The Geophysiological Damage Caused by the Greenhouse Effect.
The increase in global average temperatures and natural disasters will change every single ecological habitat around the planet and may push some of them beyond their powers of recovery.

E: The Damage to Biodiversity Caused by the Greenhouse Effect.
The rapid changes in wildlife habitats will make it difficult for many wildlife species to adjust quickly enough to survive. Global warming will have a wholesale damaging effect on the planet's wildlife.

F: The Economic Cost of the Greenhouse Effect.
One estimate puts the cost of cutting greenhouse gas emissions in the US at £3.6 trillion, equivalent to the country's entire annual gross national product. (Guardian 7.7.90, p.11). Money will also have to be spent on installing or reinforcing flood defence systems.

The economic costs caused by the greenhouse effect will be enormous. Cities will be flooded. Land will be permanently inundated. Crops will be lost because of drought or flooding. A warmer planet will cause an increase in the number of 'pests' which will increase damage to crops.

II: The Dangers Posed by a Runaway Greenhouse Effect.

Some environmentalists believe it is imperative to take immediate, and drastic, actions to reduce carbon emissions because it is feared the greenhouse effect will not increase gradually and linearly but dramatically through a quantum leap in global temperatures. The greenhouse effect could develop a momentum of its own which could lead to an ecological holocaust. It is suspected that if methane (CH₄) takes over from CO₂ as the main greenhouse gas then the greenhouse effect will become self-sustaining. "If the trends in accumulation of both CO₂ and CH₄ continue unchanged the greenhouse effect from methane could exceed that of CO₂ by 2040." (Anne Ehrlich 'Agricultural Contributions to Global Warming' in 'Global Warming, The Greenpeace Report' ed, Jeremy Leggett Oxford Univ Press 1990, p.401).

Small increases in global temperatures could lead to the thawing of the frozen tundras (peat bogs) of Siberia and Canada, and the release of vast quantities of methane. "About 27% of the world's carbon store is locked up in the peat bogs of the tundra and the boreal forests." (Tim Radford, Guardian. See also, Pearce p.148). A rise in temperatures could also lead to the thawing of ice crystals at the bottom of the Arctic ocean. "There are large stores of methane trapped inside ice structures in sediments on ocean floors." (Fred Pearce p.158).

If either of these events began to take place, vast quantities of methane would be released into the atmosphere and would exacerbate the greenhouse effect. The greenhouse effect would no longer need to be fuelled by human stupidity but could draw upon the planet's own resources to increase its momentum. The warmer the planet becomes, the greater the release of methane, the bigger the boost to the greenhouse effect.

The evidence suggests that the thawing of the tundra and ice crystals is already beginning to happen. "The Arctic tundra is melting. The IPCC report says this effect has probably been underestimated." (Guardian 12.2.92, p.3). The melting of ice crystals, "may already be the most important source of methane in the atmosphere. Some 150 million tonnes a year is one guesstimate." (Fred Pearce p.159).

Another ecological phenomena which might provoke a runaway greenhouse effect is respiration by the planet's biomass. It has been proposed that a rise in temperatures will put the planet's biomass under considerable strain so that instead of absorbing huge amounts of atmospheric carbon, trees and vegetation will release much of the carbon they have stored up. "The probability is high that a warming will stimulate the respiration of terrestrial ecosystems, including the decay of organic matter in soils, sufficiently to exceed any net primary production." (George M Woodwell 'The Effects of Global Warming' in 'Global Warming, The Greenpeace Report' Ed by Jeremy Leggett Oxford University Press 1990, p.123). Woodwell calculates that respiration will exceed even the fertilization effect, (i.e. the increase in biomass growth because of higher levels of atmospheric carbon). "The increase in respiration from (global) warming will dominate all other biotic effects and accelerate rates of release of CO₂ and CH₄ from the respiration of plants and the decay of organic matter in soils." (George M Woodwell 'The Effects of Global Warming' p.15).

III: Estimates of the Threat Posed by the Greenhouse Effect.

The scientific consensus over the threat posed by the greenhouse effect has been followed by an almost complete unanimity amongst environmentalists that the greenhouse effect is the most important ecological issue:-

Jeremy Leggett: "There is no single issue in contemporary human affairs that is of greater importance." ('Global Warming: A Greenpeace View' in 'Global Warming. The Greenpeace Report' Ed. Jeremy Leggett, Oxford Univ Press, 1990, p.480).

Norman Myers: "The greatest environmental upheaval of all, the greenhouse effect." ('The Gaia Atlas of Future World's, Challenge and Opportunity in an Age of Change' Robertson McCarta 1990, p.138).

Penny Kemp & Derek Wall: "Global warming is the most serious environmental problem we face." ('A Green Manifesto for the 1990s' Penguin Books, London 1990 p.45).

Jonathon Porritt: "Carbon dioxide emissions are the single greatest threat to human wellbeing (let alone to the rest of life on Earth)." ('Where on Earth are We Going?' BBC Books, London 1990, p.38).

Patrick Rivers: "Affecting the whole planet, it (the greenhouse effect) is the most colossal and dangerous ecological experiment of all time." ('How to Rescue the Earth for Our Children' Greenprint 1988 p.5).

Alexander King & Bertrand Schneider: "The most menacing macro-pollution by far, however, concerns the so-called greenhouse effect." ('The First Global Revolution. A Report by the Council of the Club of Rome' Simon & Schuster London 1991 p.24).

Barry Commoner: "The most potentially catastrophic problem, global warming." ('Making Peace with the Planet' Victor Gollancz 1990 p.144).

IV: The Limited Threat Posed by the Greenhouse Effect.

The IPCC's analysis of the greenhouse effect is marred by a number of theoretical and empirical weaknesses (see 'An Ecological and Political Critique of the Earth Summit' - details on back page). This opens up the possibility that the greenhouse effect, as defined by the IPCC, does not pose as significant a danger as is often suggested.

Firstly, there is no linear correlation between an increase in carbon emissions and a rise in global average temperatures. There is alleged to be a threshold beyond which additional carbon emissions have no effect on the greenhouse effect. "There is so much CO₂ in the atmosphere already that even doubling the concentration does not produce a dramatic change in world temperature." (John Gribbin 'Hothouse Earth' Bantam Press 1990 p.142). The radiative forcing of CO₂ is limited because it blocks infra-red radiation across only a short section of the electromagnetic spectrum.

Secondly, there are scientific doubts that the greenhouse effect could become a self-sustaining process.

Finally, and most importantly, it is not true that there will necessarily be an increase in global average temperatures because of the carbon pollution dumped into the atmosphere over the last two centuries. If large parts of the Earth are reforested this would not merely reduce the concentration of atmospheric carbon but would increase the planet's albedo and thereby cool the planet. And, despite Woodwell's belief that respiration will dominate all other ecological processes, it is possible that if global reforestation is carried out on a sufficiently large scale then the planet's albedo could be increased enough to prevent the rise in global temperatures which would boost biomass respiration. Global reforestation could avert the threat of climate change.

vi) Global Warming.

The 'greenhouse effect', as it has come to be defined by the IPCC, and virtually every other environmental organizations, refers to the effect of atmospheric pollution on global average temperatures. The fact

is, however, that the Earth's global average temperature is influenced not merely by the supply side of the carbon cycle (carbon emissions) but by the demand side of the carbon cycle (the planet's ability to absorb atmospheric carbon - its net primary production or its photosynthetic capacity), and, by the heat flow (the amount of sunlight reflected back into space by the Earth's surface). These three phenomena are collectively known as 'global warming'. An increasing number of theorists are beginning to make a distinction between the greenhouse effect and global warming because of the theoretical inadequacies of the IPCC's model of the greenhouse effect. What is more, the IPCC's focus on atmospheric pollution (the greenhouse effect) is a dangerous error because it is not possible to reduce the level of atmospheric carbon by relying solely on measures to limit carbon emissions. Even if carbon emissions were curbed dramatically, the greenhouse effect could continue to worsen if more and more of the planet's biomass was destroyed.

I: The Geophysiological Threat Posed by Global Warming.

The geophysiological threat posed by global warming is much greater than that posed by the greenhouse effect. The destruction of the planet's biomass will boost global temperatures far more, and far more quickly, than atmospheric carbon emissions.

One of the major benefits of developing a global warming theory is that it enables a re-evaluation to be made of the environmental threats examined above.

II: The Geophysiological Threat Posed by Pollution, Poisoning, and the Exploitation of Fossil Fuels.

It has been suggested above that pollution, biomass poisoning, and the exploitation of fossil fuels are not significant ecological threats. However, it is possible that they pose more of an ecological threat as contributors to global warming than they do in themselves.

A: Pollution.

Acid rain has a multiple impact on global warming. Acid rain reflects sunlight back into space thereby decreasing global temperatures. However, by damaging the planet's photosynthetic capacity it boosts global warming. In addition, reflecting sunlight back into space reduces photosynthesis and thus further boosts global warming. The relative contribution of these three effects on global warming is not known.

Ozone depletion reduces global warming by allowing heat to escape the Earth's stratosphere. However, the increase in ultra-violet radiation damages the planet's photosynthetic capacity thereby boosting global warming. Once again, the relative contribution of these two effects on global warming is not known.

B: Poisoning of the Food Chain.

The toxic chemicals dumped into the environment damage, and kill, biomass and thus reduce the planet's photosynthetic capacity. This boosts global warming.



II: The Geophysiological Threat Posed by Water Shortages.

The biggest, ooman-induced, threat caused by water has nothing to do with ecology but with politics. Given the ooman predilection for wars and the trigger happy state of many military institutions around the world, war could break out at any moment in any number of places around the world. Even worse is that there are some areas in the world where war could escalate into a global military conflagration. There is no longer the danger of local wars sparking off super-power conflicts but the long historical disputes between christianity and islam is still capable of flaring up into a global war. The water shortages in Israel are serious enough in their own right but, given the conflict between judaism, islam, and christianity, the disputes could erupt into something far worse than the Gulf war.

It is possible, then, that the problems caused by water shortages could erupt a long time before the onset of fossil fuel depletion and the greenhouse effect, even though such disputes are unnecessary because all are resolvable. The military confrontations over water could produce an ecological disaster bigger than many of the ecological problems analyzed above.

viii) The Destruction of Renewable Resources.

I: Renewable Resources.

There are a wide range of renewable resources - forests, coral reefs, the flora of continental shelves, photoplankton, mangroves and savannah grasslands. At one point or another over the last three decades, and in various places around the world, local people have protested about the destruction of one or other of these ecological phenomenon. However, it is extremely unusual for protesters, even environmentalists, to see the link between their local ecological resources and the rest of the planet's biomass. As a consequence, the destruction of any one of these ecological resources has been seen as an isolated, local issue and not as part of a general attack on the planet's biomass. Perhaps the most blatant manifestation of this failure is the absence of a green organization which defends the interests of the world's renewable resources.

The only issue which has come anywhere near to being regarded as a global issue is deforestation. And yet, even here, whilst the British public becomes upset about the destruction of the Amazon rainforest they are less concerned about the destruction of other rainforests around the Earth; less concerned still about the devastation of the taiga; and even less concerned about the destruction of forests in their own country. The destruction of the Amazon rainforest is one of the most recent environmental worries even though all of the Earth's forests are under threat. Unfortunately, then, deforestation is an ecological issue which is riddled with ignorance and hypocrisy.

C: Fossil Fuels.

Whilst fossil fuels could be used quite legitimately without causing any undue disturbance to the planet's geophysiological processes, the fact is that these non-renewable resources are being used to destroy the planet's renewable resources. It is arguable that atmospheric emissions from fossil fuels are less of an ecological threat than the use to which fossil fuels are put i.e. destroying the planet's renewable resources.

vii) The Destruction of a Natural Recyclable Resource.

There are a number of different materials which can be recycled e.g. metals, plastics, paper, etc.,. There is, however, only one natural recyclable resource and that is water.

There has been an environmental concern about water for many decades but, like pollution, it tends to surface only now and again - and often in a variety of different disguises.

The first concern about water was not over water *per se* but water poisoned by the toxic chemicals and toxic waste poured into rivers. The concern about water was transmogrified by the recent interest in the greenhouse effect, into fears about water shortages and drought. In effect, the water issue became subsumed under the problem of global warming.

The next fear about water was shortages created by the ever increasing social and economic demands for water - shortages exacerbated by the contamination of water by toxic chemicals and toxic waste, acid rain pollution, and eutrophication caused by fertiliser run-off, etc. The over-industrialized world's demand for fresh water is increasing so rapidly there is a prospect of water shortages in many countries. Some rivers are being periodically dewatered and some of the Earth's major aquifers are having water extracted at a faster rate than it is being replaced. "There is already an international alarm about water. There are roughly 9000 cubic kilometres of fresh water available at any time. Right now we are using about 1/3 of this. In theory, this supply should be enough for 20 billion people. (Tim Radford 'The Crisis of Life on Earth. Our Legacy from the Second Millenium, Thorsons Publishing Group 1990, p.218). Ambitious schemes are being touted to overcome the predicted water shortages e.g. in America, a \$120 billion water pipeline from Alaska to California and, in Britain, a national water grid. This concern about water is not so much an ecological, as a resource, issue similar to that concerned with the shortage of non-renewable resources.

The latest concern for water stems from the fact that a large number of countries around the world share a common water supply. Increasing water shortages could lead to disputes between countries as to how much water they should be allowed to extract. The daming of rivers for hydro-electric power and irrigation threatens to reduce water supplies to countries downstream. The concern about water supply has shifted the debate about water from being a resource issue to one involving national sovereignty and, if no agreements can be reached between sovereign governments, war.

It seems as if the only way that water could become an ecological issue is indirectly - if the disputes about water rights lead to wars which cause ecological ruin.

I: The Damage to Biodiversity Caused by Water Shortages.

Water shortages will have a severe detrimental impact on biodiversity. The more water expropriated for ooman use, the less there is for wildlife. Wildlife are already being culled in areas where there are water shortages.



It is important that all local cases of deforestation are recognized as being part of a general attack on all the world's forests. But, it is even more important that global deforestation is seen as a part of an even wider attack on coral reefs, continental shelves, photoplankton, mangroves, and savannah grasslands. What is the point of saving the world's forests if all of these other ecological phenomena are being devastated? It is imperative that such destruction is seen as part of a purge against the planet's biomass. Ecologists define these ecological phenomena as composing the planet's net primary productivity or the planet's photosynthetic capacity etc., but such phrases seem unduly technical. Perhaps the best way of defining them is as the planet's renewable resources.

II: Deforestation.

A: The Ecological Role Played by Forests. Forests play a vital role in a large number of ecological processes which are crucial for the survival of virtually all forms of life. They play a major part in the carbon cycle by extracting carbon from the atmosphere. They help to control the Earth's heat flow; oxygenate the Earth; purify water; protect fragile soils; provide a nursery for a wide variety of plants; and, provide homes for a vast array of animals. "By means of their elaborate root systems, they (trees) literally hold the soil together, preventing erosion from even the steepest slopes. Their elaborate root system also ensures that the earth beneath it is sponge-like and maximizes its capacity to retain the rains, by the same token, they control run off to the rivers, releasing only a fraction of what they retain. Forests also provide the perfect habitat for living things." (Edward Goldsmith 'The Way, An Ecological World-View' Rider, London 1992 p.177); "Deserts happen because we chop down trees. It isn't as simple as that and it isn't the only reason, but it is ultimately so. Trees shade ground and conserve soil moisture." (Tim Radford 'The Crisis of Life on Earth, Our Legacy from the Second Millennium, Thorsons Publishing Group 1990, p.205).

B: The Ecological Damage Caused by Deforestation. Without a doubt, if all the forests around the planet were cut down the geophysiological damage would be severe. Global deforestation would reduce the amount of carbon being extracted from the atmosphere and thereby boost the greenhouse effect. "Although an estimated 41% of photosynthetic activity takes place in the oceans, it is the 59% occurring on land that underpins the world economy." (Lester Brown, ed 'State of the World 1990, A Worldwatch Institute Report on Progress Toward a Sustainable Society' Earthscan Publications Ltd, London, 1990, p.5). If all the world's forests were set ablaze this would release vast quantities of greenhouse gases into the atmosphere thereby further boosting the greenhouse effect. Much more dramatically, however, deforestation would cause a rapid rise in global average temperatures because of the change in the planet's albedo and this would lead to immediate climatic instability.

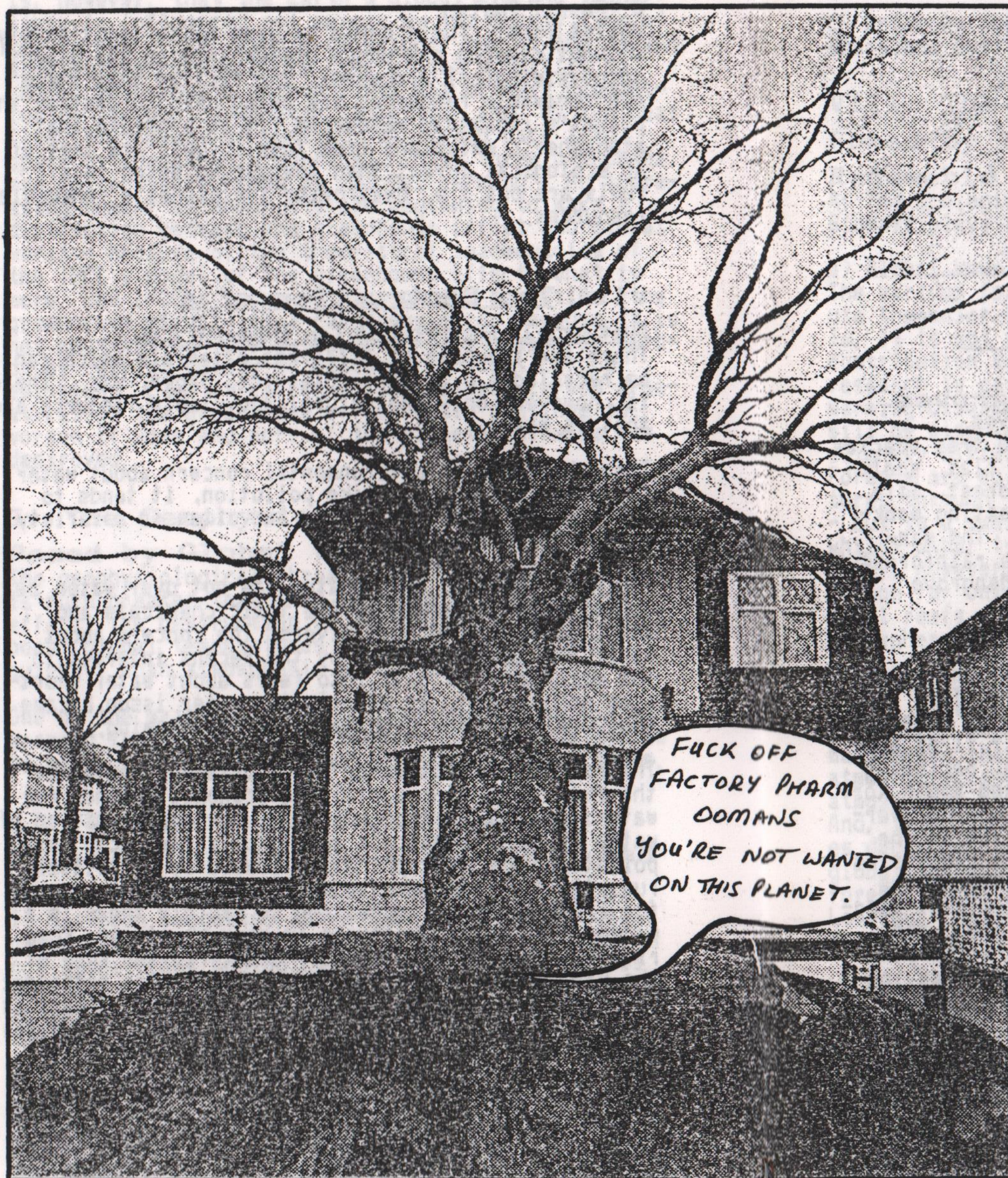
Deforestation would also cause a reduction in atmospheric oxygen but, given the vast amounts of oxygen in the atmosphere, it would happen only very slowly over the millenia and would pose no immediate threat to life.

Deforestation is one of the biggest contributors to the fresh water crisis.

Deforestation causes massive levels of soil erosion.

And, finally, deforestation would lead to the extinction of the overwhelming majority of plant and animal species on Earth.

C: The Scale of Deforestation. The current scale of global deforestation is nothing less than frightening. "Over the last 10,000 years, the earth's mantle of forests and woodland has shrunk by a third as trees were cleared to make way for crops, pasture and cities." (Sandra Postel and John C



NOT SO MUCH A STORM, MORE A POLITICAL PROTEST

Ryan 'Reforming Forestry' in Lester Brown, ed 'State of the World 1991, A Worldwatch Institute Report on Progress Toward a Sustainable Society' Earthscan Publications Ltd, London, 1991, p.74). The rate of forest destruction is no less frightening. "The planet's mantle of trees, already a third less than in pre-agricultural times and shrinking by more than 11 million hectares per year." (Alan P Durning 'Ending Poverty' in 'State of the World 1990' A Worldwatch Institute Report on Progress Towards a Sustainable Planet' Unwin Paperbacks, London 1990 p.187).

For the first time in history, it is possible to envisage the eradication of the boreal forests of Canada, Alaska and Russia, as well as the world's tropical rainforests. "The rate of destruction of tropical forests means that by the end of the century and given current trends, nearly all forests will be gone in India, Thailand, Vietnam, the Philippines, Madagascar, East Africa, West Africa, and central America, and virtually all primary forest will be eliminated in Burma and Ecuador." (Norman Myers 'Deforestation Rates in the Tropical Forests and their Climatic Implications' Friends of the Earth 1989).

It has been suggested that the Earth is one continent short of the quota of forests needed to counteract global warming.

Reforest the Earth,
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NEITHER GREENPEACE NOR
FRIENDS of the EARTH
BELIEVE REFORESTATION IS THE
MAIN PRIORITY FOR COMBATTING
GLOBAL WARMING

The Reforest the Earth project
has three aims:

- to promote global tree-planting to combat the greenhouse effect.
- to raise awareness concerning global warming and the environmental and social problems caused by deforestation and other human activities.
- to foster individual involvement in the solution to the myriad problems facing humanity in the late 20th century.

D: Estimates of the Threat Posed by Deforestation. There are a number of theorists who believe deforestation is the critical ecological problem;- Fred Pearce: "The big issue for the future of the planet (has to do) with forests, where most of the terrestrial carbon resides, ('Turning up the Heat' p.120) Anthony Milne: "The most serious environmental problem now facing the Earth is deforestation." ('Our Drowning World, Population, Pollution and Future Weather' Prism Press Dorset 1988 p.44). James Lovelock: "To me the vast, urgent and certain danger comes from the clearance of the tropical forests. Greenhouse gas accumulation may be an even greater danger in time to come, but not now." ('Gaia, The Practical Science of Planetary Medicine' Gaia Books Ltd London 1991, p.9); "To a planetary physician, by far the most dangerous malady afflicting the Earth is that of exfoliation - destruction of its living skin. In human medicine the loss of skin from whatever cause is a serious threat to life; the loss of more than 70% of the skin by burning is usually fatal. To denude the Earth of its forests and other natural ecosystems and of its soils is like burning the skin of a human. And we shall soon have destroyed

or replaced with inefficient farmlands 70% of the earth's natural land surface cover." ('Gaia' p.157); "The effects of forest clearance will probably be the first gigantic disaster to greet us within the next decade or two. Numerical models based on Gaia theory, and the experience of past civilizations, both predict that once more than this proportion of a self regulating ecosystem dies (65%) then it can no longer sustain its climate and total collapse takes place." ('Gaia' p.158).

III: The Destruction of Coral Reefs.

The destruction of coral reefs is not regarded as a major environmental problem by the public nor by many environmentalists. This is partly due to the ignorance of the ecological role played by coral reefs. The dangers involved in the destruction of coral reefs might be taken more seriously if it was seen as part of the more widespread destruction of renewable resources.

A: The Ecological Role Played by Coral Reefs. Just like forests, coral reefs play a major part in the carbon cycle. "The world's coral reefs face destruction from global warming that could be worse for the world than the loss of tropical rain forests. Coral reefs perform an equally valuable ecological function in absorbing carbon gas." (Daily Telegraph 11.4.90).

Perhaps even more importantly, unlike forests, coral reefs are a permanent depository for carbon. "Coral reefs could be absorbing up to half of the carbon dioxide dissolving into the sea from the atmosphere. If so that makes them at least as important a 'sink' for carbon as rainforests. Not only that, coral reefs do not ultimately release their carbon back into the air, as trees do when they die." (Fred Pearce New Scientist 21.11.92 p.50).

Coral reefs are just as much a home for marine life as forests are for wildlife.

B: The Scale of Coral Reef Destruction. Coral reefs are the most delicate and easily damaged eco-systems on Earth. Their very existence depends on clear, unpolluted water (corals must have plenty of sunlight and an environment free from unnaturally high levels of algae); no interference (just touching living coral can kill it); and there also needs to be a good range of fish and invertebrate species to keep the coral well maintained.

The problems that corals face are immense:- Loggers, shifting cultivators, mining companies, cash crop farmers, etc., destroy tropical forests causing soil erosion and after being washed down to the sea the silt smothers corals; industrialists, water companies, and farmers dump sewage and nitrates into rivers which poison corals; boat owners destroy coral by dragging their anchors over reefs; tourists jump up and down on coral reefs out of sheer joy at seeing such beauty; fisherfolk use dynamite to catch fish which causes irreparable damage to coral reefs; local construction companies remove coral for building purposes (as in the Maldives); local businesspeople remove coral to create tourist souvenirs (as in Mobassa); the shell trade removes key fish species from corals which leaves the corals defenseless against attack by other fish species e.g. the Giant Triton is the chief predator of the Crown of Thorns starfish which feeds exclusively on coral. The exploitation of the Giant Triton by the shell trade has led to an unprecedented increase in the Crown of Thorns population and this, in turn, has resulted in entire reefs being literally eaten away; the aquarium trade expropriates Cleaner Wrasse, a fish which cleans other fish thereby keeping them in healthy condition, and this causes other fish species to move away from corals causing reef degradation.

C: Opinions about the Threat Posed by Coral Reef Destruction. Some commentators seem to believe the destruction of coral reefs is just as serious as that of deforestation. "The world's coral reefs face destruction from global warming that could be worse for the world than the loss of tropical rain forests. Coral reefs perform an equally valuable ecological function in absorbing carbon gas." (Daily Telegraph, 11.4.90).

IV: The Sterilization of Continental Shelves.

This form of destruction is even less well appreciated than the destruction of coral reefs.

A: The Ecological Role Played by Continental Shelves. Continental shelves are some of the most ecologically productive areas on the planet. They nurture vast schools of marine life. Just as was the case with the biomass phenomena outlined above, continental shelves play a role in the carbon cycle although what would happen to the planet's ecology if the world's continental shelves were turned into deserts is not known.

B: The Scale of Destruction. Continental shelves are being ruined primarily by the toxic, and sewage, waste being dumped into rivers. The pollution dumped into rivers eventually makes its way to estuaries and then gets swept along coasts spreading over the continental shelves. Coastal resorts add to the pollution and encourage a vast array of leisure boats which drag their anchors over these shelves and ruin their ecology.

C: Opinions about the Threat Posed by the Sterilization of Continental Shelves. James Lovelock: "It may be that we can create deserts and dust bowls with comparative impunity but if we devastate the area of the continental shelves through irresponsible bad husbandry in our first attempts at sea farming we shall do so at our peril." ('Gaia, A New Look at Life on Earth' Oxford University Press 1979 p.114); "I find the prospect (of kelp farming) more disturbing than the possible effects of any of the industrial hazards which we have discussed." ('Gaia, A New Look at Life on Earth' p.118); "The vital organs of Gaia are not on the land surfaces but in the estuaries, wet lands, and muds on the continental shelves." ('Gaia, A New Look at Life on Earth' p.130); "The disappearance of a type of sea grass from the Mediterranean may be as serious as the loss of the Amazon rainforest, say environmentalists." (New Scientist 5.10.91, p.11).

V: The Decimation of Photoplankton. Once again, the destruction of photoplankton is not regarded as an important ecological issue.

A: The Ecological Role Played by Photoplankton. The scale of photoplankton's role in the Earth's carbon cycle has not yet been determined so it is not known whether its contribution is bigger or smaller than other biomass phenomena.

B: The Scale of Photoplankton Destruction. Photoplankton is being contaminated by pollutants but the main threat to its existence comes from ozone depletion. Ultra-violet light is as damaging to photoplankton as it is to land based plants. Photoplankton flourish in cold water and global warming may retard growth.

C: Opinions about the Threat Posed by Photoplankton Destruction. Tim Radford: "What happens (climatically) may depend upon how the oceans work and what role the plankton play. The tiniest creatures in the sea, plankton, may decide the fate of the globe." ('The Crisis of Life on Earth, Our Legacy from the Second Millenium, Thorsons Publishing Group 1990, p.135).

VI: The Eradication of Mangroves.

A: The Ecological Role Played by Mangroves. "Mangrove forests are made up of diverse tree species which thrive in upper tidal zones along flat, sheltered tropical shores. In the mangrove forest, life abounds. One can find shorebirds, crab-eating monk-eys, fishing cats, and mud-skipper fish. The mangroves are the ocean's equivalent of the rainforest." (Alfredo Quarto 'Life and Death in the Mangrove' Earth First! Journal Yule 1992 p.32).

B: The Scale of Mangrove Destruction. "Mangrove forests are ideal locations for the establishment of black tiger prawn aquaculture. They are being cleared, and the once self-sustaining waters and land poisoned. Prawn farms made their first appearance along Asia's coasts in the 1970s, beginning their rapid expansion in China, Taiwan and South Korea. The annual growth rate of prawn production averages 25%, mainly in Asia which produces 75% of the world's prawns. Many of these early prawn industries have by now failed or are in the final stages. The ponds are largely abandoned, the once plentiful mangroves devastated. Wherever the industry goes, the mangroves disappear as it moves on from failed pond to new, unspoiled ground. There are prawn farms in Thailand, India, Bangladesh, Indonesia, Malaysia, Ecuador, Panama, Mexico and elsewhere in Latin America. The prawn industry is moving to new coasts in Burma, Cambodia, Vietnam, Yemen and Iran. In the last 30 years Thailand's total area of mangrove forests has decreased from over 2.1 million rai to 1.12 million rai. A large part of this loss is attributable to the prawn industry." (Alfredo Quarto 'Life and Death in the Mangrove' Earth First! Journal Yule 1992 p.32).

C: Opinions about the Threat Posed by Mangrove Destruction.

VII: The Desertification of Savannah Grasslands.

A: The Ecological Role Played by Savannah Grasslands. "Savannahs, broad grasslands scattered thinly with trees and shrubs which span 20% of the Earth's surface." (New Scientist 29.8.92 p.35).

Like all the other biomass phenomena explored in this section, savannah grasslands have a role in the planet's carbon cycle. Savannah grasslands absorb huge quantities of CO₂. The United Nations Environment Programme studied grasslands on five continents and, "its results show that tropical grassland turns far more CO₂ into carbohydrates than anyone suspected, equalling - or even exceeding - the productivity of tropical forests." Consequently, it has been estimated that, "burning the savannah contributes 3 times as much CO₂ to the atmosphere as burning the rainforests." (Peter de Groot, New Scientist 6.1.90). Savannah grasslands are periodically destroyed by fires, sparked off either by nature or oomans, and thus cannot store carbon for any length of time like trees. This means their role in combatting global warming is minimal.

B: The Scale of Savannah Grassland Destruction. "The African .. savannahs are going the way of the world's rainforests." (New Scientist 29.8.92 p.35).



C: Opinions about the Threat Posed by Savannah Grassland Destruction.

VIII: The Overall Ecological Threat Posed by the Destruction of Renewable Resources.

A: The Ecological Role Played by Biomass. Biomass plays a number of ecological roles.

a) Global Warming. The various forms of biomass explored above constitute the major forces driving the planet's carbon cycle. It is not yet known scientifically exactly what contribution each makes to global warming but if more research is carried out, as it must be if a global warming disaster is to be averted, then the answers will be discovered. Each of the phenomena makes a slightly different contribution to global warming. Forests are able to influence global average temperatures through the albedo effect, as is also the case - but to a smaller degree - with savannah grasslands, whilst other types of biomass do not have this capability. However, whilst forests are capable of storing carbon for only a relatively short period of time, coral reefs are able to extract carbon from the atmosphere permanently.

The destruction of biomass boosts global warming in a number of ways. Firstly, burning off biomass creates greenhouse gases. Secondly, the destruction of biomass means that less carbon is absorbed from the atmosphere (and less is permanently removed from the atmosphere) and this boosts the greenhouse effect. And, thirdly, the destruction of forests and mangroves decreases the planet's albedo and thus increases global temperatures. "The evaporation of water from forests is part of Gaia's cooling system." (James Lovelock 'Gaia, The Practical Science of Planetary Medicine' Gaia Books Ltd London 1991, p.179).

b) Wildlife. The destruction of renewable resources is decimating a huge range of wildlife species which depend on these resources for food and shelter. The rainforests, mangroves and coral reefs are amongst the most densely inhabited ecological habitats on Earth.

c) Water. The destruction of renewable resources is having a considerable impact on the water cycle. All biomass turns carbon dioxide into oxygen and water. But forests and mangroves also contribute to the water cycle in another way. Forests are not merely stands of wood they are almost green lakes containing vast quantities of water - just as much as lakes. By absorbing so much water, forests are able to provide a constant, year round, supply of water for plants and animals. Biomass also purifies water.

d) Resources. Biomass also provides oomans and wildlife with a vast array of resources from food, fuel, commodities, etc..

B: The Co-Option of the Planet's Photosynthetic Capacity.

There is one minor issue to clarify before examining the significance of biomass destruction. A number of ecologists have sought to measure oomans' increasing dominance over the planet by examining the degree to which they have co-opted the planet's net primary productivity. "The human race is now using or co-opting at least 25% of the planet's net primary productivity. I see no sign that we, as the dominant organisms on the planet, are in any way acting to make it more hospitable for life." (Paul Ehrlich 'Co-Evolution and Its Applicability to the Gaia Hypothesis' in Stephen H Schneider, & Penelope J Boston (eds) 'Scientists on Gaia' The MIT Press, Cambridge, Massachusetts 1991 p.21).

The co-option of the Earth's net primary productivity is a valid measure of the scale of oomans' dominance of the planet. It is, however, somewhat misleading. Although it is important to know just how much of the planet's net primary productivity oomans are co-opting it implies that all that oomans are doing is using an increasing proportion of a fixed quantity of photosynthesis. But, oomans are not simply expropriating the planet's net primary productivity, they are remorselessly destroying it. What is actually involved is that oomans are taking over more and more of an increasingly diminishing resource. In addition, such a measure of ooman dominance doesn't give any indication of the way in which the planet's biodiversity is being destroyed. Oomans could be exploiting the photosynthetic resources of a natural forest teeming with plant and wildlife species or they could have razed such a natural forest and replaced it with a tree plantation with exactly the same photosynthetic output but no biodiversity. Lester R Brown provides a calculation which takes into account the destruction of photosynthesis but fails to give a clear impression of what is happening to the planet's photosynthetic capacity. "Nearly 40% of the earth's land-based photosynthetic activity is devoted to the satisfaction of human needs or has been lost as a result of human degradation of natural systems." ('The Illusion of Progress' in 'State of the World 1990' A World-watch Institute Report on Progress Towards a Sustainable Planet' Unwin Paperbacks, London 1990 p.7).

C: The Scale of Biomass Destruction. As far as is known there are no scientific assessments of global biomass destruction.

D: Estimates of the Threat Posed by the Destruction of Renewable Resources.

E: The Significance of Biomass Destruction. The destruction of the world's renewable resources is one of the greatest ecological threats of our time. It is far more dangerous than acid rain, stratospheric ozone depletion or the contamination of the food supply. Indeed, as has been suggested above, these latter phenomena are more of a threat because of their contribution to global warming than they are in their own right.

The destruction of land-based renewable resources will have a far bigger and more immediate impact on global average temperatures than the effect of atmospheric pollution on the greenhouse effect. The decrease in the planet's albedo will increase global temperatures much more immediately and much more rapidly than carbon emissions.



The burning of renewable resources will boost the greenhouse effect and, in turn, the greenhouse effect will increasingly destroy renewable resources. However, if current trends continue, oomans will destroy far more of the planet's renewable resources than the greenhouse effect. Much of the planet's renewable resources will have disappeared long before the greenhouse effect begins to bite. As has been pointed out above, the threat posed by the greenhouse effect has been overestimated. For the next few decades, at least, oomans remain a far, far bigger threat to renewable resources than the greenhouse effect.

Despite the impressive array of environmentalists who argue that the greenhouse effect is the biggest ecological threat facing life on Earth, it has to be suggested that the destruction of renewable resources is a far bigger ecological threat than the greenhouse effect.

Given that the Earth is supposed to last for another 4½ billion years, and assuming that oomans want to survive in perpetuity, then oomans have no other choice but to learn how to live on renewable resources. No matter how huge the deposits of non-renewable resources may be and no matter how ingenious the recycling of these resources, they aren't going to last for 4½ billion years. Unfortunately, though, oomans are destroying renewable resources just as recklessly as non-renewable resources. Perversely, oomans are using non-renewable resources to destroy the renewable resources they need to survive in perpetuity. It seems as if environmentalists have failed to appreciate the real threat posed by the reliance on fossil fuels. The real threat is not that oomans are using fossil fuels so extravagantly that they are boosting the greenhouse effect nor is it that the rapid rate of fossil fuel consumption will lead to the exhaustion of these resources in the near future but that oomans are using fossil fuels to destroy renewable resources at such a rapid rate they will soon be depleted. If environmentalists need to worry about a shortage of resources it is the shortage of renewable resources that is critical not the shortage of fossil fuels.

The destruction of renewable resources poses a much greater threat to ooman survival than the greenhouse effect because although oomans might survive the latter they are highly unlikely to survive the loss of renewable resources. Once renewable resources have gone, it is conceivable the ooman race could survive by obtaining all the food, fuel, energy, and commodities, etc., it needs from bacteria (for which see below) but this is merely an academic point since the disappearance of biomass will lead to the collapse of the carbon cycle and the planet would no longer be suitable for ooman habitation.

F: Rogue Biomass.

There is, however, one major exception to this trend of increasing biomass destruction - ignoring those parts of the world where forests have temporarily been expanding. Whilst all other forms of biomass are disappearing there is one which has blossomed and expanded over the last few decades - algae. The leeching of artificial fertilizers through the soil, the dumping of ooman manure, the accidental escape of animal manure and silage, the flushing of washing-up liquids and washing powders into sewer systems, etc., has led to vast quantities of nutrients pouring into streams, rivers, lakes, and seas where they have boosted the growth of algae. Algal blooms are now found all over the over-industrialized world. Algae is like a weed and is flourishing so dramatically because it is the companion of oomans' polluting activities.



Algae have a bad reputation because algal blooms look and smell awful. "All around the world, red tides, glutinous green slimes and filthy looking froths of yellow foam, caused by algae, have become more frequent. Blooms are an increasing sign of eutrophication." (New Scientist; 28.4.90). Some types of algae are toxic and the public is increasingly having to be warned against using lakes infected with toxic algae because of the health risk to both oomans and animals.

Algae have a multiple effect on the carbon cycle. They moderate the greenhouse effect through the extraction of carbon from the atmosphere. "According to one scientist, eutrophication in the oceans and on land could be generating a quantity of new biomass as large as 1 Gt of carbon a year." (Jeremy Leggett, 'The Nature of the Greenhouse Threat' in 'Global Warming, The Greenpeace Report' Ed by Jeremy Leggett Oxford University Press 1990, p.36). They moderate global warming by releasing huge quantities of dimethyl sulphide which triggers off the formation of clouds thereby reflecting sunlight back into space.

However, as far as the demand side of the carbon cycle is concerned, rotting algae deoxygenate the water killing off marine plants and animals. This destroys marine photosynthesis and boosts global warming. The overall impact of algae on the carbon cycle is not known.

The prolific growth of algae seems all too symbolic of oomans' attitude toward the Earth. The only biomass whose growth has been fostered by oomans is scum.

ix) The Destruction of Self-Sustaining Resources.

There are two types of self sustaining resources - bacteria and topsoil. Although topsoil is composed primarily of bacteria it is also made up of a huge range of different types of animal and for this reason it is categorized separately from bacteria.

In this work, self sustaining resources such as bacteria and topsoil have been distinguished from the natural recyclable resource, e.g. water, and renewable resources such as biomass. The fact that soil is a living medium of animals clearly distinguishes it from water and vegetation. "No cubic centimetre of the soil and sediment beneath is without its billions of microscopic organisms; the top soil has its photosynthesizing bacteria and nitrogen fixing microbes often attached to the roots of plants; its fungi, stones, moulds and teeming invertebrate life. The air in the soil is rich in carbon dioxide pumped down by life; dissolved in water near the rock surface, this causes rock weathering, speeded by microorganisms. Without life there would be no soil, but only regolith, the rock rubble of dead planets." (James Lovelock 'Gaia, The Practical Science of Planetary Medicine' Gaia Books Ltd London 1991, p.48).

I: Bacteria.

A: The Ecological Role Played by Bacteria. Bacteria are found in every life form on Earth - most of the ooman body is composed of bacterial cells. Bacteria are also found in every ecological niche and provide a vast range of ecological services. No attempt will be made here to list all the vital ecological functions performed by bacteria but it is necessary to emphasize just how important bacteria are. "To most of us, bacteria are intimately connected with disease. As always with human knowledge, our view is mainly restricted to the small segment that is a human concern, the pathogenic bacteria. Yet bacteria are, and always have been, the most important living things. Their ceaseless activity in the soil, the sediments, animals and plants, is essential for the continued existence of Gaia, indeed life itself. They play the largest role in sustaining Gaia. (James Lovelock, 'Gaia, The Practical Science of Planetary Medicine' Gaia Books Ltd London 1991, p.99).

B: The Scale of Bacterial Destruction.

There are a large number of ooman activities which are destroying bacteria - pesticides, toxic waste, atmospheric pollution, nuclear radiation, domestic bleaches, vaccinations, etc., etc..

There is no scientific research into the scale of bacterial destruction. Given that a gramme of soil or a spoonful of water contain billions of bacteria, it would be almost impossible to calculate the destruction.

C: Opinions about the Threat Posed by Bacterial Destruction.

Very few opinions have been expressed about the threat posed by the destruction of bacteria since so little scientific research has been done on the subject.

D: The Significance of Bacterial Destruction.

The lack of scientific research on this subject means that it is not possible to draw many conclusions about this issue. It does seem, however, that despite large scale decimation, bacteria are resisting the onslaught. Whilst trees have no defences against ooman stupidity and whilst wildlife have defences which are insufficient to deter attacks by oomans, bacteria are successfully fighting back against the oomans' war against the Earth. A large number of bacteria are becoming resistant to pesticides, vaccinations and antibiotics.

This resistance is fortunate indeed. Whereas with all other forms of ooman induced ecological destruction there is nothing to stop such self-inflicted folly, there is at least the hope that bacterial resistance will bring oomans to their senses and make them realize the ecocidal nature of their actions.

II: Topsoil.

A: The Ecological Role Played by Topsoil. The most obvious ecological role played by topsoil is to provide a medium for biomass growth. Topsoil also plays a part in the carbon, oxygen, and nitrogen, cycles because it contains bacteria which carries out photosynthesis and fixes nitrogen from the atmosphere.

B: The Scale of Topsoil Destruction.

All over the world, huge amounts of topsoil are being lost or destroyed by a wide range of different ooman activities; bad farming practices such as excessive use of pesticides, over-intensive cultivation, prairie farming which is vulnerable to wind erosion, poor irrigation leading to waterlogging and salinization, pollution, urbanization, deforestation, mining, etc.,

Paul and Anne Ehrlich; "In the 1980s more land went out of production (largely because of exhaustion, desertification, or failed irrigation) than was newly opened and the world's cropland shrank some 7%." ('The Population Explosion' p.96). Tim Radford; "At bottom, 35% of the world's land surface is at risk from turning into deserts. This land is home to 850 million people. There are 45 million square kilometres of drylands. Of these an area which is about as big as North and South America combined is already at risk of turning into desert." ('The Crisis of Life on Earth, Our Legacy from the Second Millennium, Thorsons Publishing Group 1990, p.206); "15 million acres every year turns to desert, 50 million becomes too poor to support crop or cattle (because of aggressive farming, overgrazing, salinity), 800 million is losing topsoil at an alarming rate because of erosion by wind or water." ('The Crisis of Life on Earth, Our Legacy from the Second Millennium, Thorsons Publishing Group 1990, p.50). Erik Eckholm; "Europe is estimated to be losing 1 billion tonnes a year, Asia 25 billion tonnes and the US 1 billion tonnes. Annual soil loss amounts to 75 billion tonnes." ('The Gaia Atlas of Planet Management ed N Myers Pan Books, London 1985, p.40). "More than a tenth of the world's soils have lost a substantial amount of their natural fertility in the past 45 years, according to the first results of a 15 year Global Assessment of Soil Degradation, funded by the United Nations Environment Programme. In Europe an estimated 20 million hectares of soils have been seriously damaged by industrial activity, mostly by air pollution such as acid rain and the fallout of heavy metals." (New Scientist 16.5.92 p.7).

C: Opinions about the Threat Posed by Topsoil Destruction.

There are a number of theorists who regard the loss of topsoil as a significant threat. Erik Eckholm; "Few resource problems are so important as the disappearance of our soil. There is no known way that we can replace our soil." ('The Gaia Atlas of Planet Management ed N Myers Pan Books, London 1985, p.40). Guy Dauncey; "Once the soil is gone it is gone forever. Up to 30 world civilizations have collapsed because they neglected to look after their topsoil." ('After the Crash, The Emergence of the Rainbow Economy' Greenprint, Basingstoke 1988 p.218). Lester Brown; "Lester Brown has observed that civilization might survive the exhaustion of petroleum reserves, but not the exhaustion of the world's agricultural topsoil." (Paul and Anne Ehrlich, 'The Population Explosion' Hutchinson, London, 1990, p.28).

D: The Significance of Topsoil Destruction.

The loss of topsoil is so considerable it is dramatically reducing the planet's carrying capacity. It is not known when the loss will become critical. If all the Earth's topsoil was destroyed then oomans would be faced with widespread food shortages. This would lead to refugee crises which would compound the ecological destruction.

There have always been food shortages and famines in various parts of the world at various times throughout ooman history but at no point was there the prospect of the total destruction of the planet's soil. It is already the case that, "Between 1950 and 1984, the historical peak year, world grain production per person climbed nearly 40%. Since then it has fallen roughly 1½ a year, with the drop concentrated in poorer countries." (Lester Brown, Guardian 3.1.92, p.23).

The destruction of topsoil is a bigger ecological threat than the greenhouse effect, global warming, and the destruction of renewable resources because the destruction is taking place much more rapidly than these three ecological phenomena. Whilst the destruction of topsoil usually occurs (but not always) because of the destruction of the renewable resources which help to protect it, this does not mean biomass loss is a bigger threat than the loss of topsoil for the simple reason that there could still be huge quantities of renewable resources in the sea. In addition, even if forests are clear cut there is still the possibility of protecting the soil if the right measures were taken. However, if the soil goes then the land becomes lifeless and beyond repair. The destruction of land based renewable resources is in reality only a phase in the process of top-soil destruction.

If all topsoil was destroyed oomans might survive, as James Lovelock suggests, by producing food from oil. However, even assuming there was any oil left, it would be in such a limited supply it would not last long. There is also the possibility that oomans could survive on marine resources or high-tech food produced with the help of bacteria. The pressure on marine resources, however, would be so intense it is highly likely they would soon be exhausted. The drawback to synthetic food from bacteria is that biotechnology is still only in its research stage. Such a 'soylent green' scenario would leave oomans even more dependent upon the power-mad, ecocidal whims of multi-national corporate executives than they are now. It should be pointed out that Lester Brown's conjecture, noted in the previous section, that civilization might survive the exhaustion of petroleum reserves, but not the exhaustion of the world's agricultural topsoil, is not wholly true - but it is true enough to make the destruction of top soil the biggest self-induced, ecological disaster which oomans face.

x) The Extermination of Wildlife.

I: The Ecological Role Played by Wildlife.

Wildlife helped to create the Earth's habitability and animals still play a significant part in the planet's life sustaining processes. However, it is unlikely that this role is as vital as that played by bacteria.

II: The Scale of Biodiversity Destruction.

It is much easier for oomans to decimate wildlife than bacteria. There are far more bacteria than there are wildlife; they inhabit a far greater number of habitats than wildlife; and they are also capable of putting up much more resistance to ooman belligerence than wildlife.

There are a wide range of causes of wildlife annihilation. Hundreds of millions of wild animals are killed by hunters and fur trappers; hundreds of millions are killed because they are defined, by oomans, as 'pests'; and similar numbers are killed accidentally as a result of road accidents, pollution and habitat destruction. "Harvard biologist Edward Wilson estimates that, at a minimum, 50,000 species a year - nearly 140 a day - are condemned to extinction by the destruction of their tropical rainforest habitat." (Guardian 3.1.92, p.24).

Over the last few decades, the annihilation of wildlife has increased dramatically. If the number of livestock animals is also included then it is possible that A COUPLE OF HUNDRED BILLIONS animals are killed around the world every year.



III: Estimates of the Threat Posed by Biodiversity Destruction.

There are a number of theorists who believe the destruction of wildlife is dangerous:-
James Lovelock: "Perhaps as much as 90% of all species on Earth are to be found in tropical areas. To destroy such a large chunk of the living ecosystem when we do not properly understand how it all works is like pulling apart the control system of a modern aircraft while in mid-flight." ('The Earth Report, Monitoring the Battle for our Planet' ed E Goldsmith & N Hildyard Mitchell Beazley 1988 p.63).
EO Wilson: "The worst thing that can happen during the 1980s is not energy depletion, economic collapse, limited nuclear war, or conquest by a totalitarian government. As terrible as these catastrophes would be for us, they can be repaired within a few generations. The one process ongoing in the 1980s, that will take millions of years to correct is the loss of genetic and species diversity by the destruction of natural habitats. This is the folly that our descendants are least likely to forgive us." (quoted in 'The Gaia Atlas of Planet Management' ed N Myers Pan Books, London 1985, p.159).

IV: The Significance of Wildlife Destruction.

Wildlife helped to make the Earth a habitable planet. But, wildlife not merely created the conditions under which oomans could survive and flourish they created the ooman race. It was not airy-fairy, transcendental gods who created oomans but wildlife. However, whilst wildlife continue to play important roles in sustaining and protecting the planet's ecology, it is one of the great planetary tragedies, that oomans could exterminate many of the Earth's wildlife species and prevent a geophysiological collapse - as long as they took over the ecological functions carried out by wildlife. "And the simple truth is that we could create a world that was perfectly tolerable to look at and to walk in, and as ecologically 'stable' as we are ever liable to achieve, and yet eliminate 90% or even 99.9% of our fellow species. The general argument, that biological diversity ipso facto leads to ecological stability, and that decimation will lead to our own demise, simply isn't true." (Colin Tudge 'Dying by the Million' Guardian no date).

This awful truth, however, is far from being the whole truth. There are a number of reasons why oomans cannot exterminate all wildlife on Earth without causing the collapse of the planet's life-support system. Firstly, oomans could not usurp every one of wildlife's ecological roles for the simple reason that wildlife perform such a vast amount of work protecting the planet's life support system that oomans do not have the resources to make wildlife totally redundant. The effort which would be needed to replace wildlife's ecological activities is so considerable that even if oomans decided, for some bizarre reason, that they no longer wanted to share the planet with other species, they would find it extremely difficult merely exterminating every animal on Earth let alone taking over their ecological functions. Even though at times it seems as if oomans are heading towards the total eradication of wildlife, the effort and resources needed to achieve this would be colossal.



The general rule seems to be that the larger the wildlife species, the higher up the food chain they are, the easier it is for oomans to take over their ecological roles; conversely, the smaller the wildlife species the more difficult they are to replace. Where this general rule becomes almost incontrovertible is the role of wildlife in protecting soil fertility. Micro-fauna such as ants, worms and a vast range of other 'creepy crawlies' are indispensable to the preservation of the health and vitality of the soil. "With the help of termites, ants account for most of the turning of the Earth's topsoil far more than either earthworms or human farmers." (Guardian 24.8.90).

Wildlife does such a huge amount of work fertilizing, aereating, and watering the soil that oomans could never fulfill all of these ecological functions. Even with the help of tractors to rake-over, turn-over and fertilize the soil oomans still could not do the job as thoroughly as wildlife. If this is the case at present, when oomans are exploiting the planet's resources so extravagantly that both tractors and fuel are plentiful, it will be even more true in the future when both of these resources will be much scarcer. If oomans cannot usurp the ecological functions of soil wildlife, it is even less likely that they would be able to usurp the ecological roles performed by the totality of wildlife species.

Secondly, although commentators believe it is possible to eradicate "99.9% of our fellow species" there is no scientific evidence to show conclusively which species could be exterminated without causing ecological problems and which species need to be protected. This in itself is a major reason for caution over wildlife genocide.

Thirdly, even if scientists proved that oomans could exterminate a large proportion of the Earth's wildlife species and take over their ecological roles there is no guarantee that it could be done practically - the problems may be far too complex for oomans to overcome.

Finally, it would be folly to exterminate species which provide ecological services more efficiently than oomans. Oomans have got other things they could do than devote their time and resources to carrying out ecological functions. Why waste time and money culling insects to prevent damage to crops when spiders control numbers far more efficiently?

There are, then, a number of theoretical and practical reasons why the extermination of all wildlife species would be disastrous. If, however, oomans carefully culled ecologically unimportant species, then it might be possible to exterminate many animal species - although it is unlikely to be the 99.9% proposed by Colin Tudge.

Such a carefully, ecologically calibrated, slaughter is far from what oomans are actually doing. Oomans all over the world are indiscriminately slaughtering any animal they come across no matter how ecologically important, unimportant or efficient it might be. The slaughter is so indifferent to ecological realities that any animal which provides some sport, or a resource, or a good 'animal model' for pervert vivisectionists, or happens to be in the wrong place at the wrong time, etc., etc., ends up dead. This torrent of death and destruction is so indiscriminate it is undermining oomans' ecological safety.

Whilst it is quite true, then, that oomans could exterminate many wildlife species and survive on an ecologically stable planet, the reality is that the animal extermination process is dragging the ooman race into oblivion. If oomans don't understand why wildlife should be respected and given sufficient wilderness habitats to guarantee their survival, then these ecological ignoramuses are unlikely to confine the animal extermination process to ecologically 'surplus' species. The fundamental problem is not one of ignorance and stupidity but bloodlust. The pleasures, glamour and superiority complexes engendered by the slaughter of animals reinforces oomans' ecological stupidity and species arrogance making it extremely difficult for such people to change their attitudes towards wildlife in time to prevent a total ecological breakdown. Oomans are indulging themselves in such an orgy of slaughter that it is highly unlikely they are going to be able to stop their murderous activities in time to save themselves.



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