

The

Ecologist

Journal of the Post Industrial Age

Vol.6. No.4.

May 1976 40p

**The End of Economics? More Bombs or Fewer Babies?
The Taboo Resource.**

The Mackerel War

by Michael Allaby



In this issue

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This Month's Cover: Mackerel fishermen return to port. Photograph reproduced by kind permission of The Royal Institution of Cornwall.

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Advertisement Manager: Philip Hutchings

Advertisement enquiries to: Uphill, Urchfont, Devizes, Wilts. Tel: Chirton (038 084) 370.

Published by Ecosystems Ltd., Registered Office: 73 Molesworth Street, Wadebridge, Cornwall PL27 7DS, England.

Distributed by: A.M.D. Ltd., Roding Trading Estate, London Road, Barking, Essex IG11 88U.

Printed by Penwell Limited, Parkwood, Callington, Cornwall. Tel: St. Dominick (05795) 522.

EIGHT THOUSAND MILLION BY THE YEAR 2010

One of the most frequently repeated imbecilities in the world today is that in 30 or so years' time there will be twice as many people living on the earth. This statement is bandied about because *if* the population of the globe were to continue to multiply at approximately the same rate as it has been doing for the last few years, the population would indeed double in about 35 years. Unfortunately, however, a long history of exponential population growth in no way implies a long future. Although it may theoretically be possible at some time in the future to support eight thousand million people temporarily, even the most casual examination of ecological constraints under which mankind must operate and of the lamentable failure of human political and social systems to produce an equitable and efficacious distribution of the world's limited resources, make it clear that the probability of supporting eight thousand million people by 2010 is vanishingly small.

Consider briefly just the ecological constraints. Humanity is utterly dependent for its existence upon the functioning of immense and complex ecological systems. The conditions that make Earth hospitable to human life result from complex and perhaps fragile balances among the great chemical cycles — water, nitrogen, carbon, oxygen, phosphorus, sulphur — all powered by the energy of the sun. Deadly ultraviolet rays are filtered out of the sun's radiation by a minute trace of ozone in the atmosphere, and traces of carbon dioxide and water vapour keep the surface temperature of the planet within limits tolerated by present-day organisms. Some of those organisms, in turn, regulate the environmental concentrations of nitrites, ammonia, and hydrogen sulphide — all poisonous to most forms of life. Over the long term, organisms also control the atmospheric concentrations of oxygen and nitrogen.

Today, four thousand million people depend on such free 'service' functions of ecosystems for the preservation of the atmosphere, for the bulk of their waste disposal, for most of the nutrient cycling that is essential to the production of all their food, and for the maintenance of a great store of genetic information from which new crops, domestic animals, biological pest controls, and antibiotics, will come. Furthermore, almost all potential pests of our crops are controlled by Nature, not by Man, and almost all fish and shellfish — the source of perhaps 10 to 20 per cent of the animal protein consumed by mankind — are produced by natural ecosystems. Natural vegetation reduces floods, helps to prevent erosion, moderates weather conditions, and affects the albedo (and thus the global weather balance). Soils themselves are the product of the interaction of an enormous variety of living organisms with inorganic particles which

the plants and animals help to fragment from rocks.

As incomplete as our knowledge may be concerning the vital operation of the natural systems that support human life, one cardinal principle seems clear; the ability of these systems to persist and perform their functions in the face of inevitable environmental change is related to the complexity of these systems. The more species of plants, animals, and micro-organisms, that have co-evolved to share the energy flowing through an ecosystem, the more stable the system is likely to be — in other words, the less likely it is that small changes in conditions will cause major disruptions.

Mankind has been a relentless enemy of co-evolved complexity in ecological systems — and hence a destabilising force — at least since the agricultural revolution (the hunting activities of human beings may have been a factor in the extinction of some large mammals even earlier). Agriculture itself is the practice of replacing co-evolved natural ecosystems with simple artificial ones based on a few strains of highly productive crops. These croplands ordinarily require constant vigilance and inputs of energy (in the form of cultivation, fertilizers, pesticides, and so forth) to stave off the collapse to which their biological simplicity makes them prone. Even with prodigious effort, however, it is unlikely that mankind could maintain this perilous enterprise for long without support from natural systems.

Earth is now littered with the remains of other civilisations that failed to come to grips with the ecological constraints imposed upon society: the hydraulic civilisations of the Tigris and Euphrates valleys, the classic Mayans, the ancient Khmers, and the Roman Empire, are only a few examples. While history books sometimes tend to credit these collapses to mysterious life-cycles within the civilisations themselves, the record of silted irrigation canals, salted and laterized soils, deforestation, erosion, and the like, is clear for those who know how to read it. Fortunately, the civilisations that fell victim to earlier eco-catastrophes were relatively localised. Today, so-called 'western' civilisation embraces the entire planet.

Many ecologists believe that an essential accompaniment to the intensively exploitive activities of mankind on land and increasingly in the oceans must be preservation of extensive, lightly exploited natural communities to serve as ecological buffers and reservoirs of diversity. Failure to establish such preserves and to protect our agricultural resources as carefully as possible could spell the end of our civilisation as surely as a full-scale nuclear war, though perhaps less quickly.

Today, one of the best measures of the assault

that humanity is mounting against the all-important natural systems that support it is the level of society's energy consumption. The simplifying processes of agriculture are increasingly powered by inanimate energy, and so is the destruction of farmlands through paving and 'development'. The processes that lead to the release of hundreds of thousands of new synthetic compounds into the environment are energy-intensive — and these compounds often have profound effects on the living organisms of Earth, which have no prior evolutionary experience with them. One can also regard *per caput* energy consumption as an index of the physical activity of a society — its moving of materials and people, its transforming of materials, its changing of temperatures, and so on. In virtually all circumstances, these activities exact a cost from natural environmental systems.

In MIT'S prestigious *Study of Critical Environmental Problems (SCEP)*, a majority of the global problems considered were directly involved with energy use. The fundamentally intractable problem of thermal pollution is shared by both nuclear and fossil-fuelled power technologies (at present nuclear is somewhat worse in this regard). If the 'historic growth' scenario of the Ford Foundation's Energy Report (3.4 per cent energy growth per annum, the U.S. 1950-70 average) is applied to the world, the associated heat release alone would almost certainly disrupt global climate significantly within about a century, with serious ecosystemic consequences, while climatic disruption by the CO₂ and particles from fossil-fuel combustion could occur much sooner.

What if we could miraculously develop a source of cheap, abundant power that was nearly 'pollution-free' (e.g. solar or a much-improved nuclear technology)? Some of the environmental problems considered in *SCEP* would be abated. Carbon dioxide concentrations in the atmosphere would drop, as would particulates from direct energy use, and the problems of oil pollution and containment of radioactive wastes would be reduced or eliminated. Under any reasonable scenario about the uses to which super-abundant energy would be put, however, one would expect other problems (most of which are considered in *SCEP*) to be exacerbated: atmospheric particulates from farming marginal land, particulates from mining lower-grade ores (including perhaps common rock), particulates from off-road vehicles, formation of contrails, injection of synthetic organic poisons into the biosphere, destruction of estuaries, and so on. As the population grew from four thousand millions towards eight, the attempt clearly would be made to pave, develop, industrialise, and exploit, every last bit of the planet — a trend that would inevitably lead to a collapse of the life-support systems upon which that growing population would depend.

Such a collapse could take many forms. One might be the complete loss of oceanic fisheries through a combination of overfishing, marine pollution, and the destruction of estuaries. This in turn could lead to global famine developing, as a key source of protein was removed from a world already on a nutritional knife-edge. On the other hand, the end of civilisation

might be triggered by weather changes induced by world-wide attempts at 'development' — weather changes to which agricultural systems could no longer respond because the decay of genetic variability of crops (one of today's most serious environmental problems) had proceeded too far. Or the end might be heralded by the rapid destruction of the ozone shield, posing a direct threat to *Homo sapiens* as well as to all the ecosystems of the planet. Or, as has often been predicted, the accumulation of poisonous wastes might simply swamp the natural disposal systems, making air unbreathable and water unpotable.

Most likely, of course, is a combination of such events, as mankind, largely ignorant of both the functioning of ecological systems and the nature of human attacks upon them, follows the growth maniacs and the pied pipers of technology all the way to destruction. Those who believe that science will pull a technological rabbit out of the hat to save us at the last minute simply suffer from an inability to learn. Technological rabbits tend to create more problems than they solve — they usually have large appetites and abundant noxious droppings. The 'green revolution', broadcast use of antibiotics and chlorinated hydrocarbon pesticides, dependence on the automobile for personal transportation, and today's primitive nuclear power systems, are prime examples.

Therefore when one talks about having eight thousand million people in the year 2010 one must ask what are the possibilities that a sequence of events leading to ecosystem collapse can be avoided. We think that such a world can be designed *in theory*, but the theory would have to neglect all the realities of human behaviour. One hardly needs special expertise to evaluate the likelihood that human society will reform to the point where the kind of 'Faustian bargain' that was envisioned by Alvin Weinberg can be made — not just relative to those technological rabbits, but with Mother Nature herself.

In short, believing that there will be eight thousand million people in the year 2010 is somewhat akin to believing in Santa Claus. We will indeed be fortunate if the world can support four thousand millions in the year 2010, and the population size may well be much less than that — as a result of a continuing sequence of disasters and a general deterioration of the carrying capacity of the planet. If by some combination of unlikely events there are eight thousand million people alive in A.D.2010, it will be a fairly sure bet that their very presence and the techniques used to support them will be mortgaging the future of all humanity — dramatically degrading the environment and reducing future carrying capacities. It is always important to remember that the question is not just 'How many people can we support' but 'How many people can we support, with what standard of living, and *for how long*'. And of course there is always the ultimate question: 'Why have more people?'

Paul R. Ehrlich
John P. Holdren

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Aid -

The Arch-Enemy

The kindest thing we can do about starvation in the Third World may be not to interfere.

We cannot prevent it and our attempts to do so make matters worse. The problem is too big and the planet too small. Cheques are merely a middle-class expedient for avoiding the unpalatable truth: millions of our fellows - including many who are at present well fed - should never have been born and ought to die as quickly as possible.

Western aid - eagerly sought and hungrily received - is a prime cause of the suffering it is intended to relieve, the chief detonator of the population explosion. This applies as much to help-them-to-help-themselves types of aid as to rice-bowl charity: the introduction through Western aid of 'constructive' new crops has been cruelly self-defeating - in Nepal, for example, the adoption of potatoes was followed by a quadrupling of the population; the extermination of disease vectors by the (W.H.O.-inspired) spraying of whole sub-continent has removed essential population controls, land salinization associated with large irrigation works has effectively sterilized millions of once productive acres - most spectacularly in Pakistan. Above all medical aid has temporarily at least increased life expectancy and reduced infant mortality, with tragic results.

The war on want has been lost because it has been waged with weapons which are themselves want-producers, and waged all too energetically. Aid today, whether governmental or private, increases the sum total of human misery. The momentary relief which some injections

of food or cash may seem to give can only be compared with the relief which an injection of cocaine gives the drug addict. When the effects wear off the situation is worse than before the injection.

It is not simply criminal madness for the West to continue aid policies which inevitably turn the starving millions into starving billions, it is also a particularly vicious form of neo-imperialism. By ensuring that the poor get poorer, aid widens the gap between developed and undeveloped countries and perpetuates paternalist attitudes of national and racial superiority. Aid implies and subsumes the inferiority of the aided.

Were the starving countries still dependencies, of course, they would have legitimate claims on their protecting powers - particularly since most colonial regimes played a big part in removing practical forms of population control such as infibulation, abortion, infanticide, and taboo used in pre-colonial societies. However, they have now rejected the legitimate claims of subject status, and must accept responsibility for their own peoples and resources. To say they are incapable of discharging this responsibility is good old racial arrogance on the part of the West. They are at least as capable as we are.

It is true, of course, that Third World policies today do often, in effect, collide with inappropriate Western technology in promoting mega-starvation, but these are matters of choice and policy. Worthy but doomed contraception campaigns, for example, are accompanied by medical programmes which ensure that unwanted and doomed babies survive. This is like asking people not to steal, but rewarding them when they are caught doing so. In the long run, medicine and infant care are the cruellest forms of modern help.

The natural order is to have a high rate of breeding and high infant mortality. It sounds harsh but man has been putting up with it for aeons - as much as the rest of the animal kingdom - and infant mortality is a much lesser evil than prolonged, chronic malnutrition. We would all rather be dead babies than half-live models for Oxfam

posters. Oxfam and the rest represent a generously humane but collectively futile reluctance to admit that death is the best answer to overpopulation.

The starving countries exercise their powers of choice in other ways. Feeding their poor is usually given relatively low priority in terms of expenditure, manpower and talent. The purchase of arms, the equipment and maintenance of secret police, investment in the apparatus of coercion, the establishment of airlines and other prestige projects, the elimination of democracy, the strengthening of one-party rule, the urbanization or suppression of nomads and independent (self-supporting) rural communities, and the pursuit of territorial, tribal, or ideological ambition - all these costly luxuries, or some of them, usually come first. The inevitable by-products of guns-before-butter policies are rickets, pot-bellies and the other obscenities of malnutrition.

We in the West have no right to be sanctimonious about the way power affects the newly independent states and leads them to misery-producing priorities. It is human nature - and Europe has behaved very much the same way throughout its recorded history.

The vast propaganda campaign in favour of the international aid charities and the pressure on governments to give 1 per cent of their GNPs in aid is callous folly. The history of the past twenty-five years shows that there is a direct correlation between the amount of aid given and the amount of want suffered. The implications of continuing the great population multiplier are even more dire.

Aid humiliates the receiving country and corrupts the donor. The donor expects a quid pro quo; the receiver ought to be grateful. But gratitude is an intolerably shaming emotion, particularly for a proud new country, and in practice leads to jealous hatred of the donor. Accordingly, poor countries in receipt of Western aid are anti-West and invariably bend over backwards to show that our help has in no way undermined their independence. Britain has very few friends in the Third World; the U.S.A. has none.

Easily the most generous aid-giver in history, the U.S.A., as a consequence, is loathed by all poor countries. Consequently, too, her foreign policies have become increasingly corrupt.

Clearly aid creates international friction not harmony. It does so because of inbuilt paternalism and inequality. Fundamentally, aid-givers despise aid-receivers, and aid-receivers bitterly resent aid-givers. This relationship is more dangerous than economic, ideological and military competition.

The immediate reduction and early abolition of government and voluntary aid is the most urgent task before the world today. From the technical and psychological points of view it should be much easier than, say, arms limitation. Aid produces over-population; overpopulation must lead to chaos and war: once the West, and in particular the Superpowers, accept this, it will be seen that planet survival and national self-interest require the withdrawal of aid and credit which alone can reduce the population of the world to feedable and sustainable levels. To the extent that aid has become one of the weapons of the Cold War, summit countries cannot give it up unilaterally without risking unacceptable changes in the balance of power. A Helsinki-type conference should be able to reach agreement on massive aid (and credit) limitation, however, and should be called as a matter of urgency. Such limitation is implicit in *detente* (but perhaps China should be the venue?). Without aid limitation we should find that the path to the next and last world war is paved with the good intentions of international charity.

Let no one think this is just greedy I'm-all-right-Jackery on an international scale. No-aid policies mean significant population decline through premature death in countries which cannot feed or medicate themselves. Certain poor countries may be the first to feel the effects; they will also be the first to stabilize and recover. In the long run, over-populated industrialized countries will suffer more. Soon there will be no food or raw materials left for them to import and when that happens they will

starve down to a viable population level.

The United Kingdom, with little more than 30 million agricultural acres to feed a population of 56 million and with suicidal social policies such as breeding incentives (eg. family allowances, family-linked tax relief) and farmland urbanisation (at the rate of at least 100,000 acres p.a.), is certain to starve unless drastic changes are made.

For the sake of future generations we must stop striving to keep alive those who are surplus to the planet's resources. It will be very rough justice because the innocent will suffer along with, and perhaps more than the guilty, but the only alternatives are a very much greater level of starvation in a few years' time, or even the extinction of the human race and many other complex forms of life on Earth.

Victor Gordon

The Fallacy of Triage

The Environmental Fund provides a fairly realistic assessment of the widening gap between population and food supply. I have only one quarrel with it; that is on the subject of Triage, a principle which the fund, implicitly adopts. For those who do not know what Triage means, let me explain. There is clearly no point in providing aid to people who are in such a bad way that they will not survive regardless of the aid being given to them. Nor is there any point in wasting aid on people who do not use it. If the limited amount of aid available is to be used with maximum efficiency, it must be provided to those whose survival depends on it. Those who advocate triage point out that many countries have simply "had it". In India, for instance, there are already 600 million people and by the end of the century there will probably be a billion. People are already starving in some of the poorer areas such as Bihar. The best thing is to forget about India, and concentrate on other countries.

The normal reaction to such a suggestion is that it is callous and inhuman. This is not my reaction. *My objection to it is that it is based on the presupposition that foreign aid can actually help anybody but the donors.*

The immediate reduction and early abolition of government and voluntary aid is the most urgent task before the world today.

Karl Polanyi described, forty years ago, what were the dramatic effects of the development of a market economy in Europe in the thirteenth century. Among them was that for the first time people had to buy their food. It meant that whether they ate or starved no longer simply depended on the vagaries of the climate but now also on the even less predictable ones of the market.

As Polanyi pointed out, the great famines of India during the British Raj were mainly due to the operation of market forces. There had always been crop failures, but these were largely catered for, as farmers would conserve sufficient stocks, either in their homes or at a village level. In a market economy, their grain was sold to the merchants and was stocked in the city. When there was a crop failure, they were forced to buy it back — at an inflated price and, what is more, with a greatly reduced income; hence the extraordinary spectacle of a famine in the countryside and not in the cities.

The situation today is far worse, for the market is no longer a provincial one — nor even a national one; *it is global*. What is more, the ratio of food exporters to food importers is constantly falling. (Table 1)

As can be seen from Table 1, before the war, North America, Latin America, Eastern Europe, the U.S.S.R., Africa, Asia, Australia and New Zealand were net grain exporters. Today all these areas except North America, Australia and New Zealand have become importers and the amount they are importing is increasing very dramatically. To make up for this, North American exports have increased from 5 million to 94 million tons, more than doubling within a single decade. *Its exports are sufficient to feed six hundred million people — or the*

Table 1: The Changing Pattern of World Grain Trade

Region	1934 - 38	1948 - 52	1960	1970	1976
	(Million Metric Tons)				
North America	+5	+23	+39	+56	+94
Latin America	+9	+1	0	+4	-3
Western Europe	-24	-22	-25	-30	-17
E. Europe & USSR	+5	--	0	0	-27
Africa	+1	0	-2	-5	-10
Asia	+2	-6	-17	-37	-47
Australia & N.Z.	+3	+3	+6	+12	+8

Source: Derived from FAO and USDA data and Lester Brown's Estimates.

entire population of India. As a result of these trends, North America today finds itself with an almost monopolistic control of the world's exportable grain supplies, a situation for which there is no historical precedent.

This dependence can only increase. As Johnson¹ points out, the dumping of food at concessionary prices so depresses a farm economy that if food aid in this form were to continue for long, the recipient country would almost certainly become dependent on this aid perpetually.

Lester Brown² does not consider that the governments of the U.S. and Canada have consciously sought these responsibilities, "any more than the countries of the Middle East have planned their geographical location astride the world's richest oil fields; but they must reckon with it nevertheless." This is not the point of view of the Chinese who, during the Food Conference in Rome, accused the U.S.A. of "dumping large quantities of its surplus food into the developing countries, turning some traditional food exporting countries into food importing ones, and forcing more and more countries to live on food imports."³

What is certain is that, throughout the world, whether people eat or starve will increasingly depend not only on the vagaries of climate, not only on the vagaries of the world market, but on the economic interests of a single country: the United States of America. What then are these interests?

First of all, there is good reason to suppose, as is suggested by Gale Johnson, that aid would not have played such an important role in

alleviating the Indian famine in 1966, if it were not for the fact that the main agricultural problem of the sixties was *how to get rid of food surpluses*. Let us not forget that during this period American farmers were paid not to produce food and that by 1972, fifty million acres of good American farm land had been taken totally out of production. Also at the same time, food stocks were piling up, more than in fact could be stocked. Aid was an obvious outlet and was actually being pressed on those who did not necessarily require it.

As Johnson writes, "a recipient country at times found itself being courted by more than one willing donor. During the early 1960s it should not have been surprising that a kind of euphoria developed in some of the recipient countries based on the expectation that whenever the need might arise food aid would be forthcoming."¹

Since then the situation has changed very dramatically. A growing population and rising affluence have caused a massive increase in demand for cereals, while more and more countries have entered the world food market as buyers, in particular the Soviet Union whose highly bureaucratized agricultural system is constantly failing to deliver the goods. At the same time, there is another development of equal importance and that is that the U.S. has been exhausting its own supplies of oil and mineral resources in general and, as is evident from Table 2, is becoming increasingly dependent on imports from abroad.

What is more, the foreign exchange it requires for financing these imports must come principally from the sale of its agricultural produce, which at present nets something like twenty billion dollars a year. What are the implications? At the moment 85 per cent of the cereals grown in the U.S. that are not consumed locally are sold and 5 per cent are given in the form of aid. The tendency, however, is for the amount of aid to be reduced in favour of increased sales. There has already been a 40 per cent drop in the last two years. As was made apparent at the Rome Conference, the U.S. does not intend to reverse this tendency. *The truth is it cannot afford to.* Food is likely to go increasingly to those who can afford to pay for it.

Edward Goldsmith

Table 2: U.S. Dependence on Imports of Principal Industrial Raw Materials with Projections to 2000

Raw Material	1950	1970	1985	2000
	(per cent imported)			
Aluminium	64	85	96	98
Chromium	n.a.	100	100	100
Copper	31	0	34	56
Iron	8	30	55	67
Lead	39	31	62	67
Manganese	88	95	100	100
Nickel	94	90	88	89
Phosphorus	8	0	0	2
Potassium	14	42	47	52
Sulphur	2	0	28	52
Tin	77	n.a.	100	100
Tungsten	n.a.	50	87	97
Zinc	38	59	72	84

Source: Data are derived from U.S. Department of the Interior publications.

STATEMENT ON

THE REAL CRISIS BEHIND THE "FOOD CRISIS"

THE WORLD as we know it will likely be ruined before the year 2,000 and the reason for this will be its inhabitants' failure to comprehend two facts. These facts are:

1. World food production cannot keep pace with the galloping growth of population.
2. "Family planning" cannot and will not, in the foreseeable future, check this runaway growth.

The momentum toward tragedy is at this moment so great that there is probably no way of halting it. The only hopeful possibility is to reduce the dimensions of the coming disaster.

We are being misled by those who say there is a serious food shortage. This is not true; world food production this decade is the greatest in history. The problem is too many people. The food shortage is simply evidence of the problem.

It makes no difference whatever how much food the world produces, if it produces people faster.

Some nations are now on the brink of famine because their populations have grown beyond the carrying capacity of their lands. Population growth has pushed the peoples of Africa, Asia and Latin America onto lands which are only marginally suitable for agriculture. No amount of scientific wizardry or improved weather will change this situation.

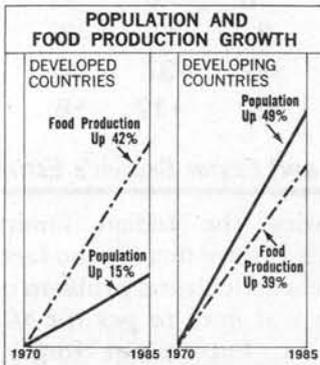
For a quarter of a century the United States has been generous with its food surpluses, now vanished. We have given at least 80 billion dollars worth of food and development aid since World War II. The result? Today, the developing world is less able to feed itself than it was before the massive U. S. aid program began. A generation ago, the population of poor countries was increasing by 16 million a year; now it increases by 67 million each year and the imbalance grows.

Furthermore, our past generosity has encouraged a do-nothing policy in the governments of some developing nations. At the 1974 United Nations meetings in Bucharest and Rome, spokesmen for these nations asserted, incredibly, that they had no population problem. They defended these twin policy statements:

1. The hungry nations have the right to produce as many children as they please.
2. Others have the responsibility to feed them.

We believe that these statements are irresponsible and indefensible. Any nation that asserts the right to produce more babies must also assume the responsibility for taking care of them.

Some speak optimistically of progress within the hungry nations as evidenced by the modest acceptance of family planning programs in many countries. "Family planning will succeed," they tell us. But how is this possible? Family planning advocates, to gain acceptance, insist that parents everywhere may have as many children as they desire. If the number of children wanted had always been two (on the average) we would not now have a population problem.



*Figures used are from reports by the Food and Agricultural Organization of the United Nations (FAO) on non-communist countries.

The crisis exists because parents want more than two children.

In Moslem countries, for example, the desired number of progeny per couple is "as many as God will send." This turns out, on the average, to be seven.

The country which has spent the most money on family planning over the longest period of time (India—24 years) has accomplished virtually nothing. Its population in 1951 grew by 3.6 million. Now it grows 16.2 million each year. Mexico adopted family planning only three years ago and the birth rate there has abruptly risen.

Yet many people insist that it is our moral obligation not only to continue but to increase our aid, totally overlooking the fact that it is impossible, from a practical standpoint. Eighty percent of the world's grain is not grown in the United States. All that we can sell or give away amounts to only 6% of the world's production and less than three years' population increase, alone, would consume this.

There can be no moral obligation to do the impossible.

No one really likes triage — the selection of those nations most likely to survive and the concentration of our available food aid on them. The question can only arise if we should reach the point where the world population outruns food resources. When such a situation arises, some people will die no matter what the disposition of the inadequate food supply will be. In that event, some hard decisions will have to be made.

At some point, we in the United States are going to find that we cannot provide for the world any more than we can police it.

In summary, our position is this: The sovereign right of each nation to control its own reproduction creates the reciprocal responsibility to care for its own people. The U. S. can help and will—to the limits of our available resources.

The belief that the crisis results from a "shortage" of food leads to disaster. Attempting to deal with this by producing and distributing more food, while doing nothing about population, is incubating disaster.

We must not permit our aid to underwrite the failure of some nations to take care of their own. When aid-dependent nations understand that there are limits to our food resources, there is hope that they will tackle their population problems in earnest.

We owe it to posterity — ours and that of the rest of the world — to promote policies that lead to solutions instead of catastrophe.

THE ENVIRONMENTAL FUND is a public interest organization created to focus public attention on the fact that exponential population growth is basic to most of our social problems. It is one of the causes of inflation, unemployment, food and energy shortages, resources scarcities, pollution and social disorder. The Fund's Directors believe that many of the problems facing the world today can only get worse, and that the quality of life of the world's peoples can only deteriorate, if population growth continues.

The first priority of the Fund, therefore, is to create awareness, first in the United States and then elsewhere, of the fact that population must first be stabilized, and then, ideally, be allowed to return to a level where it would be possible for all people to live in reasonable comfort and dignity.

The Environmental Fund does not solicit memberships or contributions, but, if you, too, are concerned about the issues raised in this Statement, and would like to be on our mailing list, let us know.

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There is still another factor to be taken into account. The U.S. will not only use its new monopolistic powers for economic purposes, but also for political ones. Already, as was pointed out in Rome, "half of America's food aid in 1974 went to Cambodia, South Vietnam, Laos, Israel, Jordan and Malta, and some was magically transformed into weapons before it could be consumed. Israel received more food aid in 1973 than needy Bangladesh, whose population is over seventy million."³

Recently President Ford formed a 'Special Food Group'⁴ which included the Secretaries of State for the Treasury, for Labour and for Agriculture, and representatives from the Council of Economic Affairs and the National Security Council. This made it fairly clear that Earl Butz, the Secretary of State for Agriculture, is no longer in charge of food decisions. As Lester Brown says, "food is simply too important a resource in the world today to consider it a narrow agricultural issue."⁴ Thus, to the vagaries of the climate, of the market and of American economic interest, must be added those of the American political scene.

But there is another set of factors, which we might refer to as ecological ones. American agriculture is very vulnerable. Not only do the endless stretches of monoculture in Iowa and Idaho provide a perfect niche for exploding pest populations, but the very reduced genetic basis of the major crops makes them highly vulnerable to plant disease. In 1970, the U.S. lost one sixth of its maize crop in an epidemic of Southern Corn Leaf Blight. A recent report of the National Academy of Science suggests that it is only a question of time before a plant disease effectively destroys a major part of the U.S. harvest of some major crop.⁵

In addition it appears that the U.S. is now reaching a point where it is experiencing diminishing returns on the particular chemical inputs needed by its highly intensive agricultural system. Since the cost of these inputs has sky rocketed (fertilizer has more than quadrupled in price) diminishing returns on capital expended on these inputs is still very appreciable. The

point is actually now being reached where, as is pointed out by the Centre for Biology on Natural Systems,⁶ it is rapidly becoming more economic to do without the inputs, which reduces costs and which increasingly compensates for the lower income resulting from slightly reduced yields. The significance of this to the recipients of food aid, and also for those who have become dependent on food imports, is that *American agriculture is likely to become less intensive in the years to come, and that yields are likely to fall rather than rise as they have been doing over the last decades.*

But this is not all. The U.S. has something like 450 million acres of arable land which is being reduced in two ways. Firstly, by urbanization, which uses up at least a million acres of the best land every year and by soil erosion, which has been greatly accelerated by large-scale capital-intensive farming methods. In many parts of the United States this is already a very serious problem. Surveys have revealed losses of anything up to 34-314 tons per hectare in the southern plains of the U.S.⁷ The U.S. National Academy of Sciences has estimated that the U.S. has already lost about one third of its topsoil.⁸ Commoner has calculated that the organic content of mid-west soils has declined by about 50 per cent in the last 100 years.⁹ By the end of the century, erosion will probably have caused another 25 million acres of arable land to be lost. Added to the losses given for urbanization, this reduces the food producing capacity by 10 per cent.¹⁰

We must also take into account that home demand will probably have increased radically by the end of the century. The population at present is about 220 million and it is increasing at the rate of 1 per cent per annum. Even if the rate decreases substantially, it is unlikely that there will be less than 300 million people in the U.S. by the year 2000. Assuming no major changes in diet in one direction or the other (trends are at present towards an increasingly extravagant one) *this must mean a 30 per cent increase in the home demand for*

food. At present, the U.S. exports about 10 per cent of its total harvest of cereals. Now it should be obvious to all but the most obstinate that *this surplus is likely to be wiped out.* Incredible and terrifying as it may sound, it would appear that before the end of the century *America will have ceased to be a food exporting country.**

This means that in the next decades we may see not only a disappearance of food aid, but also a collapse of the international grain market. This can only mean that those countries which do not start now to make themselves totally self-sufficient in food supplies are simply doomed.

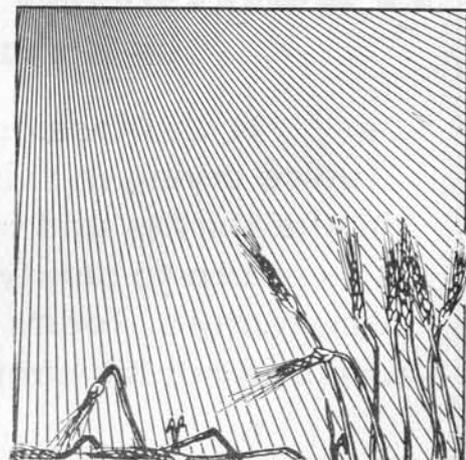
FOOTNOTE

A further implication of these trends is, of course, that the U.S. will by then have great difficulty in financing the import of the mineral resources it requires. Since the costs of maintaining this massive industrial society are growing every year — with increasingly more money required to pay for crime control, welfare, education, urban renewal, pollution control etc.,¹¹ the possibility that the American economy might have collapsed well before the end of the century, cannot realistically be dismissed — a consideration which further supports the thesis of this paper.

Edward Goldsmith

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A Eulogist of Traditional Husbandry

by Nicholas Gould

H. J. Massingham's was a voice crying in the wilderness when, in the thirties and forties, he pleaded for a return to sanity in agriculture and architecture. Today his values are widely accepted but his name is almost forgotten.

It is seldom a very happy fate for a writer to be ahead of his time. Frequently it condemns him to be dismissed as a crank during his life, and when he is dead to have his ideas popularized and hailed as the original discoveries of other men, while his own prior claims are completely forgotten. Something of the kind has happened with H. J. Massingham, who, by the time of his death about twenty-five years ago, had dealt in his writings with nearly all the topics of major concern to the conservationists and environmentalists of today. That Massingham did not have a very great influence during his own lifetime is understandable, if regrettable. He saw many of our present troubles in the bud, as it were: most people do not recognize the flowers of evil until they blossom. But his neglect today, when the world is at last catching up with his ideas, is less easy to explain. If the English environmental movement needs a figurehead, it is unlikely to find a better one than Massingham: yet today his books, dusty and unread, languish in dozens on the shelves of every second-hand bookshop in the land.

Harold John Massingham, who was to be such an uncompromising opponent of false notions of progress, was himself the product of a most "progressive" background: for when he was born in 1888, his father was already on the way to becoming the foremost liberal journalist and editor of his day. Massingham received what was then — and is, to some extent, still — the normal education of an upper-middle-class Englishman: that is, he was given, at public school and Oxford, a thorough grounding in Latin, Greek and English literature, and very little else. Many years later, in his autobiography *Remembrance*, he was to catalogue the inadequacies of his education.

"During the first twenty-one years of my life I was never taught anything whatever (1) about the social and economic history of my own native land. (2) About its geology, topography and architecture. This means the nature and disposition of the rock-floor that has conditioned its soil, landscape and vegetation. It means, too, the characters and

differentiations of that landscape, and the successive responses which man has made to these factors in his buildings . . . (3) About its agricultural history, the foundation of all civilized communities. (4) About its wild flora and fauna and their ecological relations with their particular environments. (5) About its archaeology . . . (6) About the food we eat, where it comes from, how it is grown and what is done with it between producing and consuming it. (7) About how to use my hands, with the single exception of being able to twist a cricket ball a certain way with my left one."

This brief programme for an ecological education outlines the subjects whose study was to occupy most of Massingham's adult life. After a false start as a journalist and writer in London, he became a keen amateur ornithologist, and soon an active conservationist. After the First World War he organized the campaign which led to the 1921 Act prohibiting the importation of wild birds' plumage for use as millinery. It was the experience of this campaign which set him thinking about "the true meaning of what science and general opinion united in describing as 'the conquest of nature' . . . It would have been impossible for so hellish a commerce to have persisted . . . if the human relation to nature were not resting upon a false basis." He was already beginning to suspect that this attitude to nature was not natural in man, but rather "the expression of some widespread mental disease, contrary to the nature of things and to man's own health of mind, but induced and fostered by an economic system confined to a particular phase in the history of Western civilization." This was the theme that Massingham was to explore through all its implications in over a score of books and countless articles until his death in 1952.

Massingham was no internationalist. Though his theories are of general application, his examples, nine times out of ten, are taken from England. There was nothing chauvinistic in his attitude — he would have argued, I think, that

to know one's own country as well as one ought leaves very little time to get to know anyone else's. And certainly few men have known England — or at least rural England — as well as Massingham. Some of his works are ostensibly guide-books: but the breadth of his vision raises them out of that class. It is characteristic that in such books he does not use a *county* as his unit: he recognised that county boundaries (even the oldest ones) are artificial and often arbitrary, and preferred to discuss the natural regions of England — the Cotswolds, the Chalk Downs and the like.

These divisions, of course, are primarily geological: and in taking geology as his starting point Massingham showed a sound ecological judgement. In his portrait of a region, he never loses sight of the underlying structure which has moulded natural and man-made features to their present shape. But since the countryside today is primarily the end-product of thousands of years of human activity, understanding it involves a knowledge of archaeology and history. To Massingham the past was as real as the present, so that he saw the landscape not merely in three dimensions, but in four — covering an extent of time as well as space. A region, viewed in this way, becomes analogous to a work of art. Or rather, to Massingham, it actually *is* a work of art, "achieving its self-sufficiency by both accepting and transcending the limitations of its material, as all such works do that are worthy of the name. The human contribution is as integral a part of the landscape as is that of its flora and fauna; man and rock are the end and the beginning of the masterpiece which is the region."

The most conspicuous example of the partnership of man and rock in any region is what would now be called its "vernacular architecture" — the buildings whose materials and style are the product of local conditions. Massingham had a sharp eye for detail, and saw every region, almost every village, as having its own distinct architectural personality. He also saw, of course, how this marvellous diversity was being shattered by the effects of industrial centralization. The thing

he found hardest to bear in the modern rash of suburban development was the loss of the "soul of place" — to deprive a town, a village or a region of the characteristics which made it different from all others was in effect to destroy it. A place which "might be anywhere" is for all practical purposes nowhere. Even the supposed economic arguments for this standardization seemed to him invalid. For example, seeing a row of prefabricated houses on the cliffs near Weymouth, he writes:

"They have been built at the very point where four primary building stones geologically meet — Portland, oolite limestone, corbrash and chalk clunch, with clay-pits for brick within easy reach. When reason protests, the answer is always that it is cheaper in money — that false measure — thus to deface England than to accept, for nothing but the trouble of extracting it, what nature offers at our very feet."

Massingham regarded it as noteworthy that the word "picturesque" came into the language at about the time when the Industrial Revolution was getting under way. "It struck me . . . how extraordinarily significant was the stressing of this antithesis between the 'practical' and the 'picturesque', as though they were antipathetic to each other by some immutable law of nature." Industrialization made the *practical* synonymous with the *ugly*, for the first time in our history — for in the Middle Ages beauty and industry had coexisted, with results which can still be seen in the Cotswolds and elsewhere.

Shakespeare in *Henry V*, describes the neglected French countryside as "Losing both beauty and utility." This was one of Massingham's favourite quotations: to Shakespeare, whom he regarded as a spokesman for pre industrial England, it was natural to regard beauty and usefulness as partners rather than rivals. The principle of "use in beauty and beauty in use", Massingham concluded, was fundamental to traditional crafts and traditional agriculture, and proceeded inevitably from a way of life in which nature was treated as an ally, not a defeated foe. The

logical connection in this argument is not very apparent: but its essential truth is easily proved by comparing the characteristic products of industrialism with those of earlier ages.

It was one of Massingham's greatest regrets that his urban, intellectual education had not equipped him to practise any craft except the non-manual one of writing. But though he never became a master of one craft, he made himself an exceptionally well-informed observer and interpreter of them all. In his travels around England he met many of the surviving country craftsmen, talked with them and watched them at work. So it was not as a mere armchair theorist that he gave it as his opinion that craftsmanship is "the secret of the good life, the means to happiness, and the true resolution of the inextricable tangle into which our social, economic, and indirectly our political life has tied itself."

It is scarcely possible to write of country crafts without a note of regret creeping in. Again and again Massingham is forced to chronicle the slow stifling of local industries and local culture by the forces of mechanization and centralization. Here he is, for instance, discussing cheese-making (I pick the example, from dozens I might have chosen, because of the story of the decline and fall of English cheese is perhaps less well known than it should be). Massingham began with an account of the great variety of local cheese before the industry was mechanized, and goes on:

"There was no checking the appetite of machines to do men's work for them, regardless of the quality of the product or the well-being of the men . . . It may reasonably be asked why, if all these devices made cheese-making fool-proof, the historical observer has to record an unquestionable decline both in cheese-making and in cheeses, and why, if the facilities for making multitudes of cheeses were so enormously increased, he also has to report a great diminution in the consumption of English cheeses . . . In one of the scientific reports on the mechanization of cheese-making occurs this naive remark, expressed in the customary

jargonese: 'The manufacture of a large number of varieties is an obstacle to standardization of quality on a national scale, and is calculated to perpetuate individualistic and uneconomic marketing methods'. Precisely. Science murders variety just as it murders the English language, and the variety of English cheeses in the past was the criterion of health in this particular rural craft. There is no more wisdom in desiring the standardization of cheeses than there would be in attempting to standardize sheep, whose different breeds reflect the varieties in soil, climate and environment."

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The analogy from farming is typical of Massingham. He recognized that the production of food is the foundation on which human life rests, and was convinced that modern trends in agriculture were making that foundation increasingly unsteady. Though never a farmer himself, he became perhaps the keenest observer of the farming scene since Cobbett, and a passionate and tireless advocate of organic methods, labour-intensive husbandry and small, mixed farms. His comments in the 1930s and 1940s have a surprisingly modern sound, and show an uncanny instinct for putting his finger on the real problems long before they had become widely recognized. Already he was warning that the thoughtless removal of hedges would bring wind-blown erosion; that heavy machinery would seriously damage soil-structure; that over-specialized stock would lose

their natural resistance to disease; that the use of synthetic pesticides is a slippery slope with bigger and bigger applications leading to less and less effective control; that advances in plant-breeding were temporarily concealing a disastrous decline in the real fertility of the soil; that agriculture was becoming enslaved to the enormous vested interests of the chemical industry. The expression "factory farm" is one of his favourite terms of abuse — he may even have invented it.

But there is much more to Massingham's writings on agriculture than generalizations and abuse. Always his concrete examples give detailed support to his views. He visited a great many farms, large and small, where his ideas were to some extent being put into practice. His accounts of these places, in their combination of a poetic, pastoral quality with a wealth of earthy detail, are reminiscent of nothing so much as Virgil's *Georgics*. They can be guaranteed to make any normal reader want to rush out at once, buy a piece of land and start farming. As a small sample, here is part of his portrait of the manager of a big country estate, a man whose ideals were close to Massingham's own:

"The relation of this man to his environment was the most ecological I have ever encountered . . . The very clothes on his back are home-made. The linen was woven from his own flax and the tweed from his own sheep . . . This wholeness was carried through into the very meals he ate . . . In summer we would finish a large bowl of strawberries inundated with cream from the Guernseys: in winter, a quince tart, the pastry made from the home-cured lard of the home-pig and a mixture of home-cultivated wheat, oats and barley."

Massingham's own husbandry was limited to the large garden of his Buckinghamshire home. Here, even after a serious accident had cost him a leg and much of the use of a hand, he practised on a small scale what he preached. His garden had begun, conventionally enough, as "a pleasure-garden with a utilitarian annexe in the shape of fruit and vegetables": but he later came

to reject "ornament except as a flowering out of utility". He was as firm a believer in mixed gardens as in mixed farms: during the war he refused to dig up his lawn for vegetables, as many people were doing, arguing "I do not see how a kitchen garden, corresponding with the arable of a small holding, can possibly be kept going without a lawn, corresponding with the permanent grass of the holding, provided that the plot . . . aims at some kind of self-maintenance." The lawn, he maintained, acts as a reserve of moisture, and produces a surplus of organic material for compost or mulching: so it more than pays its way in the increased fertility of the "arable".

Massingham extended the mixed-garden principle to the mixing of flowers, fruit and vegetables *in situ*. The movement was not all one way — he sowed haricots among the flowers, but bordered the kitchen garden with lupins (a good example of use-in-beauty, since being legumes they enriched his vegetables with nitrogen). Wild birds he welcomed, not merely as an indication of a rich soil with plenty of invertebrate life in it, but also because he knew from observation the part birds can play in controlling insect pests. Observing a pair of blue tits, he calculated that in a single day they cleared his orchard of about fifteen hundred Apple Blossom Weevils and the same number of Apple Sawfly maggots. "Had I sprayed the trees with D.D.T. for the weevils and arsenate of lead for the sawflies, I should have destroyed the insect predators as well as the grubs, poisoned the soil, killed many earthworms, spent a good deal of money and labour, and presumably lost the services of the blue tits."

To Massingham his gardening was a symbolic activity. He enjoyed it for its own sake, but also saw it as a protest against "the crazy edifice of super-industrialism, international trade and the exploitation of natural resources." The garden displayed in microcosm what the nation — indeed, every nation — should be, a self-sufficient unit where nature and man worked in harmony. We in Britain had "come to believe in dumping things in and out of ships and lorries as a kind of national self-preservation": the time was

coming when circumstances would force us to abandon this export-mania which has obsessed us since the Industrial Revolution.

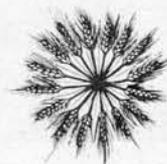
Massingham was naturally accused of wanting to "put the clock back", to return to an ideal past which had never existed outside his own imagination. He did not in fact idealize the rural past, being too well-read in its history to be unaware of its shortcomings. But he believed that the characteristic follies of the modern age could only be remedied by a return to earlier ways. These he advocated not because they were *old*, but because he regarded them as "the permanent conditions of life", to which men would inevitably return from the chaos of the present system. His attitude to modern technology was not one of unthinking condemnation: we should judge each item on its merits, simply making sure that we took into account all its effects, direct and indirect, on human beings and on the environment. Thus, for example, he saw no reason why country people should do without electricity, but believed that this should be locally generated, not mass-produced in centralized power-stations: in this way pollution would be minimized, and, equally important, the consumers would control their source of supply instead of being dependent on an external agency.

Though Massingham was so totally out of sympathy with the spirit of the age he lived in, his writings triumphantly avoid the pitfall of becoming merely a prolonged Jeremiad. Perhaps this is because he not only saw what was wrong, but also had a clear and unshakable faith in what was right. He had a full, sensuous appreciation of the countless good things in the world; in his later years this was enriched by his conversion to Christianity, which led him to regard the natural order as something entrusted to man by God, so that the abuse of it was both ungrateful and sacrilegious. In this article I have had to concentrate on Massingham's general ideas. But to do so is inevitably to give a misleading impression. His books are about real things — fields and gardens, mills and smithies, churches and barns, cows and hens, bread and beans and beer. He can write pages

about Iron Age hill-forts, or the novels of Jane Austen, or the art of laying a hedge, or a young cuckoo in a hedge-sparrow's nest, or the virtues of fifty different varieties of apple, or Georgian furniture, or compost heaps. He has something worth while to say about them all, yet he manages to incorporate them all into his own scheme of thought, so that it is unmistakably *Massingham's* view of all these things that one is reading.

I cannot do better in conclusion than to quote Massingham again, summing up what, in his view, is "the real, the fundamental, division of our times". The case for an ecologically responsible way of life has seldom been more succinctly stated:

"The division is not between political parties nor between conflicting ideologies nor even between nations, all of which are wedded to the pernicious economic system which is at the bottom of international rivalries and tensions. The real division is between rival philosophies of life. The one believes in exploiting natural resources, the other in conserving them; the one in centralized control and the other in regional self-government; the one in conquering and the other in co-operating with nature; the one in chemical and inorganic methods imitated from those of the urban factory and the other in biological and organic ones derived from the observation of nature as a whole; the one in man as a responsible agent with free will to choose between the good and the bad and the other as a unit of production directed from above by an élite of technologists and bureaucrats; the one in the divine creation both of man and nature and the other in man as self-sufficient in himself with nature merely as the means for extracting wealth for himself . . . Of the two philosophies thus opposed, the one is leading the world on the road to ruin and the other offers the only way out."



The Mackerel War

by Michael Allaby

Sea fishing is the only modern industry that bases itself on a form of hunting as old as man himself.

As it becomes ever more heavily capitalised, using that capital to harness advanced technologies and equipment with unprecedented power to locate and catch its prey, it is in danger of eroding the very resource on which it depends.



The Mackerel Fleet at Falmouth.

The story is an old one and a sad one, familiar to anyone who has spent even half an hour reading of the impact of western civilisation on simpler cultures. The westerner finds a people that obtains its food by hunting. They use bows and arrows, or spears, or blow pipes, or fish traps, or they make hooks out of bits of bone and dangle them optimistically on the end of pieces of string. It is a sorry sight. The westerner, with the best intentions in the world, supplies them with guns, nylon nets, outboard motors and all the rest of the paraphernalia with which he is so familiar. He also sells them the ammunition, fuel and other supplies they need to maintain the equipment he has provided, for he is not averse to doing well by doing good. The simple tribesmen are properly grateful. Life for them is now much easier. They marry their traditional skills at stalking and locating their prey with the increased killing power they have been given. The size of kills increases, they sell the surplus to buy more ammunition and fuel, and all goes well until, one day, the population of their prey collapses, or migrates to safer habitats. Then they migrate, too, if they can. Sometimes they starve.

The tale is hackneyed to the point of banality. You would think that by now we, the westerners, would be so familiar with it that we would have found ways to stop repeating it. In the case of tribal peoples perhaps we have — perhaps. The real irony is that the next repetition may take place not in some distant rainforest, but right here, in Britain. Our efficient, modern fishing fleets may destroy first the smaller, simpler inshore fleets, then the fish stocks, and finally themselves.

To understand the nature of the threat we need to break through some of the myths. The first is that the typical fisherman is a tough, hard living and hard working man who spends weeks on end at sea in a big, sleek, powerful ship with ice on its superstructure, fighting huge seas and fishing in the lulls between storms and Icelandic attacks to bring home the crispy cod fries. This is a picture of a distant water trawlerman and

it is not typical. The total UK fishing fleet consists of about 7,000 vessels. A little over 6,400 of them are 80 feet or less in length and about one-quarter of them are more than 40 feet in length. According to statistics issued by the Ministry of Agriculture, Fisheries and Food, 42 per cent of our fish is caught by vessels of 80 feet or less. British United Trawlers estimate a figure close to 70 per cent. The inshoremen believe it may be as high as 75 per cent.

The typical fisherman, then, works from a small boat in coastal — inshore — waters. He sails only when conditions are favourable and he — or she — usually sleeps ashore, most trips lasting a day or a night but seldom longer.

A second myth is that fishing is economically insignificant as an industry. It is true that it cannot

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compare in terms of the value of fish landed or in terms of employment with major factory-based industries, but this does not make it insignificant. Officially, about 12,000 people are employed in the industry. This figure is misleading, however, because although it includes the working members of the families of boat owners, it does not include the owners themselves. When they are counted in the figure of full and part time fishermen and women rises to a little over 23,000. They get missed from employment statistics because they are not employees. Indeed, in the inshore sector of the industry crews refuse to work for wages. Everyone takes a share of the catch. A share is set aside for the maintenance of the boat, but the owner of the boat has no special status. It is also estimated (by British United Trawlers) that for every person who goes to sea, five more are employed in service industries ashore. So altogether the industry supports something like 140,000 persons. This is

still small, but because the biggest part of the industry is based on small boats working inshore, employment is dispersed among many small coastal communities where other work is not available.

The big ships, that work the distant grounds, are capital-intensive where the inshore boats are labour-intensive. Because of their cost and, as we shall see in a moment, because of their awesome killing power, the distant water vessels have asked for, and received, economic support. Grants are available for the purchase of big ships, loans are provided, fuel costs are subsidised, and boats themselves have been subsidised for days spent at sea according to a sliding scale that starts with 40 foot boats and reaches a maximum with 135-footers. This subsidy is being phased out. Small boats need and receive no help of any kind. They are viable.

Provided the two technologies were kept apart, each remaining in the waters for which it is best suited, all might be well. As fishing in distant waters has become more difficult and more expensive, however, the big ships are being forced to work closer to home. It is not always realised that one of the difficulties Britain has had in negotiating with Iceland arises from the impossibility of compromise on territorial limits. Iceland has declared a 200 mile limit, which will be endorsed officially by the Law of the Sea Conference, but British ships are working mainly well within 50 miles of the coast.

While the cod war has attracted the attention of the world, the movement of modern, efficient vessels into British waters has generated a similar conflict there, especially in South West England, where the mackerel substitutes for the cod.

The inshoremen catch mackerel on hand lines. The technique is primitive, but it permits them to work dispersed shoals and to be highly selective in their catch. If the first line to be hauled in brings fish that are too small, these are released and the boat moves elsewhere. The inshoremen have been earning an adequate living over the past few years. At Newlyn, one of the biggest fishing ports in the region, landings in 1975 were worth

more than one million pounds. The fishermen have worked hard to develop markets for a fish that is not traditionally popular in Britain, and they have proved they can keep those markets supplied. They export mackerel, especially to France.

Their prosperity is threatened by the arrival of big ships fishing by industrial methods. The main disadvantage of large fishing vessels is that they cannot afford not to fish. Capital costs are high and fixed costs, such as insurance, must be added to them. Together they ensure that the ships cannot be allowed to lie idle in port. Once at sea, operating costs early in 1976 were around £1,500 per day. The crew is paid wages and must be flown home for shore leave at regular intervals. So they cannot remain in port and once at sea they must catch fish. This means that markets must be opened and if fish cannot be sold for human consumption it is better to sell it for processing into fishmeal than not to fish at all. Along the South Devon and Cornish coasts markets have been glutted and although the number of persons employed has risen and the size of the total catch has risen, individual earnings have been falling. Now there is talk of creating new markets for mackerel in Africa.

The problem is caused by a very small number of ships. From time to time foreign trawlers have worked the grounds but most of the large-scale fishing is done by British purse seiners, coming mainly from Scotland. They have been forced south by restrictions on herring fishing in the North Sea.

They work to order. Each skipper sets out, from Plymouth or Penzance and usually at night, to catch fish whose sale is guaranteed in advance. He knows how much fish to catch, the species and the average size of individual fish. His instruments locate shoals and indicate their size, from which he can calculate the total weight. The shoal must be fairly dense, a concentrated mass of fish. He may need only one shoal, for he can haul aboard 100 tons or so at a time. He hunts until he finds the shoal he is seeking, radioing information to other skippers about shoals that are too large, too small, or too dispersed for him to take.

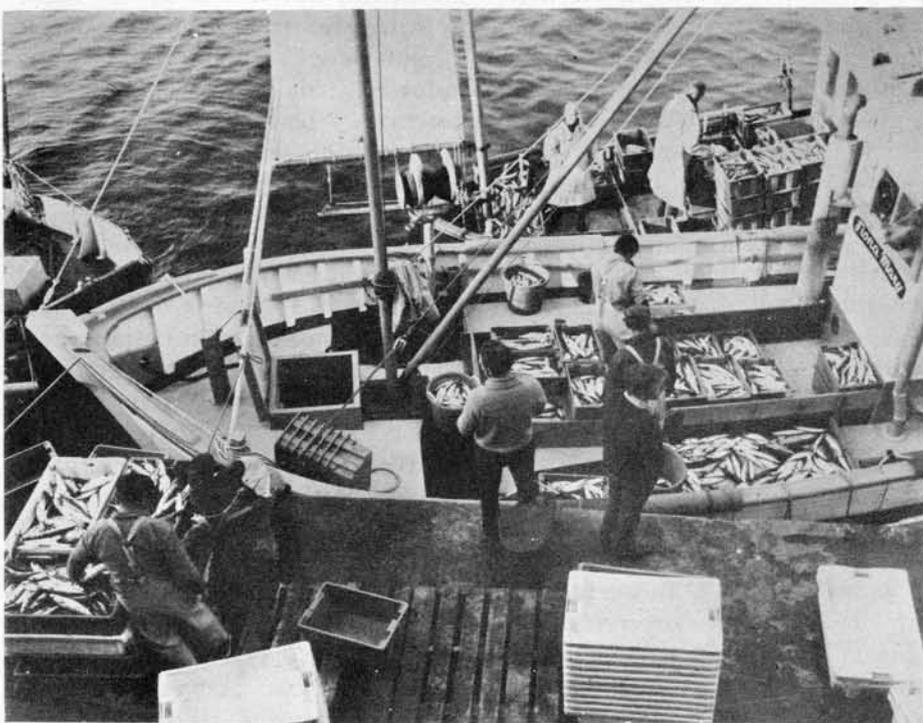
When he finds his shoal he sails in a circle around it, paying out his net to surround the entire shoal. The bottom of the net is then closed by a line from the ship to form a "purse" and the net is hauled to the side. As the fish appear at the surface of the water, the skipper sees them for the first time. He must decide whether the size of individuals is right and whether the shoal is all of one species. He has no way of sorting fish, so if he is not satisfied he will "slip" the haul by releasing the bottom of the purse and hauling in the net from around them. He may slip two or three hauls before he brings one aboard. The inshoremen, who listen to the purse seiner skippers talking on their radios, say that it is common for them to slip 100 tons in a night and that one ship once slipped 500 tons.

In theory, the slipped fish swim away free and unharmed. In reality, most of them die. The mackerel is physically delicate. Its scales are dislodged easily and it cannot stand jostling. It is common to find apparently undamaged fish at the centre of a haul that are dead. Probably this is what has happened to them, but fishermen talk of "drowned" fish. They suggest that crowding and violent thrashing exhaust the free oxygen and fish asphyxiate. No one

really knows. What they do know is that dead fish are accumulating in certain areas. One trawler reported finding 100 stones of dead fish in the course of three hours' fishing and inshoremen say there are areas they can no longer work because of the quantities of dead and rotting mackerel.* The Ministry of Agriculture's local fisheries officer has heard of these reports and so has the Marine Biological Association, based in Plymouth, but no one has been able to assess the quantities of dead fish and no one knows whether tides and currents may not be carrying dead fish into the area from a much wider catchment.

The inshoremen, who remember the overfishing that depleted stocks of herring and pilchard, fear the mackerel may be over-exploited. The official view is that present stocks are capable of sustaining higher yields yet. The view is supported by evidence that yields are not diminishing, the shoals appear

**Between Christmas 1975 and early March 1976, 5 dolphins were washed up dead on different Cornish beaches. The animals appeared to be undamaged. Although occasional dead dolphins are washed up it is unprecedented to find such a large number in a period of this length. Local fishermen believe the dolphins were caught in purse seine nets and drowned.*

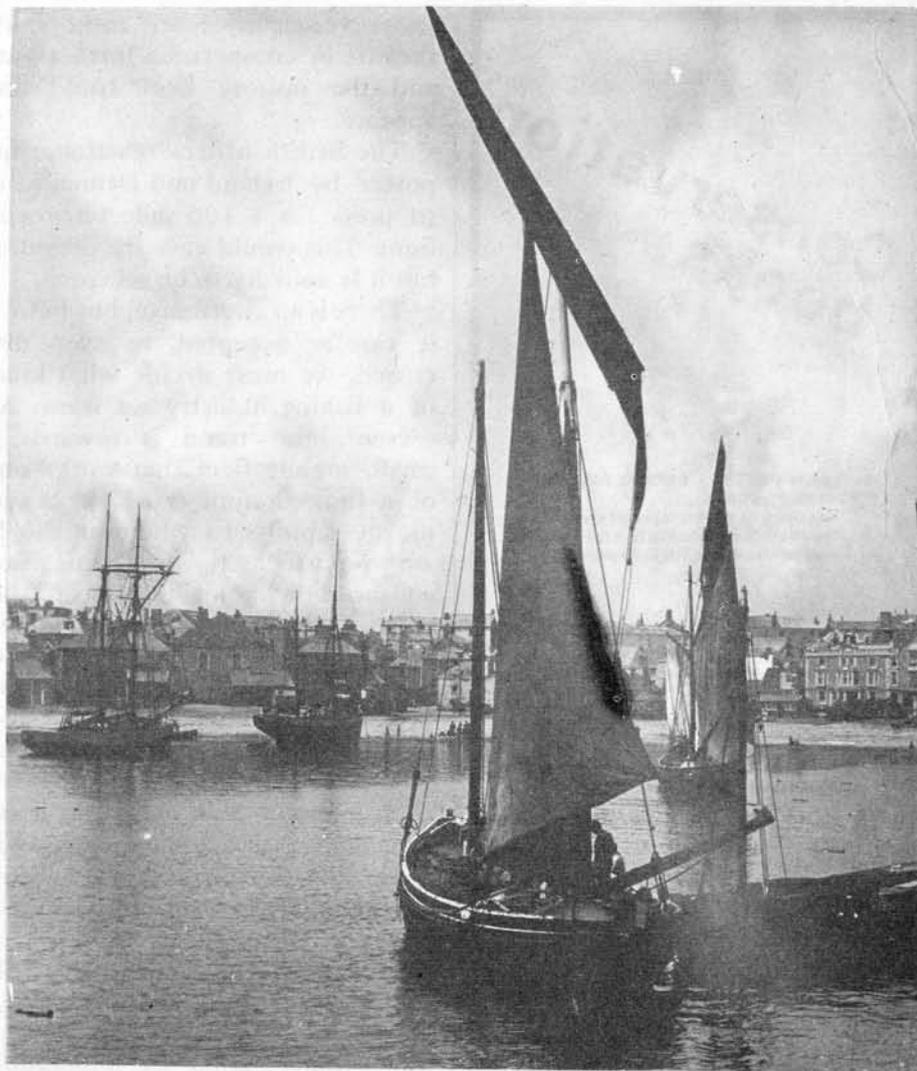


Mackerel being unloaded at the quayside.

to be as numerous and as large as ever, and the proportion of large fish to small remains constant, with more large than small. This may be too complacent. A population containing a larger number of adults than young could be an ageing and declining population. At all events, the Marine Biological Association seems more concerned about the effect of present rates of fishing on stocks than the Ministry's Fisheries Laboratory at Lowestoft, which is non-committal.

The fact is that no one knows the size of the mackerel population. In the middle of October, 1975, there were large shoals off Western Scotland. By the end of October the shoals were off Devon and Cornwall. Almost certainly they were not the same shoals, for the mackerel could not have covered the distance in the time. So where did the Scottish shoals go and where did the Cornish shoals come from? Mackerel are highly mobile. Individuals tagged off Cornwall have turned up in Norwegian waters, which suggests that any estimate of the size of the population must be based on the whole of the North Eastern Atlantic and North Sea areas. Nor is much known about some aspects of their behaviour. For several years they have overwintered off South West Britain, but they are not breeding and they are not feeding. No one knows what they are doing. They mix readily with shoals of other species, but no one knows what relationship, if any, exists between the species. All that is known is that they arrive suddenly and just as abruptly, usually in March, they leave again.

Most commercial fish species are protected by conservation quotas that restrict the size of the permitted annual catch. Where one species remains unprotected, as the mackerel does, obviously it is at risk. The same risk may apply in the next year or two to the blue whiting. Local opinion has it that a mackerel quota will be established and this may help to explain the current onslaught. Quotas are determined in relation to actual landings in preceding years, rather than on any estimate of the size of the population or the sustainable



Mackerel drivers at St. Ives in 1903.

annual yield. So, the higher yields are now, the larger will be the quotas that eventually are fixed.

No one wants a quota. The purse seiners, together with the big trawler companies, do not want one because quotas are impossible to police. The inshoremen do not want one because they believe the purse seiners would catch the whole of any quota within a couple of weeks and leave nothing for them.

Yet someone must do something, and quickly, for events this year will do much to determine the structure of the entire industry and thus the kind of future that will be enjoyed — or at any rate experienced — by thousands of families.

During 1976 it is almost certain that the Law of the Sea Conference will agree the 200 mile Exclusive Economic Zone (EEZ) with a 12 mile territorial limit for all maritime states. It is also likely that the EEC will agree a Common Fisheries Policy. A conflict arises because as

they are conceived at present, EEZs pertain to individual states, while a basic tenet of Community philosophy is the sharing of resources. If the Common Fisheries Policy establishes what is, in effect, a Community EEZ, then UK fishing grounds will be worked by the fleets of all member states. Of course, Britain is aware of the danger, and so are Ireland and Denmark, the other two major EEC fishing nations. Traditional fishing grounds would be opened to fleets of countries that themselves have a small coastline and so base their fishing on distant grounds and industrial methods. At the same time, the implementation of EEZs in other parts of the continental shelf would force most of the Community's distant water fleets into the Community EEZ, even though they are not working there now. Fish stocks inside the national 12 mile limit would come under increasing pressure from British distant

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water vessels squeezed inshore by the intense competition further out, and the inshore fleet could disappear.

The British official reaction, supported by Ireland and Denmark, is to press for a 100 mile territorial limit. This would ease the pressure, but it is unlikely to be accepted.

There is an alternative, but before it can be accepted, or even discussed, we must decide what kind of a fishing industry we want. At present, the trend is towards a small, mobile fleet that works out of a limited number of ports and moves rapidly to wherever shoals are reported. It uses the most advanced technologies to locate and catch fish. Such a fleet would be very economical in its use of labour and very easy to regulate because of the small number of vessels and ports involved. Unfortunately, its very efficiency works against it, for as its capital and operating costs continue to rise it must find itself compelled to maximise its formidable catching capacity. Unless effective measures can be taken to conserve fish stocks it is difficult to see how it can avoid depleting its resource base and bankrupting itself. Since quotas are unpopular, for good reason, and at best are a very crude and probably insensitive conservation strategy, no method exists for protecting stocks that does not require restrictions on fishing methods.

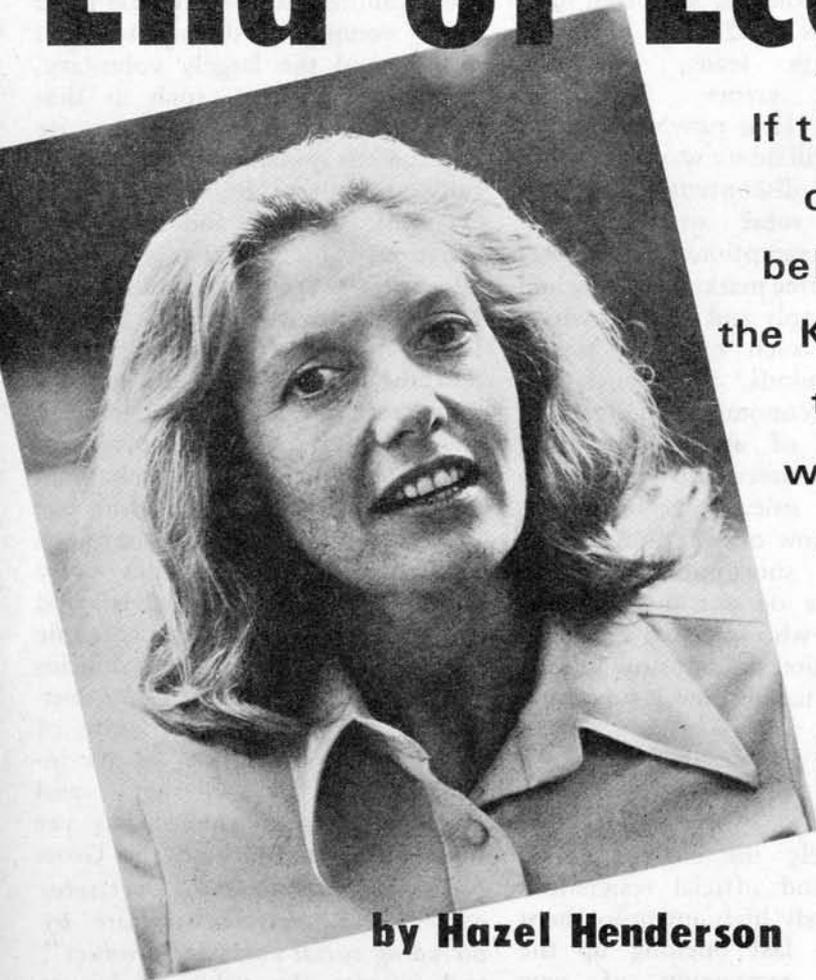
So we could regulate fishing methods. At its most extreme we could eliminate the large ships and expand the numerically large inshore fleet of small boats. These vessels would continue to work local grounds that their crews know intimately. They would be more sensitive to fluctuations in fish populations that might indicate a need to conserve stocks. The boats themselves are much cheaper to buy and to run, so they are under less extreme economic pressure: it is not catastrophic for them to remain in port for a few days. They provide a significant amount of employment in areas where no other work is available and they contribute to the local, as well as to the national economy. Their operations are more difficult to regulate nationally, but very easy to regulate at the local

community level. The disadvantage is that the industry's distant water capability would be forfeited.

The inshoremen suggest a compromise. They accept the reality of the 12 mile limit — although they would like a wider one — but they ask that this be made an exclusively British limit, which at present it is not, since some foreign boats are permitted to work their traditional grounds inside it. They ask that fish caught inside this limit be used for human consumption only, to end fishing for fishmeal. They ask that boats be required to land all the fish they catch. Since slipped hauls are largely doomed anyway, but the capacity of holds is limited, this would help conserve stocks while also reducing pollution. Their most important recommendation is that the size of boats fishing inside the 12 mile limit be restricted — they suggest to 50 tons displacement or less.

The way Britain and its EEC partners handle this issue is profoundly important to us, and perhaps to the rest of the world as well. Small scale inshore fishing is based on an antiquated technology of small nets for trawling and hand lines that are little better than bent pins on pieces of string. Yet the fishermen who use it are highly skilled, sensitive to the needs of the fish as well as of the consumer, and they have shown they can catch sufficient to meet demands, at least for human consumption. They are opposed by all that our culture holds dear: large size, sleek line, impressive gadgetry. Can we preserve the old in order to prevent over-exploitation by an industry we may not be able to sustain? That is the first question? The second concerns the kind of Europe we want. Do we seek to encourage small scale local industries in communities at the periphery of the continent? If not, what alternative is there to the continuing decline of the more remote regions while economic and political power is concentrated more and more in what is already known in Brussels as "The North West European Megalopolis"?

The End of Economics



by Hazel Henderson

If the present economic crisis is over, can the next one be far behind? Or will our latest turn of the Keynesian crank lead us back to the good times? I believe that it will not, and instead, that it will clearly reveal the inadequacy of traditional Keynesian policies and, indeed, the bankruptcy of macro-economic management itself.

In spite of an unemployment rate in the U.S. of about 9 per cent and prospects of a Federal Budget deficit in the order of \$60 billion, officials pronounce that the light is now visible at the end of the tunnel. Meanwhile, traditional economic advice is rigidifying the responses of both Congress and the Administration and continuing to generate policies that are counter-productive and often lead to exacerbation of our problems. The new combination of inflation and stagnation or indeed of inflation and depression is inexplicable by economic theory and has now been experienced by virtually every Western economy as well as Japan. Inflation, no longer understandable by the Phillips Curve trade-off with unemployment, has now become a

structural feature of many industrial economies rather than an aberration, and recession hits all industries dependent on heavy use of increasingly scarce and expensive energy and resources. And although resource prices have fallen of late due to worldwide recession, as soon as the latest shot of Keynesian adrenalin takes hold, albeit briefly, resource prices are likely to surge again and the now familiar shortages will reappear.

It is no longer unthinkable to speculate whether industrial societies are approaching some sort of evolutionary *cul-de-sac*. Instead of moving onward to Daniel Bell's salubrious vision of the post-industrial state, we may have to face the possibility that the end-game of industrialism might well be

that of the "entropy state".¹ Simply put, the entropy state is a society at the stage when complexity and interdependence have reached such unmanageable proportions that the transaction costs generated equal or exceed its productive capabilities. In a manner analogous to physical systems, the society winds down of its own weight and the proportion of its gross national product that must be spent in mediating conflicts, controlling crime, footing the bill for all the social costs generated by the "externalities" of production and consumption, providing ever more comprehensive bureaucratic co-ordination and generally trying to maintain "social homeostasis" begins to grow exponentially. Such societies may have already drifted

to a soft landing in a steady state, with inflation masking their declining condition.

We must face the fact that business cycles in these mature industrial economies are now created by economists and governments rather than by market forces and therefore market forces can no longer be relied on to right things. In their frantic efforts to deal with what they perceive as the three-headed monster of inflation, recession and energy supply problems, government policymakers, caught in a conflicting chorus of advice from economists, heroically man the money pumps and fiscal machinery and alternately inflate and deflate their respective economies. Sadly, after each one of these artificially created business cycles, the economy undergoing such treatment is left in a feverish, flabbier condition with residually more unsatisfactory levels of both unemployment and inflation. Obviously the problems are structural, and aggregate policies of pumping up the whole system to ameliorate structural pockets of unemployment and mask distributional inequities are now too costly in increasing rates of both inflation and resource consumption. Conversely, trying to deflate the whole economy will not touch structural causes of inflation, such as monopolistic pricing, government protectionism and other excesses in the wielding of institutional power, or deal with rising global competition for scarce resources or the newly perceived social costs involved in expanding world trade: the phenomenon of excessive interdependence and synchronously oscillating economies.

The short-term, artificial oscillations brought on by applications of conventional economic wisdom obscure longer-term cycles and inexorable realities, such as the declining global resource base, a climatic cooling trend, together with rising expectations and unabated population growth. The real prospect of a massive world food shortage and widespread famine suggests that Malthusian predictions cannot yet be wished away by the technological optimists. Reality is what we pay attention to,

and not only economists, but most of us, pay too much attention to short-term oscillations while overlooking longer cycles. Oscar Morgenstern recently underlined the absurdity of such fixations by pointing out that even data on these short-term oscillations, which occupy economists, are often little better than statistical illusions, replete with leads, lags and perceptual errors in their collection.² It is now self-evident that there will be no way out of our economic discontents without jettisoning some of our most cherished assumptions, particularly the elegant, free market, equilibrium model of supply and demand which still exerts such hypnotic power over our minds, and which has permitted economists to discount possibilities of absolute scarcity, of both resources and capital, on the supply side. Such unrealistic models of how our economy works are now short-circuiting new formulations of our dilemma. As any citizen who watched President Ford's inflation summit now knows, economics has become a substitute for thought.

The New Thinking

Fortunately the current policy confusion and official resignation to dangerously high unemployment levels is at last opening up the debate to expression of new economic thought formerly considered heretical and often suppressed.

The extent of the disarray among the economics establishment can be gauged by the gloom and self-doubt aired at the last annual meeting of the American Economics Association and an unusual manifesto signed by seven Nobel Prize winners at a Democratic Socialist Organisation Committee meeting in New York on January 25th, 1975. The signers included Harvard's Kenneth Arrow, Sweden's Gunnar Myrdal, Jan Tinbergen of Holland, Heinrich Boll of Cologne and Mel Delbruck of Caltech. They noted, "In the advanced industrial democracies (economic crises) raise serious questions about the very nature of the economic systems in these societies", and called for the

exploration of alternative economic systems.³

The advocates of national economic planning, including Leontief, Galbraith and others, recognize the structural imbalances and interdependencies in the economy and would try to correct these failures of the invisible hand with computerized input-output models and the largely voluntary, indicative planning, such as that used in France. They also advocate government policies aimed specifically at goals of full employment, economic growth and stabilizing inflation, for example, credit allocation, wage-price guidelines as well as fiscal and monetary tools. But sympathy for their desire to halt the current drift and adopt a more rational and humane social goal cannot obscure problems associated with their approach. Such advocates often fail to point out that the underlying assumptions programmed deeply within many of the economic models and statistical data on which economic planning and government policies rely are either erroneous or outdated. For example, in spite of widespread recognition of its inadequacies of design and assumptions, no attempt has yet been made to overhaul the Gross National Product, *which overstates advances in national welfare by including social costs as "product"*, and ignores the value of leisure time and unremunerated housework and volunteer activities. In addition many models are still flawed by underlying Smithian assumptions of the free market which ignore institutional and political power wielders; which assume that prices adequately reflect external costs (or that such social and environmental costs are exceptions); which inadequately model the behaviour of individuals, oil sheiks and ecosystems and assume that adequate information is available to all in the marketplace. Planning, using economic models in which such flawed assumptions are so inaccessibly buried, is a hazardous enterprise.

Meanwhile, the Keynesian "purists", including Davidson and Minsky, have pinpointed similar conceptual weaknesses in the main-

stream Keynesians, such as Paul Samuelson, Walter Heller and Leon Keyserling, which have caused them to misunderstand inflation and therefore downplay its effects in a manner which would have shocked Keynes himself. Davidson, Minsky and the other "purists" point out that Keynes developed a basically disequilibrium view of the economy, and although his policy recommendations have been adopted in most industrial economies in what has been termed the Keynesian-neoclassical synthesis, in reality no synthesis occurred on the conceptual level. Instead of a true integration, Keynes' policies were simply overlaid on the basic equilibrium model of the free marketplace developed by Adam Smith and later rendered more elegant, but alas, less accessible to scrutiny by Leon Walras in France some one hundred years later. Minsky has pointed out the fragile financial structure of today's U.S. economy resting on trillions of dollars of debt, and believes that the choice is no longer between inflation and recession, but between inflation and debt deflation, with resulting deep depression.⁴ He argues for achieving full employment in the context of a low-investment economy, thus joining forces with those, including the writer, who call for a shift to more labour-intensive production for reasons to be outlined further in this paper.

The radical view, espoused by many members of the Union for Radical Political Economics, including David Gordon,⁵ as well as Paul Sweezy of the *Monthly Review* sees business cycles as inevitable in capitalist systems. Inflations, where labour's position is improved relative to capital, will always be countered by recessions, whose functions are to shake out and discipline the labour force, while providing the pause in capital investment and economic growth that refreshes and restores the capitalists' profit.

Inadequacies of Economic Theory

However, all of these explanations (necessarily sketchy and much-abbreviated) are inadequate because they still lie within the confines

of the discipline of economics, and incorporate historical lags which do not capture the changes in context which have occurred since Keynes wrote his *General Theory of Employment, Interest and Money* in 1936. This radically changed context includes the aforementioned worsening population/resource ratio the planet faces, the limits of human adaptation to rationalistic, massively scaled organisation and production systems, mounting environmental disruption and the new global interdependence and rising militancy of the less-industrialized world. Thus today we notice that policies hailed as good economics, such as placing reliance on the free market, or vetoing legislation for public service employment, are becoming more obviously non-viable politics, poor sociology, inadequate systems theory and almost completely ignorant of psychology, ecology and the basic laws of physics.

Let us now examine the structural problems of the U.S. economy which are rendering the traditional macro-economic medicines ever less potent. The U.S.A. is now a highly institutionalised, interdependent society characterised by large economic, social and governmental enterprises, whether we designate them as public or private. We have not yet recognised that each order of magnitude of technological mastery and managerial control inevitably calls forth a concomitant level of government co-ordination effort of varying effectiveness. In such an economy, the cybernetic operation of the free market described by Adam Smith, where small buyers and sellers met each other with equal power and information, only exists in residual areas. Institutions and interest groups and their relative political and economic power dominate the resource allocation system and produce the characteristic "viscosity" of mature industrial economies described by Adolph Lowe in *On Economic Knowledge*. In short, we must now admit that we already plan and we already allocate credit, as for example, when Federal Reserve policies encouraged the banks to bail out the real estate speculators and their Real Estate Investment

Trusts (REITs). Thus facing the facts of extensive existing corporate/government planning, we can address ourselves to the need to plan more openly, democratically and in decentralised, counter-cyclical ways, so as to prevent those instabilities caused by excessive synchronization and scale.

Today, policy-makers are trying to arrest the inevitable process of evolution and freeze the economy arbitrarily in its current institutional pattern. By their efforts at aggregate demand management, tax credits for non-priority investment and granting tax relief or even bailing out feed-lot operators, banks, electric utilities, they are trying to preserve some of the large, obsolescent corporations in our economy.

Dependence on the Big Corporations

Such efforts are understandable because these corporations have grown so big and employ so many people that we believe that we cannot do without them, and secondly, because such large companies and interest groups have the political power to persuade government to bail them out with taxpayers' money. A typical example is the current pressure being generated by large financial and corporate interests, spearheaded by investment banker Felix Rohatyn, to resuscitate a new version of the Reconstruction Finance Corporation to channel capital into the expansion of business and as a lender of last resort to financially troubled corporations.⁶ Such a distortion in already pinched capital markets would assure that allocations would flow to the older, obsolescent corporations while further starving innovative small ones. Another case in point is the auto industry, which has so long dominated the economy that it is traumatic for it and the whole society to adjust to the possibility that fundamental changes in energy and resource availability may mean an irreversible shift towards mass transit and smaller, more efficient, durable automobiles. Detroit, however, accounting for one out of every six jobs in the economy,

is geared up for eleven-million-car years and expensive annual style changes, and has found its products all but priced out of the market.

Similarly, the U.S.A's utilities are geared toward trying to meet electricity demand projections that may never materialize. In the unfamiliar new world of capital shortages, to be discussed later, they or the auto industry cannot get the capital they feel they require without starving some other sector of the economy. With all their management reward systems predicated on corporate growth, they cannot envision a stabilization at their current size, let alone a devolution to a lower level of operations. One notable exception has been Chrysler Corporation's Lynn Townsend, who sees a future where the six-million-car year is the norm, and has announced that Chrysler will cut overhead and middle-management ranks and gear itself down to this projected level of demand.⁷ Many utilities are also re-thinking or cancelling their overblown capital spending plans, as their new troubles (rising costs, angry consumers, the disappointing performance of nuclear plants and environmental and safety issues) have reduced their attractiveness to investors. However utility managements cannot conceive that alternative power sources will emerge based on systems which they are completely unsuited to develop, for example, decentralized rooftop solar collectors on individual houses, apartment buildings and commercial facilities, or the production of methane gas from our nation's sewage plants. And as to current demand projections, utilities must heed those such as Leo Daly, Chairman of the Energy Committee of the American Institute of Architects, who notes, "An effective national programme of energy conservation in building alone could within the next twenty years conserve approximately as much energy as any present supply system is expected to produce".⁸ And, one must add, at an enormous saving of scarce and vital capital for the development of new technology.

It is still hard for us to grasp that these mature companies, so

long on centre stage, are now taking their place at the obsolescent end of our evolving economy, and if they cannot re-tool themselves and their products to meet new needs, they must be allowed to decline or pass from the scene, as did the buggy-whip makers before them. Only in this way will their capital, human and resource elements be available to be recycled into such new areas as solar energy, resource recovery and methane conversion. For many corporations which are over-dependent on production of energy and resource-intensive goods, the writing is on the wall, whether they must purchase bauxite, chemical feedstocks or other scarce resources to produce an array of marginally necessary products, from aluminium foil, throwaway polyethylene and paper packaging to plastic toys and novelties. Such companies will soon find themselves unable to produce such items profitably and may have to launch de-marketing campaigns following the lead of oil, gas and utility companies, as described in my article 'The Decline of Jonesism,' *The Futurist*, Oct. 1974.

If the normal growth/decay cycle of our economy is disrupted further, capital, management and resources will remain wastefully impounded within obsolescent corporations and the many government agencies created in the past to address long-forgotten needs. In addition, calls by businessmen for even more favoured tax treatment for investment and income from capital will worsen the social inefficiencies permitted by management's ability to set high levels of retained corporate earnings, above what is needed for working capital and replacement. The ability of large oligopolistic corporations to retain earnings, rather than pass them along to stockholders, not only weakens our nation's capital markets, but permits often arbitrary or excessive investment by management for its own aggrandizement, without such decisions being submitted to the discipline of the outside capital markets. Sumner Rosen has examined this problem in his paper, *The Inflationary Bias of Corporate Investment Control*.⁹ Even more unfortunate, when

capital is short, the current policies of banks favouring corporate borrowers with prime interest rates and the bias of government research and development assistance help shore up politically powerful companies with declining performance. Small companies, entrepreneurs and inventors are elbowed to the back of the line for capital, credit and government contracts by the wounded, but politically well-connected giants. Ironically, the giants exhibit poor performance in fostering innovation themselves, as many inventions with exciting potential do not fit with their structure or are not able to deliver large enough profits to be significant or contribute sufficiently to their massive overhead costs.

The 'Jobs' Argument

Most of such political efforts to obtain special dispensations are loudly and often solely predicated on maintaining jobs, as if this had replaced their primary function of production. But raising the issue of jobs at all costs, like a religious icon in the face of the devil of economic difficulties, whether due to technological obsolescence, saturated markets, competition for resources or capital, management ineptitude, the need for energy conservation or to preserve public health and environmental values, can no longer go unchallenged. The inevitable question such claims invite is, "Jobs producing *what*, and at what *cost* to the taxpayer and at the displacement of what *other* public priorities in spending?" Most pleas for federal bailouts, subsidies or tax credits raise such awkward questions and therefore lead to much closer public scrutiny of the corporation, its management, its products and the social costs it may incur, such as health hazards to workers and consumers, or excessive resource consumption and concomitant pollution. In addition, questions will be raised as to whether its products are vital or necessary and deserving of subsidy, or marginally useful, frivolous, wasteful, or even detrimental, such as tobacco and amphetamines.

When corporations thus make jobs the key issue they also force us to re-appraise our prevailing

economic assumptions that the dominant means of survival and entitlement to an income is to be via holding a job, and that private sector corporations can absorb a major share of the workforce in an industrialized advanced technological society. This refocuses the debate over the public and private sectors of our economy and their relative roles in providing employment, goods and services, and why we can "afford" a multi-million-dollar aerosol-can industry, elephantine cars, energy-wasting gadgets and several hundred different brands of analgesic of questionable therapeutic value, and why we cannot "afford" adequate police, fire protection and sanitation and other civic services taken for granted in other less-affluent countries, mass transit, health care, parks and clean air and water. This issue, raised by Galbraith in his *The Affluent Society* in 1958 has never been adequately presented by mainstream economic advisers to either the legislative or the executive branches of government. More importantly, our current economic dilemma and the over-riding issue of jobs has drawn our attention back to the ancient conflict between capital and labour and how the fruits of production shall be shared between them. In a recent article, I pointed out the fallacies of neat neo-classical formulas for sharing these rewards, since production itself in an advanced industrial society has become a social process.¹⁰ But the erroneous assumption that income shares to capital and labour can be rationally determined still lingers, even though these shares are most often determined by the relative power between labour and capital in each situation. In many cases there is the assumption that capital's share is immutable and only labour's is susceptible to negotiation, for example, this underlines the Phillips Curve formulation of the once-supposed trade-off between inflation and unemployment, and it is evident in the manoeuvring to balance New York City's budget, where job cuts are portrayed as the only option, and defaulting on interest payments to bondholders deemed unthinkable. The extent to which

economists have erred in defining the relative efficiencies between these two factors of production is now clear and bears crucially on our newly perceived but as yet little-understood capital shortage.

A brief historical digression may be helpful. As our productive enterprises grew in technological and managerial scale and complexity, people were lured off the land and into the growing factory system. Land was gradually fenced and redefined as a commodity to be privately held and exchanged, and working people traded their former self-sufficiency as farmers, craftsmen and small producers for jobs, cash payments and the greater mobility and excitement of the town and cities. But as technological efficiency and organizational size increased, the workers' dependence on the new industrial system for survival became almost complete. As we are now seeing, there is a price to be paid for this dependence — in vulnerability to the vicissitudes of technological change, macro-economic mis-management, corporate planning errors and energy and raw materials scarcities.

For most workers, when such large-scale economic misfortunes occur, there is almost no conceivable alternative to sitting tight, collecting unemployment cheques and waiting passively for conditions beyond their personal control to improve. The alternative of regaining personal self-sufficiency by moving out of cities, changing occupations to those perhaps of servicing needs in a small town, for example, in carpentry, home repairing, roof-shingling, plumbing, window-glazing, tailoring, locksmithing or gardening and the thousands of similar services for which there are huge backlogs of orders in most small communities, has become unthinkable. Such simple skills have rusted, are socially devalued even though they are as vital as ever, and such moves would be seen by most workers as a retrogression. And yet there is considerable evidence during recessions, including the current one, that such small local businesses ride out the storm more easily than the giants, due to their greater flexibility, reliance on family workers and modest overheads.¹¹

Moreover, there is a very real question as to whether centralised, industrialised societies, with their unmanageable complexity, can ever be operated smoothly enough to provide dependable income streams to their blue or white collar workers without frequent and painful dislocations such as we are now experiencing. Worse, many consumers and ordinary citizens now have lost faith that the economy is being managed for the good of the little people and their families, but believe it has been captured by the powerful and is being manipulated for their own economic ends.

Economic Devolution

As inflation continues to erode their real income, many Americans are now becoming increasingly angry at the monopolistic behaviour of large corporations and the consumer movement will become less interested in details and push for more vigorous anti-trust enforcement. Recent surveys by Opinion Research Corporation, Yankelovich and others confirm that approval of the performance of business has fallen to an all-time low of less than 20 per cent of U.S. citizens. Reasons cited for this disapproval of business include the health and safety issues, Watergate and a widespread feeling that U.S. companies no longer play fair but put their own interests above those of the consumer.¹² Citizens now wonder if they can be relied upon to deliver uninterrupted electricity and all the consumer durables on which we have become hooked, with adequate safety and reliability, at prices we can afford and with tolerable levels of pollution and disruption of other community values. And as global competition for resources increases and they become further cartelized and multi-national corporations increase their global search for resources, cheap labour and less-burdened environments to pollute, the social tensions engendered by their normal profit-maximizing behaviour will increase. Other mature or obsolescent corporations may be forced to devolve their managerial superstructure and reduce costly overheads. This

devolution is already evident in some industries, such as retailing, and conglomerates are spinning off divisions that they were busy acquiring in the past decade, while mammoth unmanageable cities such as New York face the same need to reduce unwieldy infrastructure. All these large institutions and power centres are now suffering from dis-economies of scale, centralization and the newly perceived vulnerabilities of complex, interlinked technologies. As transportation, which has in the past almost been treated as a free good, becomes more realistically priced, the trend to decentralization will continue. Regional and local efficiencies may again be able to compete with national market efficiencies in the same way that we are re-discovering use value as opposed to market value, in growing more of our own food and doing more of our own house, car and appliance repairs.

If such a devolution of institutional superstructure is inevitable and, given new conditions, desirable, economic concepts will have to be expanded to embrace more external variables. Since this probably cannot be achieved without sacrificing some of the pretensions to rigour that have seemingly separated economics from its humbler sister disciplines in the social sciences, economists will have to moderate their claims to value-free scientific method if they are not to further confuse government policy-makers. More uncertainties will have to be acknowledged, and the paradoxical fact will have to be faced that much of today's research into policy-related questions, using environmental impact and technology assessment methods, actually increases uncertainty, only revealing more of what we do not know. For example, the cluster of related problems economists define as inflation, recession and a shortage of capital require explanations from beyond traditional economics. While many economists have reached beyond the Phillips Curve explanation and recognised the role of the Vietnam War, global interdependence and rising expectations and, of course, the oil producers' cartel in increasing rates of inflation,

few have explored the following underlying problems:

1. The declining productivity of capital investments.

This phenomenon is rooted in our declining resource/energy base as we are forced to use ever more capital to extract resources that are more inaccessible and degraded. This decline in the productivity of capital investment is visible in the food system, where yields for many crops can no longer be increased by the massive increase in fertilizer inputs, as well as in destructively over-mechanized fishing boats which destroy fingerlings and diminish the available catch. Ecologists Howard and Eugene Odum drew our attention to the same problem in the energy extraction process, where increasing quantities of capital investment yield less and less net energy.¹³ These new conditions, in which we are now "gnawing on the bone" in many energy and resource extraction processes, means that more of society's activities, wealth and income must be diverted into getting the energy to get the energy. The GNP continues to climb and we work harder, but our money simply becomes worth less in real terms, and the multiplier effect is felt in manufacturing and throughout the economy as inflation.

2. The mounting social and environmental costs of production and consumption.

Economists dismiss these in almost a Freudian slip as "externalities". Economic activities, especially when defined in free market terms, not only treat air, water and the absorptive capacities of the environment as free goods, but also the delicate web of the social system: the human relationships of the family, community cohesiveness and the network of social sanctions that enables societies to maintain order without constant recourse to police and courts. The maximizing of profits stresses the social fabric in many ways; for example, excessive mobility demanded of corporate employees can result in less stable communities, less committed voters and citizens,

alcoholic wives and disturbed children and schools.

3. Technical and managerial scale and complexity.

This exacts its toll in human casualties, dropouts, drug addicts and criminal behaviour and alienation. In addition such dis-economies of scale, complexity and interdependence mandate soaring transaction costs, as described in my article, 'The Entropy State,' which begin to exceed the society's production.

In addition, there has been little examination of the structural tendencies of our economy to over-invest capital, for example, the favoured tax treatment of capital investment and income; the ability of large corporations to retain earnings and thus generate their own internal capital; and confusions in analysis of the factors of production which have led to definitions of productivity and efficiency slanted toward the substitution of capital for labour and normative assumptions equating technological innovation with "progress", as illustrated by Francois Hetman in *Society and the Assessment of Technology*. It becomes clear that both market-orientated and Marxist economists share this confusion. Marxists still believe in the labour theory of value, even though in the intervening period since Marx's analysis, the population/resource ratio has shifted drastically. People are now plentiful and resources are scarce, and as a consequence the capital/labour ratio has now shifted back to labour, in varying degrees, all over the planet. On the other hand, the confusion of market-orientated economists is based on their belief in the equilibrium model of supply and demand, which leads them to view capital and resource inputs as expendable. Thus all that appears to be needed to call forth more supplies of raw materials is to hurl more capital into the extraction process, even when it becomes little more than a sink. This accounts for the conventional expressions of optimism, rather than more realistic worries, when aggregate capital expenditures rise, no matter how frivolously or

wastefully allocated. Similarly, the constant demand of business and economists for increased tax favouritism to capital investments are based on a Keynesian, trickle-down theory of job creation, rather than alternatives via credit allocation and social investments, and on increasing the capital available on the supply side by progressively larger interest rates slanted to affluent, large savers and owners of existing capital.

Fuzzy Concepts

Lastly, concomitant confusion exists over the correlation between capital investment and employment. In fact, capital is often invested to *reduce* employment, as in the case of oil-refining processes, automation of supermarket check-out lines and banking institutions' drive to install electronic funds-transfer systems. The Report of the National Commission on Technology, Automation and Economic Progress tried to lay this issue to rest in 1966, but it will not go away in an economy with 9 per cent of its labour force unemployed, and even a cursory critique reveals its conceptual flaws, for example, accepting free market assumptions in viewing the labour market, rather than the more persuasive case that labour markets are highly imperfect and much unemployment in technologically advanced economies is structural. All of these confusions rest on a more profound misunderstanding of "efficiency". Rarely do economists ask, "Efficient for whom and for what system or sub-system?" Corporate efficiency often results in less social efficiency if costs are externalized to taxpayers, as they frequently are. Such fuzzy definitions of efficiency in an interdependent economy lead to chronic sub-optimization, since it is axiomatic in many other disciplines, such as general systems theory, biology and ecology, that optimizing sub-system goals is always at the expense of the larger system. The word "efficiency" is quite meaningless until defined by time and space co-ordinates. Similarly, other value-laden words, "productivity" and "profit maximizing" are indefinable unless a system boundary and a time horizon are

specified. In an even wider, longer-term context, we must face the question of whether what we call "profits" and centrally planned societies call "economic growth" do not always incur matching, but unrecorded, debit entries in some social or environmental ledger. It seems more likely that as socio-economic systems approach boundary conditions, such as those imposed by the laws of physics and cited by Dr. Alfred Eggers, Director of the National Science Foundation's RANN Programme, in his warning to economists at the Senate Conference on Economic Planning,¹⁴ that the concepts of "profits" and "economic growth" become little more than anthropocentric figments of human imagination. In the relatively brief decades of manoeuvring time available we all hope that the technologists can repeal these basic laws of physics, but prudent economic planning suggests that we had better not count on it. Furthermore, options for technological substitution are fast eroding since it is now clear that a large range of potentially substitutable resources are becoming scarce simultaneously.

Policy Directions Suggested for the Coming Economic Transition

An economy which has been riding on a cornucopia of resources and enjoyed a long historical period of growth cannot be shifted drastically to a new course without dislocation and hardship, at best, and at worst, widespread social unrest, depression and economic gyrations, and paradoxically for economists, continued inflation. Therefore a series of stop-gap policies are called for to ease passage and enable a rolling readjustment, while attention is turned to needed long-term structural changes in consumption patterns, lifestyles and values, and to effecting the mandatory shift to sustainable forms of production and energy based on renewable resources, a corresponding reduction of rates of materials throughput and the maximum conservation of all non-renewable resources. Such interim policies during the vital

readjustment decade ahead should be geared toward the following:

1. Maintaining consumer purchasing power, even at minimal levels, by extending unemployment benefits to those in dislocated, resource-intensive industries and proving a comprehensive system of negative income taxes for those for whom jobs cannot be found. Such uncomfortably austere, but basic economic security for all citizens would act as a stabilizer and permit phasing out of old production processes and allow orderly transition without unacceptable individual hardship and the danger of widespread social unrest.

2. Vigorous conservation measures to preserve maximum options in dealing with oil-producer and other likely cartels and our own declining resource base, geared toward the concept of reducing throughput and that a BTU of energy saved is always cheaper than a BTU generated. Specific policies might include :

- (a) Bringing domestic natural resources under greater democratic control, e.g. public lands, publicly-owned oil and gas and coal reserves. Tightening up on leasing practices geared to rapid exploitation or speculation, e.g. separating exploration from leasing and retaining exploration in the hands of government to determine exactly what is being leased and assure the public a fairer return. Bringing all major components of the energy industry under much tighter government surveillance and control, not excluding nationalization.
- (b) Mandatory fuel allocation programmes, less penalizing to colder climatic regions than raising import tariffs.
- (c) "White rationing" of petrol and taxing horsepower and fuel inefficiency. White rationing is, in effect, more of a "market" solution to petrol conservation than raising prices and attempting to offset social inequities by setting up complex

systems of transfer payment to the poor. Not only would raising prices set off another inflationary surge, but the need for compensatory transfers to the poor would engender higher transaction costs than a system of white rationing, while the taxes to be collected and transferred would probably prove an irresistible pork-barrel and unlikely to be transferred to the poor. A white rationing system, based on the issuance of a prescribed number of ration coupons covering the total consumption rate targeted, would be made available to all citizens over the age of 18, rather than merely drivers. This removes a major inequity, since some 20% of U.S. families do not own a car, and at the same time, assures enough ration coupons in circulation to make counterfeiting and black-marketeering marginally unprofitable. Such a scheme has the additional advantage of providing not only a "stick" reducing consumption, but also a "carrot" rewarding non-consumption, by permitting those who do not own vehicles to sell their coupons to those who do at free market prices. This would also do away with the need for rationing boards and much costly administration, because there would be plenty of extra coupons available to those willing to pay for them. Coupons could be issued each month at post offices or through other means, and any citizens who wished to turn them back at an established price could immediately do so, or otherwise sell them to friends, neighbours, or employers. Thus a socially equitable solution to petrol conservation might be possible without adding to inflationary pressures.

(d) Tax and credit allocation policies to reduce energy

consumption and materials throughput, e.g. repealing depletion allowances, tax credits for capital investments, however wasteful or unproductive in net energy terms. Directing and encouraging investments in the needed new industries geared to recycling and based on renewable resources, such as solar, wind and geothermal energy, methane conversion, with selected tax credits for such investments and government research and development funds targeted to meet similar criteria. Repeal taxes favouring use of virgin materials and explore amortization taxes to increase product durability. Require full disclosure to corporate R. and D. investments, and technology assessments to determine likely social and environmental impacts, shifting the burden of proof, in recognition of capital shortages, to the instigator of technological change.

3. Policies recognizing the need to shift low-investment, labour-intensive production are as follows:

(a) Retraining programmes for all workers dislocated from resource-intensive production, including the re-orientation of highly-skilled engineers trained in esoteric, high-technology fields where job opportunities will temporarily shrink, as emphasis in investment is placed on achieving economies of scale in manufacturing less complex solar, thermal and wind energy components and recycling systems, geared to replacing scarce capital with abundant labour.

(b) A federally funded programme of public service employment, similar to that recently vetoed by President Ford, or modelled after the Humphrey-Hawkins Bill, to

finance productive human service jobs, particularly to fill pressing needs in cities for restoring services cut by lay-offs in police, fire, sanitation, hospital and education services, and to restore confidence of urban populations that cities will not be abandoned by federal and state governments, due to pursuit of economic policies based on free market assumptions. Human service jobs must be recognised for their social and humanitarian benefits; for example, they are labour-intensive, capital-conserving, energy-conserving and environmentally benign.

(c) All federal programmes now authorized, which create needed public facilities in labour-intensive, capital-conserving, energy-conserving and environmentally benign ways, should be rapidly funded and initiated, e.g. the some \$6 billion authorised under clean-water legislation for water-treatment facilities, funds provided in the Railroad Reorganization Act for repair of roadbeds, Highway Trust Funds for repair, maintenance and setting up of express bus lanes on all arterial roads. The Council on Environmental Quality¹⁵ has prepared a summary review of all such mandated programmes that can be initiated without further legislation; finally laying to rest the artificial conflict often fomented by special interests between labour and environmentalists. Conversely, all resource and capital-intensive projects, such as new highways, space and other high-technology programmes should be re-assessed in light of capital shortages and competing needs. Mass-transit expenditures represent a grey area, since many projects are overly capital-intensive

white elephants geared to science fiction schemes more suited to the capabilities of high-technology vendors than the needs of riders.

- (d) Tax policies and expenditures to restore neutrality in treatment of capital income and wage income, treating dividends at the same rate as wages.¹⁶ Repeal of across-the-board tax credits for capital investments, however wasteful or socially marginal, and replace by credit allocation to essential industries, and tax incentives to needed new industries geared to declining resource base. Repeal of favoured tax treatment permitting wasteful real-estate speculation, ruining of agricultural land and all accelerated amortization which encourages unnecessary write-offs and capital replacement. Tax credits should instead be enacted to give incentives to hire labour and replace capital; for example, credits to those who are self-employed and employ others, with a cut-off aimed at encouraging small businesses and preventing the programme from subsidizing large company payrolls unduly. Such a programme would help reduce the disastrously high unemployment rates among minorities, teenagers, women and other special and unskilled categories, by making it more feasible for people to hire each other in child-care, yard-care, home repairs and small proprietary retail businesses. If capital is scarce, such a package of policies will raise its marginal cost, relative to labour inputs, thus conserving it for more optimal productive uses.
- (e) Reform of banking institutions to limit bank holding companies and excessive speculation. Repeal of

regulations limiting interest payments to small savers to encourage more decentralized capital formation. Rather than thus forcing small savers to underwrite cheap mortgage funds, specific subsidy of mortgages for home construction may be needed.

- (f) Anticipatory studies on the employment ramifications of all public and private investment over a certain size, such as the Employment Impact Statements, suggested by Jerry Brady in a recent article, "Putting People to Work," in the *Washington Post*.
- (g) More vigorous anti-trust enforcement to prevent corporations with undue market power from exercising it for internal capital investment and to restore market competition under the new tax constraints to prevent development of socially-costly and wasteful goods and services.
- (h) Explore ways of controlling the volume of product advertising on radio and television through the Federal Communications Commission and the Federal Reserve Board; to develop this area as a new means of aggregate demand management. No First Amendment principles would be violated, since total advertising time available is already limited by regulations and the limits of the electromagnetic spectrum. Space and time would still be available to all commercials on a competitive basis, as today, but limiting the total time and ceilings for advertisers as a means of reducing inflationary demand would tend to prevent saturation advertising by powerful corporations to achieve rapid penetration and domination of market share, which in turn, would favour small

businesses which cannot compete with such massive advertising budgets. Disallow corporate advertising expenditures as tax write-offs.

- (i) Policies designed to encourage the wider diffusion of capital ownership, such as the Employee Stock Ownership Trusts recently enacted, based on the ideas of Louis O. Kelso in *Two Factor Theory: The Economics of Reality*. Diffusing capital ownership and encouraging small savers with the same rates as large savers would tend to restore the vitality of capital markets and reduce tendencies to over-invest, as well as reducing the concentration of wealth and mal-distribution of incomes.

Lastly, the *sine qua non* for the successful transition to a sustained-yield economy based on renewable resources will be leadership and programmes of public education to explain the basis for such apparently drastic policy shifts. The current vacillation in economic policies is heightening the atmosphere of fear and creating loss of consumer confidence. An all-out programme is required to illuminate the new contexts and the need for change, and to reassure people that a gentle, managed economic transition can sustain full employment, if we make the tough choices we now must, and are willing to forego our former waste of energy and materials in order to invest in our new productive base. It should even be possible to portray the advantages we will gain in less pollution and environmental disruption, not to mention the psychic relief in store for those who relinquish the destructive, exhausting game of keeping up with the Joneses.¹⁷

Longer-term structural readjustment to a sustained-yield economy and to restore lost flexibility will require policies of decentralization of population and industrial activities. Such moves are now under discussion in Congress, where the House Committee on Public Works last year appointed a

Scientific Advisory Panel to explore how public works investments could direct and distribute growth more rationally to uncrowded, less developed areas of the U.S.¹⁸ Chairman John Blatnik voiced concern over increasing urbanization and the Panel's Report reviews the trend to centralization and cited the potential of performing "carrying capacity" assessments of the environments of many overcrowded regions, so as to set limits on their growth and redirect it to sparsely developed areas.

Finally, it is vital that we counteract the long-accepted notion that economics is a science, which is now proving destructive in that it is preventing Americans from talking to each other and debating the important subject of what is valuable.

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Princeton Center for Alternative Futures Inc: This article is adapted from the paper given at the *Limits to Growth Conference '75* and is reprinted by arrangement with *Technological Forecasting and Social Change* (American Elsevier Publishing Co. Inc: New York) where it appeared in March 1976.

May 29th — June 6th

ROTHERHITHE STREET FESTIVAL

A Festival of PEOPLE'S HABITAT will be held in Rotherhithe Street, Surrey Docks to celebrate alternative ways of living. Surrey Docks is known locally as 'the island' — a peaceful one, away from the sound of traffic yet only 1½ miles from Tower Bridge. 'The Island' is the country in the city, with an urban farm and allotments on part of 600 acres of fallow land. People's Habitat will coincide with the U.N.'s World Conference, *Habitat on Human Settlements*, in Vancouver. It will be a conference for bureaucrats — the same old questions, the same old answers. The usefulness of such a conference is doubtful; in contrast the Rotherhithe Street festival will be for everyone.

Surrey Docks is an example of the destructiveness of our capitalist society; the docks are now unused and half are already filled in, dockers have had to find work elsewhere and the spirit of the place is almost gone. Can it be saved? It can indeed, if the good things of the past and the future can flourish; already old warehouses have been converted to craft workshops and a theatre. Peoples Habitat will bring an alternative life to Rotherhithe Street during the festival and will try to leave more than pleasant memories behind.

There will be practical workshops on the construction of wind generators, solar panels, and other alternative technology equipment; building skills; bicycles; farming (urban and rural); clearing of waste land; spinning; weaving; pottery; glass blowing and many others.

Discussion workshops will take place during the week on all aspects of changing our human settlements including the politics of alternative technology, co-operative housing, community living, growing food on waste land, devolution, co-operatives, use and ownership of land. Films and other audio-visual aids will be shown.

There will be all kinds of music from African to chamber music, buskers and street theatre. A camp site will be available on Lavender Rock.

If you would like to participate, or want more information contact:

Fiona Cantell
Intermediate Technology Publications,
9, King Street,
London WC2E 8HN. Tel: 01-240-2106.

A setback for community land trusts

Both *Community Land Trust Ltd.*, and *Rural Communities Trust* have now been turned down by the Charity Commission in their attempts to register as charities and to acquire land from landowners threatened by the Capital Transfer Tax.

The Charity Commissioners have now stated that communes are ghettos of benefit only to their inhabitants, and have expressed the opinion that the self-sufficiency movement is against the spirit of Queen Elizabeth the First's *charity law*, which was intended to promote the cohesion of the nation.

The main objects of his charity are looking after the needs and amenities of Guiting Power, and the restoration of the dwellings at rents the tenants can afford, with the surplus untaxed income from the estates being used to provide a nursery school, educational help for gifted village children, wildlife conservation etc:

According to the *The Times* of April 2nd 1976, Mr. Cochrane sees little future for land ownership because of the combined effect of taxation and inflation. He says: 'One cannot really own land; one can only be a trustee of it for an infinitesimal part of its existence.'

Rural Communities Trust, C/o Alternative England, 65 Edith Grove, London SW.10.

More Bombs or Fewer Babies?

by Tim Black

Almost ten years ago twelve leading heads of state signed a Declaration on Population. One year later on the 11th December 1967 a further eighteen heads of state added their signatures. The opening paragraph of this Declaration ran as follows: "The peace of the world is of paramount importance to the community of nations, and our governments are devoting their best efforts to improving prospects for peace in this and succeeding generations. But another great problem threatens the world — a problem less visible but no less immediate. That is the problem of unplanned population growth". At the time of the initial signing the world population was 3,346 million and growing by some 56 million yearly. In about March this year the world population reached 4,000 million and is now increasing at between 78-80 million annually. The question is to what extent, in the face of this deteriorating situation, have the world governments diverted their 'best efforts' from 'improving the prospects for peace' to defusing the population bomb.

Nine years after the signing of the Population Declaration 63 developing countries support the provision of family planning services. However, only 33 of these countries cite reduction in population growth as an objective. Fortunately these countries do embrace 75 per cent of the population in developing areas. But to what extent the 1966 Declaration heralded a true commitment to population control is difficult to determine. Official sources indicate that those countries committed to reducing birth rates are still seeking a solution through traditional contraceptive and sterilisation programmes. It is evident, however, that after twenty years of trad-

itional family planning activity such approaches are not going to bring about an accelerated demographic transition and hence reduced population growth. Consequently several schools of thought as to future action are emerging amongst family planning strategists. The hawks are advocating triage, a policy of letting the hopeless countries sink. The hard liners see man's salvation in terms of readily available abortion and anti-natalist fiscal and social policies such as those being adopted by Singapore. Then there are those who take a more ecological point of view and maintain that population control will only succeed when developing countries reconcile their politics to a rural agricultural way of life rather than pursuing the hot-house conditions of a capital and energy intensive urban biased consumer economy. Finally, there are the fatalists who maintain that the situation is now irredeemable. Our numbers, they maintain, already exceed the natural carrying capacity of mother earth since existing agricultural output is only possible so long as we continue to subsidise food production with fossil fuel energy inputs. When this becomes prohibitively expensive there will be a 'natural' solution to over-population, so why bother with birth control?

Analysis of policies and programme trends, however, is one thing and objective measurement of commitment is another. A review of the financial resources being mobilised through official channels is therefore perhaps a more appropriate method of assessing how seriously world governments are tackling this problem. After all governmental budgetary expenditure while by no means an indication of need is, unlike rhetoric, an objective

measure of political priorities. Since the Declaration likens the threat posed by the population problems to the dangers of war there is some justification for comparing governmental spending on what might be termed demographic defence and what they spend on the military.

The first country to allocate funds for demographic defence was India in its first five-year plan (1951-56) with a budget of 65 Lakhs rupees (about \$866,000) for a National Family Planning Programme. The first instance of bilateral foreign assistance was in 1958 when the Swedish began funding a pilot family planning project in Ceylon. In 1960 Pakistan adopted a population policy to be followed by S. Korea in 1961. China, Fiji, and N. Vietnam in 1962. In 1964 Britain with a commitment of £11,000 was the second government to include population activities in foreign aid. Then in 1965 the United States Agency for International Development (USAID) budgeted \$2.1 million, since when it has been the major donor in this field.

By 1971, according to an exhaustive survey undertaken in 1973 by Catherine Howell and George Varkey of the International Planned Parenthood Federation, the developed countries were spending about \$124 million on official population assistance. In addition local Governments put up a further \$100 million. Of the funds flowing from developed countries, governments were providing \$69 million of which 90 per cent came from the American Government alone. Howell and Varkey's estimates of how these funds were allocated are shown in figure 1. They also estimate that of this \$124 million, only about

\$64 million actually reached the developing countries in which 87 per cent of the world's population growth is taking place. And of the money available for 'field activities' the majority went to training, research and 'information, education and communications'. Their disturbing discovery was that only about \$30 million of all the foreign assistance funds actually went towards client services, that is, the delivery of birth control to the front line.

A more recent OECD review suggests that by 1973 the total funds available for population activities through foreign assistance from governments and non-governmental organisations (NGOs) had increased to \$220 million. Of this nearly half was derived from direct government to government aid, just under a third from UN resources and a fifth from NGOs. This is about 2.3 per cent of the estimated \$9-10,000 million of development assistance in 1973 and represented about 0.008 per cent of the developed countries' GNP. In addition a number of sources suggest that developing country governments probably spent a further \$130 million on their own programmes. For instance in 1973 India spent \$75 million (down 31 per cent from the previous year) on family planning, and Mexico budgeted \$25 million. In a world context the biggest domestic spender is again the U.S. whose Department of Health, Education and Welfare spent \$212 million through Federal population activities in fiscal 1974.

This history of increasing, if modest, expenditure on demographic defence is very encouraging. Some might conclude that world governments are beginning a sane realignment of their priorities. After all it is not unreasonable to postulate that increasing population pressures are a demographic threat to the established order. You might, therefore, expect a switching of funds from military to demographic defence. Unfortunately, this does not appear to be the case. If the horrendous expenditure on arms and war are taken as the yardstick to what world politicians are willing to spend in 'defence' of their society it is evident that exponential pop-

ulation growth is still not perceived as a serious threat.

In 1966 when the Declaration was signed world military expenditure was estimated by the Stockholm International Research Institute (SIRI) at \$175,604 million (1970 prices and exchange rates). Since then such expenditure has risen sharply and in 1974 world governments were lavishing an estimated \$207,000 million (1970 \$), or almost 7 per cent of the world's GNP on military business. Last year nearly half of all research expenditure or an estimated \$20,000 million was spent on military R & D and occupied the full-time of some 400,000 scientists and engineers.

**Most Governments
are spending no
more than
0.03 to 0.07 per cent
of their total GNP
budgets on
birth control...**

This compares to the estimated \$4,000 million currently being spent on all forms of medical research. Unfortunately, it is not only the developed countries which are promoting and perpetuating war or euphemistically "pursuing peace". Of the 20 countries which spent over \$1,000 million on defence in 1972 six were from the Third World. In some 93 developing countries about \$10 is currently spent on the military for every man, woman and child.

Supreme optimists like to point out that world military expenditure has been plateaued at around the \$200 billion level since 1968. Although this is encouraging it is disturbing to note that Third World military spending has if anything been accelerating as figure 2 shows.

In Africa alone military spending has risen by nearly 120 per cent since 1966 to over \$2 billion annually. Unfortunately although population pressures are becoming ever more acute there is evidence to suggest that official funds for demographic defence are also plateauing in both absolute and relative terms, i.e. relative to other forms of official expenditure such as health. As Table 1 shows the growth of funds available for population assistance has never been spectacular and actually slowed between 1972 and 1973 to an increase of only 11 per cent, which in these days of two figure inflation is no growth at all.

Because of the preponderance of American dollars in this field, US government spending is the barometer of population assistance cash flows and possibly even local government spending on family planning in general. USAID support for population activities was \$95.6 million in fiscal 1971, \$123.3 million in 1972 and \$125 million in 1973. But in fiscal 1974 spending declined to \$112.5 million. Some \$145 million was voted for fiscal 1975 as part of an overall \$2,690 million US foreign assistance programme.

Fortunately, some smaller donors such as Sweden, which upped spending for this purpose 60 per cent in 1974/75 to \$29 million, are still increasing their commitments. But spending on population activities by the British, Germans and Japanese governments is barely keeping pace with inflation and is in any case no more than a token 0.3-0.6 per cent of their total foreign assistance budgets (6 per cent of Sweden's 1974/5 foreign aid budget went to population assistance). Locally some developing countries have nominally increased spending in this field. India, for example, has allocated \$688 million for family planning over the next five years which is an average of \$137.6 per year and a substantial increase over the depressed 1971-73 budget levels.

In relative terms the signs are that local governments are not increasing the amount of funds available for family planning purposes in relation to either their

total budgets or even health expenditure. A review of governmental spending in 23 countries for the five years up to 1973 by Dorothy Nortman of the Population Council indicates that in 1972 only two governments allocated more than one percent of their budgets to family planning (India 3.7 per cent and Mauritius 1.1 per cent. Most Governments supporting National Family Planning Programmes are spending no more than 0.03 to 0.07 per cent of their total GNP budgets on birth control which compares to the 2-11 per cent assigned for health care or death control. And retrospective evidence seems to suggest that few governments are willing to increase their birth control budget beyond such levels. This contrasts to the enormous portion of budgets spent on preparing for war. India, for example, appropriated 19 per cent of its total 1972-73 budget for defence and Thailand 18 per cent, figures which are not atypical of many developing countries.

Of course, the official government spending on population control is by no means the total expenditure

in this field. No analysis embraces China, the one country which probably has the most effective and some maintain the only successful programme if a reduction in population growth is the criterion applied. Nor for that matter does it take into account what individuals pay in the commercial market place to control their fertility, such as the estimated 20 million regular Pill users who buy their supplies or the millions of women who pay for abortions. One attempt to estimate such personal spending came up with a figure of \$1,700 million for 1971. Nevertheless this review of official expenditure, however incomplete, does give some indication of how world governments perceive their defence priorities. And the indications are that in spite of the apparent gravity of the population situation world leaders clearly prefer to lavish funds on military arsenals than invest in cutting birth rates. One can only hope that they do not decide to rationalise their expenditure by mobilising the enormous destructive capacity at their disposal to solve the world's population problem.

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The Taboo Resource

The Use of Human Excreta in Chinese Agriculture

by Michael G. McGarry



The Good Daughter-in-law
by Hsieh Chang-yi

“Early in the morning, the magpies cry,
The newly-wed daughter-in-law is carrying excreta on a pole
Liquid from the excreta stains her new trousers
The hot sweat soaks into her embroidered jacket
The commune members praise her and mother is pleased
All tell her she has got a good daughter-in-law.”

Folk-song translated by J. Gittings

(The Author wishes to acknowledge with thanks the help given him by Genevieve Dean in collecting information on the Chinese background.)

Throughout their history, frugality has had to be second nature to the Chinese. Whereas the industrialized Western nations regard certain wastes as being offensive, the Chinese in response to the need for material resources have come to value and put such by-products as excreta to good use. In the West, the transport of faecal matter by water through underground pipes gained widespread popularity during the industrial revolution; this mode of waste collection has remained essentially unchanged to this day. Coming in the Victorian era when “cleanliness was next to Godliness” the concept of flushing away one’s wastes, was an attractive one indeed. Sewers were advocated as the solution to the human waste problem in the cities. The wastes had to go somewhere, most often they were discharged and effectively treated by the river. Inevitably with the growth of the city and increased volume and complexity of wastewater, the self-purification capacity of the river was soon surpassed. Treatment before discharge became an expensive necessity.

Meanwhile in China, the technological era had not arrived, human wastes were looked upon as a natural resource of nutrients for plants. Instead of the growing cities being regarded as an undesirable source of river pollutants they were viewed as a valuable source of fertilizers, where the farmer could purchase excreta from the housewife at relatively little cost. The two approaches to essentially the same problem exemplify the basic differences between the two societies. To Westerners, human excreta are useless, undesirable waste products to be gotten rid of as quickly and inoffensively as possible. To the Chinese, night-soil is a desirable resource. With economic and population growth, the exhaustibility of wastes to the environment, yet an end to indiscriminate discharge of wastes to the environment yet alternative approaches which are socially acceptable in Western eyes are expensive. In contrast, the Chinese continue to utilize excreta for agricultural development and by doing so provide a positive monetary incentive for pollution control. Admittedly, prior to the fifty’s, use of excreta as fertilizer aided the

spread of disease in China. However, more recently and as a result of the campaign against schistosomiasis methods of treating night-soil prior to its application have been developed and are in widespread use.

Unfortunately, the example set by China has not been followed by many countries other than certain ones in Southeast and East Asia. Often through colonization, overseas education and other less direct means, most developing countries have taken up European mores and practices, frequently to the disadvantage of their lower income populations which cannot afford waterborne sewerage and to their national economies which are in dire need of inexpensive fertilizers.

Excreta Disposal and Public Health

Unfortunately, it is impossible to quantify the greater benefits accrued through the hygienic disposal of human wastes — those related to improvements in public health through reductions in endemic levels of enteric disease. To the people of low literacy rates, the concept of improving health through the use of a latrine is as abstract as the idea of invisible microorganisms causing disease. Where pit latrines are supplied, they frequently deteriorate to an unhygienic and aesthetically unpleasant condition. Can the individual be blamed who in face of being cooped up in an odorous and soiled out-house chooses to return to his pleasant communion with nature in privacy by the wooded river bank? Through the centuries the Chinese have, however, exploited the economic value of excreta as a motivational force which supports health education in convincing the people of real benefits to be gained by proper defecation habit. In preference to elucidating on alternative technologies used for excreta collection this paper attempts to take a broader view by assessing the importance of excreta to national development and by implication, it considers the opportunity costs currently being incurred by other developing countries which refrain from the use of human wastes.

At the time of the Communist revolution, China suffered very low

levels of public health. The rural population of nearly 400 million was poorly distributed over the more fertile areas which were intensively farmed. Surveys of widely scattered populations indicated that between 40 and 90% of those examined were harbouring the ascarid worm (Worth, 1963). Other "faecal route" diseases of importance were typhoid, other salmonellosis, shigellosis, cholera, paragonimiasis, clonorchiasis, hookworm, trichomonas, enterobiasis, entamoebiasis, and last but certainly not least, schistosomiasis (Feng *et al*, 1960).

Since that time China has succeeded in developing the most effective rural medical care and public health education schemes in the developing world. Priority has been given to disease prevention over the curative approach. The well-known barefoot doctors are neither doctors nor are they barefoot. They are health workers at the lowest level of the medical organisation and are the backbone of the public health programme in the rural areas. Being indigenous to the area and population in which he works the barefoot doctor is effective in reaching all levels of the rural masses. His efficacy is borne out by the fact that smallpox, leprosy, plague, cholera and kala-azar are no longer of public health significance and schistosomiasis, malaria and tuberculosis which once ravaged the Chinese people are now said to be under control (Smith 1974). The barefoot doctor's principal task is in establishing disease prevention programmes, using the time set aside in each worker's day for political thought to provide advice on contraception, hygiene and sanitation. The Chinese success in raising public health levels lies not so much in its unique political system but in its government's sincere and determined effort to support its rural peoples; also in its policy to break down the cultural, educational and economic gap between the rural and urban sectors. The installation of public latrines is not simply a technical exercise paternally executed by central government. It is a social process of animation through education where the peasant is first and foremost brought to understand

why change is necessary and then is brought into that change process controlling it from its inception.

Recovery of Plant Nutrients from Excreta

As the Chinese soil has been intensively cultivated for centuries, the nutrients taken from it by plant growth must be replenished. Human and animal excreta, compost, river and pond bottom muds and even bird feathers were used to fertilize the soil at least as long ago as the thirteenth and fourteenth centuries during the Yuan dynasty (Perkins, 1969). In a survey conducted by the University of Nanking in 1929-33, the farmers were using an average of over seven tons/ha-year of animal manure and night-soil combined (Buck, 1964). These included animal and human excreta, oil-seed and soyabean cakes, green (grasses) manures, pond and river muds, bones and bone products, ashes, and waterweeds.

In the rural areas, night-soil is still at a premium. Daily collection is made from the cities and rural villages for treatment before application to the soil and fish ponds. In Canton, there is no conventional sewage treatment plant, the human wastes are efficiently collected and dispatched to the rural areas. The familiar latrine out-house is a common sight in the open fields in rural China, indeed even before 1949 the farmer constructed latrines at the road-side should passers-by wish to contribute to his welfare.

Night-soil application in agriculture does have its drawbacks by assisting the spread of intestinal disease, the most important being schistosomiasis and the soil transmitted helminthes such as hookworm and roundworm ascariasis. This has given rise to such statements as:

"China can ill-afford to use night-soil unless it can be made sanitary. From an economic viewpoint, it would probably be cheaper to throw away night-soil than to incur the losses concurrent with ill-health which result from its use." (Buck, 1964) Fortunately China has not paid heed to such advice, instead it developed simple acceptable methods of treatment which effectively kill the

schistosome and hookworm ova (Worth, 1963 and Cheng, 1971).

Prior to 1949 human faeces were spread on the fields as fertilizers without prior treatment and fed to ponds used for fish culture. Hookworm was ubiquitous (except in the dry northwest); and a 1955 survey of schistosomiasis revealed that over 10 million people were infected (Cheng, 1971).

As part of the campaign against diseases, practical modifications were made to existing practices. Night-soil was a valuable source of crop nutrients: its application to the fields could not be banned on the basis of being a public health hazard lest ill-health be replaced by famine. Studies had indicated that anaerobic (no-air) digestion of night-soil and manure over a 2-4 week period would destroy hookworm and schistosome ova. Through health education campaigns which stressed the infective nature and life cycle of the enteric parasites, the farmer was exhorted to store his fertilizer in closed containers over a four week period prior to its application to the soil. Success of the programme is being achieved not so much by the provision of properly designed storage chambers, but rather in having the farmer understand and respect what he was being asked to do. The schistosomiasis campaign met with many obstacles, not the least of which were sheer disbelief in "microbe theory" and local superstition about the disease. A variety of media was used to inform the peasants of the diseases that were infecting them, the most important being group meetings and personal contact between the bare-foot doctors and the people.

An anomaly remains with respect to the ascariasis egg which, being very difficult to destroy, is not inactivated by the usual 2 to 4 weeks storage beside the field. No empirical data has come to light either proving that current practices of night-soil use have continued to spread ascariasis or if other factors such as improved health education, hygiene or curative measures have reduced ascariasis incidence. Two facts are clear however, (i) human faeces continue to be applied to the soil and (ii) enteric disease incidence rates continue to decline in China.

Natural Fertilizers and Agrarian Reform since 1949

In 1949, the Communists took over a disrupted economy, in which both industry and agriculture had been ravaged by war and civil strife. By 1951, emphasis was on industrial expansion; agriculture underwent major social and political reformation but little was accomplished early in the fifties to improve technology on the farm. Agriculture and industry are inextricably linked, the former providing essential raw materials and food supply for labour and the latter providing farm implements and machinery. By the mid-1950's the government came to recognize the urgent need to raise agricultural production. Unfortunately right up to the 1960's, demands were made of the agricultural sector without its being technically modernized, reliance being on traditional inputs and not on modern machinery and chemical fertilizer.

Chao (1970) has estimated the nutrient values and absorption rates of the various natural fertilizers commonly employed. These are listed in Table 1.

pushed up to 90% (297,800,000 tons) in 1966, a truly remarkable undertaking of gigantic proportion. (Table 2).

By 1953, the task of redistributing land was complete and the first five year plan launched. Economies of scale were sought through collectivization and consolidation of land holdings. Land was reclaimed, and multi-cropping schedules were introduced to many areas. Total inputs to the agricultural sector increased at about 5% per year (Eckstein *et al*, 1968). During 1954-5 there was a rapid acceleration of centralization and ambitious goals were set. Eager to raise agricultural productivity, an "Accumulate Fertilizer" campaign was initiated and spread throughout China during the winter of 1955-6. Chao reports that 70 million rural youths participated in gathering 400 million tons of natural fertilizers.

Apart from working on the communal land each farmer tended his own private plot, allowing him to grow vegetables and raise pigs as well as satisfying his desire to indulge in private enterprise. Over-zealous

Table I (Chao 1970)
Nutrient Content and Absorption Rates of Various Chinese Fertilizers

	Nutrient Content%				Absorption Rate %
	N	P ₂ O ₅	K ₂ O	Total	
Night-soil	0.6	0.2	0.3	1.1	45
Pig Manure	0.5	0.4	0.5	1.4	20
Draft Animal Manure	0.6	0.3	0.8	1.7	20
Compost plant residues	0.3	0.2	0.6	1.1	30
Oilseed cakes	7.0	1.3	2.1	10.4	65
Green Manure	0.4	0.1	0.4	0.9	65
River, pond mud and others	—	—	—	0.2	10

Night-soil is far more effective in returning available nutrients to plant and soil and is therefore a more valuable commodity. Chao (1970) has also drawn up estimates of quantities of fertilizers used between 1952 and 1966. Over this period about one-third of the nutrients applied for plant growth was provided through human night-soil. Chao estimates that during 1952, 70% of human excreta was collected and used as fertilizer, this was

application of rules by rural cadres quickly gave rise to difficulties between private and communal activities. One commodity was central to the controversy and was of a peculiarly private nature, this was night-soil which was sometimes expropriated at abnormally low prices, payable at a future date by the collective organization. There was a tendency for farmers to withhold the night-soil they produced for use on their own private plots. At the

With self-reliance being central to the Chinese it was only natural that wastes re-use was central to development policy.

“Energetic steps must be taken to increase output of fertilizers and chemical fertilizers.

Agricultural Producers’ Cooperatives must employ all means to solve their own fertilizer needs. Special attention should be paid to hog-raising — in some localities sheep-breeding. With the exception of certain nationality areas which do not raise hogs for religious reasons, the number of hogs raised in the countryside by 1962 should reach the average of from 1.5 to 2 per household and from 2.5 to 3 by 1967. Pigs should be kept in pigsties, sheep in sheep-folds, cattle and horses in barns. Measures suitable to local conditions should be adopted actively to develop green manure crops of various types and to utilize fully human manure from the cities and the countryside, garbage which may be used for fertilizers, and other fertilizers.” Extract from the Central Committee of the Chinese Communist Party’s Revised Draft Programme on Agricultural Development in the Nation, 1956-1967, October 25th, 1957 (Chao, 1960)”

The ability to propagate concepts and ideas down to the farmer’s level is the underlying reason why China has been able to achieve a net gain from human excreta refuse. The public health programme stressed a preventative approach to disease. This is in contrast to most developing countries where investments have concentrated in the wealthy urban areas and where doctors, being trained as elite professionals, remain in the urban centres to the exclusion of the country’s low-income population in the rural areas. Chinese health education is imparted through mass mobilization which raises the people’s level of consciousness to good health and provides motivation for environmental sanitation measures to be

Table 2. Application of Natural Fertilizers in China (after Chao, 1970)

	1952	1955	1959	1963	1966
Night-soil (gross weight)*	176	218	246	281	299
Night-soil nutrients, %**	32	31	28	38	35
Pig Manure	125	144	324	194	245
Pig manure nutrients	13	10	21	16	18
Large animal manure	268	358	384	188	257
Large animal manure nutrients	33	36	30	18	21
Compost plant residues	71	81	79	39	53
Compost plant nutrients	8	8	6	4	4
Oilseed cakes	5	5	5	5	5
Oilseed cakes nutrients	11	9	8	10	8
Green manure	11	25	54	78	102
Green manure nutrients	2	5	6	13	19
Muds	73	73	73	73	73
Muds nutrients	1	1	1	1	1
Total nutrients, million tons	2.8	3.4	4.4	3.7	4.2

* gross wet weight in millions of metric tons

** % total nutrients applied as fertilizer available to plant

peak of the fertilizer campaign exhortation was so great as to give rise to the extreme example of houses being torn down to capture the fertilizer value of the earthen walls (Chao, 1970). Resentment was engendered among certain sections of the workers which was aggravated by poorly designed incentive schemes. By the end of 1958, the government had come to realize just how serious the situation in the agricultural sector was and regulations were relaxed to allow for some decentralization of authority, reduced collectivity, private incentives and the individual ownership of small numbers of domestic animals.

Human excreta was at a premium during the fertilizer drive. Undoubtedly more fertilizer was produced and collected, but the main sources of natural fertilizers were already being utilized and marginal increases were low in nutrient quality. Chao estimates an increase of from 940 to 1,165 million tons

between 1955 and 1959: an increase of 24%. A proportional increase in nutrients reaching the fields was not achieved. By 1961, the collection of natural fertilizer had fallen back to pre-1953 levels, only 745 million tons were applied.

The period 1959-1962 saw a return of authority to the lower levels of the commune, increased private ownership of vegetable plots, fruit trees, pigs and poultry, a general decentralization of authority and a rise in natural fertilizer application for the dual purpose of meat and fertilizer production. Prior to 1961 chemical fertilizers were practically unknown in rural China. Recognizing the practical limits to natural fertilizers, China set about the rapid extension of industrial fertilizer production. The push to increase production and use of chemical fertilizer continues today but natural fertilizers remain as essential inputs and by far the most important source of nutrients.

taken. Mass mobilization campaigns use a variety of media including films, demonstrations and commune brigade meetings led by Party cadres. Impetus is provided by propaganda, exhortation and competition; economic incentives tend not to be used (Stavis, 1966). Campaigns can be very disruptive of the normal bureaucratic system when carried to extremes but when used properly are more cost effective than conventional Western approaches to health education using formal education. A critical element to the success of such campaigns is their being supported by rural health programmes providing continuity through doctors, rural midwives and the village health workers who constantly disseminate information whilst going about their daily calls and routine duties.

To the reader, the title of this paper might have appeared as being somewhat fatuous. The question posed is often ignored but is nonetheless relevant to development policy. In China's case, human excreta was essential to its rapid development. One can imagine the retardation that would have occurred if, after 1930 the fertilizer resources available to Chinese agriculture had been reduced by one-third: that portion contributed by human night-soil. Food shortages such as occurred during 1960-62 would have become widespread famines. There are many countries of south and southeast Asia which have

land use and fertilizer problems similar to those of China but are still not realizing the full potential of night-soil in agriculture. Many of these have cultural blocks and exhibit no interest in re-use of human wastes. Their political superstructure, administrative bureaucracies and public information systems are unlike China's and less effective in reaching the farmer. The Chinese example provides a real challenge to other developing countries to capture the joint benefits of increased fertilizer resources and incentives towards improvement in rural hygiene and public health levels.

Two expert committees convened by the World Health Organization considered the subject of excreta re-use, both approached it in a not very positive fashion. Being singularly public health orientated, they comment:

"Night-soil is sometimes used as a fertilizer, in which case it presents great hazards by promoting the transmission of food-borne enteric diseases and hookworm" (WHO, 1974).

"Unless certain precautions are taken, this practice can be dangerous" (WHO, 1964).

China has demonstrated the importance of human fertilizers to agricultural development. It has also provided practical approaches and technologies by which health hazards may be minimized and has incorporated these into a successful

public health programme. A gap remains in applying the Chinese model to other developing countries, one that will be filled only by more thorough investigation of Chinese experience. Obviously the variations in political systems, cultures and agricultural technology, land-use and organization will necessitate major adaptation of the Chinese model before it can be applied in other developing countries. The principle has however, been proven in practice, the benefits are obvious, but the challenge has not been met.

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Notebook

A Timely Drought

1976 seems likely to be remembered in England as the Year of the Drought. A very hot summer followed by a dry winter has brought water supplies to an exceptionally low level. Unless we get several months of abnormally heavy rainfall soon, we are in for a severe shortage later in the year. The crisis comes at a time when the Government is discussing proposals for a new National Water Authority. A thirsty summer will be all to the good if it leads to the establishment of realistic and responsible long-term plans for the nation's water supply.

But will it? Britain's record so far is a depressing one. We are all appalling spendthrifts where water is concerned, apparently assuming that we have a right to as much of the stuff as we can possibly find a use for. Britain is exceptionally rich in this most precious of all natural resources — after all, a season which we regard as a drought would be hailed in many less favoured countries as a miraculous and life-giving bounty. The impending "drought" is man-made in two senses. Firstly, human activity is to blame for a great decrease in available water over most of Britain: within historical times deforestation, artificial drainage systems, over-extraction of groundwater and several other factors have reduced the rainfall and enormously lowered the water-table. But secondly, if *any* limitation of our demand for water constitutes a drought, we are likely to be in for pretty continuous drought from now on.

The official view is that we need to double our water resources by the end of the century. Presumably the new Authority will be given the job of achieving this — it may even succeed, at the cost of appalling environmental damage. But sooner or later the unpleasant truth will surely dawn on the Government that finite supplies cannot forever satisfy an exponential demand. With water, as with every other natural resource, we must learn in the end to cut our coat according to our cloth. Why not start now? The National Water Authority should be given the job of fixing a realistic *sustainable* figure for Britain's water use (which might well turn out to be less than our present consumption), and then devising ways of keeping demand down to that figure. Any other approach can only be a short-term palliative.

Population Crisis — Latest

A short time ago, many an environmentalist's breakfast table must have been brightened by the news

that, for the first time since official records began, the population of England and Wales had actually fallen slightly. This was partly thanks to an excess of emigration over immigration: for the birth-rate for 1975 was still a little above replacement level (22,000 more births than deaths). The drop in the birth-rate has been fairly steady over the last ten or twelve years, and it is expected that this year births will actually number less than deaths. It is a little early yet to start throwing our hats in the air and dancing in the streets: long-term prediction of population trends on the basis of a few years' figures is a notoriously tricky business (as an accurate science it falls into roughly the same category as palmistry, astrology and the Roman method of foretelling the future by observing the meal-time behaviour of the sacred chickens). But the fact that the trend has been consistent, and is apparently accelerating, does give grounds for cautious optimism.

But wherever there's a silver lining, as the proverb has it, somebody is sure to start looking for the cloud to go with it. Even in this grossly overcrowded island, which experienced a population explosion of Third World proportions in the 18th and 19th centuries, and is still suffering from the consequences, people can be found to stand up and scream national suicide at any sign of a minute alleviation of the problem. First in the field comes Professor Scarisbrick of Warwick University. For a professional historian, the Professor seems to have a remarkably blinkered attitude to social questions. "We are facing a national emergency — more severe and more fundamental than inflation or any of our current economic problems." *National emergency* — because for the first time since the Black Death the population of England is *not rising*?

Scarisbrick's case, in so far as he may be said to have one, seems to rest on the fact that present trends will lead to a "geriatric boom" in the 2010s and 2020s, when "a very large number of non-productive elderly people will have to be supported by a very small number of young and middle-aged people." But, even leaving aside the obvious point that we may have plenty of worse problems than that to worry about long before 2010, does he really think we shall be less capable of coping with this imbalance than countries like India, which are right now having to support a very large number of non-productive *children*? In many Third World countries, the proportion of the population under the age of 15 approaches 50%: and their crisis is going to get worse, as those children grow up and start having families of their own, whereas a geriatric boom, by its very nature, is bound to cure itself in a fairly short time.

The real bee in Scarisbrick's bonnet, as you may have guessed, is abortion. He is chairman of Life, an organization working for the repeal of the 1967 Abortion Act. But he does no good for his cause by trying to confuse two quite distinct issues. The pros and cons of abortion should be discussed on their own merits, as should the whole question of optimum population levels. At present abortion is only one, and not the most important, of the methods by which the birth-rate is being reduced. No one, presumably, regards abortion as desirable, or anything better than a lesser evil: but to attack it by raising the irrelevant bogey of national suicide is morally irresponsible and intellectually indefensible.

Tea Time in Uzbekistan

New Scientist recently (1.4.1976) published a photograph of two Uzbeks having a tea-break in the desert. An idyllic, timeless scene — one man had his back up against a recumbent camel, the other had a tame eagle on his wrist. The only detail in the picture which would have puzzled Genghis Khan is an object standing between the two men, which looks rather like a shiny umbrella with a kettle where the handle should be. This device is a portable, collapsible solar heater, capable of boiling water or cooking meals. It was developed by Uzbek scientists for the use of shepherds, hunters and others whose work takes them into the desert for several days at a time. It is a pity that the Soviet Union does not devote more of its technical expertise and industrial resources to projects of this kind, which meet real rather than imaginary human needs.

Good News for Gourmets

Soviet attitudes to wildlife often seem to be based on a naively anthropocentric division of the animal kingdom into "goodies" and "baddies", on the basis of the direct utility or otherwise of each species to man. Thus, predators in the U.S.S.R. tend to be eliminated, at least until their numbers are so reduced that the few remaining specimens can safely be preserved for scientific reasons. (It must be admitted that in this respect the Russians are no worse than anyone else.) The most spectacular successes of wildlife conservation in the Soviet Union have occurred with species which lend themselves to large-scale economic exploitation — the Saiga antelope is the best-known example.

The latest beneficiary of Marxist utilitarianism is the Caspian sturgeon, chief source of that archetypal capitalist luxury, caviar. The Caspian Sea has suffered a great deal since the 1930s: the rivers which feed it have had much of their water diverted for irrigation, causing a 15% reduction in the surface area of the Sea. What water it had left was heavily polluted. The sturgeon were overfished, and new dams cut them off from their up-river breeding grounds. Even allowing for propagandist exaggeration, the remedial action over the last ten years seems to have been a model

of its kind. The catch is now strictly limited; pollution has been greatly reduced by the installation of filtering and recycling systems; twelve sturgeon hatcheries have been set up; and there are plans to divert the flow of a number of northern rivers to restore the waters of the Caspian to their former level. (This last scheme, though, sounds as if it might have alarming ecological side-effects further north.)

As a result of these measures, the sturgeon population is back to the 1930 level of about 200 million. Eventually this total is to be doubled. A longer-term aim is to increase the proportion of mature fish: most specimens caught today have attained less than a fifth of their potential size. A mature sturgeon is extremely large; the most valuable caviar-producing species, *Acipenser gueldenstaedti*, grows to about 12 feet and can weigh over 300 pounds, while the largest species of all, the Beluga, reaches a staggering 28 feet and a weight of well over a ton. One does not need to be a rich gourmet to rejoice that the survival of these magnificent animals now seems assured.

The Public Cost of a Private Indulgence

A man drinks himself silly, gets possession of a potentially murderous weapon, and starts to rampage through the streets with it. He threatens to kill a girl of eight, and a policeman trying to protect her is so badly injured that he loses both his legs. The criminal is brought to trial. Is he punished with the utmost rigour of the law, made an example to strike terror into the hearts of other wrong-doers? Well, not exactly. He is fined £250 and told he must not use that type of weapon for the next three years.

The "weapon" in question was, of course, a motor-car. The case is just one example of the alarming extent to which this machine seems to confer on its users exemption from the normal judgements of law and morality. We hear every day of the tragedy of Northern Ireland; yet the total death-toll there, in the years since the present trouble started, is about the same as that for a typical *two-month* period on the roads of Britain. Or, to make an even more horrifying comparison, the Hiroshima atom bomb killed approximately the same number of people as have died on our roads since 1966.

Perhaps our policy-makers have thought all this out. Perhaps they have really decided that 6,000 deaths and 70,000 serious injuries a year, not to mention the noise, lead poisoning, loss of foreign exchange, reduction of agricultural acreage and all the other public costs of private motoring, are a fair price to pay for the convenience cars represent to their owners. Perhaps. Or is it really just that human beings come to accept without question anything, however wicked or absurd, which has succeeded in insinuating itself gradually and imperceptibly into their way of life?

Big Business

Pollution control is now a booming industry, writes Sheldon Novick in the U.S. Scientists' Institute

for Public Information journal, *Environment*. Campaigns to ban certain pesticides actually employ more people than are occupied in manufacturing those pesticides. The effort to outlaw the growth hormone DES is now more important to the U.S. economy than the hormone itself; and campaigns against nuclear power and artificial sweeteners are becoming big business on an international scale.

This news offers a novel propaganda approach for the pollution producers. "We'd like to stop making this chemical, but think of the massive unemployment that would cause among the people campaigning against it!" How about it, ICI? You can have the idea for £1000.

Nature Reserves Alone Are Not Enough

Despite the efforts of bodies like the Nature Conservancy and the county naturalists' trusts, wildlife conservation in this country depends largely on our farmers. (In quantitative terms, nature reserves cover less than 1% of Britain, farmland more than 80%.) So much has been said in recent years about factory and prairie farming that it is easy to depict the typical farmer as a ruthless businessman interested only in profits. Fortunately, such a picture is false. A recent Ministry of Agriculture survey reveals (what anyone with the smallest personal knowledge of the farming community could have predicted) that farmers are in general very sympathetic to wildlife, and eager to do what they can to encourage it.

The survey, *Wildlife Conservation in Semi-Natural Habitats on Farms*, is based on detailed interviews with a representative sample of about 300 farmers. Among other good news, it suggests that the hedgerow-grubbing spree is coming to an end: only 2% of the farmers had plans to remove hedges in the next ten years, and a rather larger number were intending to plant new ones, or improve existing ones for the benefit of wildlife. Most impressive of all, about one-third of those interviewed said that they would welcome specialist advice on conservation.

Modern farming is not inevitably antipathetic to wildlife: the mammals and birds which are in balance seriously harmful to agriculture can be counted on the fingers of two hands. (Rabbit, grey squirrel and rat, by far the worst among the mammals, are all alien introductions, not natives. There is a moral to be drawn here.) Even among invertebrates, contrary to popular belief, the farmer will find far more friends than foes. There seems to be a need for educative material on wildlife and conservation, specifically aimed at farmers. Almost every farm has odd corners "not worth bothering with" — copses, old sunken lanes, steep scrubby slopes, disused pits and so on. Their owners must be encouraged to stop regarding such areas as "wasted", and instead to take pride in them and, if possible, actively improve them as private nature reserves. The goodwill of the farming community has been proved: now it is up to all interested organizations to exploit that goodwill to the full.

Nicholas Gould

This Month's Authors

Hazel Henderson was born in England and became a U.S. citizen in 1962. An author, lecturer and civic activist she is a Co-Director of the Princeton Center for Alternative Futures and a member of many Boards of Directors and Advisory Boards of Institutions concerned with the environment and the future. She has contributed articles to a large number of periodicals and anthologies in the United States and has lectured in Australia, Japan, Hong Kong, Singapore, Kenya, Canada and Europe.

Dr. T.R.L. Black is a doctor of medicine specialising in international population control. Regional Director of Population Services International, he has worked as a physician in a number of developing countries and recently spent two years in Kenya implementing an experimental family planning programme.

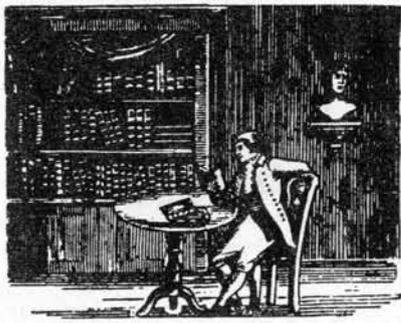
Dr. Michael McGarry is Programme Officer of the Population and Health Sciences Division of the International Development Research Centre, Ottawa, Canada.

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Books

Bringing up Baby

THE CONTINUUM CONCEPT

Jean Liedloff Duckworth.

£3.95 Dec. 75

From the first page of her narrative it is clear that Jean Liedloff is no ordinary woman. Her story began in Florence where as a young woman she joined two Italian explorers on their way to the Amazonas jungle in Venezuela to look for diamonds. They did in fact find diamonds, but once in the jungle, diamonds became more or less a sidetrack for Jean. It was the jungle environment and in particular the way that primitive man — in this instance Yequana Indians — had adapted to it that caught her attention and made her determined to get her ideas down in writing. What had struck her forcibly was how the Yequana brought up their children.

This in fact is what her book is about — child care as it should be practised. And she calls her story *The Continuum Concept*, because according to her observations stone-age Amerindians have never lost what she considers an aeons-old primaeval ability to raise their children so that they become responsible, integrated human beings. We, on the other hand, have severed our links with the continuum and have imposed instead our own selfish rationalisations as to how children should come into the world and from then on how they should be cared for. No wonder, says Jean, that we develop into alienated less contented human beings.

One of her early chapters describes what she terms the 'in-arms'

experience. The Amerindian infant is never left on its own — an isolate in a world it cannot yet comprehend. It is held in someone's arms all the time, whether those of its own mother or of a temporary surrogate, and despite the hurly burly of a primitive woman's existence, always feels itself close to the pleasant warmth and comfort of human flesh and blood. That phase passes to the crawling phase and here lies the paradox; having been so much a part of its mother and her associates for all its worldly life, the crawling infant has by now acquired a natural sense of security and can be left by its mother in safety with other children. By the time it toddles the infant has acquired some independence, but with sufficient built-in caution, and the mother does not panic should it play near fire, pick up sharp knives or go near water. And, remarks Liedloff, accidents are very rare.

She then contrasts our own way of bringing up children. The modern child is born in the sterile world of the hospital and almost without exception is plucked immediately from its mother and put to sleep alone in a cot, and all too rarely does the mother actually breast-feed her child. Then, so that we adults can be 'free' of our children when we want, we train them from an early age to go to sleep by themselves and have their meals at times imposed by us.

We would like to think that our way of bringing up children makes them secure in themselves and independent, but Liedloff contends that we in fact achieve the opposite, and that many of our deep-rooted psychological hang-ups stem from our feeling of isolation as infants. She may well be right, but she does rather weaken her case by giving her own sketchy analysis of how upbringing causes each of the major misfit types — from homosexuals to drug takers. Also for the cynical readers of today, there is perhaps too much eulogy for the Indians, and a blind spot for their defects. Can they really be so perfect in bringing up their children, and do they as adults not suffer some of the psychological problems that afflict us? Nevertheless Jean Liedloff's thesis is enjoyable to read,

if a little repetitive, and on the whole it makes a great deal of common sense. It would be an excellent beginning if all maternity hospitals as well as mothers and mothers-to-be had access to it, and could bring some of its essential credos to life in our own selfish and materialistic world.

Peter Bunyard

The Conservation Game

PLANTS AND ENVIRONMENT — Third Edition by R. F. Daubenmire. John Wiley & Sons Ltd. THE CONSERVATION ALTERNATIVE by R.F. Dasmann. John Wiley & Sons Inc.

Without plants there would be no life, or environmentalists to worry about its degradation or destruction. Plants are the essential energy gate, processing endless sun energy into streams of endless life. Our science and technology have enabled us to ransack the relatively simple physical universe — but at the level of the cell we hit a wall of miasmatic complexity and diversity. Transistors, for example, might seem pretty clever, but photosynthesis does so much more, and plants reproduce themselves! Ecology is therefore a humbling science to the technocrat, and a reassuring one to those who believe the human condition is basically that of a clever animal in a magic, green world. A good ecology textbook should enable us to see this, coolly disentangling the major strands — light, heat, moisture, other living things, soil and so on — explaining and then carefully replacing them in the throbbing change and continuity of life.

Daubenmire's book does this admirably: a lifetime observing and investigating plants shows clearly. And despite the complexity of his subject, his book reads easily in the main. At times he does use compressed, information-saturated language — but it is not jargon, and my advice to anyone put off temporarily would be 'keep reading!'. Daubenmire opens up the wonderland all around us, transforming a walk even at the edge of concrete deserts into a fascinating lesson on plant life. We see how light-loving and shade-tolerant trees battle in

subclimax rounds, with the very success of light-loving pines creating shade conditions that can favour the infiltration of oaks, which photosynthesise better in shade. We see the fantastic importance of CO₂, which is craved by plants, but forms only 0.3 per cent of the air. In hot, moist places it becomes a critical limiting factor, encouraging plants to form specialised leaf shapes and stem structures that can trap rich pockets of the gas, absorb it quickly, and grow on towards that ultimate green fire of the jungle. He also finds time to sketch in the odd, important fact for gardeners and farmers – for example that 5° of slope can be 'worth' 185 km of latitude, which should get you banking up the north end of your vegetable plot immediately!

Daubenmire's book is a celebration of fact and reasonable theory – he does not add 'think pieces' on the damage that thought-free human intervention can wreak, and from which the blurb writers can trumpet how many years we have or haven't got left. It is not that kind of book, sensational examples of which helped the British media to mount a 'media overkill' campaign in the early 1970s from which the environment movement, in Britain, has yet to recover. The sensationalist 'survival' books – which cost a lot of trees – poured out a stream of dire warnings to the extent that Government agencies were able to deflate the issues by issuing calm and rational-seeming edicts to the effect that everything in Britain was OK because we had fast rivers, tall chimney and unbelievably strong faith in the willingness of poor countries to subsidise our wealth.

By the time of the Stockholm conference the flirt with ecology was, in the main, over. Concern for environment has become absorbed by international agencies dealing in other arcane irrelevancies such as nuclear disarmament or population. British politicians were pleased to shelve the environment issue as elitist irrelevance, and return to developing the Concorde and the world's biggest fast reactor. But while they did this, real concern for the environment did continue. R. F. Dasmann's book is a perfect comple-

ment to Daubenmire's – learn what complexity and diversity are all about, then *apply it to society*.

As the senior ecologist at IUCN, he is right there in the front line of the battle to prevent 'progress' from winning the war with nature that far too many people still think is the aim of 'development'. In his excellent and important book, he goes much further than rapidly and lucidly covering the reasons for concern – he develops ground rules, or basic rights, necessary for any society that does wish to come out the other side of the storm of crises. As one of these, he makes the point that so many environmentalists shy away from, and in doing so, gives the politicians their chance to seize its omission as an invalidation of the whole ecology movement. The ground rule is that "all individuals (must be) free to choose a lifestyle that is personally acceptable and does not seriously abridge the rights of others."

Now Britain has a tradition of the gentleman-conservationist, jetting the world to get rare species and loudly decrying the rape of nature. Yet the socioeconomic system that enables him to do this is the *very same one* that would use the last whale for gear oil, and the last snow leopard to wrap some celluloid goddess. His freedom to care for dying nature is paid by squashing many peoples' freedoms, some by a little – as in the West – and some on a no-limit basis, as hunter-gatherers are hounded to genocidal extinction, and tribal people are ethnocidally converted to factory fodder. Dasmann rightly concludes that without freedom "conservation remains a game played by the world's elite".

In a way the population, pollution and species-diversity crises are all parts of some slow-motion avalanche that – for strange reasons – we go on accelerating towards, passing yet more turnings off the road to where it has to land. One reason, of course, is that in the politicians four-year horizon, and Mr. & Mrs. Western Citizen's one-day cycle, these crises do not 'mature'. But energy, in a disconcerting way, has even penetrated the muzak-filled supermarket and fluorescent citadels of the West, because of OPEC.

Despite the way the media irresponsibly 'explained away' the price rises as 'only political', it just occasionally emerged that equally or more important to OPEC was that many members had less than 25 years output in reserve. The non-communist world's uranium supplies are not much healthier, and Britain has the extra problem that 50 per cent of its uranium comes from Namibia!

Dasmann coolly parades these energy facts, which themselves guarantee a kind of hope – if only negatively.

But he goes on to cite the many straws in the wind that, although insubstantial, carry much hope. In Western societies there is social discontinuity – people can and will change radically and overnight. They drop out, they begin to experiment with the countercultures of organic farming, group living, recycling, and revolving their culture through 180°. And in the non-Western societies a healthy interest is developing in a new kind of progress: eco-development. Dasmann's book includes these straws in the wind – and to mix metaphors, we can all move in their direction, which is away from the avalanche. Politicians, planners and human beings, too, should read this book.

Andrew Mackillop

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Letters

Fluoridation And The Cancer Death Rate

Dear Sir,

Artificial fluoridation of the public water supplies and the cancer death rate are related. This is the conclusion reached from a study comparing the ten largest American central cities artificially fluoridated with similar unfluoridated cities by Dr. Dean Burk, Late Head of the Cyto-Chemistry Dept. of the National Cancer Institute and Dr. John Yiamouyiannis Ph.D. Science Director of the National Health Federation, dated 25th March 1975.

The cancer death rate and rate of increase with time were virtually identical until the significant excess in fatal cancers occurred in those cities adding fluoride to their water supplies. In as little as two years a significant difference was evident and it was very marked after 5-years. The 3,600 excess cancer deaths per year per ten million persons would by simple extrapolation amount to 29,000 excess cancer deaths per year in persons subjected to artificial fluoridation in the U.S.A. in 1969, and 33,000 excess cancer deaths per year in 1975.

This will be of especial interest to the three million people in Britain now being compelled by the authorities to drink artificially fluoridated water, as well as to those who are to be subject to fluoridation in the near future.

The National Cancer Institute of America rejected the Report without having read it, which was, indeed, likely to destroy many reputations. They afterwards attempted to discredit the findings of this study by intimating that the two Scientists had neglected important variables, and that the excess deaths

were due to lung cancer and unconnected with the water. The facts are otherwise. This has now been confirmed by an eminent American statistician Dr. W. Edwards Deming.

The interpretation of the figures by the National Cancer Institute is so at variance with the facts as to seem to be deliberately misleading. In any case the National Cancer Institute is now facing a Congressional Investigation.

Meanwhile in the United Kingdom the matter is further obscured by the Royal College of Physicians Report "Fluoride, Teeth and Health" which follows the lead of the National Cancer Institute but conceals the Institute's failure to examine the study with proper care.

Nor is the Royal College of Physicians' interpretation of a similar U.K. Study any more reassuring. They reject positive evidence of a

link between fluoridation and cancer as being non-representative even although significantly higher cancer mortality associated with high levels of fluoride was found.

The question we need to ask is why the facts of this controversy are so consistently misinterpreted. It would seem as if the leading proponents of fluoridation have reached a point of no return and cannot possibly retract at this late stage without complete loss of face and credibility.

Yours faithfully,
Ronald V. Mummery.

Hon. Sec. Scientific Committee for
the Study of Fluoridation Hazards.
Jermyn St. London SW1.

On March 9th F.O.E. launched their "Crops and Shares" Garden Sharing Scheme.

The purpose of this scheme is to put people who want to grow their own food, but have no access to suitable land, in contact with those who find it difficult to cultivate their own gardens, but would be glad to have them used. The desire to grow food is evident from the fact that the allotment waiting list has lengthened from about 27,000 in 1973 to around 57,000 in 1974. There are about 15 million gardens in Britain and no one knows how many of them are under used. What is certain is that there are a large number of disabled or infirm people, and those without the knowledge, inclination and time, who are unable to cultivate their gardens and who might be reached by the scheme.

20 Friends of the Earth groups from such places as Stoke, Horsham, Birmingham, Lambeth and Milton Keynes have already started operating such schemes. The "Crops and Shares" manual will be used both to extend the campaign to the other 140 F.O.E. groups and to involve other community organisations such as tenants associations, old people's clubs, task force, women's institutes, community service volunteers, etc.

The aim of the campaign is to persuade local authorities to take over the running of their own schemes and so follow the recent example of the London Borough of Camden.

Growing food is one of the few defences against rapidly rising food prices. Government figures showed that food prices doubled between 1970 and 1975.

Since then the increase has been even more rapid; one estimate of the weekly bill for basic foods for a family of 4 is that it rose from £8.45 in January 1975 to £11.12½ in January 1976. With last year's food import bill approaching £4 billion pounds there is every incentive for Britain as a nation and for individuals in particular to produce more of their own food.

The Garden Sharing Scheme is the next phase in Friends of the Earth's campaign for greater self sufficiency in food. Their first step was last year's allotments campaign aimed at turning derelict land into allotments.

"Crops and Shares" by Colin Hines a comprehensive guide to organising a garden sharing scheme. 25p from Friends of the Earth, 9 Poland Street, London, W1V 3DG. Tel: 01-434 1684.

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