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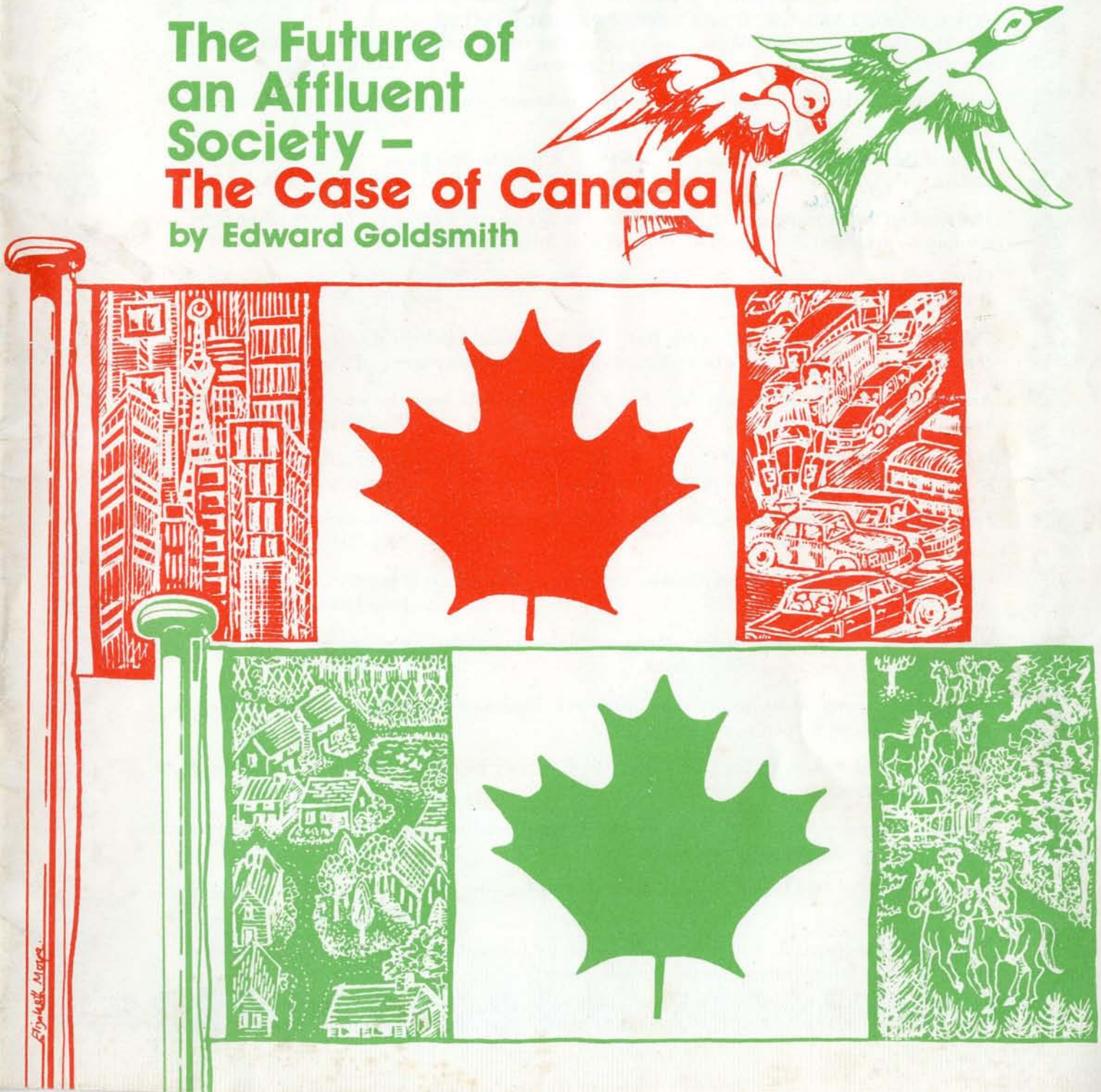
The Future of an Affluent Society – The Case of Canada

by Edward Goldsmith



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ERRATA

The following errors appeared in *Deindustrialising Society* in our May issue (Vol. 7. No 4) for which we apologise to our readers.

Page 132. Para 26. add to the final line 'in its natural environment'.

Page 137. Para 71. for 'exported our *agricultural land*'
read: 'exported our *food problems*'

Page 141. Para 107. for 'low *cost* of the services involved
read: 'low *quality* of the services involved'.

This month's cover: Elizabeth Moya.

Note: While every care is taken with manuscripts submitted for publication, the Editors cannot guarantee to return those not accepted. Articles published in the Ecologist do not necessarily express the views of the Editors.

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GUEST EDITORIAL

DOWN WITH THE NANNIES!

Man's Need for Autonomy

"The hand-out society has had it!" said the youthful organizer of a group of squatters (and a service advising citizens of their rights) to me recently. I think that was a significant verdict, though it may take the hand-out society a long time to die.

I believe the roots of this reaction lie in the deep human desire to manage one's own affairs, to achieve independence. People do not want simply to be given food, shelter, and so on: they wish to achieve the satisfaction of their needs by their own efforts. Psychiatrists call this the need for *autonomy*. A minority may settle for a parasitical existence but they then find themselves permanently dissatisfied; not knowing the reason for their sense of frustration, they may go on asking for more and more.

Arguments are often advanced for centralising planning decisions in the interests of efficiency. In the recent local government reorganisation is was specifically said that this would make the best use of a limited number of skilful staff. But efficiency is not by any means the sole criterion of a satisfactory society. Dostoevsky understood this: "And how do these wiseacres know that men want a normal or a virtuous choice? What has made them conceive that man wants a rationally advantageous choice? What man wants is simply *independent* choice, whatever that independence may cost and wherever it may lead."

This is what devolution is about. This is what the communes are about. This is what much protest and pressure group activity is about. And, as I shall show, this is a major element in vandalism and delinquency.

A word now much in vogue is *elitism*. This refers, I believe, to the same feeling that too many decisions are taken by small groups of so-called 'experts' (who may indeed be better qualified to judge) without much reference to those their decisions will affect. As one woman said in a letter to the press recently: "I don't expect my opinions necessarily to prevail — but I do want to feel that they have at least been taken into consideration." Two reports on the British Civil Service have commented on the tendency of civil servants to feel confident that they know better. They probably do know better — but this is not the point.

The cardinal mistake of the Left, over the past half century, has been to underrate the demand for autonomy — to assume that need-satisfaction was enough in itself (that is, the satisfaction of material needs). Now that such needs are, for a majority of the population, near being met, the demand for autonomy begins to raise its head and will eventually either sweep centralism away or provoke a dictatorship.

The Right, on the other hand, in demanding 'freedom', has shown a vague awareness of the need for autonomy but has failed to think the matter through. On examination, their freedom has tended to mean, too often, freedom to preserve privilege and freedom to engage in cut-throat competition. Neither of these have anything to do with autonomy: and far too many people are totally disillusioned with the malpractices and monopolistic tendencies of what is called, or miscalled, private enterprise. One might add that freedom for individuals and freedom for joint stock companies are two different propositions.

The demand for autonomy does not mean that people wish to battle away in isolated individualism. One does not lose autonomy if one *voluntarily* follows a leader or if one voluntarily works cooperatively with others in a group. Nor does it mean that one must take every decision oneself. People wish to make the decisions they feel competent to make, and are generally delighted to delegate matters where they feel at a loss to competent persons, provided they feel confident that such persons understand their objectives and have their interests at heart. (We see this in fields as diverse as going to the doctor or making an attack in war.)

The function of the state is to maximise autonomy by creating the conditions in which a maximum number of decisions can be peripheralised.

It is useful to look at autonomy in developmental terms. Initially the child is completely dependent. Its development is, or should be, a steady progress towards independence. The child needs to discover "What I do makes a difference." If it fails to do this adequately, it remains in a passive, dependent state — demanding satisfaction but making little effort to achieve it. Moreover, if it fails to change the environment constructively, it may fall back on changing it destructively. Little boys who stamp on the sandcastles of other children lead on to bigger boys who pull up trees, spray paint, or try to prove that they can change matters in even more destructive ways.

At puberty (traditionally) the child passes to adulthood, from dependence to independence, from the influence of the supportive mother to that of the more demanding father. In 'uncivilised' societies this transition is clearly marked, and the individual is left

in no doubt of what is expected. In 'civilised' societies, we delay the assumption of adulthood and obscure the transition, leaving the growing individual in doubt of his manhood or womanhood. Hence the need they feel for acts of daring and defiance, from 'doing the ton' on motor-cycles to crime or political protest. Others seek autonomy in drug experience, eccentric behaviour and clothing, and so on.

One's control of oneself — one's body and one's emotions — can be demonstrated by acts of physical bravery (hence the initiation ceremonies of 'primitive' societies) and risk-taking generally. Modern society, by seeking to protect people from risk, often forces them into creating risk, which they may do in an anti-social or self-destructive fashion.

I can clearly remember how anxious I was to finish my formal education and 'get out into the real world.' I can therefore sympathise with those young people who, having no academic bent, raise hell during their last year at school. To a much larger extent, education needs to become education for autonomy rather than education for a role in the productive process or for academic ends.

Many parents, of course, fail to manage the transition from the mother's to the father's influence for their sons, and sometimes there is no parental influence at all.

The assumption that the state knows best, the assumption that people should be protected from risk, the assumption that people want only material comforts form a complex that I have christened Nannyism. It was Britain which invented the nanny, which perhaps explains why Britain is so deeply committed to Nannyism. "See what the children are doing and tell them to stop" is a widely-encountered attitude. Even British air hostesses — in contrast with the aloof French beauties or the friendly Scandinavian girls — seem to treat their charges as slightly subnormal children who must be fed, potted and comforted; and strapped into their chairs lest they do something tiresome.

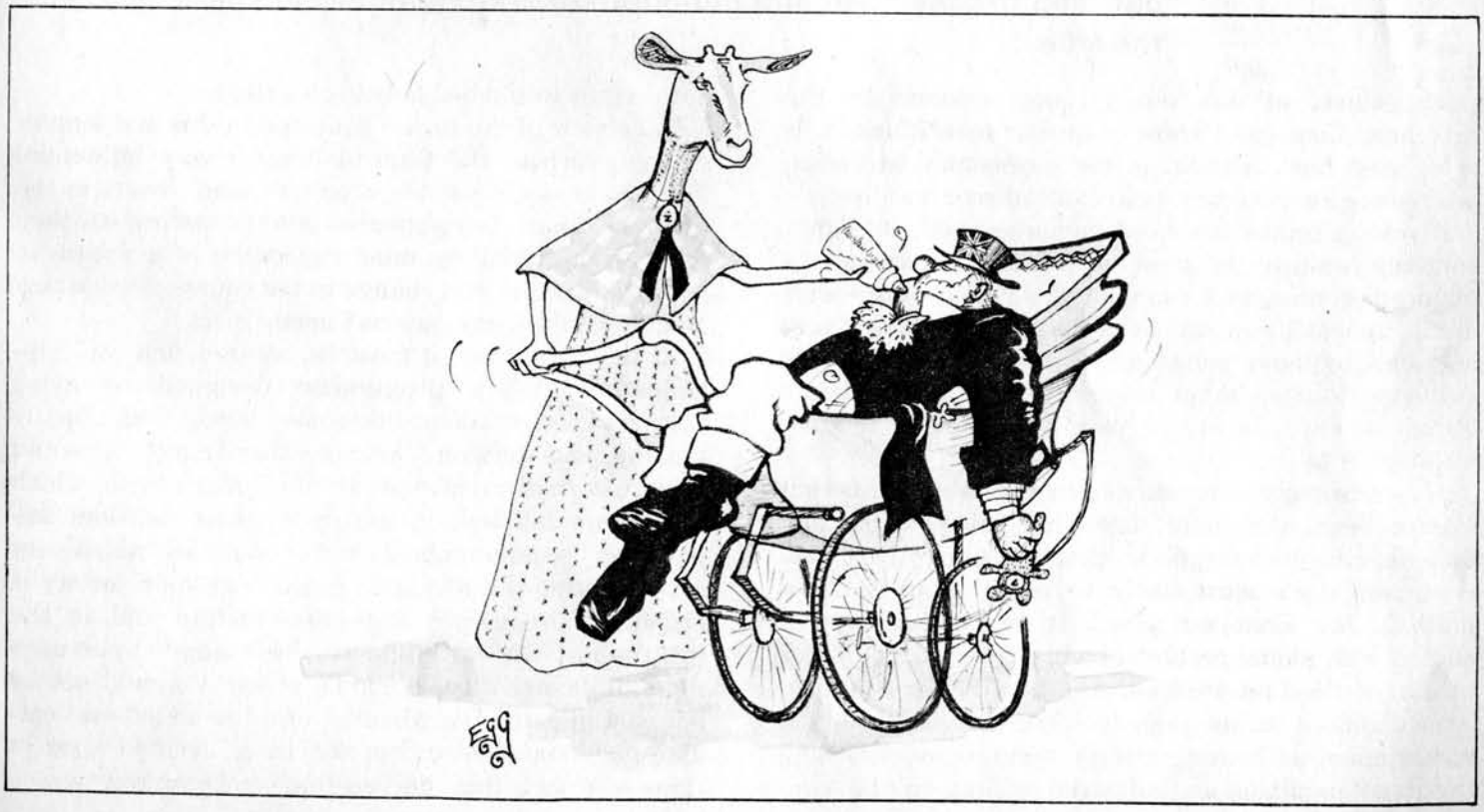
Nannyism permeates not only Parliament, which attempts to govern by promulgating more and more rules of behaviour with ever more penalties for being naughty, but also is rife in local government and the courts. ("If I let you off this time, you must promise not to do it again." is now a standard pattern.) But it is not really a laughing matter. One London Council, to my knowledge, moves into the houses it lets every two years and replaces the wall-to-wall carpeting without asking the tenants whether they want it replaced, what colour they would prefer — much less whether they would rather have polished or painted boards. Such arbitrary practices are the rule rather than the exception.

A major obstacle to the reintroduction of local autonomy is the obsessive desire for consistency. Like the commanding officer who cannot bear to see some boots dubinned and some polished, many bureaucrats are shocked by what they term 'anomalies,' and work with an enthusiasm worthy of a better cause to iron them out. The unions have exploited the administrators' horror of local variation and tend to see inconsistencies as injustices. In reality, since local conditions vary widely, variation of reward is only sensible. It is centralisation and unfication which most often generate injustices. To which the official response is: "We can't cater for minority cases." Exactly so.

Unfortunately, it is possible to condition many people to dependence by minimising their opportunities to 'stand on their own feet.' The Russian system of education is perfectly designed to produce a passive 'heteronomous' population. The State retains, like a dominating parent, its psychological leadership. I would not like to see such a development here.

DOWN WITH THE NANNIES!

Gordon Rattray Taylor



THE FUTU
AFFLUENT
The Case

by Edwar

It is customary to base long-term planning on forecasts of socio-economic changes made by projecting current trends into the future.

It appears, however, that we have now reached a crossroads in the history of human affairs, for globally, well established trends in agriculture, fishing, settlement patterns and basic life-styles are suddenly being reversed along with corresponding changes in basic attitudes to the most general principles governing man's relationship with his physical and social environment.

Is Canada, with its relatively small population, huge land area and apparently limitless resources likely to be affected by such discontinuities? The answer is yes. Canada is not the cornucopia it is supposed to be. Only 6% of its land area is fit for cultivation. Its usable oil reserves are running out, and urbanisation and immigration are beginning to cause problems in the cities.

The object of this report, commissioned by the Advanced Concepts Centre of Environment Canada, is to suggest how Canada, in the forthcoming decades, can reduce its vulnerability to global discontinuities.

If such a report has been commissioned, it is presumably because the possibility of the occurrence of major discontinuities capable of causing large-scale social upheavals in the next decades, is taken very seriously by many people in Environment Canada, as evidenced among other things by this Department's *Perspective on the next decade* published in October 1974.

If I, personally, was asked to do this report, it is that I have been examining, for some years, those biospheric and technospheric processes in which discontinuities are most likely to occur; that I edit a journal, *The Ecologist*, which is predominantly concerned with global problems; and that I was co-author of one of the first studies, *A Blueprint for Survival*, which pointed out the probable occurrence of such discontinuities, while suggesting a programme of change designed to adapt an industrial society to the conditions they would be likely to give rise to.

If the view of the future reflected in this and similar studies, such as the Club of Rome's very influential *The Limits to Growth* — is correct (and events in the five years since they appeared tend to confirm it), then the discontinuities we must expect are of a nature to justify a fundamental change in the course upon which an industrial society such as Canada is set.

At the same time, it must be realised that the implementation of a programme designed to move Canadian society along this course would undoubtedly be slow and difficult. Among other things, it would require a radical change in the values with which people are imbued; in the conventional wisdom imparted in Canadian schools and universities, which very much reflects these values; in the way your society is organised, in its physical infrastructure and in the institutions whose influence increasingly pervades more of its activities. For this reason it should not be adopted in extremis, when all else has failed and catastrophe looms ahead, but should be decided upon in time so that it may be carefully orchestrated over a

RE OF AN T SOCIETY of Canada

Goldsmith

The principle that Canada must move away from a consumer society to a 'Conserver society', first put forward by the Science Council, is now accepted by the majority of those working within Environment Canada and a great deal of work is being done to determine what would be the implications of shifting Canadian society into this new direction.

The author of this report tries to show that this must be regarded as but a first step towards the achievement of an 'Ecological Society' — one in which political and economic activities are considerably reduced in scale, in which local self-sufficiency is encouraged, and mobility is radically reduced. Such a society is, among other things, the one that can make the most rational use of increasingly limited and expensive resources, and that must minimize social and ecological disruption. It is probably also the one that best satisfies real human needs and aspirations.

sufficient period of time.

Unfortunately, these considerations do not appear to have affected the way the Federal Government is looking to the future, nor, *a fortiori*, the nature of the policies it continues to pursue, which can only be regarded as being based on the implicit assumption that *the future will be like the past.* Indeed, the accepted methodology for making predictions remains uncritically to project the trends of the last decades into the future, without taking into account the implications of significant global changes that have already occurred, are now visibly occurring and that can logically be expected to occur in the none too distant future.

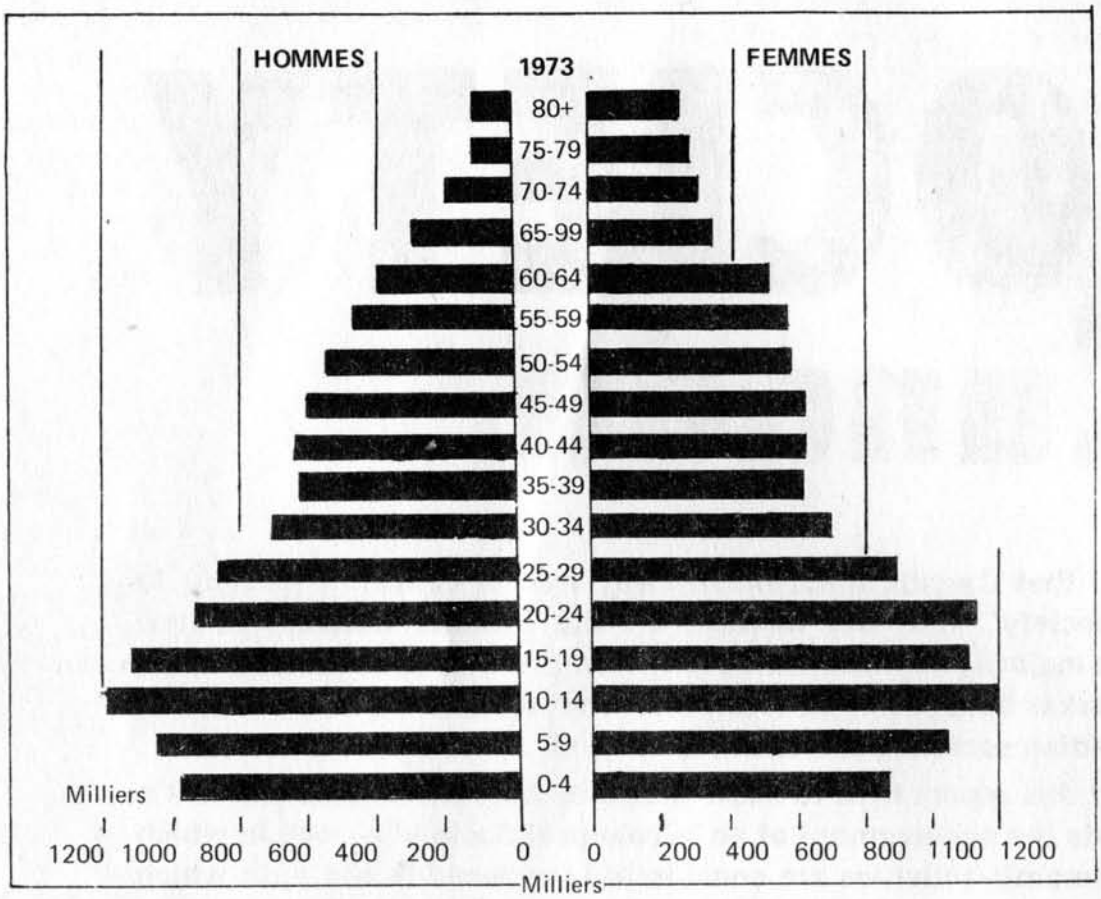
I shall devote the first part of this report to examining the nature of these probable discontinuities.

Population and Food Production

A basic assumption underlying the recent discussions at the Habitat Conference in Vancouver was that, by the end of this century, world population would be somewhere between six and a half and seven billion. This assumes that the present rate of population growth of about 2% will be maintained, or will taper off but very slightly, during this period.

It is indeed the case that the present very appreciable reduction in fertility in many industrial countries, including Canada, will not have significantly affected population levels by the end of the century because of the age-distribution of the population today. (The parents of the children who will be born during this period are to a large extent already here, and, because of previous population growth, they constitute an important segment of the population. See Table 1.) However, the rate of population growth is not determined exclusively by the birth rate, *but also by the death rate*; and this we assume, will continue to fall, as it has done since the introduction of modern sanitation, modern medicine, and more recently with our apparent conquest of major infectious diseases. However, it is in this latter field that we are beginning to witness a major discontinuity. These diseases are staging a comeback. Pathogens are developing resistance to antibiotics, their vectors to pesticides, and logistical prob-

Figure 1
Division of the Canadian Population according to age and sex (estimation)



(Canada 1975)

lems are developing all along the line.

In the industrial world, gonorrhoea has returned with a vengeance, and has been admitted by WHO to be out of control. Pneumonia and tuberculosis are beginning once again to take a heavier toll of human life,[1] and in the tropics dengue and schistosomiasis are spreading to countries where these diseases were previously unknown.

Much more likely to affect population levels, however, is the reappearance of malaria whose 'eradication', according to WHO, has allowed five hundred million people to be alive, who would otherwise have perished by it.

This disease is now beginning to affect populations deprived of the natural controls which previously made the disease endemic, killing off mainly the old and the weak. Already, in the last two years, millions of people have died of it, and one can predict that its ravages will increase still more drastically, as resistance to insecticides builds up still further among malaria-transmitting mosquitoes, as spraying programmes are trimmed for lack of funds, and as human resistance to the disease is still further reduced by even more predictable malnutrition and famine.

This brings us to another major reversal of previous trends. In the 1960's FAO was predicting on the basis of previous trends, that world fishing catches would go on increasing from about 60,000,000 tons[2] at that time to over 100,000,000 tons by the year 2000. In 1971, with the failure of the Peruvian anchovetta catch, they began to fall, and as a result of previous over-fishing and of the growing pollution of coastal waters, have fallen ever since.[3]

In the case of agricultural production, discontinuities have either occurred or are visibly occurring in almost all of its major aspects. The most obvious is that there is very little more land to bring under the plough. Growing populations throughout history have been accommodated by systematically clearing forests for agricultural land. In this way more agricultural land has up till now been found when required, though it may have had to be sought ever further afield — sometimes in other continents.

A point has been reached where this will no longer be possible. The world is indeed finite, and yet another implication of this truism is being brought home to us. The world's forests, which have so far provided the main source of new agricultural land are shrinking

rapidly, and from the ecological point of view, disastrously. What is more, in most cases, their further clearance, especially in South America, Africa and South East Asia, would yield only marginal agricultural land, unlikely to bear crops under modern intensive conditions for very long.[4]

In reality, the amount of agricultural land available to us is *actually decreasing* — as the result of two processes whose seriousness has been generally underrated: I refer to *soil deterioration* and *urbanization*.

Soil deterioration has occurred ever since the first development of large sedentary populations that tried to obtain, for their sustenance, more from the soil than it could provide on a sustainable basis.

North Africa, once the granary of Rome, has, as a result of such agricultural practices been transformed into a desert — a desert that is studded with the remains of once majestic and populous cities.[5]

However, modern intensive agriculture has vastly accelerated this process. According to Borgstrom,[6] in the last seventy years, we have caused more soil deterioration and desertification than during the rest of man's tenancy of this planet.

In the principal agricultural areas of the USA, on which the world increasingly depends for its sustenance, soil deterioration is already very advanced. Surveys have revealed losses of from 34 to 314 tons per hectare in the southern plains.[7] The US National Academy of Sciences has estimated that the US has already lost about one third of its topsoil.[8] Commoner[9] has calculated that the organic content of mid-West soil has declined by about fifty per cent in the last 100 years. By the end of the century, erosion will probably have caused another 25 million acres of arable land to be lost.

In the tropics, the situation is far worse. Modern agriculture is destructive enough in temperate zones. It is considerably more so in the tropics where climatic and hence ecological conditions are quite different — as is eloquently shown by Biswas[10] of Environment Canada. In many countries desertification is now highly advanced, especially in mountain areas which are most vulnerable to erosion. In Africa, the Sahara Desert is said to be advancing across a wide front, in some places at the rate of thirty kilometres a year.[11]

Loss of agricultural land to urbanization is possibly equally serious in industrial countries — especially as development tends to occur in the rich plains and valleys. It is probable that in the UK the best agricultural land, in the valleys of the Thames and the Mersey for instance, has already been built over. In all, something like a hundred thousand acres are lost every year.[12] The Fens, from which most of the country's vegetables are derived, are particularly vulnerable. Dust storms are frequent — and it is estimated that within fifty years this area will cease to be of any agricultural value.[13]

Loss of agricultural land to urbanization is equally serious in the US, and has been estimated at about a million acres a year,[14] which means that if soil deterioration and urbanisation were to continue at the present rate, the US would be deprived of anything up to a tenth of its agricultural land by the end of the century — which, if one takes into account that this country's population will have probably increased to three hundred million people, may be sufficient to deprive it of its exportable food surplus. This, needless to say, would have terrible consequences for a world increasingly composed of food-importing nations which currently derive 75% of their imports from the US and Canada,[15] and whose requirements are expected by then (unrealistically as we shall see) to have doubled.

It would also, needless to say, have disastrous consequences for the US economy, which is becoming increasingly dependent on the foreign exchange earned from the sale of agricultural produce to finance its growing imports of minerals and fuel.

Climate

Another assumption that underlies current policies is that of the continuance of present climatic conditions. Thus, the new hybrid strains of the major cereal crops whose introduction heralded the much vaunted Green Revolution, and whose imposition on Third World farmers is still our only answer to the population/food gap, were designed to provide higher yields with the appropriate inputs and *in present weather conditions*. How they will respond to climatic changes is not, I believe, known. In any case, the possible effects of long-term climatic changes have not been taken into account by those who predict a world population of six and a half to seven billion people by the end of the century.

Unfortunately, in the last few years, we have witnessed new climatic conditions in almost every part of the world. These have been held at least partly responsible for the Soviet food shortage of the last few years, and for the famine in Sahelia, Ethiopia and Maharashtra Province of India.[16]

The climate of the last decades, which we have taken to be quite normal, and which we assumed would continue into the foreseeable future, appears instead to have been abnormal and we now seem to be entering a period during which climatic conditions will be far less favourable to man's welfare and indeed survival.

As Winstanley[17] of Environment Canada writes, "The view held by some climatologists is that human activity has become 'locked in' to the climatic conditions that prevailed during the first half of this century. There is considerable evidence to suggest, however, that these climatic conditions were, in many parts of the world, the most benign for several hundred years. The global cooling and high frequency of anomalous weather events during the last ten to twenty years are seen as indicators of climatic deterioration which, if it continues, will have an adverse effect on human activity, and in particular, on our ability to meet the rapidly increasing demand for food. In short, the mean climate conditions over the so-called climatic 'normal' period 1931-60 cannot be projected with any degree of confidence to forecast climate for the next thirty years.'

The CO_2 content of the atmosphere, for instance, is increasing at 0.2% per annum and could by the end of the century cause an increase in the temperature of the earth by 0.5°.[18]

The increase in the injection of particulate matter into the atmosphere could lead to a decrease in global temperature by as much as 3.5° in the next fifty years[19] which would be enough to trigger off another ice age.[20]

Were the present level of human activity to increase at the present rate for another 250 years, emissions of man-made heat would reach 100% of absorbed solar flux, causing a 60% increase in the Earth's temperature, which would be sufficient to render it totally unsuitable for human habitation.[21]

Heat emissions, however, only have to reach 1% of solar flux for noticeable perturbations to occur, and if economic activity increased at the rate of the last twenty years, this point would be reached within forty years.

It is maintained by some climatologists, notably Reid Bryson, that man-induced pollution is already having noticeable effects on weather. He believes that the drought in Sahelia is at least partly attributable to air pollution over Western Europe. Whether this is so or not,[22] the fact remains that man's activities are now one of the most important influences on world climate, and it is but a question of time for them to lead in some way to largely unpredictable climate modifications, which, among other things, must introduce further instability into world agriculture.

The Price of Inputs

Another factor making for reduced world food output is the radical increase in the price of the inputs into modern intensive agriculture, such as fuel, fertiliser, pesticides and machinery.

Fertiliser prices went up by as much as three times in the US corn belt in 1974. Since the main energy source for producing fertiliser is natural gas, whose price is still very low relative to other energy sources, it is likely that they will rise still further in the immediate future.

Already fertiliser is beyond the reach of all but a small minority of farmers in the Third World. This in itself makes nonsense of the Green Revolution, since the high-yielding hybrid strains on whose cultivation it is based, are only high yielding because they are sensitive to fertiliser applications which, very often, traditional strains are not.

It is now but a question of time before it ceases to be economic to use fertilisers even among farmers in the US and Canada. The reason is simple. It is well documented that the use of artificial fertiliser eventually meets with diminishing returns. In the UK, for instance, the amount of nitrogen fertiliser used has increased by eight times since the last war,[23] with an increase in yields of less than fifty per cent. In the US, between 1951 and 1966, there was 146% increase in the use of nitrates and a 300% increase in that of pesticides for a 34% increase in yields.[24]

Such diminishing returns were tolerable so long as the price of fertiliser was falling, which was the case for decades. It ceases to be tolerable, however, once it starts rising — for then one meets with diminishing returns not only on the inputs, but — what is more serious — *on the capital employed.**

With regard to the use of pesticides, in fact, there is no evidence whatsoever that, in the long run, they have actually led to increased food production. In the US, for instance, despite a many-fold increase in pesticide applications in the period between 1948 and 1970, crop losses to insects have actually increased from 32% to about 36%.[25]

It would thus seem economic for the farmer to give up the use of chemicals especially in a period of capital shortage, since such capital could be put to more fruitful use elsewhere.

Undoubtedly, it will take some time before farmers understand the implications of such trends, and still more time for them to make the changes required to switch over to organic farming. *Eventually, however, they must do so.*

We are faced here with a major reversal of recent trends — a situation which no agricultural expert has predicted, and few would probably be willing to face today. Needless to say, it has major implications. It means among other things, that even in the most agriculturally favoured countries, overall yields are no longer likely to increase, for it will be more economic for farmers to aim for lower yields so as to reduce costs.

In fact, worldwide agricultural yields, though they have been systematically increasing for several decades, *have already started to fall.* Lester Brown[27] attributes this to five principal factors (see figure 2): '(1) the release for production of the 50 million acres of idled, below fertility cropland in the United States that, added to the global cropland base, almost certainly reduced the average crop yield; (2) the high cost and tight supply of energy; (3) the high cost and tight supply of fertiliser; (4) the build up of population pressures that reduce the fallow cycles of shifting cultivators in large areas of West and East Africa, Central America, the Andean countries and Southeast Asia to the point where fallow periods are now too short to allow soil fertility to regenerate; and (5) the growth of the demand for firewood in developing countries to such an extent that local forests could not keep pace and that more and more animal dung was used as fuel and less and less as an essential source of soil nutrients.'

The same point has already been achieved in the fishing industry. If, for many years, catches have been rising, it is mainly as a result of the introduction of increasingly elaborate technology, and at the cost of seriously depleting stocks in a way that could not have been done with conventional fishing methods. Since this has been the main reason for the subsequent fall in fishing catches, further technological innovations, and in general, further investment in technology can only have the effect of further reducing catches. In this case, we have encountered not merely diminishing but negative returns on inputs, and hence, even before the increase in their price, on the capital employed to purchase them.[28]

* A series of studies by the Center for the Biology of Natural Systems at Washington University[26] reveals that we have just about reached this situation already. Farms in the US cornbelt that use chemiclas earn a little more per acre than do organic farms, but this advantage is largely offset by higher costs, which in 1974 (though not in 1975) more than compensated for these earnings.

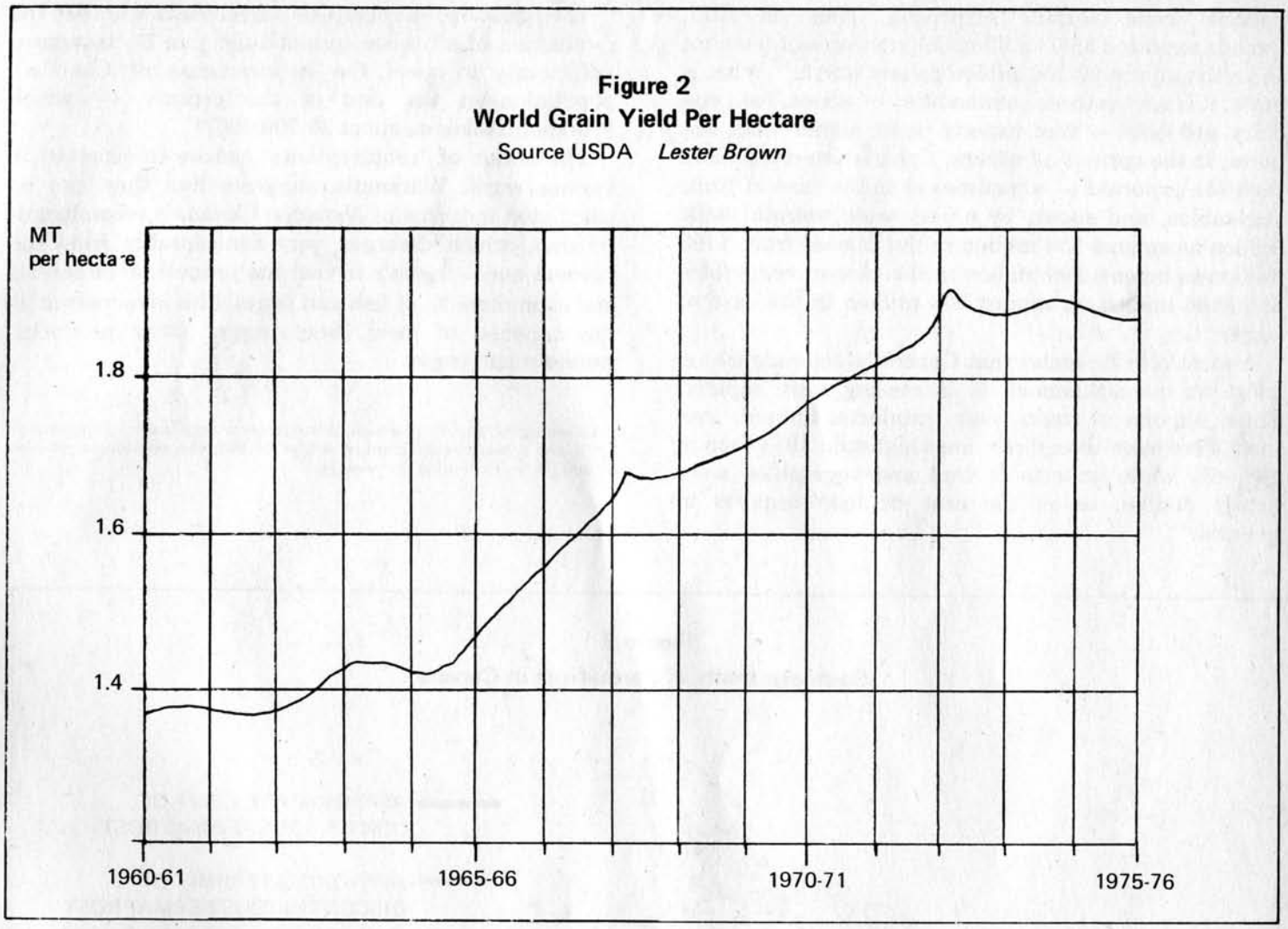


Figure 2
World Grain Yield Per Hectare
Source USDA *Lester Brown*

Current price increases can thereby only accelerate the inevitable return to more traditional fishing methods — after that period required to amortize investments in capital equipment already in use. This could lead, pollution permitting, to a stabilisation of world fishing catches at a level somewhat lower than the present one.

If one takes all these considerations into account, one cannot conceivably accept the current notion that world population will continue expanding into the next century. Paul Ehrlich considers the notion that the world population will double between now and the year 2100 as 'the most frequently repeated imbecility of today. [29]

Winstanley[30] considers that even under optimistic assumptions, massive foreign aid in terms of food and food inputs will be required by developing countries between now and 1985. Under less optimistic, but perhaps more realistic assumptions, many face widespread starvation and bankruptcy.'

In *A Perspective on the Next Decade for Environment Canada*, the authors came to a similar conclusion: 'the world in the decade 1975 to 1985,' they write, 'may experience famine on a scale never before seen. Estimates for 1974 have ranged through 20 million to 80 million deaths from starvation. It is probable that up to 300 million people will die from malnutrition and starvation in the next decade.' [31]

My own opinion, and many students of the world food situation will agree with me, is that deaths from famine and disease in the next decade will be sufficient to prevent world population from rising very much beyond four and a half to five billion — the maximum that this already terribly degraded planet can hope to support for even a single generation. Over a longer period there should be a further decline to a more sustainable level — unfortunately considerably below that of the world's present population.

What, one might then ask, are the implications of these predictable major global discontinuties for Canada?

In the eyes of the world, and perhaps still of many people in Canada itself, Canada is one of the world's remaining empty spaces, capable of absorbing a considerable proportion of the world's surplus population, and hence having a duty to do so. It is also viewed as having a limitless food-producing capacity and thereby being duty-bound to provide food in the form of trade or aid to all those countries that are increasingly short of it.

Though Canada's food producing capacity is indeed relatively high by most standards, and its population relatively low in a grotesquely over-populated world, *it would be a dangerous error to regard this country as capable of providing a long-term means of solving or even appreciably reducing the world's population/food gap.*

The first thing we must realise is that Canada is not itself self-sufficient in all food products. In fact, the extent to which it depends for its sustenance on inter-

national trade is quite surprising. Thus, in 1973, Canada exported 3,003 million dollars worth of food but she also imported 2,160 million dollars worth.[32] What is more, it is only in three commodities — wheat, feed and dairy products — that exports were higher than imports. In the case of all others, Canada *imported more than she exported* — sometimes as in the case of fruit, vegetables, and sugar, by a very wide margin: $401 million as against $34 million in the case of fruit, $193 million as against $59 million in the case of vegetables and $166 million as against $14 million in the case of sugar.[33]

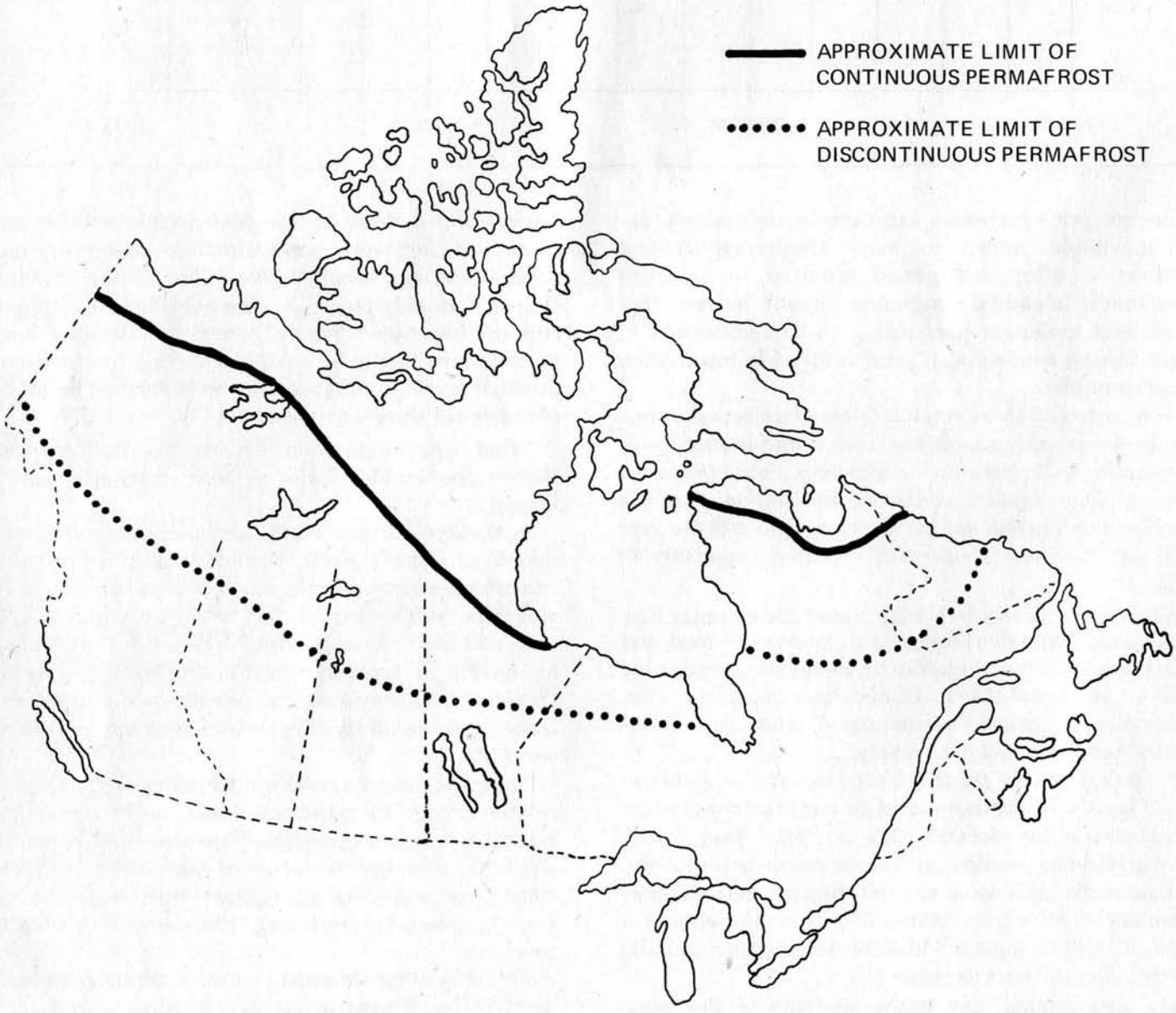
It must also be noted that Canada's dependence on trade for its sustenance is increasing very rapidly. Thus, imports of sugar, dairy products, animals and meat were more than three times higher in 1973 than in 1965-69, while imports of fruit and vegetables were nearly double, as in the case of food imports in general.[34]

The question we must ask ourselves is whether the production of all these commodities can be increased sufficiently to meet the requirements of Canada's population at the end of the century — which Warkentin takes as about 30,700,000?*

The notion of 'requirements' can be interpreted in various ways. Warkentin suggests that they can be calculated in terms of *Nutrition Canada's* recommended diet, which diverges very considerably from the present one — mainly in that the proportion of cereals and even more so of fish and vegetables is increased at the expense of meat, beef, eggs, dairy products, potatoes and sugar.

* According to *Statistics Canada*, if one projects a medium fertility rate of 2.2% and a net annual immigration of 60,000, the population will be 30,000,000 by the end of the century.

Figure 3
Southern limits of Permafrost in Canada



To satisfy these requirements, the present area devoted to vegetable production must be increased by 200,000 acres and that devoted to fruit production by 325,000 acres.[35]

Can this be done?

Warkentin considers that it would be feasible to increase fruit and vegetable production by 50% at the maximum, using present agricultural practices and inputs.[36] *Further increases would be possible but only with small-scale largely non-commercial production.*

Warkentin, in fact, considers it 'Unlikely that production can approach consumption'. For this reason he concludes, '*Food production possibilities . . . provides a limit to the desirable population for Canada.*[37]

As for Canada's capacity to continue increasing its exports of wheat (they increased from 758 million tons during the period 1965-69 to 1,218 million in 1973), neither he nor other students of the Canadian agricultural scene such as Geno[38] are particularly optimistic.

This seems a shattering conclusion to come to, and it seems well worth-while examining the considerations on which it is based.

First of all, because of Canada's cold climate (see figure 3), the growing season is relatively short, largely as a result of which yields are quite low: 1,700 lbs per acre on average, as against 4,000 lbs in the USA.

Also, though Canada has three million eight hundred thousand square miles of territory, only a very small fraction is actually used for agricultural purposes. What is more, the prospects for bringing more land under the plough are poor.

As Geno puts it, 'two thirds of Canada is useless due to climate for any commercial agriculture. Of the remaining one third, the greater part is limited by too much moisture, rockiness, or steepness. We are left with 200,000,000 acres of potentially useful arable land, and a developed area of 174,000,000 acres. Only about 100,000,000 acres is improved land, in crops, fallow or pasture. Only about a quarter of this (24,000,000 acres) is arable land in climatically favoured areas' — suitable, in fact, for growing fruit and vegetables.[39]

Another important factor to consider is annual precipitation. In this respect, the Prairies are not at all favoured. As Hammond Scott points out, 'Southern Alberta has the lowest annual precipitation of any region in Canada. Annual precipitation at Medicine Hat is twelve inches per year and at Pincher Creek nineteen inches per year. (However, this is only the average of wide and violent variations from season to season and year to year.) There are desert areas in the world receiving as much precipitation as this.'[40]

Again Scott Hammond draws attention to another factor many people overlook: the climate in the south renders much of the precipitation that occurs there useless. Evaporation rates at certain times are extremely high, and unfortunately especially at peak demand periods.[41]

'In general,' Geno[42] writes, the prospect of increasing productivity through expanding the land base seems poor. The lands that are available are less suitable on either soil or climatic grounds and some of these will not be suitable at all if the Canadian climate is indeed changing.

What is more, Canada is losing land very quickly to soil deterioration, urbanisation and also farm abandonment.

Geno estimates that soil losses in the Canadian Prairies are substantially as serious as they are in the US prairies.[43] Warkentin[44] tends to confirm this. The amount of organic matter returned to the soil is about 80% of what is removed for dairy-grass, which is sufficient to maintain soil structure, but only 40% in the case of intensive crops and 20% in the prairies, neither of which are sufficient, especially in the case of the prairies, to prevent a gradual deterioration of stability of structure[45] and hence of the land's food-producing capacity.

The loss of land to urbanization appears to be even more serious in Canada than in the USA, especially as it is occurring on the best agricultural land. As Geno[46] points out, the 24 million acres of climatically favourable land in Canada are also those areas where the major metropolitan conglomerates are situated. (see figure 4)

It is precisely in these areas that lies any potential whatsoever for increasing Canada's production of fruit and vegetables. Geno[47] considers that at 'a conservative rate of land conversion to non-agricultural uses of 300 acres per 1,000 increase in urban population, and a projected increase in urban population of 17-19 million in 2000 AD, this would mean taking 6.5 million acres of our best land out of production in the next 25 years . . . Over 2 million acres of farmland have been lost in Canada over the 1961-71 period, which works out to a fairly high rate of 785 acres of farmland lost per 1000 increase in urban population.'

In other words, if current urbanization trends were to continue, the actual land lost in this way by the end of the century would be very considerably higher than Geno estimates.

Nowland[48] estimates that by the year 2001, Ontario will have lost 12% of its food producing capacity to urbanization, and Quebec as much as 25%. 'This figure would be higher,' as Warkentin[49] points out, 'for fruit and vegetables because it occurs near cities.'

Farm abandonment has also been very high in Canada as farming in marginal land and in areas in which large-scale capital-intensive farming is not practicable has ceased to be economic.

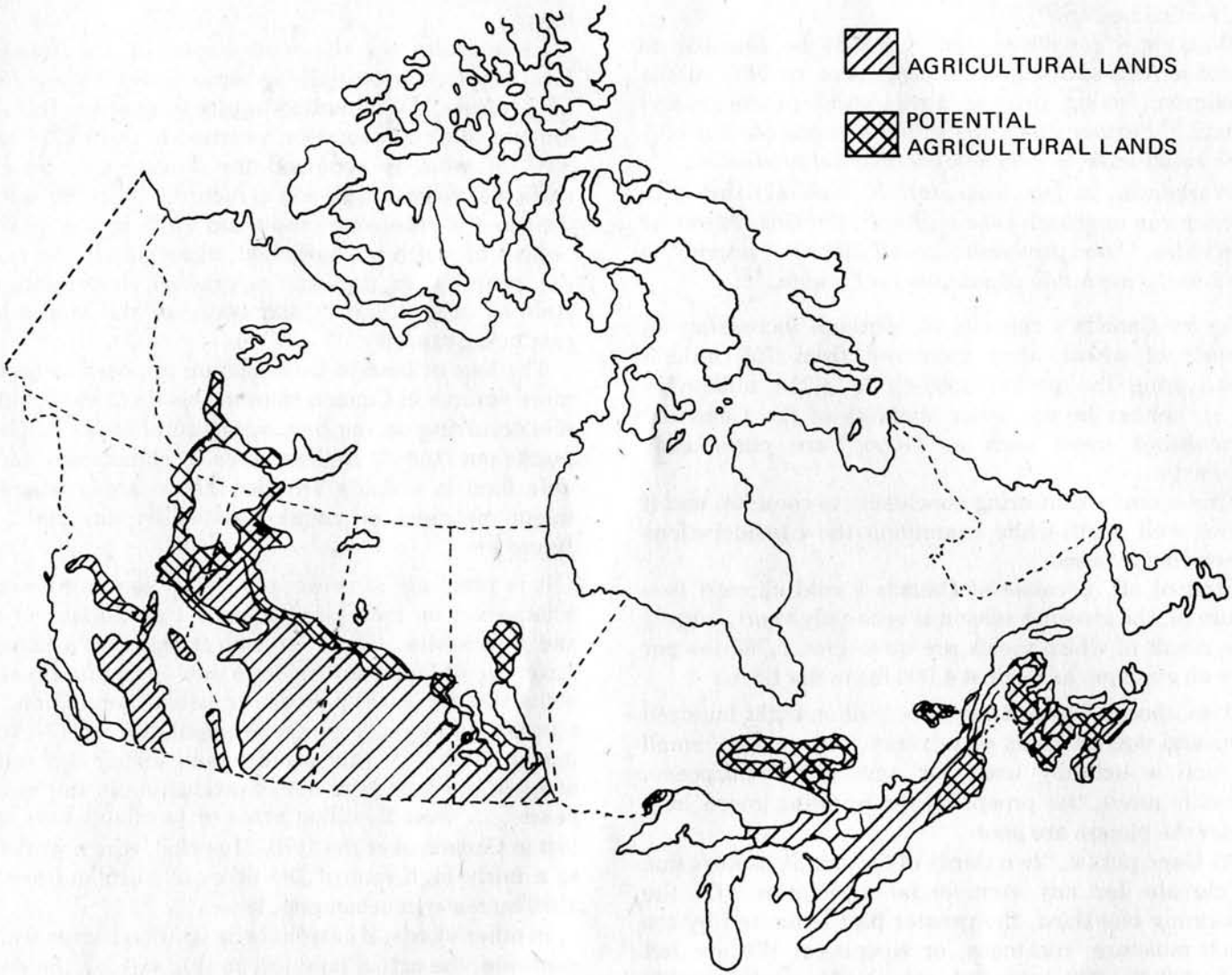
Thus on Prince Edward island, 87% of the land was farmed in 1891[50] while in 1971 this figure had dropped to only 55%.

Noble's[51] study of farm abandonment is particularly illuminating. Between 1891 and 1941, 30% of the farms whose history he studied had ceased to operate. In Ontario, as a whole, there has been a drop-out of some two and a half million acres of occupied farm land from 1941 to 1956, and over two million acres in Quebec during the same period. This trend is only likely to be reversed with a radical increase in the price of food, or more likely with the abandonment of large scale capital-intensive farming, and a return to traditional methods of husbandry.

Finally, in determining the prospects for increasing

Figure 4

Agricultural Regions of Canada



the amount of land that could be put under cultivation in Canada, one must consider the effects of possible — indeed, it would increasingly appear — probable — long-term climatic changes.

To these, Canadian agriculture is particularly vulnerable. According to Winstanley[52] a 1% fall in temperature, which might well be a feature of the new climatic regime that appears to be establishing itself, could further reduce the land available to agriculture. (see figure 5)

If the prospects for increasing Canada's food production *extensively* are relatively poor, what are those for increasing it intensively? We have seen why this is unlikely to happen in the US. The same factors conspire to make it unfeasible on any scale in Canada. Geno[53] considers that diminishing returns on fertiliser and pesticides have been encountered in Canada, as elsewhere, while the increasing price of chemical inputs must render their use even less economic.

As we have seen, Canada cannot afford the loss of land that the further intensification of agriculture would inevitably give rise to, by accelerating soil deterioration, encouraging further farm abandonment and causing more prime agricultural land to be taken over for building motorways, housing estates, factories, parking-lots, shopping centres, etc.

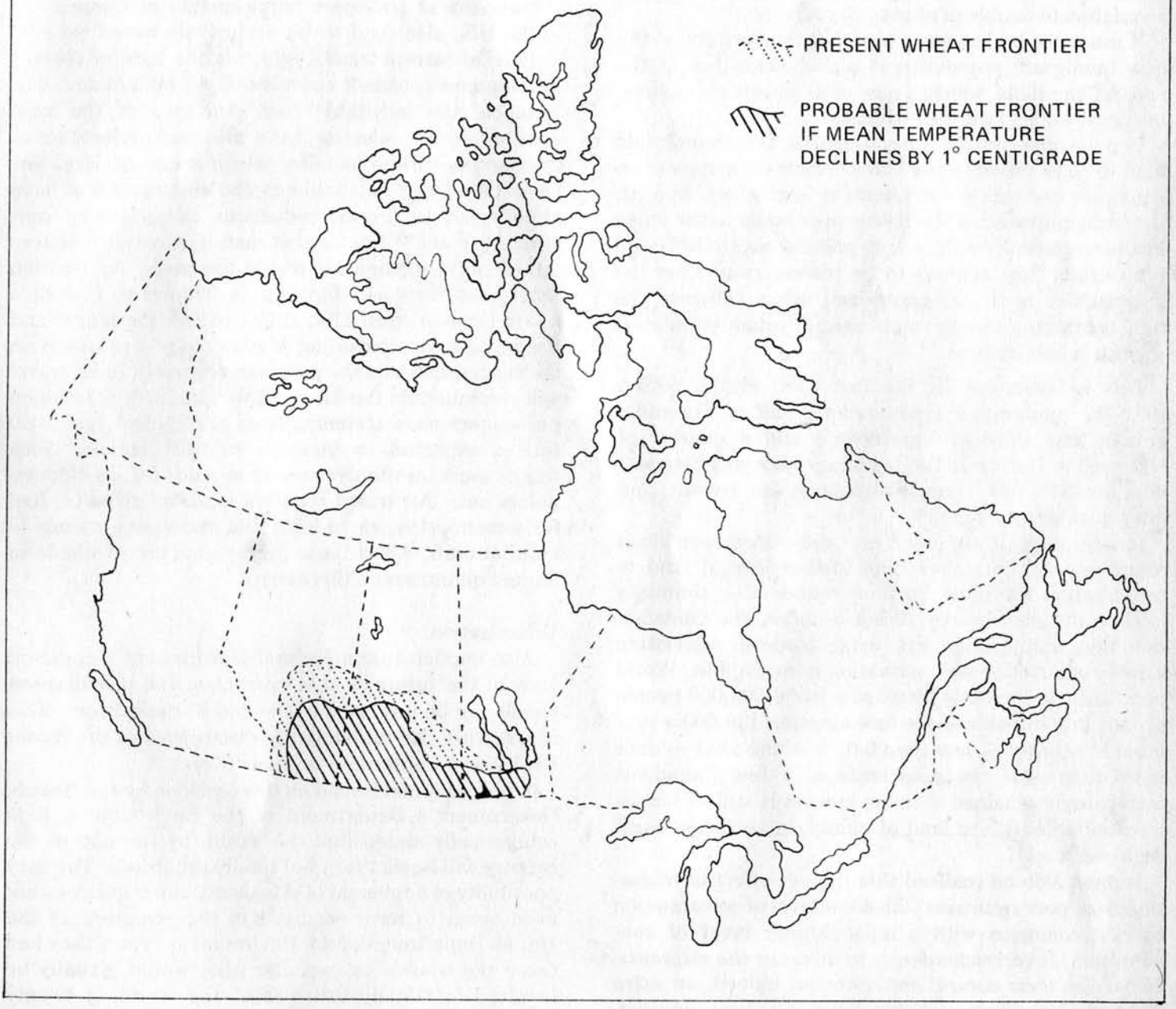
Nor, as we shall see, could Canada afford, for very long, the environmental deterioration, especially to the country's vulnerable water resources that would be caused by further intensification of food production.*.

As North points out,[54] Canada is 'short of good subsurface aquifers because so much of our territory is either Precambrian shield or impermeable igneous rock.' This means that most of Canada's water resources lie on the surface, 'in easily polluted lakes'. Let us not forget how seriously polluted already (very largely with agricultural chemicals) is the Great Lakes — St. Lawrence system, Canada's chief source of fresh water, which the Science Council regards as the country's most serious pollution problem.[22]

For all these reasons, Canada's ability to increase its grain exports and hence contribute to the reduction of

* Levels of PCBs (polychlorinated biphenyls) in Coho salmon caught in the Great Lakes have been found in excess of the five parts per million regarded as safe for human consumption. (Fish tested in the Credit River, for instance, had levels as high as 23 parts per million.) The Ontario Health Ministry has warned people not to eat Great Lake salmon more than once a week. Pregnant women have been told not to eat any at all.[56]

Figure 5
Wheat and Climate



world malnutrition and famine *must be regarded as considerably lower than is generally thought.*

In any case, if Canada is to maintain its industrial society, like the USA, she is likely to become increasingly dependent on food and feed exports to finance imports of high-technology equipment and other manufactured goods — and remarkably soon too, as we shall see, imports of fuel and minerals. This tendency must also be accentuated since Canada's principal method of overcoming its foreign exchange deficit — which is to attract foreign investment — becomes less practicable, both because of the predictable world capital shortage, and also as resistance builds up still further within the country against further extension of the foreign ownership of Canadian resource companies.

This means that, like the US, Canada will not be in a position to provide food to countries where it is required on humanitarian grounds, but rather, *will tend to sell it to those that can best afford to pay for it* — which largely means the already-industrialised countries, and those in possession of key resources, such as oil.

It should now be clear that *Canada is not the limitless cornucopia that many people think it is. Nor for that matter can it serve as a limitless dumping ground for the world's surplus population.* Its carrying capacity is, in fact, very considerably smaller than people have thought in the past.*

* Many past estimates appear quite ludicrous in the light of the above considerations. Consider for instance that G.C. McGree, MP for Vancouver, believed only a few decades ago that British Columbia and Alberta alone could support 100 million people. Sir Donald Mann believed Canada needed 150 million people. Griffith Taylor, a famous Canadian geographer, stated in 1936 that the Prairie Provinces alone could support a population of 90 million, at European standards of living. Stephen Leacock, in his book, *Economic Prosperity in the British Empire*, stated that Canadian resources would support a population of 250 million. 57

Immigration

In the last thirty years four million people have entered Canada,[58] that is about 130,000 a year. This means that, during this period, immigration was directly responsible for an overall population growth-rate of more than 0.56% which alone would cause the population to double in about 125 years.

It must not be forgotten too, that the fertility of the new immigrant population is higher than that of the native Canadians, which is now at its lowest point since the depression of the early thirties.

It must also not be forgotten that the immigrants tend to concentrate in the cities, where their impact on amenities and on the environment is greatest. Indeed, the rural migration of the native population to the cities has been radically reduced, as pointed out by ZPG and inter-urban flow appears to be biased away from the larger cities to the medium-sized urban centres. The only continuing strong component of urban population growth is immigration.[59]

This is borne out by the fact that, in the period 1961-71, immigration accounted for half of Toronto's growth, one third of Vancouver's and a quarter of Montreal's. During 1941-71, immigration was responsible for 31% of Ontario's population growth and internal migration for 13%.[60]

Immigration, therefore, not only increases food requirements, but by causing further loss of land to urbanisation, it must further reduce the country's food-producing capacity. What is more, the contribution that immigration can make towards alleviating world malnutrition and starvation is negligible. World population is currently increasing by 70,000,000 people a year. It is difficult to see how allowing 130,000 a year into the country — less than 0.02% of the total — does more than ease the conscience of a few Canadians increasingly ashamed of living in what is still — for the moment at least — a land of plenty, in an increasingly deprived world.

It must also be realised that the net effect of migration from poor countries with a low level of consumption to rich countries with a much higher level of consumption, *is correspondingly to increase the migrants' impact on their natural environment.* Indeed. an extra 130,000 Canadians probably have the same environmental impact as an extra 3,000,000 Africans or Asians.

If immigration is to be limited — as is proposed by the Survival Institute of Canada and ZPG — so must all other measures to be taken for reducing population growth, at least so as to stabilise it (as both these organisations suggest) at about 30,000,000 by the end of the century, and preferably, at a still lower level. No efforts should then be spared to reduce it progressively to a sustainable level, i.e. one that can be supported with minimal environmental deterioration.

Among other things, this may mean, as ZPG suggest developing the sort of economy that will not have to depend on importing skilled or unskilled workers to make it function;[61] nor, it might be added, on technologies that are as environmentally destructive as those we make use of today. It is in this way that Canada can make the greatest contribution to the solution of the problems that confront us, both by the example it would set other countries, and also by preventing the further deterioration of 7% of this planet's terrestrial surface — much of which is still largely unspoilt.

Forecasts of Transport Requirements

Forecasts of transport requirements in Canada, as in the UK, also tend to be exclusively based on projections of current trends, which in the light of current developments, cannot conceivably be maintained. For instance, the inevitable fuel shortages of the next decades do not seem to have affected projections of the number of automobiles entering into service, nor have the equally inevitable capital shortages that have already led to drastic reductions in motorway construction plans.[62] Nor for that matter, have such factors influenced Canadian air traffic forecasts. As Budden notes, the forecasts figuring in Transport Canada's new release of April 21st, 1972 entitled 'Passenger and Cargo Forecasts including Methodology' are based on the assumption that the past rate of growth in air travel will continue into the future. Thus, in 1970, 6.3 million passengers were accommodated and by the year 2000 this is expected to increase to 61.9 million. Such trends must inevitably come to an end, for, as Budden points out, 'Air travel requires land for airports, fuel for consumption, air to burn fuel and scarce metals to build aircraft. All of these ingredients are available in limited quantities on this earth.[63]

Urbanization

Also implicit to the Federal Government's apparent view of the future is that current global urbanization trends can be projected to the end of the century. This assumption also underlay the discussions at the recent UN Habitat Conference in Vancouver.

In the pamphlet issued on this occasion by the British Government's Department of the Environment, it is categorically stated that the world, by the end of the century will be (not *may* be) totally urbanized. The very possibility of a reversal of this disastrous trend does not even seem to have occurred to the scientists of the British Department of the Environment. Yet if they had taken the trouble to examine what would actually be involved in 'totally urbanizing' the world in twenty five years, they might indeed have realised that, for all practical purposes, such an enterprise is *simply not possible.*

Surprisingly enough, they themselves concede that it will mean building as many houses in the next twenty five years as have been built since the beginning of the historical era, but this does not appear to daunt them. They seem to regard it as just another challenge, which man, with his 'limitless ingenuity' to use a well-worn phrase, will be able to meet, as he always has those of the past.

Where, however, will the resources come from for this gigantic enterprise — the land, the water, the timber, the metals and other building materials, the fuel with which to power it and the capital to finance it? Also, let us not forget that cities are built with resources extracted from the countryside; but can the countryside, from which we must also derive our food,

Figure 6
Percentage of the population which is urban

	1901	1911	1921	1931	1941	1951	1961	1971
CANADA*	34.9	41.8	47.4	52.5	55.7	62.4	69.7	76.1
Newfoundland	–	–	–	–	–	43.3	50.7	57.2
Prince Edward Island	14.5	16.0	18.8	19.5	22.1	25.1	32.4	38.3
New Scotland	27.7	36.7	44.8	46.6	52.0	54.5	54.3	56.7
New Brunswick	23.1	26.7	35.2	35.4	38.7	42.8	46.5	56.9
Quebec	36.1	44.5	51.8	59.5	61.2	66.8	74.3	80.6
Ontario	40.3	49.5	58.8	63.1	67.5	72.5	77.3	82.4
Manitoba	24.9	39.3	41.5	45.2	45.7	56.0	63.9	69.5
Saskatchewan	6.1	16.1	16.8	20.3	21.3	30.4	43.0	53.0
Alberta	16.2	29.4	30.7	31.8	31.9	47.6	63.3	73.5
British Columbia	46.4	50.9	50.9	62.3	64.0	68.6	72.6	75.7

** The Yukon and the Territories of the North-West not included.*

Perspectives Canada

support further depredations on quite this scale?

Have the DOE scientists also considered the massive costs of supporting a totally urbanized world population on a global scale? Of providing it with capital intensive jobs, of transporting food from where it is grown to the vast asphalt jungles where it will be consumed, the cost of evacuating and dispersing the huge quantities of waste products that the cities must generate, of maintaining the roads and motorways, the sewers, the hospitals, the schools,the universities, the prisons, the dealcoholisation centres, and the vast state-welfare institutions needed to sustain the increasingly alienated city masses?

It should also be unnecessary to point out, that, in to what extent *we are failing, even today, to provide such amenities*, and thereby to accommodate present urbanization pressures.

It should also be unnecessary to point out, that, in spite of the massive and very costly conference in Vancouver, *no remotely feasible plan has been formulated for dealing with the problems already caused by industry in any major country, let alone on a global scale.*

What then is it assumed will happen? Is it really believed that the governments of the world, aided and abetted by the international agencies, will simply go ahead systematically manufacturing misery and squalor on an ever more massive scale until it encompasses the greater part of humanity?

Is it not more likely that something will collapse, somewhere along the line, that one at least of the many aberrant conditions that have rendered possible this fatal process will suddenly cease to be satisfied?

Self-fulfilling Predictions

If we continue insisting that the future will be like the past, it is also that we wish to justify present activities *to which we are committed psychologically and also financially.*

'The forecasters,' as Taylor[64] points out, 'are often at the same time the planners, and often too they have decided in advance to undertake projects such as Pickering Airport and 'Design for Development' and *must rationalise such decisions by forecasting a need for them.'*

Once such projects have been undertaken, the predicted urbanization and economic growth will have been accommodated, thereby rendering it that much more likely to occur. In this way the original forecasts will have been self-fulfilling. In Taylor's words, 'they are implicitly based on the decision to provide the public capital and urban facilities necessary to service the forecasted growth, *otherwise the growth would not occur.'*

There is, in fact, another factor involved. The different aspects of the urbanization process tend to be examined in isolation from each other. *If they were regarded together*, as Kenneth Watt[65] has attempted to do for the US, and as we shall also attempt — in very rough outline — in this report, then we must quickly come face to face with reality. For one thing, the total cost of urbanization at a national, let alone a global level, cannot conceivably be met for very long even in the US, let alone in many other countries, with much shakier foundations such as Canada and the UK.

Kenneth Watt[66] has shown just how much cheaper it is to sustain a small population in small towns and villages than in large cities. He shows, for instance, that the cost of public welfare in towns of less than 10,000 people is about 12 dollars per capita, while in large cities such as New York it is 192 dollars. The cost of police protection in the small town is 5.70 dollars and in a large city 52 dollars. The difference is also appreciable, though not quite so dramatic, for education, fire, and direct general expenditure.

J.C. Kapur[67] does the same exercise for a Third World Country. He and all other serious students of the socio-economic problems facing India can only see their solution in terms of a programme of radical decentral-

isation. For one thing, as Kapur points out, the capital necessary to provide just one job in Bombay will provide twenty-two in the villages.

People until recently have been required in the cities as necessary components of the production-consumption process to which everything else has been subordinated. Today, this process is saturated with people. It requires no more. It cannot, in fact, even absorb those that have already been introduced into it. Over and above the number it can make use of, *people are random to it.* They constitute 'noise' or, 'pollution', since they serve but to interfere with its proper functioning. This means that the state must care for them — and that capital must thereby be diverted from activities that *contribute to the perpetuation of the production-consumption process, to others that are largely parasticial to it.*

If these costs be taken into account, it is not difficult to show that urbanization has, among other things, *become uneconomic and that, on economic grounds alone, systematic de-urbanization is required. In fact, it can be shown that in many countries de-urbanization is the only alternative to bankruptcy, social breakdown and famine in the very short-term.*

It is not surprising, in fact, that such a policy has been adopted by a number of governments that are not ideologically committed to fostering the lifestyle that goes with urbanization.

Thus, in China, urban migration appears to have ceased, and as many as 8 million young people have left the cities for the countryside, the population of Shanghai itself having fallen in the last decade by 500,000 to 5.6 million.

The same trend is occurring in South East Asia with the communist victories in South Vietnam and Cambodia, though in the latter case de-urbanization is apparently occurring with considerable brutality. Thus, it is said that the population of Phnom Pen has been reduced from 2 million to 20,000 — and according to some reports to an even smaller figure.

The Government of South Vietnam has announced its intention of moving ten million people from the cities to the countryside. Sooner or later, other countries will probably follow their example.

In the meantime, a trend towards de-urbanization is discernible even in Western industrial countries. Mainly as a result of ethnic problems and the associated escalation of the crime rate in the major cities of the US, there has been a systematic exodus of the middle class which has had a positive feedback effect. Offices and factories follow in the wake of this exodus, with a resulting decline of job opportunities in the cities (by more than 10% in the four years between 1970 and 1974 in Baltimore, Philadelphia and Washington, and by more than 18% in Detroit and St. Louis over the same period).[68]

The consequent increased expenditure on welfare has to be met from a reduced tax base, putting the city government into financial difficulties. As a result, the cities are simply being run down. In fact, some city areas, where crime and general dilapidation are particularly bad, are simply being abandoned. In 1973, the city government in Philadelphia was actually selling abandoned houses for one dollar apiece — at the time there were 30,000 of them.[69]

In general, amenities are being eliminated, museums closed down, the police force reduced, teachers and security guards in schools laid off — all of which must render life there still more unattractive and accelerate the trend towards yet further de-urbanization.

In fact, in the US since 1970, the number of people living in big cities is down 1.9%, those living in suburbs up 8.4% and those living in small towns and rural areas up 5.0%. In the eastern half of the US, practically every large city is losing population, those in which the trend is most pronounced being Minneapolis (down 12.0%) and St. Louis (down 10.3%).[70]

The notion that the problems facing US cities are a specifically American one is a terrible illusion. The same situation must occur to a varying degree throughout the industrial world, as the environment provided by modern conurbations comes to satisfy, ever less adequately, man's biological, social and aesthetic needs.

The presence in many US cities of large Black, Puerto Rican and Mexican minorities, which find it even more difficult to adapt to urban and industrial living than does the mainstream society and tend to form a depressed proletariat at the bottom of the socio-economic ladder, is of course an aggravating factor — especially in a society whose members are exposed from infancy to egalitarian values.

Immigration is leading to precisely the same problems in the UK, contrary to all the predictions of the experts who have continually evoked all sorts of arguments to rationalise their desire to show that British cities would be exempt from the problems that are devastating the cities of the US.

The signs are too, that the same problems are beginning to occur in Canadian cities — in particular Toronto, Vancouver and Montreal. As large cities in the US, and in general throughout the industrial world, become increasingly run-down and abandoned by all who can afford to do so, they will be left to ever more demoralised slum-dwellers, living off an ever more bankrupt welfare system, and ever more addicted to crime, vandalism and various forms of retreatism — such as alcoholism, drugs, etc. — that permit people to escape, albeit temporarily, from an increasingly intolerable social environment.

What solution is there to such a problem? There is only one: the slum-dwellers must be moved out and efforts must be made to integrate them into smaller communities that provide a physical and social environment that better satisfies basic human requirements than does a modern conurbation. *In other words the only solution to the urban problem is de-urbanization.*

De-urbanization, as already intimated in this report, will be necessary for other reasons as well: firstly so as to reduce the consumption of fuel and mineral resources, secondly to reduce pollution levels, and thirdly, as we shall see, to reduce the loss of agricultural land.*

*Geno[71] points out that attitudes are changing rapidly. For instance, the Alberta Land Use Forum gathered over 450 written and oral presentations to the forum members — and the most often represented theme was the importance of preserving agricultural land from further development pressures.

Changing attitudes will partly facilitate this process. Disillusionment with the urban, industrial way of life is setting in very rapidly among middle-class youth in industrial countries, and will probably soon spread to the working classes. A new ethic is developing which stresses such things as natural foods, self-sufficiency, small-scale enterprise, the rural way of life, community living and a search for cultural identity. There is every reason to suppose that *these are not just fads but the necessary components of an emerging post-industrial culture.*

In reality, we have little choice. De-urbanization will occur whether we like it or not, for among other things, *we can no longer afford our cities.* Either they are phased out or they will die a natural death — and this would be very much more painful.

Economic Growth

Population growth, increased food production, urbanization, the substitution of capital inputs for human labour — these are the necessary components of economic growth. To suggest, as I have done, *that all these trends are going into reverse implies that the continued increase in the material consumption that has marked the last 150 years can no longer be maintained and hence that the 'march of progress' itself — at least as it is defined today — is coming to an end.*

Needless to say the implications of such a development are immense. Among other things *if economic growth is to be no more, then capital will cease to be available to provide material and institutional solutions to people's problems. Since no government can admit to its electors that it cannot solve their problems, a totally new range of solutions must be found — and to provide its rationale a new interpretation is required of man's relationship with his physical and social environment.*

This means a revolution in our most basic assumptions. Secretly, most people know that this revolution is necessary, that present attitudes to basic issues are archaic. The events of the last four years should by now have dispelled any doubts as to the validity of the thesis of the Club of Rome's *Limits to Growth* and of *A Blueprint for Survival.* What is more, they should have made it amply evident that these limits will manifest themselves much sooner than the authors of these documents envisaged, *in fact, that they are already beginning to do so.*

Maurice Strong recently said in a speech in Ottawa that the energy crisis, the rapid development of the environment issue, and the chronic shortages of food are no longer isolated events, "but the harbingers of a major transition in human affairs — comparable in effect to the discovery of fire, the advent of agriculture and the industrial revolution."[72]

This major transition is unlikely to be directly triggered off by resource shortages, pollution, social breakdowns and the growing gap between population and food supply as suggested in *Limits to Growth.* Their effect is to render conditions ever less suitable to the industrial process and a symptom of this is the dramatic increase in the cost of maintaining our industrial society. In fact, it seems increasingly clear that it is inflation and capital shortage that will directly bring the industrial society to its knees and bring about the major transition that Maurice Strong refers to. Since there is nothing in current economic theory that suggests why this should occur, it may be worth re-examining this theory in the light of the problems we face today.

Economics

Economics like most of the disciplines into which we have divided modern knowledge (sociology, and psychiatry, for instance) has been built up on the basis of the examination of *but a minute fraction of man's total experience on this planet* — basically, that of the industrial era, no more than 150 years out of three or four million. What is more, this period is quite atypical of all other previous periods, and also nonrecurrable — since its main features are dependent, among other things, on the consumption of a limited reserve of fossil fuels which have taken three hundred million years to accumulate (since the end of the Carboniferous period), and which we shall have largely burned up in three hundred years — the most valuable part, i.e. the oil, in less than fifty.

Karl Polanyi,[73] George Dalton,[74] and others have convincingly shown that modern economics simply does not apply to pre-industrial and, in particular, tribal peoples. One finds among the latter no trace whatsoever of the 'homo economicus' who tries to maximise the return on various factors of production such as capital and labour. Instead, things, are grown, manufactured and distributed to satisfy kinship obligations, for ritualistic purposes, and in general to conform to socially approved norms and thereby to favour the acquisition of social prestige.

The more we examine the economic behaviour of primitive people, the more it becomes apparent, in fact that the principles of modern economics, rather than being of universal application, as we have been led to believe, apply at best, to but a specific period in our history — what is more, one that is fast drawing to an end.

Economics as an autonomous process

Underlying economics is the notion that the *production-consumption process occurs in a closed system.*[75] This is implicit to Marxist Economics, which regards labour as the only factor of production and hence as the rightful beneficiary of all the fruits of the industrial process. It is also implicit to capitalist economics, which, though it recognises that there are other factors of production — including land and resources for instance — prices them in accordance with their immediate value to the economic system only.

From the point of view of the economic system, their value is determined by supply and demand. To acquire value, something must thereby first enter into the production-consumption process and also it must become scarce. As Samuelson[76] states, 'if there is no scarcity there is no economics, since the main justification of this discipline is to enable people to make the logical

choice between benefits with different marginal utilities.' The value of commodities increases when, to use the jargon of the economists, their marginal utility increases, which is simply a way of stating the law of supply and demand. Seen slightly differently, the more there is of a commodity, as Samuelson puts it, 'the less the relative desirability of its last little unit becomes, even though its total usefulness always grows as we get more of the commodity. So, it is obvious why a large amount of water has a low price. Or why air is actually a free good despite its vast usefulness. The many units pull down the market value of all units.'

Since 'cost' must imply reducing the value of something, it is not surprising that *economics does not provide any formal means of taking into account the effect of the economic process on the biosphere, in other words 'biospheric costs.'* These are external to the economic system, functioning in a closed system as it is supposed to, and are thereby referred to as 'externalities'. When it becomes impossible even for economists to ignore them, however, they can be 'internalised', but no methodology is available for determining how this 'internalisation' can be achieved. What is certain is that as economists are progressively forced to internalise biospheric costs, so does the economic process become even less viable. Janice Tait[7] points out how this process has characterised the economic history of the last century:

'The history of nineteenth century industrial expansion can be viewed,' she writes, 'as a long and bitter struggle to internalise external costs. In Britain, the social upheaval following the Enclosure movement and the rise of the factory towns completely changed the lives of rural agricultural workers. Factory owners on the other hand worried about the cost of raw materials, plant and a cheap labour force. (Five-year-olds were particularly welcome in the mines where they could penetrate the narrower seams; women too because — you guessed it — they were hired for lower wages than those paid a man.)

'By 1830, dispossession from the land, factory slums without amenities, and inhuman working conditions had brought Britain to the brink of social collapse. Certainly the price of goods such as bread, cotton cloth, dishes, went down; but the cost in terms of human well-being was devastating. These costs were externalised to society as a whole and paid for in innumerable ways: constant threat of cholera epidemics, overflowing public poorhouses, and a legacy of class bitterness that continues to this day. The history of the Labour Movement in Britain and elsewhere in the last 150 years has been an unconscious process of struggling to force producers to internalise the whole cost of maintaining a labour force in reasonably good physical health from birth to death.

'When industrial accidents became rationalised by the development of the Theory of Probability their status changed from that of miracles or 'acts of God' to predictable events. The comforting title of externality was then no longer applied to industrial accidents. Internalising the costs of diseases produced by industrial processes has taken longer because the causal connections of working with lead, coal, mercury, asbestos, herbicides, pesticides, PCB's vinyl chlorides, taconite tailings, radio-active materials, etc., is harder to establish. But, nevertheless, in principle, it is now generally acknowledged that the costs of industrial diseases should be internalised.

'Which brings me to the costs of environmental protection — the most aggravating of the externalities now waiting to be internalised. It is obvious that this internalisation is going to be at least as long and painful a struggle as the others. In the nineteenth century people were expendable; today birds, fish, animals, green space, trees, tundra, fresh water, clean air, arable land, oceans, perhaps even our life-support systems are being sacrificed at the altar of economic growth. Not only that, but we also plan to bequeath to our descendants, carefully wrapped packages of radioactive waste with a half-life of 10,000 years.'

The result of adopting so totally misguided a system of accountancy is that for decades it has been possible to indulge in economic activities that caused the biological, social and ecological degradation with, it appeared, *total impunity.*

Needless to say the economists' view of the production-consumption process is very misguided. Rather than occur in a closed system, it is a process directly affecting the biosphere, from which it derives the resources it makes use of, and to which it consigns the wastes it must inevitably generate. The technosphere, or world of human artefacts, which these resources are organised to constitute, is *thereby parasitical to the biosphere. It is in competition with it. The expansion of the one can only be to the cost of the other. Economic growth, can thereby only be regarded as biospheric contraction.*

The more cities, factories, housing estates, airports, reservoirs, motorways, parking lots, even the more farms we carve out of the world's remaining forests — the smaller must be the expanse and the more degraded the structure of the biosphere.

Since we are very much part of the biosphere, since, in fact, we evolved in our present form over millions of years so as to be biologically and socially as adapted to it as possible, the notion that we can destroy it, in order to replace it with the crude and rudimentary world of our own design and manufacture, must rank as one of the most preposterous notions ever entertained by man. *Yet it is this notion that provides — implicitly at least — the rationale for the economic process to which all biological, social and ecological considerations are mercilessly subordinated.*

What it is essential to realise, however, is that as the biosphere is methodically degraded, so must we incur corresponding biological, social and ecological costs. These were supportable for a long time, for our numbers were smaller, our activity on a more modest scale and of a less destructive nature. Today, this is no longer so.

We are, in fact reaching the point where the impact of our activities on the biosphere must, among other things, affect its ability to provide the materials required for the industrial process — the land, food, timber, water, fuels, minerals etc. *Since the depletion of these resources does not constitute economic costs*

(that is until they are properly internalised), our accounts reflect their consumption at a price that is very much inferior to their replacement cost — which, in normal business practice is a sure road to bankruptcy.

Similarly, as the biosphere becomes increasingly saturated with ever increasing quantities of pollutants which we consign to it, *so are the biological and ecological costs of pollution becoming translated into economic ones.* Stunted plant growth, reduced fish catches, the corrosion of buildings, pollution-induced diseases such as cancer, together with the ever greater cost of the technological installations required to limit such damage, are beginning to constitute an increasing drain on a society's resources — and must continue to do so as industrialisation proceeds.

One can see this occurring in Canada in many areas. Thus, according to the Science Council, 'sulphur dioxide from Sudbury smelters has had widespread effects. Severe tree damage has been detected up to 30 miles from the emission sources; vegetation has been stunted within a 720 square mile area; and, in a ten year period (1953-1963), the loss in production of white pine in this area is estimated to have been $1,717,000. Within a radius of up to at least 50 miles from Sudbury, there have been radical changes in the past decade in the acidity of the soft waters of the lakes. As the lake waters have become acidified, various species of fish have been exterminated; there are now no fish of any kind in at least 33 lakes, and soon they will be gone from at least 38 more.'[78]

If one looked at accounts which figured the true costs of the Sudbury smelters — those that reflected the damage they did to all the different natural systems in their vicinity, and which would inevitably one day be reflected in economic costs to be paid partly by the company that caused it, *but much more by others who have nothing to do with it* — then they would look very different indeed from those that are audited by the company's chartered accountants.

Eventually too, the disintegration of the family and the community — the basic units of social organisation — under the impact of all the urban stresses to which they are subjected in an industrial environment must also be reflected in a veritable constellation of pathological social manifestations — crime, delinquency, vandalism, drug-addiction, alcoholism, suicide and general demoralisation and helplessness, whose incidence must give rise to ever less supportable economic costs.

Eventually too, the increasing intrusions into the functioning of ecological systems must lead to corresponding economic costs. Thus, when the banks of the Mississippi River were narrowed and lined with concrete, and its flood-plains built on, ecological costs were thereby incurred. It may have been necessary to wait for a period of heavy rains for the river to burst its banks and do four hundred million dollars worth of damage, *but it was simply a question of time for this to happen — for ecological costs, in fact, to be translated into economic costs.*[79]

Such considerations should lead us to formulate what should be one of the basic laws of a new economics: *All biological, social and ecological costs incurred by our activities must one day be translated into economic costs. They should thereby be considered from the start as long-term economic costs.* This means that what our economists today regard as costs — those that are taken into account in the 'cost-benefit' analyses on whose conclusions so many important decisions are based — are but *immediate economic costs* — the tip of the iceberg, so to speak — while the great bulk of costs incurred still linger beneath, waiting for the appropriate conditions to emerge on an unsuspecting economy, which, on the basis of accepted economic indices, appears to be in perfect health.

What is more, these costs differ from those we are used to taking into account in one important respect: As we shall see, *they are, in the short or medium term, difficult — in some cases impossible — to reverse, except by phasing out the offending economic activity.*

This has a dramatic implication — it means that a rise in the price of a commodity affected will not necessarily trigger off an increase in its supply, *for rigidities have unexpectedly appeared on the supply side.* Thus, if a country's main sources of fresh water are polluted with DDT, or radio-active wastes or mercury, a rise in its price will not necessarily result in an increase in its supply, *because there is no practical way of removing these poisons in the short or even medium-term.*

If soil erosion and urbanization so limit the amount of agricultural land available that food production slumps, higher prices may not suffice to increase supply because the top soil that has thereby been destroyed may take several hundred years or more to be reconstituted.

An increase in the price of non-renewable resources, such as oil or minerals, would undoubtedly lead to an increase in their availability — at least for a time, since it would permit the exploitation of sources that were previously uneconomic. However — and it is this that is important — *the price rises which may eventually be required to increase their availability will not be indefinitely compatible with a growing economy.*

The same of course would be true, in many cases, for the supply of such basic commodities as fresh air or fresh water. Pollution-control measures which could provide us with these commodities would, in many cases, be so expensive as to render uneconomic the enterprises generating the pollution and thereby responsible for the shortages.

Let us look at the implications of this new situation. Economic growth has been based on the systematic substitution of capital and non-renewable resources for human labour. Why should this have been so advantageous? The answer is that it was cheaper. *The possibility that it might, one day cease to be cheaper, and hence cease to be advantageous too, does not seem to have occurred to our economists.* Yet, if the price of obtaining key resources increased sufficiently, while at the same time there were a surplus labour supply, because the economy was not growing fast enough to provide jobs for all those seeking to enter it, *then a point would eventually be reched when it would cease to be economic to substitute resources for labour.*

According to the law of supply and demand, when this occurs, the reduced demand for resources will cause their price to fall until such time as it becomes economic to use them once more. This would be true if the increased price of the resources were in fact *reversible*, as would be the case if it were due to the sort of inefficiency that occurs with the general euphoria of an economic boom. *It is no longer the case, however, when the higher price of resources reflects the increased cost of extracting them from lower grade ores, or from less accessible areas, for it would no longer be economic to provide them at a lower price.*

In many cases, resources may still be available, but this would be of academic interest only, for they would no longer be at an economic price, which would mean that, from the economic point of view, *they would have ceased to be 'resources'*.

In the case of commodities that have been made totally unavailable as the result of an irreversible process we are faced with rigidities on the supply side. (The demand can go up but the supply cannot follow.) In the case of commodities made unavailable at an economic price we are faced with rigidities of the demand side. (The supply can go up but the demand cannot follow.)

What is more, it is not difficult to imagine the latter type of rigidity spreading fairly generally to affect all manner of capital goods. Why, for instance, would a company buy capital equipment if it becomes more economic to replace it with labour? Why too should a woman buy domestic appliances designed for saving a few hours' work in the home when, to earn the money required for purchasing them she must work far longer every day in the factory?

The result of this increase in effectively irreversible costs is to create yet another situation which cannot be understood in terms of modern economics: a depressed economy with large scale unemployment and yet, at the same time, a high rate of inflation, previously only associated with an economic boom — 'stagflation', as it is coming to be called.

The truth of course, is that today's inflation is different from any we have come across before. The price rises are increasingly due to resource depletion and the *translation of biospheric costs into effectively irreversible economic costs.*

Against such a problem, economic expedients that have proved effective in the past are ineffective. One can no longer reduce unemployment by expanding the economy as this, in the new conditions, is proving increasingly difficult and would, in any case, give rise to further inflation. Nor can one reduce inflation by further depressing the economy so as to reduce effective demand, as this would but further exacerbate the unemployment problem.

In the new conditions, inflation, economic depression and unemployment are the result of the same basic phenomenon:- the increase in the cost of sustaining the industrial way of life.

This, in addition, has a further consequence: a constant increase in government expenditure reflecting the need to devote an ever greater proportion of GNP to combatting the side-effects of the economic process, and to undertake an increasing number of functions that are no longer sufficiently economic for them to continue to be assumed by the private sector.

In the US, where there is no ideological commitment to expanding Government activities, Government expenditure nevertheless continues to rise regardless of the Government in power. In 1962 it was no more than 100 billion dollars, in 1977 it is expected to be 400 billion dollars, while at the current rate it will attain 574 billion dollars in the period ending 30 September, 1980. It is increasingly difficult for Government revenue to keep up with expenditure and the Government deficit is likely to go up at the current rate to a maximum of 77 billion dollars in 1980.[80]

In the UK, Government expenditure now accounts for nearly 65% of GNP. What is more, in spite of the fact that inflation is now regarded as the country's most serious problem, all efforts to reduce this highly inflationary level of Government expenditure are being strenuously resisted.

As ever more money is required by the Government to provide the massive technological infrastructure needed to control the increasing deterioration of biological, social and ecological systems, one can easily foresee a time when there will be very little left to finance the production and consumption of consumer goods whose general availability is supposed to constitute one of the principal justifications for our industrial society.

As this occurs, so the price we will eventually have to pay for them will become prohibitive. Consumer foods and services whose general availability everybody now takes for granted would become luxury items, as many of them were in the past. Already in the UK we are seeing this happen, as every year less and less people can afford to pay their telephone and electricity bills.

Inflation without economic growth — stagflation — can also simply be regarded as a measure of general impoverishment, and hence, as reflecting the fact that *conditions are becoming ever less favourable to the industrial process.*

In the UK, at the end of the eighteenth century, conditions were at their most favourable. The necessary natural resources were available from all over the Empire. There was no problem in getting rid of wastes generated by industrial activities. The rivers, the seas and the sky seemed limitless in their capacity to absorb them. There was no difficulty in finding markets for finished products. Britain had no competitors. She was the 'workshop of the world.' What is more, subject people could be forced, if necessary, to buy British goods. Britain killed the textile industry of the Indian villages so as to favour the export of textiles from Lancashire. She declared war on the Chinese when they refused to buy opium from British merchants in India.

What is more, and this aspect of it must not be underrated, the changing psychological climate was particularly favourable to the industrial process. As Weber[81] showed, the non-conformist world-view actually provided its rationale and led people to enter into it with quasi-religious fervour, while social conditions, as Hagen[82] has since pointed out, favoured the spread of these attitudes among the population at

large.

Today, these conditions are ever less well satisfied. To sustain industrial society is an increasingly exacting feat. It is this that is reflected by the increasing costs of this enterprise — which we must now look into more carefully.

The Cost of Energy

The unprecedented spurt in economic development that occurred after the last World War was largely made possible by the exploitation of cheap Middle Eastern oil. As it has now come to be accepted that this will have been largely exhausted by the end of the century, and in any case, as even the richest industrial countries are finding it increasingly difficult to finance its purchase in the ever increasing quantities in which they require it, and at an ever rising price, one has witnessed in the last few years a veritable scramble for alternative sources of oil and a frantic search for alternative types of fuel.

In the US, the scramble for oil is proving relatively unsuccessful. Oil exploration is yielding ever poorer results. Thus, from 1860 to 1920, the average amount of oil discovered per foot for each 100 million feet of exploratory drilling in the United States was 194 barrels; the amount then rose to a maximum of 276 barrels per foot and then underwent a precipitous decline to about 35 barrels per foot by the end of 1965.

Even in other areas, exploration has been increasingly disappointing, so much so that according to North[83] 'less than 5% of remaining proven oil reserves is in basins opened up since the end of the 1950's.'

At the same time, when it is found it tends to be further afield in the frozen North of Canada and Alaska, or in offshore deposits in deep and stormy seas off the Scottish coast. The cost of these new developments is thereby predictably high. To finance the British sector of the North Sea, for instance, has been estimated by BP at 42 billion dollars.

In the meantime, industrial countries have made no efforts of any consequence to economise this precious substance and marginal producers facing a short-term or medium-term oil shortage, like Canada and more recently the UK, have exported it whenever they could to help subsidise their unrealistic standards of consumption for yet a few more years. Canada's policy in this respect is particularly short-sighted, as was pointed out at the time notably by North[84] and by Hurtig.[85] According to the former, oil exports went up during the sixties to such a level that by 1972 Canada was selling in one year 5% of its total known reserves to the US — a policy until recently sanctioned by the National Energy Board.

Non-conventional oil sources like the Athabasca 'tar sands are not going to solve the world's growing energy gap, and what is more their development and generating costs are likely to be ruinous. A syncrude plant costs about a billion dollars to set up. To make Canada independent of OPEC oil would mean setting up some seventeen such plants at a cost of a minimum 20 billion dollars. This has been recommended by Hermann Kahn, who suggests that manpower problems should be overcome by importing 30 to 40 thousand South Korean workers, and social ones by implementing the War Measures Act for the duration of the enterprise — a suggestion that has actually been taken seriously by certain Alberta politicians.

Professor North[86] points out the insuperable logistical and financial problems that would be involved. 'Such a programme would oversaturate Canada's access to capital markets and our ability to fabricate or purchase steel, cement or electrical components. It would require the services of more engineers, construction crews and machinery than we could possibly manage. No other major engineering undertaking of any kind could be attempted during the duration of this construction, which would bring in its wake terrifying social, economic and environmental consequences.'[87]

Even with a syncrude plant a year, according to North,[88] Canada would still have a net deficit of a million barrels a day by 1981 — which it would increase with further economic growth. This, of course, would mean further increasing her annual deficit with OPEC.

Other industrial countries would, needless to say, be even worse off. It is difficult to see, for instance, how the US can avoid spending some $30,000,000 a year within the next five years on imported oil. In the meantime, according to a study done by the Chase Manhattan Bank, the Oil Industry as a whole will have to invest some 500 billion dollars between now and 1985, of which 200 billion will have to be raised externally.*

Oil will be providing an ever smaller share of the energy required to power an expanding world economy and hopes are still largely pinned on nuclear power. Their construction, however, is a daunting task, whose cost is likely to be stupendous.

Because of all the problems involved, the cost of putting up nuclear power stations has been rising dramatically, more than twice as fast, in fact, as that of building coal-fired generators. In the US in 1967 the price for a kilowatt of installed capacity was about $100. By 1972 it had risen to above $300. Today it stands at about $800 and is expected to reach $1135 by 1985.

'The cost of breeder reactors, without which nuclear power has a limited life expectancy, are extremely uncertain. Cost estimates for the small Clinch River Breeder Reactor in the US have grown from an original estimate of $700 million to a current guess of $2 billion.'[90] Because of all sorts of snags the total estimated cost of the breeder reactor programme in the US has recently doubled in the space of two years.[91] **

What is more, these calculations are misleading on a number of scores. The US nuclear energy industry, as Lovins points out, benefits from two billion dollars worth of research supplied free of charge by AECL, and a legal dispensation from having to carry full accident insurance.[92] Insurance costs for nuclear reactors are artificially held down by a legislated ceiling on liability.

* 'Traditionally, the oil industry has financed exploration and the majority of capital expenditure from internally generated funds, but over the past ten years, increased costs and government intervention have altered this pattern. A study carried out by the Chase Manhattan Bank shows this trend very clearly. In the early 1960's a group of 12 major US oil companies provided roughly 90% of their own finance — by 1973, this proportion had dropped to below 70% and is expected to be less than 50% by 1980.'[89]

** As a result of President Carter's recent initiative it now looks as though this programme will be abandoned.

In the US this is 4% of what the Government regards as the cost of the worst possible accidents, an estimate that critics regard as unreasonably low. If nuclear power were to bear the normal insurance expenses, its cost per kilowatt would be very much higher.[93]

Furthermore, 'installed capacity' is a misleading measure of a nuclear power station's effectiveness — since, largely because of technological snags, they tend to function well below this capacity. Thus, the capacity factor of US nuclear reactors (kilowatt hours produced divided by potential capacity) was 58.4% in 1973, 52.4% in 1974 and 54.9% in 1975, while, as Lovins points out, the nuclear vendors continue to base their economic analyses upon an 80% capacity factor.[94]

Hayes points out that during the first three years the capacity factor is very low as mistakes are discovered and slowly corrected. For the next three years it is much higher, attaining perhaps 70%. Then corrosion, fuel leaks, component fatigue, and similar problems of ageing occur. Since by this time much of the reactor contains high levels of radioactivity, repairs are of necessity slow. Indeed thousands of workers have had to participate in the repair of a single plant so that no single worker should exceed his maximum permissible radiation exposure. It seems that the same problems have arisen in all other countires. In fact, the capacity factor in 1974 varied from 76% in Switzerland to 20% in Sweden.[95]

In addition an average of ten percent of output is lost during transmission, and four to seven per cent appears to be required to power other parts of the fuel cycle.[96]

Also, as Edwards points out, 'Among the hidden costs of nuclear power, one must include the decommissioning of nuclear reactors, the perpetual surveillance of stored radioactive wastes, and the security measures which will be deemed necessary to protect reactors, shipments, and reprocessing plants from sabotage. Decommissioning a reactor is not as easy as it sounds, because of the radiation levels inside the building.'[97]

A calculation of real costs would also have to take into account the damage that must inevitably be done in the long run by the systematic release of low-level wastes into the waterways and the sea. Some students of the situation, such as Polikarpov,[98] consider that enough has already accumulated, if we are to avoid long-term damage to marine ecosystems and also if we are to prevent the inevitable increase in cancer and mutations that must occur among human populations eating fish in which radioisotopes have concentrated.

The real costs of the release of high-level wastes stored in containers that must corrode long before radioactivity levels have been significantly reduced is likely to be even higher, as is likely to be that of the accidents that must inevitably occur to generators, retreatment plants, and to vehicles transporting radioactive materials. Let us not forget that *there is no such thing as an accident-proof technological device.* Even a typewriter or a washing machine must occasionally go wrong. Up till now accidents have been of a tolerable nature. Even when a passenger aeroplane developed a serious fault, it would only have led to the death of a hundred or so people. This is not the case of accidents occurring to nuclear installations, which could, and in the long-run will, lead to disease, intense suffering and death over wide and often highly populated areas.

All of these factors are likely to conspire to bring about further serious increases in the price of the nuclear programmes envisaged by major industrial nations. There is yet another such factor and one which may play the determinant role. A considerable proportion of the immediate costs of nuclear power is that of the massive amount of energy required for the *construction of the reactors*. This means that as the cost of fossil fuels goes up, so must the cost of nuclear power. What is more, the actual amount of net energy it produces over and above that consumed during construction, still remains very much in doubt, and may in fact be very small indeed, especially if one takes into account the factors already mentioned which cause output to fall so radically below installed capacity.

In Britain, apparently thorough studies of this question have been done by Chapman and Price.[22] They conclude that there is a significant net energy output, but that during the exponential stage of a nuclear-power building programme most of it would be required for building more generators — so that it would contribute relatively little to satisfying all the other insatiable needs of a growing economy — the less so the greater the rate at which the generators are being built.

In the UK, with a reactor population proposed to double every 4.3 years or so, and assuming high-grade uranium ores . . . only about a third of the energy which the programme is supposed to produce would actually be left over for general use after reinvestment in the programme!

As Bunyard points out, this further increases by as much as three times the capacity that must be installed if it is to attain that which, other factors being taken into account, is actually required. In other words, 'a unit of installed capacity will cost about three times as much as has been claimed.'[100]

These calculations, however, assume that high-grade oil is used. With uranium from low-grade ores such as Chatanooga shale, it is likely, according to Chapman and Price,[101] 'that a sustained programme of SGHWRs (the type of reactor adopted in the UK), with a 4.3 year doubling time, *would always be a net consumer of energy: the more reactors we build, the more energy we would lose.*' In other words, the availability of that form of energy on which we count to power our industrial machine, once oil ceases to be available at an economic price, is totally dependent on the availability of such oil.

Whether such studies have been done to calculate the net energy output of CANDU reactors, and hence the energy cost of Canada's nuclear power programme, as well as the other real costs involved, I do not know. Clearly, however, they are necessary, and what is more, it seems unlikely that any valid reasons would be found for supposing that they would fare very much better than those envisaged by other industrial nations.

It is in the light of all these considerations that we must consider the implications of the US's 'Project Independence' — that massive programme of energy

development that would enable that country to achieve its desired independence from OPEC oil importations.

As is becoming increasingly evident, the massive logistical problems involved in the implementation of this programme are just about insuperable. As Professor North[102] points out, it means — among other things — building over half a million new oil and gas wells (more than doubling the present number) involving 2,700 new land rigs, 278 drilling platforms, 230 offshore rigs, 73,000 rig personnel, and 87 million pounds of drill pipes;

- more than 60 new oil refineries, requiring 10 million tons of steel and 41,000 man years of engineering and technology;
- an equal number of plants for oil-shale development and for coal gasification and liquefaction;
- more than 30 new nuclear plants each year;
- more than 140 new coal mines in the east and more than 100 new strip mines in the west;
- plus thousands of miles of new pipelines, both on land and offshore, and half a dozen superports;

apart from the most incalculable costs and trained manpower needs that may be beyond solution, political and environmental obstacles.'

As Lovins writes,[103] 'this ten year US energy programme will cost, in constant dollars of today, about one trillion dollars or a current GNP year. Over those ten years, on average, the US energy sector will therefore require not a quarter as now, but more like three-quarters of all US net private domestic investment. In other words, during the decade half of all the money society has available to spend on houses, schools, hospitals, roads, National Parks, factories — everything except the energy sector — would disappear into the maw of the energy sector . . . *There simply wouldn't be enough money left over after building the power stations to build the things which were supposed to use all the electricity.* And out of that trillion dollars, I mentioned, three-quarters would go for electrification, even though its energy share would be much smaller. So rapidly do power stations burn money that at that margin, the US could save in ten years some $140 billion of its energy investment just by reducing the electrical growth rate from 6½ to 5½ per cent per year.'

To what extent could Canada come to the US's help? Even were it desirable for this country to become further involved commercially with the US, to which already more than 70% of exports are directed, and from which more than 70% of imports are derived, Canada's contribution in this direction would be minimal.

To quote again from Professor North:[104] 'Our total, known, remaining reserves of conventional oil represent less than 15 months of current North American consumption. The proven reserves of the tar sands, those accessible to strip mining, the only established technology for their exploitation, represent for North America an extension of reserve life of four years — not several hundred years, as many people seem to imagine. Canada's total known reserves of natural gas, including those in the Arctic which may never be made available, constitute a supply of about thirty months at present North American consumption rates. The reserves of gas so far known in the Mackenzie Delta, after nine years of drilling, would keep the proposed 48 inch pipeline filled for four and a half years.'

As Mel Hurtig suggests,[105] the most desirable form of co-operation that could be entered into between Canada and the US would be *to co-operate on a plan for reducing energy use.*

Total costs

The total cost of energy developments until 1985 has been estimated by OECD at between 1200 and 1600 billion dollars — and this is considered by many students of energy economics to be very conservative indeed.

Where, it might be asked, is this enormous sum of money supposed to come from? The OPEC countries? This is unlikely as their surplus is likely to be far less than estimated. Several are busy building up industrial societies of their own, which will soon suffer from the same problems which inevitably affect others and towards whose 'solution' an increasing amount of capital will have to be diverted. They are also busy building up large modern armies whose appetite for capital-intensive equipment seems almost limitless.

Iran has already had financial difficulties and will undoubtedly have more. The greatest danger, however, stems from the fact that the immigrant population of many OPEC countries is fast building up, and it can feel no allegiance to the traditional autocratic regimes under which they now live. Equally dangerous is the development of a large student population, that is being nurtured on the 'progressive' ideas which will lead it to regard such regimes as 'antiquated' and 'reactionary'

The elements favouring a revolution of the type that has dislodged traditional regimes throughout the world in recent times are likely to be increasingly present — in fact, it would seem extremely unlikely that a revolution could be avoided in the majority of the OPEC countries, in the coming years. What would be the investment policy — or any other policy for that matter — of the revolutionary governments likely to take over, is a matter of conjecture — but there is no reason for optimism on this score.

In any case, in order to satisfy short-term political exigencies, a large proportion of the present OPEC surplus is being used by the West to finance the maintenance of present unrealistic consumption standards and in particular the plethora of institutional services provided by central and local governments, to whose reduction (especially in the UK) there is considerable resistance.

This clearly means that ever less money is likely to be available for the massive investment programme required to sustain industrial society in the next decades, much of which will have to come from government sources*[106]

* Assuming that the US economy grows at something approaching 6% which appears necessary to reduce unemployment to an acceptable level, the US capital needs from now to 1985 could exceed the available supply of savings 650,000 million dollars — according to a series of studies by the New York Stock Exchange. Companies, according to these studies, will probably have to raise 250,000 million dollars by issuing new shares and are likely to fail to do so by as much as 70,000 million dollars.[222]

What then is likely to happen? The first development is clearly likely to be an increase in the price of petrol and electricity and indirectly of those consumer goods and services in whose production they play a particularly important role. These price increases cannot proceed indefinitely especially in a period of economic depression, without triggering off a positive-feedback process towards economic contraction.

Certain California utilities, as Lovins said in a recent talk in Toronto, are already telling their customers that the price of electricity will triple between 1980 and 1985. People will simply have to buy less electricity. The utilities will be in trouble. No-one will buy their bonds, the price of electricity will rise again, further reducing demand.[107]

The lesson for Ontario is clear, according to Lovins. 'If Ontario Hydro persists in rapid growth,' he warns, 'in a world which has fundamentally changed, I forsee the Province, not too long from now, getting into the same mess as New York State; people buying Provincially backed Hydro bonds will look through the backing to Hydro and will decide that Hydro can't be counted on to service its own debt. Thus, the Provincial Treasury will have to be emptied to bail out Hydro. I think that the down rating of Hydro's bonds after the failure of last year's flotation is the first of many warning signs.'[108]

The answer is for Ontario to stop trying to bring about any further increases in electricity generating capacity, and as he says, 'now is the right time to start, with the 38% reserve margin in electricity which will jump to around 50% when Bruce and Wesleyville come on stream.'[109]

However, to fully appreciate the logistical and financial problems involved in providing the industrial world with the energy it requires in the next decade, one must try to see them in the light of all the other logistical and financial problems which our industrial societies will have to face.

Pollution costs

Ten years ago, no one would have considered pollution as providing one of a country's major financial problems. The point has been reached however, where the capacity of the natural systems that make up the biosphere to go on absorbing with impunity the ever increasing quantities of the two million or so pollutants we are continuously exposing them to, is being severely strained.

The damage done, let us not forget, is cumulative, over and above the rate of natural recovery, which is, in relation to the damage, minimal. What is more, the problem is no longer purely a local one, it is becoming increasingly global. Throughout the world, mainly by annihilating fish populations (especially in inland waterways), by reducing fresh water supplies, by stunting plant growth, by corroding buildings, and significantly contributing to the development of a new set of diseases of which cancer is the most widespread and the most devastating, it is visibly beginning to affect the nature and extent of human activities and hence that of the economic process to which they are increasingly geared.

What is important to realise is that the costs involved must be paid for one way or another, either directly or indirectly in the form of expenditure on pollution-control installations. Most of it, as it happens, is likely to be paid in the former way, because pollution-control is not that effective and also because the capital to pay for it is unlikely to be made available in anything like the amounts required.

For this there are two obvious reasons over and above the general shortage of capital.

Firstly, pollution still ranks low in the average man's preoccupations, and hence among Government priorities. Neither growing affluence, nor increased knowledge of environmental problems seem to influence governments to spend more on pollution-control than is essential to keep the economic machine functioning and to take the air out of the sails of the more clamorous environmentalist movements.

Consider for instance that neither Hull nor Montreal are equipped with any sewage treatment plants of any kind — and that the excrement of their inhabitants is simply released as raw sewage into the nearest waterway. Seen in the light of the latter's megalomaniac extravagance, in building a complex of tunnels and motorways which make its approaches more daunting than those to Los Angeles, in constructing the biggest airport in the world, and in putting up the most ambitious installations of all time to accommodate a one-off sporting event, this can only be regarded as truly scandalous.

Secondly, many industries simply could not support the full cost of really effective pollution control. This appears to be true of feedlot operators, who very often cannot get rid of animal wastes save by dumping them in the nearest waterway.

It appears to be true of the asbestos industry. The fibres most closely associated with asbestosis and lung cancer seem to be the smallest ones — which can only be detected with an electron microscope and which it is unlikely to be economic to control.

It is certainly true of uranium mining, in which the casualty rate from lung cancer among miners must remain inordinately high (as much as 50% in some mines, it appears).

It is so of the nuclear industry in general, which has not found a means of reducing the exposure of its workers to levels as much as thirty times higher (5 rems which is the new proposed annual limit in the US) than that at present judged acceptable (0.17 rems) for the general public, nor of separating its wastes from the biosphere for anything like the time they will remain highly toxic to most forms of life.

In general, it must be so of all those industries making toxic synthetic substances which cannot be effectively recycled by life processes such as PVCs, PCBs, organophosphate and organochlorine pesticides, etc., whose general use, as Commoner has so convincingly shown, has been responsible more than anything else for the radically increased pollution of the last decades.[110] There is probably no economic means of preventing these substances — when in general use as they are today — from causing serious biological damage, save by not producing them. Since this would

mean correspondingly reducing economic activity, it it not today acceptable.

In spite of this, pollution-control in the US, according to the Council on Environmental Quality (CEQ), is likely to cost 194 billion dollars in the decade 1973 to 1982 with peak spending in 1976 amounting to 320 dollars per family of four. This means an expenditure of nearly 20 billion dollars per year. It is admitted that even this will not effectively cut down pollution damage. According to CEQ, it will lead to a general improvement in air pollution. Water pollution problems, on the other hand will probably get worse. There is likely to be little progress in land use planning, and pesticide production is likely to continue growing.

The total costs are likely to be very considerably higher — and, at the present stage of the art, largely unquantifiable. Several attempts, however, have been made to calculate some of the biospheric costs of pollution, and to show how they must eventually be reflected in economic costs.

Watt[111] considers this problem with respect to four Californian counties, two of which, Santa Barbara and San Luis Obispo are relatively air-pollution free, while the two others, Riverside and San Bernardino, are close to Los Angeles, and hence highly polluted. He found that the incidence of respiratory diseases is two to five times less in the former than in the latter. He considers that clearing the air pollution would reduce the death rate by 38%. Further material from both the US and the UK, according to Watt, suggest that this is an underestimate and that 50% would be more realistic. He considers that the direct costs are so high that 'almost any expenditure to control air pollution in big cities would be justified.'

Zerbe[112] calculated that in 1965 air pollution costs in Canada were $52,46 per head, $70.94 in Ontario and $93.98 in Toronto. On the basis of these calculations, *Pollution Probe* estimate that by 1980 these figures would be respectively $115.38, $156.78 and $207.70 — assuming that pollution levels will increase in proportion to economic activity and population trends. This would mean total costs by 1980 of over 4 billion two hundred million dollars for Canada as a whole, nearly 2 billion dollars for Ontario, nearly one billion 800 million for Toronto.

These figures only take into account a fraction of the probable total costs, direct or indirect. No value is assigned, for instance, to human suffering or death, aesthetic costs or ecosystem damage — all of which in a variety of ways, must eventually be translated into economic costs.

In general, the real costs incurred by industry in polluting our natural environment have only just begun to be internalised and as this proceeds, which indeed it must do, so will the viability of industrial enterprise be correspondingly reduced.

Consumerism

If the public is beginning to awaken to the cost of pollution it is also beginning to feel that its interest as consumers does not always coincide with that of the producers. This new awareness, whose flames have been fanned by the activities of the indefatigable Ralph Nader, is giving rise to a very considerable increase in the costs of regulating industrial production so as to assure that consumer products conform to the ever more exacting new standards set by Government in answer to ever more vocal consumerist agitation.

In the estimation of President Ford $130 billion dollars — or 2,000 dollars per family — are spent every year just in enforcing these standards. Their cost to industry is, needless to say, considerably higher.

As a result of the pressure applied by the Consumer Products Safety Association, the price of a 100 dollar lawnmower is said to have gone up to 185 dollars[113], that of automobiles so as to meet current safety as well as pollution standards by $320[114]. Tyre manufacturers complain that safety standards have increased their costs by $150 million[115] while Federal Drug Standards are said to cost consumers 200 to 300 million dollars a year.

The regulations established by the Occupational Health and Safety Administration (OSHA) are said to have increased costs in all by as much as 3.12 billion dollars[222] and these, it is expected, will rise very considerably once new noise standards are established.

Particularly significant is the result of a public survey which showed that 56% of Americans want even more government regulation and only 45% want less, which seems to reflect the growing mistrust of industry. It suggests that these new costs will have to be met if the public is to be persuaded to accept the industrial way of life; and indeed, as awareness grows concerning the real costs of industrial activity, they can but increase still further.

Social costs

In a traditional society, the functions of social control are assumed by the family and the small community at no financial cost. The reason is that both these basic units of social organisation are self-regulating, as are the other natural systems — biological organisms, ecosystems etc. — that make up the biosphere.

A mother does not have to be paid to look after her children, nor to assure the proper functioning of her household. Nor does a husband have to be paid to assure his family's material sustenance and protect it from the various challenges to which it may be subjected.

This is also true of the small community when left to itself. The members of an African tribe, for instance, all participate in its government simply as a matter of course. It is their duty to do so, and also their cherished prerogative. The same is still true of those few communities in Europe where participatory democracy is still practiced, for instance in a number of the more rural Swiss Cantons.

It ceases to be the case, however, once the functions normally fulfilled by the family and the community have been usurped by an institution that is external (asystemic) to these natural systems, thereby rendering them redundant and assuring in this way their inevitable disintegration.

This, however, gives rise to two sets of costs: firstly those involved in paying for the institutions that attempt, rather inadequately to take over; secondly those involved in controlling the pathological symptoms of social disintegration, which must inevitably manifest themselves in different forms.

Thus, the educative function of the family and the community has been largely usurped by the state, which has given rise to the ever increasing cost of putting up and operating a plethora of educational establishments. Increasingly, things that were once learned during the course of growing up within the family and of everyday living within the community, must be formally taught with the aid of increasingly elaborate technological devices, in specialised educational institutions of some sort, and the cost is rapidly getting out of hand. At the same time this means a reduction in family and community responsibility. It also means that youth is correspondingly submitted to socially random influences, i.e. influences that are not designed to help them fulfil their family and community functions which is what education, in traditional societies, is all about.[117] The result of this is further social disintegration and further institutional costs.

The economic functions of the family, in particular, have been usurped by the developing cash economy. Such functions as tending the vegetable garden, baking bread, cooking the family meals and making the clothes for the different members of the family, contributed to its cohesion and assured that it remained a real unit of behaviour. Increasingly, today, both husband and wife must go out to work to pay for the growing number of material goods and services required for the purposes of everyday living. Very few activities occur in the home — which is largely empty except at night. Food is bought in supermarkets — convenience foods at that requiring the minimum of preparation in the home; while clothes and other material goods are all bought in shops. Even entertainment is provided from the outside in the form of radio and television programmes.

Just as people increasingly live in dormitory suburbs, they now also live in dormitory homes — lifeless shells — that provide an ever less adequate social environment for their members.

The economic functions of the community that once contributed to making it a viable social unit have been largely usurped by large commercial concerns. The very shape of a modern settlement is that which best favours the functioning of such concerns; social considerations being regarded as almost irrelevant and people being moved from one community to the next in accordance with the requirements of their work — which prevents the establishment of any durable social bonds. It is said that in the US less than 15% of people live in the area in which they were born.

The welfare function of the family and community have also been usurped — largely by state institutions. Day-care centres are increasingly exempting women from the duty (and the pleasure) of bringing up their children, while old people's homes exempt them from those of caring for the elderly, and vast free state-run hospitals make it unnecessary for them to look after members of their family who should happen to fall sick.

Once the family and community have been effectively destroyed in this way, people become entirely dependent on state welfare. As this occurs, a veritable new social class comes into being, which Jordan[118] refers to as the 'Claiming Class'. Its development in industrial countries is noticeably giving rise to a right-wing reaction among the working classes, who despise the claimants and resent their ability to obtain, by various bureaucratic stratagems, all sorts of financial benefits for very little work. This, together with a similar resentment for foreign workers and immigrants of different ethnic groups, is probably the most important new factor in the politics of many industrial countries.

The social control function of the family and the community has also been usurped by increasing government control of almost every aspect of people's lives. Public opinion, reflecting traditional values, has always been the only really effective instrument of social control. There is little social deviancy in an African tribe, nor even in a rural village — to the extent that it has succeeded in remaining outside the orbit of the larger conurbations. The cost of replacing this self-regulating mechanism by external institutions — the police force, law-courts, prisons, and every type of institution for caring for those who have resorted to some form of retreatism in an effort to escape from the intolerable social environment — is increasingly exorbitant, as is the direct cost of the damage done by these different types of deviants.

These are all the social costs of economic growth and, as they increase, so do they render industrial activity that much less viable.

A measure of family disintegration in the US is provided by the following facts. In 1973, there were 913,000 divorces in a single year, one for every four marriages.[119] In 1974, 6.6 million families were headed by women (one out of every eight, a fifty per cent increase since 1955) many of whom, indeed a greater proportion than ever before, had never married.[120]

In Britain[121] there were 621,000 single women struggling to bring up 1,080,000 children — who will thereby all be subjected to different degrees of family deprivation and will grow up to display a correspondingly pronounced tendency towards some form of social deviance.

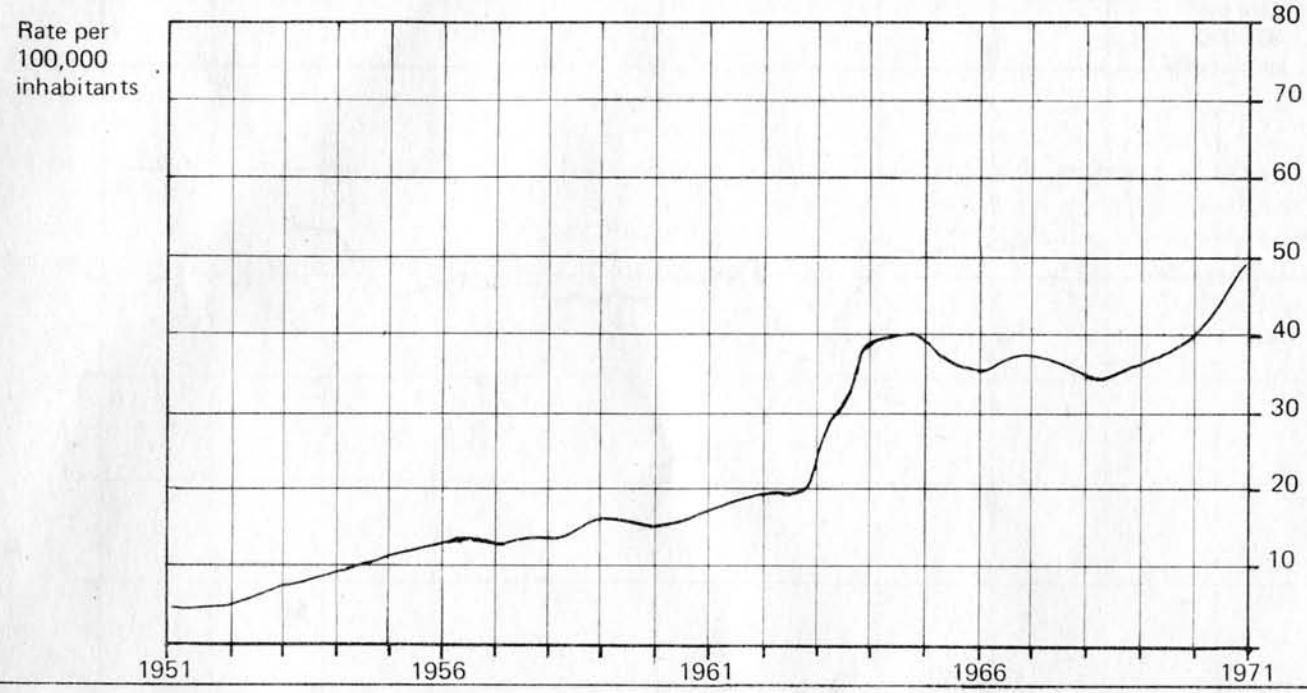
It must be noted that this situation could not occur in a traditional society, in which firmly entrenched cultural patterns strongly backed by public opinion prevent a situation arising in which children could be brought up in an unsatisfactory family environment of this sort.

What makes matters worse is that divorced women are finding it increasingly difficult to obtain support from their husbands, of whom, according to a study in Wisconsin (1972) 20% were in arrears on payments after one year, and 42% were paying nothing at all.

What is more, in general the women concerned must work full-time which means that their children are not only deprived of a father but, during most of the day *of a mother as well.*[122]

A further measure of family breakdown in the US and the UK is the increasing violence within the

Figure 7
The Rise in the level of Alcoholism in Canada
Perspectives Canada



remains of the family unit. Battered wives have suddenly emerged in the UK, and also in the US, as a major social problem. In many US cities, domestic violence often leads to death, and is indeed responsible for a high proportion of all murders.

Another measure is the number of runaway or 'throwaway' children, which is increasing very rapidly. In 1975, it was expected that the figure for the USA would increase by 50% over the 1974 figure.[123] Their fate is generally unpleasant. Among other things, they provide the principal source of prostitutes in most large American cities.

A further measure is the increased abandonment of old people, who tend to be confined to institutions, where they are 'stored' at very considerable cost — often under heavy sedation — until they die. In Britain, the cost of maintaining the aged is said to absorb nearly 45% of the country's total expenditure on welfare, a figure that is expected to grow with the predicted further increase in their number in the next decades.

In the US, the fund established to provide old-age and disability payments is proving insufficient to do so. By 1990, it is expected that the system will be running a deficit of 20 billion dollars a year. There just will not be enough money collected in the future to pay off all the benefits that people have been promised (whose cost has gone up from 0.3 billion dollars in 1945 to 68.9 billion dollars in 1975 (est.).[124]

Alcoholism

The number of alcoholics in the United States nearly doubled between 1958 and 1971, while that of alcoholics as a percentage of the population has more than doubled (from 2% to 4%).[125]

The cost of alcoholism in terms of loss of wages and productivity alone has been estimated at 10 billion dollars — which, if one takes into account the cost of treatment, the associated crime and delinquency and vandalism, the family and communal tension and deprivation, that it contributes to, must be but a fraction of the real cost.

Suicides

The number of suicides in the US has risen by 50% between 1955 and 1973. In 1973, 24,440 people are reported as having committed suicide. Only a proportion of suicides are registered as such. If all were registered it is estimated that suicide would rank as fourth or fifth among the causes of death. It is estimated that between 70,000 and 80,000 young people between the ages of 15 and 24 will attempt suicide in the US this year and between 3000 and 4500 will succeed.[126] In Canada, as is apparent from figure 9, the suicide rate has doubled in the 49 years between 1921 and 1970. The cost of this, the ultimate form of retreatism, has, as far as I know, yet to be estimated.

Crime

Crime can be intimately linked with all the other symptoms of social disintegration. As Murphy, President of the Washington Police Foundation, writes: "We have to face facts. There is too much instability in our cities. As long as we have unemployment, underemployment, broken homes, alcoholism, drugs, and mental health problems, we are going to have crime."

And along with the rest of these problems, crime has risen in the US and the UK in the most dramatic fashion. In the US, the number of crimes rose in the ten years from 1963 to 1973 from 314,230 to 861,000, while aggravated assaults during the same period rose from 172,250 to 412,000.

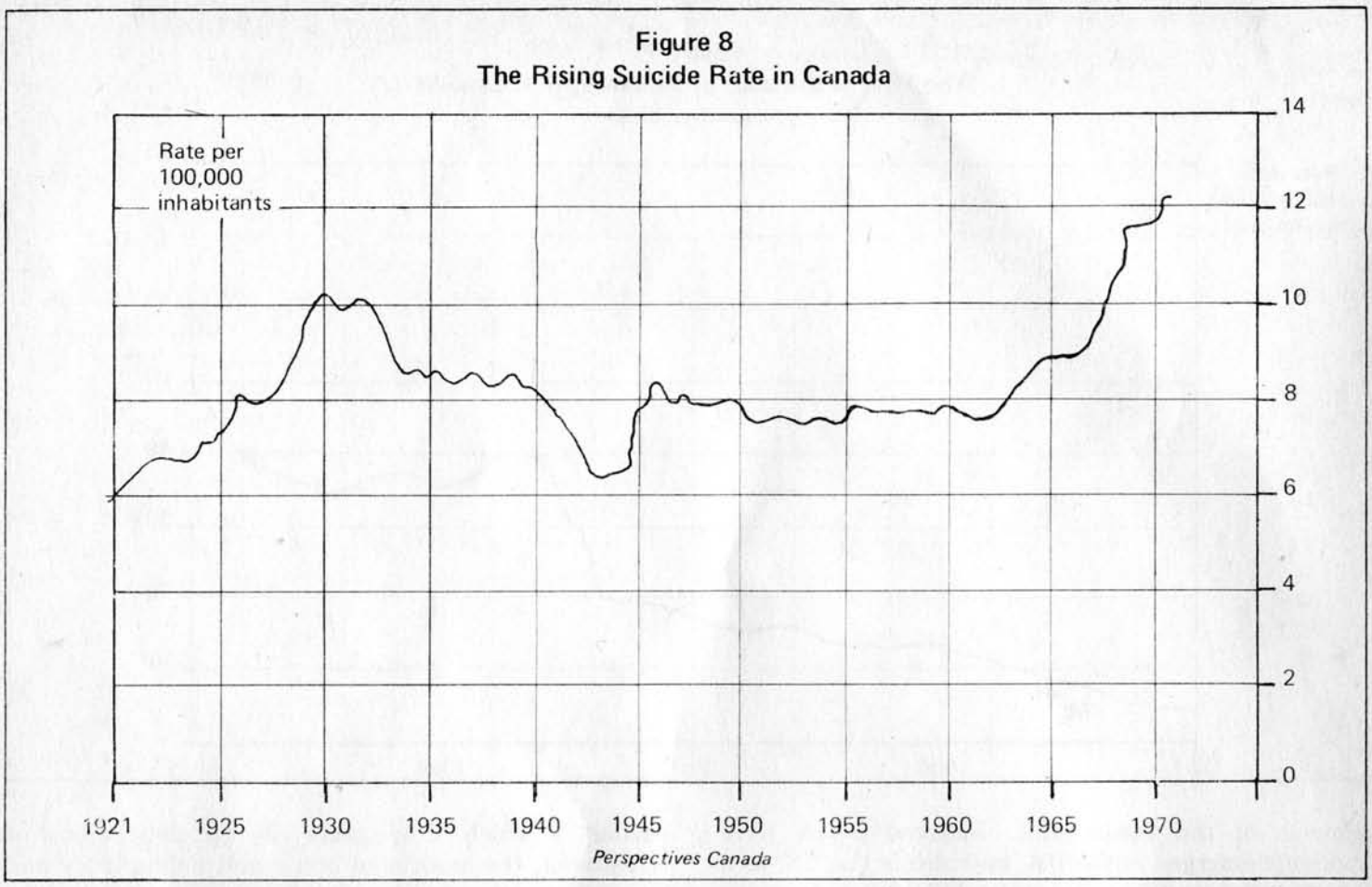


Figure 8
The Rising Suicide Rate in Canada

According to the FBI, in 1974, 42 million dollars were stolen in robberies, 1.2 billion in burglaries and 816 million dollars worth in larcenies. These costs are expected to go on increasing.[127]

What is more, theft is constantly taking new forms. Arson for profit, for instance, is now said to be an established business, and according to insurance experts, one hundred thousand fires were set in 1974 to collect insurance, the cost exceeding 350 million dollars. One of the side-effects, of course, is to bring about a corresponding increase in insurance premiums, which further affects economic viability. According to a firm of brokers[128] specialising in channelling funds into the thriving crime-control business, the economic impact of crime and related expenditures — including police, corrections, the courts, prevention services and equipment — exceeded 21 billion dollars in 1971. This figure, they regarded as 'only indicative and does not include the value of loss or damaged lives and/or property, or the cost of the fear and suffering generated by the impact of crime.'

One must also take into account that all crimes are not reported to the police, indeed it would appear that in the US less than half are. Acording to the Law Enforcement's Assistants Administration, the number of crimes committeed in some cities is more than five times the number reported.[129]

The same trends are visible in other industrialised countries. Thus, in Sweden, the crime rate has jumped 90% in a decade. In the UK a recent report estimates that the cost of crime in Britain in 1974 was at least £1,670 million and this does not take into account everything. 'Many crimes are not reported for instance and figures of losses from arson do not take into account the disruption of business and employment, the loss of overseas markets, etc. It is estimated that in 1975 the cost will be about £2,000 million.'[130]

Visible trends in our industrial world undoubtedly favour further increases in the crime rate. The large-scale introduction of women into the cash economy, for instance,has led to a massive increase in female criminality. In the US, between 1968 and 1973, the arrest of women for serious crimes ranging from car theft to murder went up 62% compared with only 8% for men.

Vandalism

Another measure of social disintegration is the increasing vandalism in industrial countries. It is particularly high among youth in the larger cities. In the US the damage done to schools by vandals in the academic year 1972/3 was estimated to be half a billion dollars, working out at about $10.87 per pupil, or about the same as the amount spent on text books that year.

The total cost of vandalism to the nation is hard to estimate. According to the police, only one case out of three gets reported. What is certain is that it is colossal and increasing every year.[131]

Health

If an industrial society provides an unsatisfactory social environment for its members, it is biologically equally unsatisfactory — so much so that it is giving rise to a new range of diseases — the so-called diseases of civilisation.

These include most forms of cancer, ischaemic heart disease, diabetes, diverticulitis, peptic ulcer, appendicitis, varicose veins and tooth caries. Their incidence appears to increase very much in line with per capita GNP, and their human costs are rapidly coming to be reflected in economic costs. Health costs are also increasing very radically in line with general demoralisation and alienation. Psychological problems are multiplying as are prescriptions for sedatives and tranquillisers.

Modern medicine, depending as it does on the use of medicines of increasing biological potency (such as antibiotics and corticosteroids), tend to give rise to all sorts of side-effects. Iatrogenic diseases are, in fact said to account for a high proportion of current disease. Various figures have been quoted. At the recent meeting of the British Association, it was suggested that they accounted for perhaps 20% of all disease, 'and this may only be the tip of the iceberg.' [132]

Its efficacy in reducing the incidence of the diseases it is designed to deal with has been overrated, as it is primarily concerned with treating their symptoms. Its inability in the long run to control infectious diseases has already been pointed out.

For these and other reasons, economic growth must lead to a continual increase in the cost of disease and its control. So much so, that in 1975, the US spent 118 billion dollars on health services, which is $547 for every man, woman and child. This represents a 13.9% increase from 104 billion dollars two years ago. [133]

If medical costs were to go on increasing at this rate, it would reach a stupendous 500 billion dollars by 1985 — or half today's Gross National Product.

It goes without saying that none of these trends towards ever increasing expenditure on counteracting the biological, social and ecological destruction caused by economic growth can continue to be met for very long.

This is yet another set of trends that cannot be projected into the future. Regardless of their ideological commitments, governments will have to cut down ever more drastically on every sort of expenditure — in particular, on that designed to maintain all those institutional services that are expected of a welfare state. This must be the only way to make available more capital for investment in capital goods — energy installations, factories etc. Since governments will still be short of capital for this purpose, investment in the production of all but the apparently essential consumer products will slowly be abandoned. In any case, with the growing inflation and reduced economic growth, ever fewer people will be able to afford them.

All this means an implicit abandonment of the philosophy and goals both of the welfare state and also of the consumer society. It means, in fact, that we are now entering, at best, a period of economic contraction, at worst one of economic and social collapse.

Which it is to be depends very largely on decisions that must be taken now — that should, in fact, have been taken some five years ago, when the issues involved were first presented in concise form to the decision makers and the general public.

It depends on whether we decide to adapt to the new conditions that are unmistakably emerging, or obstinately cling to ever more obsolete socio-economic forms which must inevitably be eliminated by the brutal and unsparing hand of natural selection. It depends, in fact, on whether we assume responsibility for the necessary adaptations, or alternatively, as we put it, in *A Blueprint for Survival*, we decide instead to 'delegate to disaster.'

The Conserver Society

Clearly if Canada is to avoid major discontinuities of a type capable of bringing its economy — and hence its society, which has increasingly become an appendage to it — to its knees, it must make itself less dependent on the use of resources which will become ever less available and increasingly more expensive. *Canada, must, in fact, learn to conserve rather than to consume.*

Such a policy is all the more necessary if we consider what a massive proportion of world resources is consumed by the industrial nations at the expense of the non-industrial ones. It is possible that it was this consideration which above all prompted the Science Council to recommend in January 1973 that Canada became a conserver society.[134] 'We cannot,' wrote the authors, 'continue to endorse continental or global resource policies which will contribute only to the disparity between the rich nations and the poor. A small number of nations now consume a large proportion of the earth's resources. Within this global context, the Science Council recommends that Canadians as individuals, and their governments, institutions and industries begin the transition from a consumer society, preoccupied with resource exploitation to a conserver society engaged in more constructive endeavours. Ideally, Canada could provide the leadership necessary to work toward more equitable distribution of the benefits of natural resources to all mankind.'

This is indeed an historical decision, one that has given Canada a considerable lead over other industrial countries, in the task which all will soon have to undertake, that of adapting for the new era that dawns before us.

The establishment of the Advanced Concepts Centre at Environment Canada* is a further step in this direction. This body is free to study all the possible implications of the conserver society.

Yet a further step has been taken with the appointment of a team under Professor Cimon Velaskakis, whose members are drawn from McGill and Montreal Universities to study the details of a plan for the establishment of a conserver society for Canada — the Gamma Project.

It is undoubtedly the case that a very considerable saving in energy and resources can be achieved without radically altering lifestyles; even in Canada, where the climate is particularly cold and where as a result the high level of energy consumption simply for heating purposes is often regarded as essential. It is pointed out, however, by Wood[135] that the Swedes with a similar climate to the Canadian one also enjoy a very high standard of living yet their per capita consumption

* This body has now been merged with the Science Adviser's office at Environment Canada.

of energy is only 60% of that of the Canadian people. The potential for energy saving is also greater than most people think in the case of housing. In this field, techniques for energy saving as McCallum[136] points out, include minimising surface area to reduce heat loss, building houses of local materials to avoid transport costs and the use of energy intensive materials, orientating the house in an east-west direction and on a south slope in the northern hemisphere, putting windows on the south side only, building a greenhouse on the south side to trap the heat, planting deciduous trees around the house to regulate temperature, and using conifers as windbreaks, since wind-speed is related to heat loss.

It is probable that the most effective of all these measures is to ensure careful insulation.[137] It is considered that in Scandinavia, if one has a thousand dollars to spend on heating a house, $900 should be spent on insulation. In the UK, it has been estimated that it would suffice to double insulation standards in the home in order to reduce the energy used for heating by 50%%.[138]

The potential for reducing energy and resources used in industry is even greater. Thus, Wood[139] refers to studies in the USA by Makhijni and others at the University of California, which estimate that if the automobile industry used recycled materials and made smaller cars (2000 lbs instead of 3000 lbs) the saving in energy by the year 2000 would be equal to the output of nine large nuclear power stations.[140] In general, recycling offers a great potential as according to Wood, 'the energy required to extract and process virgin materials is in almost every case very much greater than that needed to recycle discarded materials. For example, making aluminium from bauxite requires approx. 55,000 kwh/ton while recycling discarded aluminium to the same state requires less than 5% of that — between 1300 and 2000 kwh/ton.'[141]

The idea that such a programme would reduce employment in the period in which the unemployment level is already very high is without basis. Considerable employment would be provided by manufacturing and installing the new technological infrastructure for a decentralised low energy society. According to Wood,[142] for instance, it has been calculated by Senator Hart, 'that if one-fifth of ground traffic were shifted to public transport, 1.5 million new jobs would be created by 1985, including 51,000 in the construction industry, 134,000 in repairing road beds and electrifying lines, and 450,000 manufacturing for which an estimated 225,000 workers annually could be drawn from the ranks of unemployed auto workers.'

However, it is undoubtedly true that as this programme got under way and the capital intensiveness of employment were systematically reduced, the material standard of living would fall, as indeed it must do if the QOL is to increase.

In any case it will soon be realised throughout the world, that the provision of jobs at the present level of capital intensiveness will no longer be possible on anything like the scale required. *It will, in fact, only be by reducing the capital intensiveness of employment and thereby the cost of providing a job that there could be any hope of reducing unemployment.* [143]

What reduction in the use of energy and resources is possible without radically affecting the Canadian lifestyles and at what rate can it be achieved? According to Amyot, an economy of 10 to 20 per cent is possible by 1985. By the year 2000 he considers that this could be increased by 15 to 30 per cent. He suggests that it would be more realistic to aim for a 15 per cent reduction by 1980 and a 25 per cent one by the beginning of the next century.[144]

My personal feeling, based on conversations with MacKillop and others, is that a saving of between 40 and 50 per cent could, in fact, be achieved without bringing about a transformation of the Canadian way of life.

However, even if such a programme were achieved, the Canadian economy would still be dependent on non-renewable resources, and economic activity would still be of a nature capable of causing continued and ever less tolerable biological, social and ecological disruption.

For this reason, as McCallum writes, 'we must gradually move through a period of mixed renewable and non-renewable energy usage to a future period in which renewable sources of energy supply *all* our energy needs. It is only in this way that we can achieve a healthy relationship between human beings and the environment and also solve the problem of resource depletion.[145] The advantage of renewable resources, apart from their renewability and hence their sustainability, is that their use gives rise to the minimum number of problems — or externalities. Wind-power and solar energy do not cause pollution. Wood burning has fewer deterimental effects than coal burning. As McCallum[146] points out: it does not give rise to SO^2 pollution and the wood ashes unlike coal ashes can be directly recycled and used as fertiliser.

What would be the implications of this from the energetic point of view? In Canada 45 per cent of the energy used comes from oil, 20 per cent from gas, 10 per cent from coal, 1 per cent from nuclear generators, 1 per cent from wood, and 23 per cent from hydro power.[147] Broadly speaking about 25 per cent of the energy used in Canada is from renewable resources, but this is very much higher than in most other countries. It must also be remembered that the potential for increasing energy from wood is very considerable in Canada as are the possibilities offered by wind and solar energy.

These have been looked into very carefully by specialist consultants to the Advanced Concepts Center and one need not go into the details here. What is essential to realise, however, is that *even in Canada the exploitation of renewable energy resources alone would not suffice to assure the maintenance, let alone the continued growth of an industrial society of the type we have known in the last decades.*

To begin with it would be limited by the availability and cost of resources required for the appropriate installations. Chapman[148] has done some of the basic calculations for the UK. He writes: 'to convert all 18 million houses to solar heating requires some 3.25 million tons of aluminium. Even allowing the conversion to be spread over a long period produces problems. At the peak of the conversion programme, cor-

responding to 700,000 houses per year, the material demands would use up half the UK produced aluminium, almost three quarters of the UK sheet-glass production and more than twice the UK copper production.'

The Ecological Society

The implementation of a programme to achieve a real conserver society should be the Canadian Government's top priority and in view of the high degree of awareness of the problems involved among top Canadian civil servants both at a Federal and at a Provincial level, this should not be too daunting a challenge. But would this be enough? Would this enable Canada to achieve a sustainable society? The answer is unfortunately no, as should be clear to any reader of this report.

Even after all the apparent wastage in the Canadian economy has been removed, and after all possible technological expedients have been exploited within the framework of a conserver society, the Canadian people's consumption of non-renewable resources and, in general, their impact on their natural environment will remain very considerably higher than can be sustained for more than a generation or so.

This would be so even if a regime of zero-population and zero-economic growth be achieved, for this impact is *cumulative* (over and above the rate of natural biospheric recovery). *It is not just further demographic and economic growth that is intolerable, but the maintenance of the present impact of human activities on the Canadian natural environment. In other words, it is not zero growth, but negative growth, that must be achieved.* It may be argued that the Canadian economy is heading in that direction in any case. However, it must be realised that *economic contraction would be a very different thing, on the one hand,* in a society that has been specifically organised to negotiate it as *smoothy as possible, and on the other, in one that has remained geared to the ever less achievable objective of economic growth.*

For negative growth to be possible without causing socio-economic discontinuities, it must involve a planned change in lifestyles.

The goal of the second phase of our programme, that which will lead us to an ecological society, is thus very different from the goal of our first phase, which gave rise to a conserver society. *If the goal of the latter is to conserve resources so that present lifestyles might be sustained as long as possible, that of the former is, on the contrary, to change lifestyles so as to reduce the need for these resources.*

There are two reasons why an ecological society cannot be brought about immediately. The first is that the principles that underlie it are incompatible with current values and with modern science, which faithfully reflects them. The second is that the physical infrastructure of our highly urbanised industrial society is totally unsuitable for a de-urbanised and largely de-industrialised ecological society.

It must follow that during the conserver society phase, a determined effort must be made to modify our current values and reformulate the knowledge taught in our schools and universities so that they may provide the rationale for the policies Canada must embark upon to ensure its survival, while at the same time, the foundations of the physical infrastructure of an ecological society must be laid.

It is probably the former task that is the most daunting problem, and it is worth examining some of its implications.

The Ecological Approach

If we were persuaded to embark on the adventure of economic growth on such a scale and with such enthusiasm, it was that we were imbued with a view of the world which led us to regard it as the only means of achieving our own welfare as well as that of mankind in general. The history we learned at school was viewed as a linear process from our original state of barbarity to one of civilization, from being the slaves of nature at the mercy of its every caprice, to becoming its masters, subject only to laws of our own making. The economics we were taught assumed that the benefits available to us were of a material nature: it attributed no value whatsoever to non-material benefits, those that satisfied the needs of our ancestors for millions of years before the coming of industry — clean air, sweet water, fresh foods, beautiful landscapes, wild animals, a festive and convivial life — which means that it was possible systematically to suppress them without incurring any costs.

Our sociology, rather than see a human society as a self-regulating natural system governed by the same basic laws to which all natural systems are subjected, as has been true of well over 90 per cent of all the societies developed by man — has seen it as a heterogeneous mass of people who happen to live in the same area and be governed by the same institutions.

In this way, mass society, of today, instead of being regarded as the cancerous aberration that it is, has come to be regarded as the norm, its obvious failings being attributed to technical deficiencies in the institutions that control it.

In such conditions we have no alternative but to rewrite economics, history, sociology, and all other disciplines which are implicitly based on the world view of industrialism. The knowledge imparted in our schools and universities would then come to provide a rationale for the programme of change which must undoubtedly be adopted and which could not be justified on the basis of academic knowledge as it is organised at present.

A new economics would concentrate on measuring real costs and benefits as opposed to immediate economic ones. The goal of government would then be to maximise real benefits and minimise real costs. This would be perfectly achievable economically, since it would mean reducing both immediate economic benefits and costs.

Already, attitudes on this subject are changing very fast indeed. The quality of life in the working place, for instance, is becoming of much greater concern. The simple expedient of paying people more money is likely to prove ever less sufficient to induce them to work in uranium mines, steel works, nuclear power stations or vast urban factories. They will want a more meaningful existence, and to do work which is more

relevant to their welfare and survival — as was that of our ancestors who lived by hunting and gathering, or those who lived by subsistence agriculture, or plied some self-fulfilling craft within the socially satisfying environment provided by the traditional family and small community.

As is pointed out in Environment Canada's *Perspective on the Next Decade*, 'What does seem likely is that the period ahead will witness mounting resistance to mechanistic work carried on in environments not conducive to current perceptions of human dignity and personal fulfilment.'[149] And again, 'Many people are no longer prepared to accept unquestioningly or to live within the distinctions which economists and others have traditionally made between work and leisure — that work is socially useful but oftern personally distasteful while leisure is personally satisfying but often socially unproductive.'[150]

A New View of Costs and Benefits

Already it is being realised by many influential people in Canada, that in many cases, the most important costs and benefits to be taken into account in determining the advisability of any given action are 'external' to the economic system as seen by modern economists.

As is pointed out in the Final Report of the Prince Edward Island Royal Commission on Land Ownership and Land Use, this is almost certainly the case with forestry which often comes out badly in a conventional cost-benefit analysis. The authors write: 'It may be, in fact, that the productive benefits of proper use of forest soils is more largely in externalities than in the forest crop itself. Consider the water storage function of forests in municipal watersheds. Or the function of forestry in preventing floods and controlling soil erosion through control of rapid run-off. Or the effects of the forest in sheltering of houses and fields from the winds. What are the costs of alternative methods of water storage, run-off control, soil protection, and wind shelters? What are the costs of recovering healthy stability in the landscape when forests have been destroyed? We cheat the forests if we accept cost-benefit analyses that fail to calculate these costs for they are enormous.[151]

As *Pollution Probe* put it, 'The time has come to begin performing broader cost-benefit analyses which take these 'hidden' costs into account and to arrive at more meaningful and equitable decisions.[152] They illustrate this point by examining what would be the cost of the increased air pollution that would be caused if Ontario Hydros' application for increased power export in October 1973 were to be accepted.

When this is taken into account, they calculate that 'the cost of the increased power export will far outweigh projected benefits.'[153]

As is noted too, in a *Perspective on the Next Decade* for Environment Canada, a transport policy based on a cost-benefit analysis which took into account real costs and benefits would heavily favour rail transport as opposed to airways. Indeed, 'Railways,' this report points out, 'the least environmentally damaging form of mass transport, are subsidised to perhaps 25 per cent of cost. In contrast, airline travel, which is highly energy-intensive and exhibits gross local, environmental disruption because major airports must of necessity be in areas of intensive competing land use, is highly subsidised with the traveller paying less than one quarter of the cost of airport construction, navigation aids, weather service and so on.'[154]

Among other things, on the basis of such calculations, the Canadian Government could have avoided the error of allowing the development of many small towns that depended for their sustenance on the exploitation of non-renewable resources, or one that could not renew itself fast enough for commercial purposes. This has inevitably led to social and consequently economic problems, involving the resettlement of the inhabitants, and the abandonment of valuable installations whose cost is unlikely to have been ammortised in the accounts of the enterprises involved.

According to Dixon Thompson, this has happened with asbestos in the Yukon, copper in North Central BC, and with many small towns such as Elliott Lake, Ontario (uranium) Ocean Falls, BC, and Temiscaming, Quebec (pulp and paper), Sheridon, Lynn Lake, Manitoba (nickel) etc.[155]

It is suggested by Storrs McCall, consultant to Environment Canada, that the key concept is quality of life (QOL). It is by seeking to maximise whatever quantity is used to measure it, that Governments can best serve the interests of their electors. This, he illustrates with reference to the case of the resettlement of the inhabitants of the Newfoundland outports.[156]

According to current notions of human welfare, these people were poor and miserable — for in the remote coves they inhabited, the full benefits of modern materialist civilisation could not be brought to them, and in terms of the world view with which we are imbued, life without automobiles, deep freezes, colour television sets, electric toothbrushes, etc. must by necessity be miserable and unfulfilling.

Secondly, even to meet what were estimated as the basic needs of modern living, the inhabitants had to be heavily subsidized by the state to the extent of at least half their total income. Thirdly, the more recently developed offshore fisheries were, with the aid of modern methods and equipment, very much more efficient.

In view of all this, Cope advised that inshore fishing must stop, the fishermen put on full-time relief, and most of them moved to larger conurbations. This was indeed the right conclusion to come to, *if one applied the criteria provided by modern economics.* Needless to say, however, they are irrelevant.

Life in the outports may have been hard, but it was satisfying.[157] People lived in a sound physical and social environment — resembling very closely that to which man has been adapted by his evolution. It thereby satisfied basic needs far better than living on relief in an urban wilderness conceivably can, regardless of the comforts and conveniences provided.

What is more, to force people to live exclusively on welfare is to do them the most terrible psychological damage, for it must deprive them of their goal structure, of that social environment that is normally provided by the place of work — of their status within it — of

their very identity, pride and self-esteem. *This represents a massive human cost — for which the provision of material goods and institutional services offers little compensation. Indeed, it is difficult to find an example of welfare solving any social problem. Wherever we find people living exclusively on relief, we also find crime, delinquency, alcoholism and other forms of retreatism. Indeed, they must go hand in hand.*

McCall considers that, 'if the Government were interested in maximising not savings in the provision of public services but QOL, they would in many instances have adopted exactly the opposite policy, namely that of providing 'stay options' to make it economically and socially feasible for the outporters to remain where they were.'[158]

What is more, the capital-intensive offshore fisheries that we regard as 'economic' are exploitative, and can only lead to the depletion of fish stocks. Indeed, everything is to be gained by reducing catches well below the levels judged as 'economic'.

As McCall writes, 'a reduction of effort below the current sustainable yield level should result in future years in an increase in stock, and hence in increased catches for the same effort.' It should also permit better inshore catches. The right level of catches for outshore fishing is that which will not prevent the destruction of inshore fisheries. These cannot deplete stocks as only a certain percentage of adult cod come inshore to feed on capelin during the summer months.'

In fact, a fishing policy based on a cost-benefit analysis that took into account real costs and benefits would lead to a reversal of the present one. As McCall writes: 'Since fishing inshore is less energy-intensive and less capital-intensive than fishing offshore, and in addition employs more fishermen, it would seem that support of the inshore fishery would accord with general policies aimed at energy conservation, self-sufficiency and maximum utilisation of Canada's human resources.'[159]

McCall has shown that, in the case he has examined, it would be socially and ecologically advantageous, *and hence in the long run economically advantageous,* to adopt a course of action which is diametrically opposite to that which would be regarded as economic in terms of modern economic theory. We have seen that this is probably also true of forestry on Prince Edward Island and of power generation in Ontario. Are these isolated cases or simply particularly illustrative examples of a principle with a more general application?

Is it not conceivable that it might equally apply to many other economic activities necessary for the maintenance of our industrial society? Many of them if subjected to a realistic cost-benefit analysis, might even prove contrary to the interests of society, and hence in the long term uneconomic. In fact, is it not possible that economic growth itself at least beyond a certain point, might be in the long run uneconomic? Undoubtedly, if all the biological, social and ecological costs, and hence, the long-term economic costs, were taken into account our cost benefit analysis of economic growth would look very different.

Benefits

We have so far re-examined the notion of costs. At this point, we must also examine that of benefits. It has been intimated that many of the benefits provided by our modern society have been considerably overrated in comparison with *the basic benefits provided free by the normal functioning of the natural systems that make up the biosphere; and whose disruption gives rise to real costs.* Let us, however, look at the notion a little more closely.

The relationship between costs and benefits is clearly a very intimate one, *since something can only be regarded as constituting a cost to the extent that it deprives one of a benefit.* Thus our present interpretation of costs implies a corresponding interpretation of 'benefits'. It implies in fact that benefits are also short term economic benefits — benefits in fact that can be bought, which largely means consumer goods, capital equipment and institutional services. Thus in the same way that what we regard as costs does not take into account biospheric costs: — costs caused by the disruption of the biological, social and ecological systems that make up the biosphere — *what we regard as 'benefits' does not take into account the free benefits that these provide.*

Thus cutting down forests involves, in the long run, incurring costs only because it means depriving us of the great benefits they provide — and which we unfortunately just take for granted.

Similarly, building power-stations means incurring unexpected costs — those that deprive us of the fresh unpolluted air whose general availability has been a necessary feature of the environment in which our species has evolved.

In the same way, building a town to exploit a short-term resource means incurring costs because it deprives the settlers of the stable employment that they may have benefited from elsewhere and would undoubtedly have benefited from, if they had been involved in subsistence agriculture, or the hunting and gathering way of life of primitive societies — such as the Aleuts and Eskimoes, based on the exploitation of totally renewable resources and hence indefinitely sustainable.

Breaking up the small communities of the outports of Newfoundland in order to settle their inhabitants in large conurbations, involved incurring unexpected costs because it deprived them of the quality of life that they previously enjoyed.

Up till now, discussions of this concept have tended to be vague. To look at it in a more precise way, however, means facing a principle which runs so contrary to everything we have been taught that it has rarely been put forward — for fear of ridicule, if nothing else. It is a principle which inevitably follows, however, from another — which no-one on the other hand would care to question — that of the adaptiveness of the evolutionary process which has given rise to the biosphere of which we are a part.

As Boyden[160] constantly points out, if evolution is an adaptive process, then the environment it has provided us with is the one to which we are best adapted — which is the same thing as saying that *it is that which best satisfies our needs.* However unlikely this might seem in terms of the world view of industrialism, it is this environment which should in theory provide us

with the highest possible quality of life (QOL).

If we accept this principle, and it is difficult to see how one can objectively refrain from doing so, then one is led to reject the very notion of 'progress' which is so basic to the world view of industrialism, for industrialism is justified only on the assumption that the world we have inherited is *imperfect* and that by means of science, technology and industry, *it is possible to improve it.*

Indeed, man's real needs, like those of any other form of life, developed during the course of his evolution. I refer to his biological need for sleep, exercise, fresh and varied diet, sweet water, uncontaminated air; his need for the aesthetic satisfactions provide by nature when left undisturbed, his need to fulfil his genetically and culturally determined functions within his family and community.

I refer also to his need to feel all those varied sensations that are derived from the vicissitudes of everyday living — laughing, crying, loving, hating, braving, fearing, revelling in triumphs and self-indulgence but also suffering humiliations and deprivations.

The nature of the entertainments that we most relish should make this clear. If we enjoy a comedy, it is that comedy is a vital part of life — and to laugh satisfies a very basic need. If we enjoy a tragedy or a thriller, it is because we also need to weep, to fear and to suffer.

To force man to spend his days doing dreary and monotonous work in vast factories, to return at night to the 'controlled environment' of his box-like lodgings where every known domestic appliance and institutional service *serve to insulate him against situations that could elicit such responses and otherwise satisfy his basic needs*, is to deprive his life of any meaning; to transform him into a passionless robot that functions rather than lives — an insensate component of the doomsday-machine that is fast grinding up his real environment and, with it, any remaining chance of a real life.

Boyden[161] points out that the modifications we thereby bring about to the biosphere must cause it to diverge ever more radically from that to which our evolution has adapted us, and that this must give rise to biological maladjustments — of which the diseases of civilisation — cancer, ischaemic heart disease, etc. — are but the symptoms.

The argument can be generalised. Such maladjustments do not occur exclusively at a biological level, but at other levels as well. For example, epidemics of infectious diseases affecting plants and animals including man, can best be regarded as the symptoms of ecological maladjustment and that constellation of aberrant behavioural traits that we find in large modern conurbations — crime, vandalism, drug-addiction, etc. — can also be regarded as the *symptoms of social maladjustment.*[162]

If this is so, then quality of life [QOL] is highest among the most primitive of people — hunter-gatherers and slash-and-burn agriculturalists — precisely those whom we have been taught to regard as the poorest and most miserable of men.

These societies lived within their biospheric means, in that they did not consume their capital or biospheric resources, but rather lived off its interest. In this way, they caused no biospheric deterioration. Their societies could co-exist with climax ecosystems — which means that from the ecological point of view, they constituted climax ecosystems.[163]

Stability is another word for continuity — indeed such societies could last indefinitely, just like the ecosystems of which they were part. Only geophysical changes, like the ice-age, could have destroyed them, or ecological invasions, such as the penetration of the Europeans into those favoured areas where, until recently, they still survived.[164]

If these societies were ideal from the strictly ecological point of view, they were ideal too, from the social one. Family and community life were well developed, and judging by the very low incidence of the symptoms of social deprivation, crime, delinquency, drug-addiction, suicide etc. (that is, over and above the levels built into their cultural pattern), they provided their members with a very satisfactory social environment.

What is more, warfare tended to be highly ritualised and led to few deaths.[165] If a community were rent by factionalism it would simply break up to form two communities instead. Fission was a highly effective means of solving such problems. It still is — but today there are institutional impediments to prevent it from occurring (as in Northern Ireland, the Lebanon, Angola, etc.) and also population pressures to make it more difficult. The attachment of hunter-gatherers to their territory (within which they were nomadic) prevented them from indulging in any imperialistic designs on their neighbours. Wars simply took the form of short raids — after which things would rapidly fall back into place.

Such problems as homelessness[166] and unemployment,[167] of course, did not exist. Shelters were simple and temporary. Everybody knew how to build them, and the building materials were never lacking. As for unemployment, this there could not be, for there was no employment. Nor strictly speaking was there such a thing as work. The men would hunt, for which privilege people today are willing to pay a very high price indeed. Women would gather berries and roots. (Gathering, it might be noted, is still a favourite pastime of most members of the female sex, though today it is conducted in supermarkets and shopping centres rather than in the open bush). Nor, among primitive agriculturalists, did tending to the family garden, and building the slightly more permanent shelters really constitute 'work'. Such activities were just part of everyday living — indistinguishable from other activities, which we might prefer to regard as leisure. This is evidenced by the lack of a word for work in the language of such societies. It is also reflected in the resistance often displayed by their members to working in mines and plantations set up by colonialist enterprises — which has often forced the latter to import labour from areas where such attitudes have already been dispelled by social disintegration.

It also seems that it was this way of life that best satisfied man's biological needs. They enjoyed a varied diet of fresh uncontaminated foods — and the more we learn of the culturally-determined diets of primitive

people, the more we realise how balanced they were, and how well they tended to satisfy their nutritional requirements in the environmental conditions in which they happened to live.[168]

They had ample access to fresh unpolluted water — an increasingly rare commodity today. They had plenty of exercise, and also of sleep, and perhaps most surprisingly of all for people reared on the technological ethic, they were largely exempt from the major infectious diseases of large settled populations — such as smallpox and tuberculosis.

The small nomadic groups in which they lived did not, in fact, provide a niche capable of supporting viable populations of the micro-organisms that transmit them.[169] It appears that a population of 500,000 is the minimum that can support the virus that causes measles, for instance.[170] Nor would they have suffered from poliomyelitis and yellow fever, specifically the diseases of hygiene — against which, even today, the people in the rural areas of the Third World obtain immunisation in early infancy being in closer contact with dirt and excrement.

As for the diseases of civilisation — cancer, ischaemic heart disease, diabetes, diverticulitis, varicose veins, peptic ulcer, appendicitis, and tooth caries — it goes without saying that their incidence, as evidenced by numerous studies of surviving primitive societies, was negligible.[171]

Nor is it likely that their life was boring and unfulfilling as some may suppose. Their knowledge of plants and animals among whom they lived was extensive, as was the vocabulary which they used to describe their relationship with the world around them. The Hadza, the most primitive people of Tanzania, had, according to Woodburn,[172] a vocabulary of 12,000 words in contrast to the 400 used by the average delinquent of New York.

Unfortunately, the sheer mention of primitive people tends to elicit the reaction that we are no longer primitive peoples and that their experience can be of no relevance to our particular predicament. This is yet another example of our highly culture-bound approach to our problems. As already mentioned, perhaps 95% of all the people who have ever lived were hunter-gatherers. To postulate uncritically that the experience of 95 per cent of humanity is irrelevant to the understanding of the problems of the other 5 per cent is an act of extraordinary presumption *that is based on no valid theoretical considerations of any kind.*

Indeed, our condition has changed, but we have not changed the basic laws of biological, social and ecological behaviour to which we, like all other forms of life, are submitted. Neither our science, our technology, nor our industry can repeal the law of thermodynamics, nor can it repeal the other basic principles governing the behaviour of our biosphere.

The changes we have made have not demonstrated our ability to change these laws but only our ability to violate them with apparent impunity over a very short period of time. How apparent is this impunity is now being demonstrated by the fact that in all sorts of ways we are beginning to pay the consequences of our presumption.

There is a great deal we can learn from the experience of our hunter-gatherer ancestors — notably we can try to determine what features of their way of life made the greatest contribution to the stability of the society they lived in, and having determined this, we can attempt to introduce these features, indeed in a very modified fashion, into our own life styles permitting us thereby to increase accordingly the stability of our own society.

This is also the conclusion reached by Valerius Geist[173] of Calgary University. He points out that the most successful human settlements are precisely those that cater for the needs of 'natural man'. Studies have revealed that it is precisely in settlements which accommodate natural man's need to live in discreet family units linked together to form small communities, rather than one which simply lumps them all together in vast blocks to form an anonymous mass, that the incidence of crime and other aberrations is at its lowest.

In general the first and most obvious feature of the life of hunter-gatherers was the insignificant role played in them by material goods, technological devices and institutional services. *This would lead one to suppose that such things do not actually satisfy basic needs.* Life is possible without them, and it appears a very satisfactory one indeed — one in fact, that it is suggested in this report maximises the quality of life (QOL). From such considerations, it would appear that the quantity and nature of material goods, etc, that we require, rather than be constant among human societies, is very much a function of the sort of life they lead. It seems reasonable to suppose that this is because in different conditions different quantities of material goods, etc., are required for the satisfaction of real, i.e. biological and social needs.

Thus, a people living in a society on the edge of a lake which earns its living by fishing will have need for boats and nets *not per se*, but because boats and nets in these particular conditions are required to satisfy basic biological needs. Also, so as to carry out rituals and ceremonies associated with the particular cultural pattern which evolved as a means of holding together their society and controlling its relationship with its environment; certain animals must be sacrificed, certain foods eaten and certain clothes worn, and so there is a need for those commodities again *not per se but because in the specific conditions involved they are necessary for the satisfaction of basic social needs.*

It is in this light that we must regard the material goods and institutional services which our industrial society provides. We do not need an army of motorcars, washing machines and electric toothbrushes, nor massive state institutions dispensing welfare of all sorts, looking after the sick, the young, the old, intruding into almost every aspect of our lives, *per se. We need them because in the particular circumstances in which we live, they are necessary to satisfy biological and social needs.*

If people live ten miles away from their work and there is little public transport, then clearly they need a motorcar. If in a family, made up of the father, the mother and two children, both parents go out to work and both children spend their day at school, a lot of domestic appliances are required so that the cooking and cleaning can be done in the very short space of

time that must in these conditions, be allocated to these tasks. If children are brutalised or abandoned by their parents and left helpless in an urban wilderness, in which they have no relatives and no real friends, the state welfare system is clearly required to look after them.

It is important however, to realise that this is a very abnormal and very aberrant situation, one which would not conceivably occur in the sort of society in which man has lived until very recently. This being so, it would appear that *all that industrialisation appears to have accomplished is to have increased the quantity of material goods, and hence the cost, of satisfying real needs* — a cost, what is more, that we can ever less afford. A society's GNP, in other words, cannot be regarded as a measure of the real benefits available to it — *but merely of the cost of providing these benefits. A society's GNP could, in fact just as well be regarded as its GNC — gross national cost.*

This principle is less apparent, in the euphoric stage of development, when a high proportion of GNP is made up of luxuries, which, it would seem, a society could not do without — the automobile when it first appeared, for instance. Unfortunately, however, as development proceeds, *luxuries tend to become necessities.* Thus, life changes to accommodate the automobile. People start living further from their place of work; shopping centres appear away from city centres; alternative means of transport are progressively phased out — and finally the automobile has become a necessity — just as, in the same way, have the various institutional services which the welfare state provides — and to which a society becomes increasingly addicted. As — in order to combat the ever less tolerable side-effects of development — these services come to make up an ever greater proportion of GNP, it becomes correspondingly more apparent that GNP and GNC are but two different ways of looking at the same thing.

However, the GNC referred to is not real GNC, i.e. that which takes into account the biological, social, and ecological costs incurred, and hence long-term economic costs, but only short-term economic GNC. Since the former is much greater than the latter — since, in fact, the ever-increasing real costs of our activities are becoming reflected in ever higher short-term economic costs — GNC and hence GNP must correspondingly increase simply in order to meet these costs — and prevent social and ecological collapse. This means of course, incurring still more real costs, and hence further expanding the economy. *In this way industrial society is caught up on a positive feedback course towards ever further expansion.*

This is a principle which, unfortunately, our most illustrious economists have failed to understand. Indeed Keynes agreed with John Stuart Mill that eventually our economy would have to stop expanding — to achieve a steady state — so that we could devote ourselves to more elevating pursuits than just earning money. He did not realise that this was impossible without correspondingly modifying society so as to reduce its needs for material goods. Samuelson[174] wrote in a recent edition of *Economics* that an investment of twelve billion dollars would suffice to eliminate poverty in the USA. The Office of Economic Opportunities (OEO) spent more than that in three years with no effect on poverty levels whatsoever. The reason, of course, is that poverty in the US, as we have seen, is largely due to social deprivation. In reality, the situation is still worse than this. To provide material and institutional benefits must lead to the further disruption of biological, social and ecological systems which, as a result, become ever less capable of satisfying man's basic need for the benefits that they normally provide. In other words, by providing compensations for basic biospheric benefits, industrialisation, by the same token, renders these benefits ever less available thereby creating a demand for further material and institutional compensations. Thus, state welfare is only necessary when the family and small community that once provided it have been disrupted — to which disruption it must contribute, directly, by usurping its functions, and indirectly, by favouring further economic growth.

What is more, no-one can seriously suggest that welfare dispensed grudgingly by an anonymous civil servant in some distant capital is a satisfactory compensation for that once lovingly provided by the extended family.

In the same way, the police, law courts, prisons etc., are but institutional compensations for that extraordinarily effective instrument of social control that in a traditional society, is provided by the normal operations of public opinion.

In the same way too, the domestic appliances and convenience foods whose availability we prize so highly would have been quite superfluous in a traditional household, where grandmothers, aunts and little children were available to fulfil all the household chores. It is the disintegration of the family that their general availability helps to foster, that has rendered these devices so necessary.

In fact, the more one looks into it, the more it becomes apparent *that our economists' notion of 'benefits' is no more satisfactory than is their notion of 'costs'. This further confirms the view expressed in this report that today's economic criteria are of no value for determining public policy.* They are justifiable only in terms of that very misguided world-view according to which human welfare is assured exclusively by the provision of material goods, technological devices, and institutional services, i.e. of the technosphere or surrogate world with which we are supplanting the biosphere or real one.

The trouble is that this world-view is so firmly entrenched in many of us that we cannot conceive of life without these benefits, except in terms of hideous misery and deprivation. Hence our refusal to face the fact that economic growth is no longer an option for medium-term policy, nor to consider the possibility that we should adapt to an inevitable economic contraction by systematically reducing our needs for the 'benefits' that it provides.

Yet this is the only policy likely to prevent the socio-economic discontinuities that at present threaten Canada and also the best means of maximising the real benefits (QOL) that can be made available to the Canadian people in order to assure their real welfare.

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VIEW FROM... THE Ecology Party

ELECTION REPORT

In the run up to the local elections we were noticed by *Punch* (an article on organising small parties), *The Sunday Times* and *The Guardian* (reporting activity in Cornwall), *The Birmingham Post* (a friendly feature on our philosophy) and *The Sunday Mercury The Sunday Telegraph* reported the campaign and the results, and Teddy Goldsmith and Jonathan Tyler were interviewed for *The World This Weekend* on Radio 4. All this produced fresh enquiries and must have contributed healthily to making our name better known. So far so good, but this publicity puts us in a dilemma. We need quick success and may feel that time is short if the Nation is to heed our message — but a diffusion of resources to fight limited campaigns in many areas which may attract attention, could constrain solid growth to a winning position through concentrated effort in selected areas.

It is good to have now three councillors, but we must realistically acknowledge that all have been elected in favourable rural circumstances. We are a long way from substantial percentages in urban areas, which is where political clout has got to be earned. So what do we do now? That is what the Party must decide.

Regional Results

The South-East. The London and Sussex results were both promising. Jonathan Porritt, coming in at the last moment was fifth out of seven with 298 votes. In rural Cuckmere Beryl Bowser, having fought as an Independent last year, gained 19% in a straight fight with a Conservative. In Essex Ben Percy-Davis achieved 1,269 votes in the big Hornchurch division on his 'People and Agrarian' ticket which has strong affinities with Ecology.

West-Midlands. These results reflected the characteristics of the four wards concerned. In Birmingham Sparkhill, an area with typical inner-city problems Peter Sizer achieved 2.3%. In Walsall, where the party's name was already known from the parliamentary by-election, John Duff gained 182 votes. In Sandwell Wednesbury Market, limited time for campaigning and the mood of a depressed area showing a swing to the right, probably accounted for Peter Rout's disappointing 0.6% of the vote. In Birmingham Selly Oak, Jonathan Tyler received 572 votes, only 48 short of the Liberals in a four way contest.

West Yorkshire. The Leeds branch fielded six candidates. In Garforth David Corry took 6% of the poll in a three cornered fight. Steve Waldenburg, standing on a joint Ecology/Liberal ticket appears to have counterbalanced the defection of Liberal votes to the two big parties. In the other three Leeds wards, and one in Bradford the candidates took between 2% and 4% in six cornered contests.

Cornwall. Perhaps because of its strong links with *The Ecologist* and with Cornwall Conservation Forum, the newly formed Cornwall Branch received wide publicity. Headlines in the local papers heralded the arrival of the 'Green' movement in the area. Interest shown in the message of the Ecology party, during door to door canvassing was very encouraging. It would be good to report success in one of the four contested areas, but it was not to be achieved in this first round. Jeremy Faull, was returned unopposed when the sitting member withdrew, because, as he said, he could not fault the policies on which Jeremy was standing. In Bodmin John Bamford came fifth out of eleven candidates in a hotly contested fight for two seats. In Wadebridge Edward Goldsmith polled 23% in a three cornered fight with independents, and in a straight fight with an independent at St. Stephens, Dick Smythe achieved 35%. Sally Willington scored an excellent 8% at Menheniot in an area almost feudally commited to a local family.

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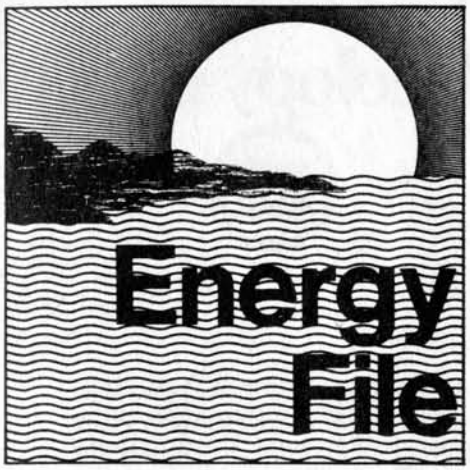


REPROCESSING THE TRUTH

By Peter Bunyard

One of the most disturbing features about atomic energy is that it has generated problems for which no viable solutions have yet been found. Such a situation has led opposition groups into the ambivalent position of actually supporting certain nuclear activities when their natural instincts would probably dictate otherwise. Thus Friends of the Earth, the Conservation Society, Half Life and Canto, who, with other groups, are bringing a case against British Nuclear Fuels at the Windscale Public Inquiry on June 14th, will only be opposing the proposal to build a commercial thermal oxide fuel reprocessing plant. British Nuclear Fuel's other two proposals — to refurbish its Magnox reprocessing plant, and to develop the Harvest vitrification process — have been accepted because they are considered vitally necessary to cope with an existing problematical situation — the safe disposal of nuclear waste. Indeed when calling for the Public Inquiry, Peter Shore insisted that only the proposal for the thermal oxide reprocessing plant was under discussion because in his opinion, this was the only one of the three main proposals that was controversial.

But there is a discrepancy here. Why tolerate a Magnox fuel reprocessing plant when all reactors, Magnox included, generate radioactive waste and plutonium? The answer lies in historical fact, for when the present Magnox reprocessing plant began operations in 1964 no-one was there to oppose it, any more than anyone set out to oppose the Magnox reactor programme when it came into being with the opening of Calder Hall in 1956. As it happens the environmental movement did not then exist, and CND, while protesting manfully about military installations, failed right up until the 70s to make the cerebral connection between commercial reactors and the generation of plutonium. Thus a Magnox reprocessing plant exists — arguably by default — and, because it no longer works well and contaminates the Irish Sea, it makes sense that British Nuclear Fuels should now set to and build a better one.

Of course for the environmentalist, letting BNFL go ahead with its refurbishing of the Magnox reprocessing plant is sheer compromise, but the environment must come first, and if BNFL continues to use the obsolete plant and then contaminates the environment more than it should everyone and everything becomes the loser.

On the other hand environmentalists are making a strong stand, at least as strong as their finances permit, against BNFL's proposal for a thermal oxide reprocessing plant. The reasons for that particular opposition are manifold, and are in part symbolic, for THORP, as the reprocessing plant has been dubbed, represents the next crucial step forward, in the seemingly inexorable development of nuclear power, towards the fast breeder reactor, since it will be from the world's largest reprocessing plants — as THORP is intended to be — that plutonium, measured in tons, will be separated out for use as nuclear fuel.

All along BNFL has tried to play down the connection between its THORP reprocessing plant and any threat to the world because of plutonium build-up. Thus, BNFL states, a reprocessing service is urgently required to cope with the stockpiles of spent oxide fuel — most of it coming from light water reactors. Furthermore if nuclear fuel is to remain economic in price when cheap uranium ores have been mined out, then reprocessing will be essential to permit the industry to benefit from the 'breeding' process which occurs in the reactor core.

It does not in fact need President Carter's proposed moratorium on the reprocessing of spent oxide fuel for us to realise that BNFL is hardly being explicit. For, whether noted bluntly or not, reprocessing is the key to nuclear arms proliferation, and — hardly more benign — to the development of the fast breeder reactor.

It might matter a little bit less if reprocessing were in itself a clean process; but it is the one stage in the nuclear fuel cycle when large discharges of radioactive substances are released into the environment even when the plant is working efficiently. The Irish Sea is already significantly contaminated with radioisotopes such as caesium-137, plutonium and Americium-241 through the operations of a Magnox reprocessing plant. But the spent fuel that THORP will reprocess is many times hotter in radioactive terms than Magnox fuel, and the environmental damage ensuing from the two plants working side by side, one for spent Magnox fuel and the other for spent oxide fuel — a great proportion of which will be from overseas — is surely inconceivable.

Some radioisotopes — tritium and krypton-85 for example — are flushed out from reprocessing plants without any attempt to retain them. Both isotopes have half lives in the range of 10 years and as the world

nuclear programme gets underway — assuming that reprocessing keeps pace — then within 30 years the levels of tritium in the atmosphere and surface waters will be more than 10 times higher than the natural level. Being a hydrogen isotope with access to every molecular structure in the body the tritium level in every living thing will increase significantly.

Indeed G. Schwarz and his colleagues told an International Atomic Energy Agency symposium in Vienna in 1975 that by the end of the century ways would have had to be devised to retain close to 90 per cent of both tritium and krypton-85 generated in German reactors, otherwise the doses to the public in West Germany would be beyond those permissible. But of course Germany may by then have shipped its waste to Windscale to pass on the problems of retainment.

We should also remember the warning by Professor W.L. Boeck of Niagara University, New York, who stated: "Should nuclear power proceed as planned, within 25 years the quantities of krypton-85 released could bring about substantial worldwide weather changes in the electrical conductivity of the atmosphere."

Even if the technology existed to retain nearly 100 per cent of all the radioactive wastes released from the spent fuel during reprocessing — and even if it could be made to work economically — the problem still remains of what to do with the long term highly active waste. Up until now most nuclear energy authorities have been content for that waste to be kept in special stainless steel tanks such as those at Hanford in the United States and at Windscale in Britain. But such tanks cannot be kept under close supervision for ever, moreover their actual useful life is hardly more than 30 years, and in many cases a lot less. Indeed at Hanford a great many tanks have leaked.

One answer, which at present seems to be most favoured by the authorities, is to vitrify the waste and then find a suitable geological site into which the glassy solid can be dropped and left for ever more. But again there are problems and we hear some of them from Professor Jean Rossel, of the Physics Department, the University of Neuchatel in Switzerland.

For the glass to remain solid its temperature must not exceed 600°C. Since the radioactive waste locked up in the borosilicate structure is generating nearly half a million curies (one curie is measured as 37,000 million atomic disintegrations per second) unless the heat generated by those multi-billion atomic disintegrations per second is taken away, the temperature of the block will rise to the melting point of glass. The continued 'safety' of the vitrified block thus depends on the thermal conductivity of the rock in which it has been buried. So far so good; for if salt is used as the burying medium then a simple steady state is reached in which the temperature of the block at its centre is some 340°C and on its surface around 250°C. At those temperatures the block will undoubtedly remain solid.

However the gamma radiation dose to the surrounding salt (measured in rads which is the absorption of 100 ergs of energy per gram of matter) is of the order of 10,000 million rads per year, and at Grenoble they have shown in experiments that many crystalline structures break down completely at far lower radiation levels and even lower temperatures. Once the molecular structure of the substratum has changed so radically its ability to conduct heat away also alters, being reduced by a factor of 100. A steady state calculation now shows, says Jean Rossel, that the temperature at the centre of the vitrified block would soon rise to its own melting point.

Nor would it help to lower the concentration of fission products in the block because it would lead inevitably to the need for a considerable increase in the number of stainless steel tanks into which the fission product liquor is put after reprocessing.

We know that the UK Atomic Energy Authority is combining research with the Camborne School of Mines in Cornwall to study the heat conductivity of granite. The aim in the end is to test the suitability of granite as a possible dumping ground for high level vitrified waste. In view of the experiments at Grenoble and the evidence of structure-breakdown well within the radiation emissions of vitrified waste, we must certainly ensure that similar experiments are performed in Britain and that the results are made public.

Because we already have a substantial problem of high level waste bubbling away in storage tanks at Windscale, we do not have much choice other than to allow British Nuclear Fuels and the Atomic Energy Authority to find a satisfactory solution. Hence we must agree to the development of the Harvest process at Windscale; but it may not provide us with the easy way out that the authorities have led us to hope for, and if it does not, then without question it is one particularly strong reason why we should bring the whole nuclear programme to a final end.

5-DAY COURSE ON ORGANIC HUSBANDRY

THE SOIL ASSOCIATION will again hold its annual course on THE PRINCIPLES AND PRACTICES OF ORGANIC HUSBANDRY at the N.E. Surrey College of Technology, Reigate Road, Ewell, Surrey, from July 11th-15th, 1977.

The programme will include a simple scientific introduction to soil structure and plant nutrition, followed by the practical application of organic methods for the farmer, grower and those practising self-sufficiency. The course will include a visit to an organic farm or an organic garden. The relationship between the health of the soil and the health of the individual will be discussed and although Dr. Schumacher, President of the Soil Association will be unable to be present, the course will conclude with a tape recording of his talk given at the A.G.M. — The Next Thirty Years. Other lecturers will include Lady Eve Balfour, Mr. Sam Mayall, Dr. Victor Stewart, Mr. Jack Temple and Dr. Anthony Deavin.

The course fee of £23 is inclusive covering the cost of tuition, two meals per day, morning coffee and afternoon tea. Landlady accommodation (£1.60 B&B) can be arranged through the College or students may arrange their own accommodation. Hotel list available on request. No camping facilities are available.

For further details and booking forms please contact N.E. Surrey College of Technology at the above address or The Soil Association, Walnut Tree Manor, Haughley, Stowmarket, Suffolk 1P14 3RS. Tel: Haughley 235/6, enclosing a s.a.e. please.

Report

ECOLOGICAL BREAKTHROUGH IN FRANCE

The ecological breakthrough we have all been waiting for has occurred in France. Almost a thousand Ecology candidates presented themselves at the municipal elections on the 13th March and they did unexpectedly well, obtaining anything between 8% and 14% of the votes, which is enormous in a country with a multi-party system. The fact is that in many cities, the Ecologists have come out as arbiters between the two major political alliances, Gaullists — Giscardians on the one hand and the Socialists and the Communists on the other.

In the elections taking place in the cities there are two rounds of voting. I am referring, of course, to the first one. In order to be able to participate in the second round, a party must have 12% of the registered voters which normally means about 18% of the votes cast. This unfortunately, no Ecology candidate obtained. As a result, one has witnessed an astonishing scene: the major political leaders who had probably never even heard of the word ecology before, let alone considered that it could provide a basis for a new political party, suddenly proclaimed themselves to be life-long ecologists and sought by every means to obtain the ecological vote. Giscard d'Estaing published a pamphlet with an oak tree on the cover vaunting the conservationist achievements of his government. Marchais, the Communist leader tried to demonstrate, very unconvincingly, that only the Communists can implement a truly ecological policy.

Alliances were proposed with the leaders of the Ecology Parties in different cities, most of which were turned down. In Paris at least, the local Ecology Party (Paris Ecologie) has sought to remain totally neutral in the irrelevant struggles between the right wing and the left wing. The Ecology Movement, they maintain quite rightly, cannot be classified in terms of these rudimentary and outdated classifications. As a result, they left their supporters quite free in the second round to vote for whomever they liked.

Particularly interested has been the reaction of the Press. Up till now, as in Britain, it has systematically prevented the expression of the Ecological point of view. Suddenly there has been an ecological explosion in the media. The papers talk about nothing else. Brice Lalonde, the glamorous and highly articulate leader of *Paris Ecologie*, seems to be on the television almost every night and is permanently followed by a band of reporters and photographers. But the action is not all in Paris. In Alsace, where it all started in France, quite a large number of candidates were put up in the main cities. One of the leaders of the political movement 'Ecologie et Survie' is Antoine Waechter. He got over 12% of the votes in his Mulhouse constituency. Waechter is a professional ecologist at the local university. It is interesting that in France many professional or academic ecologists dealing with ecology with a small 'e' have had the courage to join the Ecological Movement and hence become Ecologists with a big 'E'. Another example is Jean Marie Pelt, director of the very important Institut d'Ecologie in Metz. He is also vice-mayor of this city — the principal one of Lorraine, and is actively engaged in ecological politics, being a member of the committee of 'ECOROPA' (Action Ecologique Europeenne), set up in November in Paris to co-ordinate all the local ecological groups in Europe.

In the countryside the electoral system is very different and works on the basis of proportional representation. This has enabled a lot of Ecology candidates to get elected, in fact in many local councils in the Alsatian countryside the Ecologists are in the majority. In one council 21 out of 23 candidates are Ecologists. Solange Fernex (see *Ecologist*, Vol. 5 No. 10, Dec. '75), another of the leaders of the Alsatian Ecology Movement was elected as a councillor in her village of Biederthal, after having been involved with six other people, including one of her sons, in a hunger strike which lasted 22 days, in order to obtain the agreement of the EDF (the French equivalent of the CEGB) on the setting up of essential controls in the new nuclear power station at Fessenheim — whose construction the Ecology Movement has failed to prevent.

What is astonishing is how the Ecology Movement seems to have spread as if by magic throughout the country. What do they have in common? Many of them are intimately linked with the 'Friends of the Earth', started in France some years ago by Alain Hervé and Edwin Matthews and run today by Brice Lalonde. Many of them, too, were inspired by René Dumont's Presidential campaign in 1974. Others have undoubtedly been converted by reading 'Le Sauvage', a remarkable and highly professional ecological magazine published by the 'Nouvel Observateur' and edited by Alain Hervé, also by 'Ecologie' edited by Jean Luc Burgunder, by the highly polemical 'la Gueule Ouvert' and 'Cahiers de la Baleine', the paper produced by Friends of the Earth and edited by Brice Lalonde.

What is going to happen to the French Ecology Movement after the election? It is too early to say. However, the signs are that it can only grow. The reason for this optimism is that the Movement is obtaining its support principally among the young. Even in the Communist areas of Paris, where it proved very difficult to convert the hardened Communist Party members, many of their sons and daughters voted for the 'green' candidates. Why does it appeal to youth? The answer is that it provides a complete philosophy which no other political movement has done since Marxism. The philosophy of Ecology, what is more, provides a rationale for the spreading gut-reaction to the ugliness, mediocrity and boredom of the industrial world and the intolerable social and ecological disruption that it will eventually give rise to. One of the advantages of having the young on our side, too, is that they will outlive the old.

Books

Whose Food Crisis?

HOW THE OTHER HALF DIES, by Susan George. Penguin Books 1976. £1.00.

Death, one of Benjamin Franklin's two inevitable certainties in this Vale of Tears, is the common experience facing us all, eventually. And, we most of us hope, as eventually as possible. Until then, many variables preceding this ultimate discontinuity influence the conditions under which our lives are to be lived; as short and brutish; long, dignified and fulfilling; or at any intermediate level between these two extremes.

Today, the other half of Franklin's dual inevitablity — that of taxes — has a considerable and growing influence on the point at which the evaluation of our lives falls within this scale, from brutishness to fulfillment. For more and more of the wealth we produce (over 60% in some countries) is impounded by the tax-collector, and dispensed at the behest of governments and their entrenched functionaries, as often as not against our will, or at least against a background of indifferent acceptance of our helplessness to participate in the process.

Susan George has written a book about the way the system works — in particular about how it affects the poorer people of the earth, whose lives most *Ecologist* readers would judge to be about as nasty and brutish as they could be. It is a pity she got the title wrong, for she has written an important book — one might say a seminal work, which is likely to have a profound and sustained influence on the mounting debate about the future shape of our global society, and the policies we must persuade our masters to adopt to achieve this. For her "Other Half" is more like two thirds, since she is writing about the poverty stricken Third and Fourth Worlds, the population of which outnumbers that of the rich industrialised (First?) world by at least two to one. (Would somebody please tell me, by the way, what became of the Second World?)

It might seem a pity to start reviewing a work which will undoubtedly prove of great value with a quibble. Unfortunately, so much else in Miss George's book invites similar hair-splitting, and this vitiates the impact of her otherwise strongly argued case. She writes with the heat and acid of youthful engagement, which lends strength to her case for those already convinced of the need for change. On the other hand, the sceptic who tends to resist the idea that a new direction must be sought might only find confirmation, and reinforcement of his doubts in the niggling points of inaccuracy and frequent overstatement to which the author's commitment and obvious caring have driven her. But then, caring is perhaps worth more than the too-familiar and compromising, mealy-mouthed "carefulness" more frequently met with in this kind of book — and for which my complaint might seem to imply a preference.

Susan George's thesis is that the current starvation and undernourishment so widespread in the Third World are not the results of climatic failure or over-population, but because food is controlled by the rich. Its production and distribution are in the hands of the supranational agribusinesses, led by United States agripower and served and serviced by the international aid industry headed by FAO, UNDP and the World Bank. In essence she subscribes to a theory of Orwellian conspiracy, by which the power hungry big business establishment of the West has achieved the ultimate weapon — the power to decide what, or even whether, the rest of the world should eat. To this reader at least, she proves her main point. Quoting at length from the public utterances of such international manipulators as Kissinger, Earl Butz, McNamara, Boerma, and the heads of the multi-national corporations and international agencies which control the world-wide food cartel — and its allies in the petrochemical, agricultural machinery, shipping and distributive industries — she leaves little room to doubt the effectiveness of this unholy alliance of massive interests, out of reach of any public control.

Miss George identifies the forces which produced this artificial crisis, and hopefully advocates the formation of pressure groups to try to bring them within the province of rational human control, to use her phrase. But her main solution (and indeed, what other can there be, if we reject the chaos of revolution as ultimately aimed at by the more despairing reformers?) is for the "recipient" countries to achieve autonomy of their own food supplies — a policy consistenly favoured by *The Ecologist* (though perhaps for other reasons), since its foundation. A major point of divergence, however, lies in the fact that Susan George is basically a "system-reformer" or "improver" rather than a "system-modifier". She would, one judges, be prepared to maintain the essential *status quo* of today, with the addition of a more just parity between rich and poor. At heart she maintains the "need" for growth, for "development" — for "more of the same, only better". This is, perhaps, explained in part by her approach to these problems, which is through economic analysis. Indeed, she gives short shrift to ecological or environmental considerations, writing them off crisply in an appendix to her long and densely written book, to the effect that " . . . the stricter stripe of ecologists (should not) rejoice for the chemical purity of the Third World (but should) realise that food lost *on the stalk* through pests and disease in the poor countries is estimated at about *one third* their actual harvest, and that food lost *in storage* can run as high as 40 per cent."

She continues, later, "It may be altogether logical for environmentalists to worry about pesticides in California valleys . . . but . . . the UDCs could feed themselves even today if they benefited (!) from the kind of crop protection — on and off

the stalk — that is a matter of course in the rich countries." She entirely ignores the consideration that the export of this type of poisonous technology represents one of the most unacceptable aspects of development aid.

Like all development economists, Miss George has a predilection for impressive-sounding figures, which she calls statistics and uses with dexterity. "In the time it takes you to read this book," she tells us, "2,500 people will have died of hunger . . ." Very impressive — but what does it mean, if anything? How many of these people would have died of something else, had they not died of hunger? How many *should* have died — of old age and other natural causes — to maintain viable population levels in our varied but limited habitats? (And not forgetting that starvation-related mortality is the most common and effective population control mechanism in the "natural" world, as anyone familiar with animal population dynamics will know).

But how many is 2,500 anyway? I seem to remember reading elsewhere that a baby is born somewhere on earth every second. Which works out to over 20,000 in the six hours Miss George suggests reading her book requires, or eight times her number of starvation deaths. Does either figure really tell us anything, except that the human race is burgeoning?

More interesting is her statement taken from the UN, on the subject of fertilizers in the UDCs. "It is very roughly estimated that the total of waste products (usable as "soft" organic fertilizer) in developing countries in 1970-71 . . . contained 7-8 times more nutrients (in terms of N, P and K) than the total amount of inorganic fertilizer consumed by them in that year." Here again, one recognises the author's ambivalent attitude when confronted with an unresolved conflict resulting from lack of ecological awareness. A few pages earlier she clearly states her opinion that ". . . soft technology using wastes . . . is wholly inadequate to the needs of modern farming which demands chemical industrially produced fertilizers." If it does — bearing in mind the quantities and richness in nutrients of the wastes mentioned above — this is surely an indictment of modern farming methods, rather than of the principles of organic farming based on recycling wastes, as she implies.

These points of criticism — important though they may be — do not detract greatly from the general value of Miss George's brilliant achievement in getting published, by a reputable publishing house, a refreshingly new, controversial review of the state of play in the aid industry. That she is a polemicist, in the best sense of the word (an honourable title to which, for instance, George Orwell proudly laid claim) need frighten no one. Except perhaps the sclerotic establishment which will, one hopes, be shaken to the fundament of their comfortable seats of power. Let me conclude by quoting her advice to the student of these things: "Study the rich and powerful, not the poor and powerless." And further, "Let the poor study themselves."

Marcus Linear

Limits to Growth

THE NEXT 200 YEARS by Herman Kahn, William Brown and Leon Martel. Associated Business Programmes Ltd. £5.95.
SOCIAL LIMITS TO GROWTH by Fred Hirsch. Routledge and Kegan Paul Ltd. £5.50.

Herman Kahn has become a victim of his own image. His large bulk, Old Testament beard, and rapid verbal delivery that is often difficult for an English ear to follow, combine to give him a prophetic quality that inspires legends. We all know his views, of course, but unless our knowledge stems from him directly, it is almost certain that it contains some myth.

His new book is worth reading, then, simply as a statement of his present position, and if it contains little that is new, at least all of it is authentic, and for those exposed to the myths it may contain some surprises.

Dr. Kahn argues that societies move through four economic phases. In the primary phase they are engaged mainly in the production of primary agricultural and mineral commodities. In the secondary phase, the industrial processing of these commodities becomes more important. The tertiary phase is dominated by activities servicing primary and secondary production, and in the quaternary phase the most important economic activities are undertaken for their own sake. This, he suggests, is the post-industrial society where conventional economic yardsticks become unreliable because material gain is no longer an important goal. Can you assess the economic worth of a string quartet, or the management of a nature reserve? Should you even try?

At present we are well into the tertiary phase and within the next two centuries — the period covered in his book — we will advance completely into the quaternary phase. Seen in this longer perspective, the rapid growth of populations and economies that has characterised recent history becomes ephemeral, a mere blip on the graph — and he provides one or two graphs to illustrate the point.

The transition may not be easy, however. He urges us not to underestimate the problems facing us, the uncertainties, the risk of misjudgements that could plunge us into the kind of chaos that was being predicted a few years ago — but, says Kahn, for the wrong reasons. If we allow ourselves to become obsessed with problems that can be solved fairly easily, such as those connected with world food and energy supplies, mineral depletion, or pollution on a global scale, we may overlook some of the more difficult and less tangible problems. If you were to draw a scale of images of the future ranging from extreme technological optimism to what Kahn calls "convinced Neo-Malthusianism", then the view of the Hudson Institute rates as guardely optimistic, but sharing many of the fears of the guardedly pessimistic — which embraces most of the environmental movement.

The book is short, the arguments compressed. Dr. Kahn admits this and apologises for it. Even so, some of his assumptions need more justification than he gives them. In the case of energy, for example, he favours the development of hydrocarbon fuel reserves and great caution — possibly including a moratorium — in developing nuclear

technologies. The hydrocarbon reserves are vast, but does it follow as naturally as he suggests that they can be or will be exploited? In some places the availability of water imposes a severe restraint and in many places local populations will oppose the despoliation of their own environment to provide energy for profligate consumption by others. Nor is the question of minerals quite so simple as is suggested. It is true that civilizations develop by exploiting whatever materials are available to them, so there is no such thing as a critical material without which civilizations is impossible, but at least we should admit the possibility that having based a civilisation on certain materials, at some stage that civilization may become critically dependent on certain of them. I know of no such material, but it may well exist, and in dwindling quantities.

Dr. Kahn accepts, then, an end to economic growth. He supposes that this will be brought about not by any physical constraint but by a decline in demand. At this point in the discussion, Professor Hirsch's book provides a deeper, more thoughtful, and altogether more satisfactory hypothesis and one which, if he is right, will end growth rather sooner than Dr. Kahn imagines.

According to Prof. Hirsch, an economic philosophy based on continual growth is incapable of providing the goods it promises, and its end will come as more and more people realise this. Once the basic material needs of society are supplied, further "progress" must depend on advancing the position of individuals within society. I may seek an education for my children that is better than the education I received, for example, so as to give them social and economic advantages that I did not enjoy at their age. Or I may wish to own a motor car, to take my family on outings. Like Napoleon's private, I may carry a Field Marshal's baton in my knapsack. Perhaps I will become a Field Marshal, and perhaps the politician who wins my vote by promising me such enhanced status is honest. If he makes a similar promise to everyone, however, he is not honest, for only a very few of us privates can become Field Marshals. We can all own cars, but if we all try to enjoy the kind of leisure motoring that the rich enjoyed fifty years ago we will need motorways and we will participate in traffic jams. If my children receive a better education, they will be qualified for more prestigious jobs, but if all children receive that better education and the number of prestigious jobs remains constant, then other ways will be found to select applicants, and soon the better (and more expensive) education will be necessary to obtain much humbler jobs.

The competition for position intensifies as the satisfactions become more difficult to obtain, and the injustices become more blatant. So we seek equality, but studiously avoid defining it. We can ensure equality of opportunity at the start of the race, up to a point, but what can we do about equality of health, of natural ability, of the home environment into which children are born? Even if we solve these little snags, can we ensure that everyone finishes the race together, as equals — for that is the important thing? For the moment we pursue unrealisable goals by sometimes heroic attempts to reconcile irreconcilables. We seek equality while preserving the advantages of particular individuals or groups. While one section of the community goes on strike to preserve wage differentials, quite different groups demand, almost as divine right, educational privileges for their children, and both claim to be egalitarian.

The contradictions being inherent to the system, they cannot be removed without a radical restructuring of society, a restructuring of a kind that has not been attempted so far anywhere in the world (the Chinese are aiming to prevent their society from developing in all directions that will lead to the appearance of these contradictions). Prof. Hirsch is hopeful. He believes society can be changed, and will be, provided we recognise the nature of the problem and provided we take steps to identify more accurately the social and physical limits to growth that bind us, and he makes a number of useful suggestions for ways in which the changes may be initiated.

Michael Allaby

HENRY DOUBLEDAY RESEARCH ASSOCIATION

A SERIES OF THREE LECTURES by LAWRENCE D. HILLS WILL BE GIVEN IN THE CONFERENCE ROOM AT WADEBRIDGE TOWN HALL WADEBRIDGE, CORNWALL ON THE FOLLOWING DATES:

Tuesday 16th August	**Sewage, Municipal Compost and Fertility**
Thursday 18th August	**Tree Farming**
Friday 19th August	**Organic Gardening and Farming**

All at 8 p.m.

This is a unique opportunity for members and friends in the West Country to hear the distinguished Director of H.D.R.A. on these important and topical subjects.

Admission: FREE to members of H.D.R.A. Non-members 20p each night or 50p for the three.

For further information or help in arranging accommodation please contact The Ecologist, 73 Molesworth St., Wadebridge, Cornwall. Telephone 020/881/2996.

Letters

Fluoridation and the Royal College of Physicians

Dear Sir,

As a retired dentist and one who has considerable doubts about the long-term safety and efficacy of fluoridation, may I express my dismay at the manner in which this treatment is being promoted in Britain.

Let me refer to a statement — one of many I could cite — made by the Committee of the Royal College of Physicians in their report 'Fluoride, Teeth and Health' where reference is made to research conducted by Dr. Robert Weaver, a former senior medical and Chief Dental Adviser to the Ministry of Education.

The report states that Dr. Weaver had found the average number of decayed, missing and filled teeth (DMF) among the 5 year old children in naturally fluoridated South Shields with 1.4 parts per million (PPM) fluoride in the water to be 3.9 per child. In North Shields with only 0.25 (PPM) in the water, the average number of DMF teeth in 5 year olds was 6.6. "Moreover," says the report, "at the age of 12 the number of DMF teeth in South Shields was 56 per cent of that in North Shields."

The Royal College of Physicians quoted the findings as part of their reason for giving their unqualified support to fluoridation which they recommended should be implemented. Dr. Weaver's early findings were correctly reported, but by the omission of his highly pertinent conclusions a misleading impression of his subsequent views was given which virtually invalidates those published in 'Fluoride, Teeth and Health.'

For example, in a paper published four years later in the Proceedings of the Royal Society of Medicine (Vol. XLI, 1948, pp. 284-290) Dr. Weaver pointed out that the effect of water-borne fluoride on dental caries was no more than a delaying action.

Because of this, any comparison made between tooth-decay among children of the same ages, in the same area, before and after fluoridation, or between children of the same ages, living in fluoridated and non-fluoridated areas, would not reveal how much decay had been prevented by the fluoride, but to what extent it had been postponed by the fluoride, a very different matter. In his paper Dr. Weaver said, "I think the most important lesson to be learned from the North and South Shields investigation is that the caries inhibitory property of fluorine seems to be of rather short duration.

"If the protection given by fluorine in South Shields had not been of brief duration the members of the dental profession would have been faced with an embarrassing question — if the incidence of dental caries in South Shields is so very much less than in North Shields, why is it that the population of South Shields is no healthier than the population of North Shields?

"The answer is, that the figure of 56% which I have given in connection with the findings of 12 year old children is *misleading*. There is no very striking difference in the incidence of caries in the two towns." Dr. Weaver pointed out that by the age of 17, those in the high fluoride area had 6.5 DMF teeth as against 7.2 DMF teeth in the low fluoride area. A difference of about half a decayed tooth, on average a difference which steadily lessens with increasing age. The incidence of untreated caries in North Shields mothers did not differ appreciably from that in South Shields mothers.

Dr. Weaver also said that 'few water supplies in Britain contain significant amounts of fluorine and were for all practical purposes fluorine free'. So that it is fallacious and misleading to suggest that fluoridation is merely adding something to water which is normally present.

He also advocated administration of fluoride tablets in preference to compulsory medication of drinking water.

The Royal College Committee obviously regard Weaver as an acceptable authority, and while none of his conclusions have been disproved, a careful examination of his papers show that his overall conclusions are very different from the impression given of them in 'Fluoride, Teeth & Health'.

The most serious aspect of this matter is the omission of all reference to these conclusions published in the British Dental Journal (Oct. 6, 1944, Vol. 77, No. 7) and in the Proceedings of the Royal Society of Medicine in 1948, Vol. XLI. One would naturally like some explanation of this.

Yours faithfully,
Ronald V. Mummery, LDS, RCS (Eng.), Dental Surgeon,
St. Helier, Jersey, C.I.

A Very Dangerous Silence

Dear Sir,

I am receiving newspaper cuttings from all over the country which raise the very important issue of how the Department of Health came to be committed to acting in the interests of several industries without the consent of Parliament.

By what manner of means can vested interests manipulate a Government Department in a democracy and ignore the wishes of those elected to represent the people?

The case of fluoridation is vitally important because it provides such a clear and striking example of democracy being sacrificed on the altar of Big Business.

In the issue of fluoridation we have the manifestation of a phenomenon which is bigger and more sinister than people realise. Usually we get only hints of what is going on behind the scenes, but the well-documented case of fluoridation should alert us all to the very real dangers of excessive Government in peacetime.

It is unfortunate that today we find the main function of the Official Secrets Act is to provide the requisite cover for supranational business to rule the State.

Not only is this clandestine activity obnoxious to a freedom loving people; it is very dangerous when subtle and secret forms of coercion give freedom to industry to cause irreversible damage to the environment.

The risks of a nuclear holocaust no longer come from the threat of war but from the unbridled greed for profit in the race to exploit an engineered energy crisis.

We can no longer tolerate the dangers of secrecy in Government and we must persuade the Government to keep its promise to replace the Official Secrets Act with a Freedom of Information Act. Every citizen should demand that the Government restore our *right to know the truth* regarding issues such as fluoridation. It is unwise to assume that Ministers of Health and their advisers must know best.

Yours faithfully,
Arthur W.J. Lewis, M.P.,
Chairman — All Party Committee for Freedom of Information.
House of Commons.

Not Guilty!

Dear Sir,

With reference to the article "Cancer Hazards in Food" in *The Ecologist*, Vol. 7, No. 1, Jan/Feb. 1977, I wish to advise you that Nabisco Shredded Wheat as manufactured in the UK, USA and Canada does not contain the colour Amaranth (F.D. & C. Red No. 2) and has never contained this colour at any time.

Yours faithfully,
R.J.W. Anderson,
Manager — Laboratory Services,
Nabisco Ltd.,
Welwyn Garden City.

A Dialogue in Two Languages

Dear Sir,

In the Wytopitlock area things are just starting to pick up. We've organised a local chapter of MOFGA as well as a food co-op just last year and are all trying to be as self sufficient as possible with food, energy and housing.

While this Community is developing, the mass society has not yet given up (after all we are a very small handful!). It seems the two groups speak a different language — we use different metaphors and very different basic assumptions. An example of this is that millions of acres of forest up here are being sprayed with biocides every year to kill the spruce budworm. We protest that the spraying causes ecological disruption, deteriorates health, and prolongs the infestation as well as creating other unexpected ones by killing predators and creating genetic types resistant to spray, etc. I'm actually involved in a suit against the companies which sent the three W.W.II airplanes over my land to dump the poison all over me from 150 ft off the ground.

The State sees our arguments as possibilities, but their thinking runs as follows:-

1. The demand for wood pulp and other forest

products is rising rapidly.

2. A huge industry has already developed to meet these demands — this industry uses enormous and expensive equipment to meet these needs — it would be an economic disaster to cut back now.

3. The industry has created a great source of employment (¼ of all the workers in the State are somehow connected with the forest industry). Letting the budworm have its way would therefore cause economic collapse and high unemployment. Thus — any alternative to spraying the poisons now used must satisfy the three demands for growth, industry and employment.

The alternatives looked at are "safer" sprays, better silvicultural practices (a long run goal, but it is emphasized that "silviculture" is adjusting the forest ecosystems to maximally fit man's economic and mechanical needs). This type of thinking has led to clearcutting, spraying with dangerous herbicides, and planting single species in even spaced forests that are easily "harvested" by huge destructive machinery . . . In other words the mass production monoculture of the farms has finally caught on in the Maine woods, with biological controls (sterilization, diseases, predators, etc. to control budworm populations), or a mixture of all the above. Within this system of thought they try to be "ecological" if possible but the three criteria must be met first.

So when we demand no spraying they ask, "But how will we meet 1, 2 and 3? No spraying makes no economic sense (in the short run at least, for that is as far as their minds are capable of ambulating). The argument is the same for energy or any other growing area of society. The question is "Sure it's nice to be ecological, but how do we meet all of society's demands?"

Like I said, it is difficult to communicate when words mean different things to different people. Each crisis is dealt with as a separate unit as though the whole of society were not a complex interconnected organism which needs a whole solution. It is hard to propose solutions for these problems when what we really want to talk about is not the forest and how it will meet our "needs" but the structure and direction of society itself. Our argument (for the woods) is that the demands are already outrageous. There is no way we will meet a geometric growth of these demands in the future because there is only so much that a healthy forest ecosystem can lose before it collpases in a very sick state.

Trying to meet today's demands, the paper companies are already drastically simplifying forest ecosystems, wasting away precious topsoil and polluting air and water as though their ownership of 50% of the State gives them the right (like beating one's wife?). So, what we say is that the demand must be reduced to that which a healthy forest can supply indefinitely. And likewise with energy; if we wish to survive as a society for more than twenty or so years then we must learn to live on what energy can be supplied by renewable resources in a non-disruptive way.

This argument is totally unacceptable since growth is supposed to cure all the ills of society — and what we ask for is a good healthy shrink. The fact that the U.S. already consumes one third of the world's resources at a per capita rate such that it will take Europe decades, even centuries to catch up to where the U.S. is now; and that "now" which Europe so desperately aims for is full of unemployment, crime, diseases of civilisation, mental illness and a life out of control does not seem to deter our dear leaders from the belief that the way to go is to grow even more. The belief is that TREND is DESTINY. All the graphs and charts say that we will be at such and such a place in so many years, so of course we *must* plan to be there, right?

Such an approach is demented. Our goals, rather than being an ever higher GNP should be first of all a stable ecological and social system that can be maintained over time. The forces of industrialisation have found ways of killing time for short term profits. But, as Thoreau said, "Can you kill time without injuring eternity?"

Yours faithfully,
A.M. Lansky,
Wytopitlock,
Missouri.

Is This the Best Way to Achieve an Ecological Breakthrough?

Dear Sir,

Thank you for your letter enclosing your manifesto, I am most impressed with it and find that I (at least) am in complete agreement with all your policies and can find no areas of contention.

Of all the views expressed and all the policies advocated, none is at variance with basic Liberal policy as laid down in recent years. The difference lies in the fact that the E.P. has but one aim, to change the whole system and work towards a stable and sustainable society, and everything in your manifesto is geared towards this end and thus, you have succeeded in presenting a cohesive strategy, whereas, as you rightly say, many Liberals still cling to outworn dogmatic theories that are totally unrealistic in the world of today, while others fudge the issues by producing instant remedies for dealing with only one aspect of 'The Crisis.'

Although this may sound like castigation of the party to which I belong, this is not really so because basically, the majority of Liberals really do believe in the principals spelt out in my last letter to you but, having always to fight in order to hold on to their political base, they have not yet managed to free themselves from all the irrelevances encountered in the day to day business of councils (and Parliament) although many of our councillors do make a certain amount of impact on their councils, and through them, to the public. This surely, is one way in which we can promote ecological ideals.

There have been some interesting developments since you kindly published my letter. I was asked to write an article for Liberal News on 'why we should link up with the E.P. (I now await reaction from readers) and have had several letters from people of all political persuasions, which seems to suggest that the potential is there for an eventual amalgamation of all like-thinking people. One, from Mr. Clive Lord, contained a copy of a letter he has written to you and, although I sympathise with his viewpoint, it does not really represent the facts; to begin with, I do not *deride* the 'nil-publicity' of the E.P. I *regret* it and I understand the difficulties of getting the ecological 'message' across.

He also asserts that David Steel holds conventinal 'growthist' views, but 'growth' is a very misleading word, except where specifically defined as GNP, and I do not think that anyone could approve of our present state of stagnation. There has to be growth in some areas as, for instance, in the third world countries, or in the type of technology needed for the future but this must be balanced by the phasing out of unnecessary growth — the greed and wastefulness of the developed countries must be reduced in order to bring the poor countries up to a reasonable standard of living — the advertising and sale of ephemeral trivia must be ended and of course, conservation of raw materials and control of pollution must be taken into account. This is why the Liberals voted for 'controlled' growth rather than zero growth, it was more a question of what was implicit in the terminology than the intention.

Britain already has 'negative growth' in terms of GNP but in it's present undisciplined form it is far from helpful so it might be more accurate to say that what we need is an overall reduction in the economy, with growth in certain directions and corresponding cuts in others.

I would like Mr. Lord to know that a decision not to actually join the party is not the same as deciding not to help. I am a widow (over 50) living alone and without transport, in a country village, 5 miles from the nearest railway station and a ludicrous bus service. As far as I know, there is not a member of the E.P. anywhere nearby. What good can I possibly do by becoming a member? whereas, from within the Liberal Party whose policies, as I interpret them, do not conflict with your own, I do at least, have a platform, however small, from which I can advance the ecological viewpoint. There are many Liberals in the district, whose help enables me to attend conferences and speak against motions which do not conform with the environmental policies laid down, I write repeatedly to the Liberal News (and other papers) on these matters and do everything I possibly can to point out the real solutions to a more stable future.

I do care who I offend (and that includes MPs and ordinary members of the party or the public) if they do have the sense to see or the honesty to admit that without radical change we are all hellbent on the road to suicide. As I said in my article in LN, there are many in the party who think as I do and I cannot think of a better way to promote these beliefs than to let them fight the next election under the label of Liberal and Ecology Candidate.

Yours faithfully,
Doreen Elton
Storrington
Sussex.

Eco-Link

Dear Sir,

I read with extreme interest your editorial 'Ecology — The New Political Force' in *The Ecologist*, Vol. 6. No. 9 (November 1976). The emergence of a broadly conceived political movement, unfettered by dangerous irrelevant ideological baggage, is a necessary precondition for resolving humanity's present crisis. The World Conference you spoke of (on p.311) is a vital first step in this direction. The formation of an international Ecology Movement, a 'sixth international' so to speak, is a greatly needed initiative, as I am sure you know.

By way of introduction, The Progressive Action Coalition is an outgrowth of the 1976 presidential campaign of former U.S. Senator Eugene McCarthy. McCarthy received about 750,000 votes in the election. Subsequent to the election, many of the people who worked in the campaign on a state or local level perceived the need for a new political movement and party. The consensus was that such a party should have a stronger commitment to fundamental change than that of the Democratic Party, and an analysis and programme free of the preconception of Marxism. This latter consideration is significant because presently all radical political parties in the U.S.A. are heavily committed to a socialist vision of industrial urban society.

Consequently, in February of this year, a conference of people who had worked in the McCarthy campaign, and others, was held in Kansas City, Missouri, to discuss a continuing political organization. A decision was made to form a Progressive Coordinating Committee for the Progressive Party. During the course of the McCarthy campaign the Progressive Action Coalition was formed. Consisting of college and other young people, it was confirmed as the youth affiliate of the PCC and ultimately, the Progressive Party.

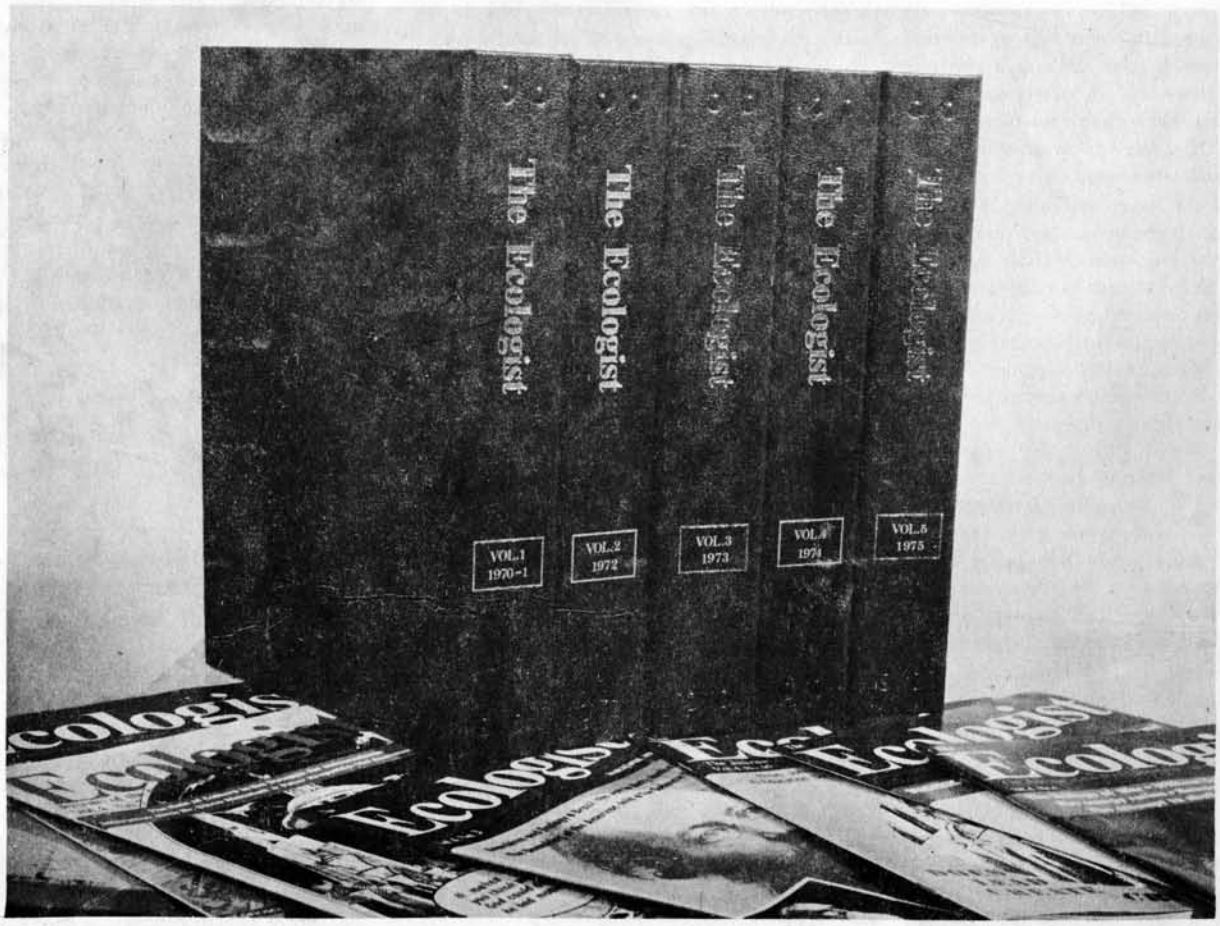
The precise programme of the Progressive movement is presently being formulated. However, it is already clear that we will be in substantial agreement with the outlook of the Ecology Movement. Of course, the level of international consensus would be enhanced by the early integration of the progressive movement here in the U.S.A. with the international Ecology Movement.

Thus, my interest in your news of a World Conference of ecologically oriented no-growth political parties. I feel that by bringing the progressive movement into contact with the international Ecology Movement from the outset, the Ecological orientation of the Progressive Party will be strengthened. I noticed that the encouragingly extensive enumeration of Ecologically orientated political parties you gave did not include one here in the United States. Hopefully the Progressive Party will fill the gap.

Yours faitfhully,
John Emory Pike 111,
Interim Executive Director,
Progressive Action Coalition,
Nashville, Tennessee.

ECOLOGIST BINDER BARGAINS

Owing to flooding in our basement some cases of VOLUME 4 binders are now marginally sub-standard in that the metal parts are slightly rusty. This in no way affects the usefulness of the binders nor does it show on the outside.
The backs are blocked in gold VOL 4 1974.
We are offering these binders at £1.00 each post free ($2.00) or £4.00 ($8.00) for a set of five (they are not large enough to contain Vol 1 1970-1971). The supply is limited so let us have your prepaid orders without delay.
For those who prefer undamaged binders, these, including VOL 7, 1977 are now available at £2.00 each ($4.00) free.
Indices for all volumes also available 50p each or £2.50 for a complete set ($1.30) ($6.50)



The Ecologist, 73 Molesworth Street, Wadebridge, Cornwall, PL27 7DS, UK.

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A SPECIAL OFFER FOR READERS OF THE ECOLOGIST
from Village Square Restaurant specialising in French Crepes served in unique rural surroundings. 147, Yonge Street North, Aurora, Ontario. Present this advertisement, purchase an Entrée Crepe and get one free. For reservations and directions call 416 727 8398.

PERSONAL

INTERESTING, IMPERFECT MALE, 41, vegetarian, mature in mind – well nearly; looks for New Age woman, adaptable, willing to change to a less consuming and materialistic lifestyle as possible life partner? Write, Simon Birch, c/o The Birches, W. Marden, Chichester, Sussex.

MISCELLANEOUS

FULL-TIME HOUSEPARENTS wanted for a Christian based study/retreat centre in Hampshire to work under the guidance of a full-time project director. The applicants would be responsible for the day to day needs of a constantly changing community numbering 20 to 50 persons. Flat provided. Salary according to age and experience. For further particulars write to Tim Selwood, c/o Burnett Swayne, 11 Westwood Road, Southampton.

SMALL COMMUNITIES RESEARCH UNION has formed to research, develop and promote small communties, rural or urban, family or commune based, self-sufficient or not, as an alternative social form to wasteful industrial society. We aim to assist intending community members to get to now each other well through working together beforehand, and to develop part-time schemes whereby cautious people can become involved more gradually. We seek members, voluntary rsearchers and consultants, and communication with others working in similar fields. Emphasis: organic agriculture, small industry, skill sharing, realism. Details: 9x4 SAE please to SCRU(2E), 13 The Rose Walk, Newhaven, Sussex.

EXHIBITIONS

TH SOLAR HOUSEHOLD in the Exhbiition Centre at Campus West, Welwyn Garden City, Hertfordshire on Friday and Saturday July 1-2, from 10 a.m. to 5 p.m. A display of solar heating devices you can install now: flat plate collectors, heat exchangers, temperature differential controls, etc. Compare products from Solacyl, Suncell, Sunstor, Solaray, Solchauf, Solaronics, Sunheat etc. Free leaflets; lectures on Saturday. Tickets 75p at the door, 50p in advance from Country College, 11, Harmer Green Lane, Digswell, Welwyn, Herts. SAE for details or phone 043871-6367.

HOLIDAYS

WELSH HILLS. 22ft. 4-berth caravan on organic smallholding with house cow etc. Self-catering. Produce available, unspoilt countryside, £10-£15 a week. SAE for details to Spencer, Rhoslan, Llanfyllin, Montgomeryshire.

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4 acre smallholding with luxury nearly completed Dormer bungalow (electric wiring, plastering, plumbing incomplete), 3 miles from Ilfracombe – 100 yds sea: **£25,000.**

4 bedroomed farmhouse, fully modernised, 15 acres horticultural holding, Cheddar, Somerset: **£50,000.**

18 acre site, beautiful surroundings, planning permission for erection of 11 holiday homes, 1½ miles from sea, Bangor, Wales: **£15,000.**

Recently renovated farmhouse, 5 bedrooms, glasshouse, moat, ponds, 10 acres good land. Boston, Lincs: **£29,000.**

Established market and nursery garden, 1 acre of glass, 3 bedroomed bungalow, packing sheds and offices, further 3 acres, Salisbury: **£60,000.**

Edward Savage and Associates,
New Buildings, Trinity Street,
Coventry.
Tel: Coventry 22048/22049.

NORTH DEVON. Completely secluded stone house (1890) in one acre, inc. organic garden, slate quarry, outbuildings. Magnificent view. Mains electricity and water but ideal for alternative energy. Part central heating and open fireplaces. Single and double reception rooms, 4 bedrooms, pine-clad kitchen and bathroom, workshop. £18,000. Tel: Anstey Mills 320 or 01-289-0215.

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