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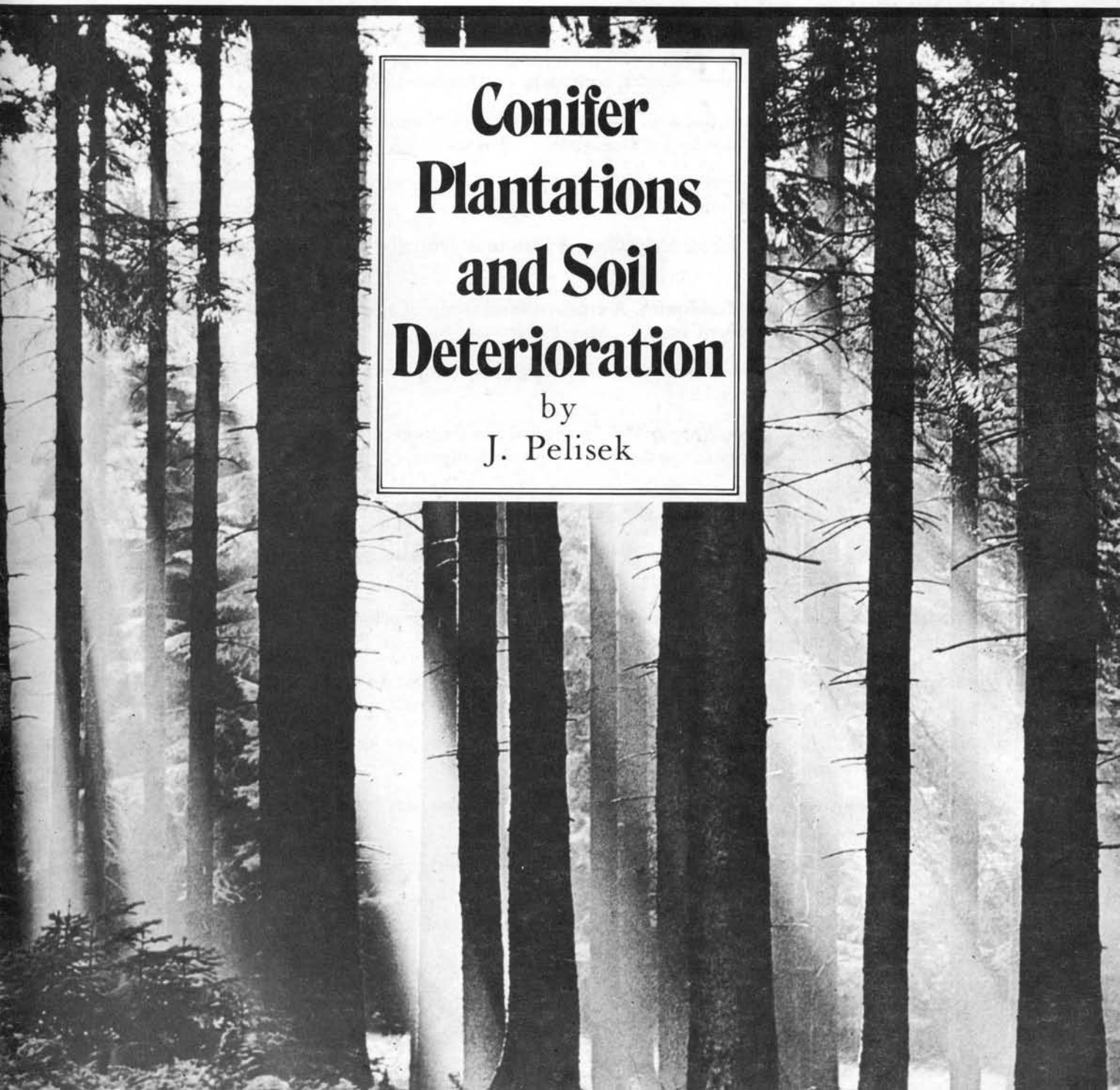
Interview with Jamaica's Minister of Resources
Driving into the Future - Atlanta 2000



Conifer Plantations and Soil Deterioration

by
J. Pelisek

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A Blueprint for Survival. The now famous plan, by Edward Goldsmith, Robert Allen and others, for the achievement of a sustainable society.

In this issue

Vol. 5. No. 9. November 1975

This Month's Cover: Spruce Trees in Czechoslovakia

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In Praise of the Abnormal

It is extraordinary how ineffective are the controls we have set up. Indeed, possibly the best way of gauging the level of crime in a society is by counting the number of policemen engaged in fighting it. The number of doctors in practice provides an indication of the ill-health of its inhabitants, the number of dentists, of the rottenness of their teeth, the number of lawyers of their quarrelsomeness, while the number of conservationist groups reflects the rate at which a society is committing suicide by destroying its resource-base.

If our controls are so ineffective, it means that we have no way of counteracting the biological, social and ecological side-effects of our industrial activities, save, of course, by cutting down on them. Deindustrialisation is clearly the only way we can solve the problems facing us, which can be shown to be but the symptoms of the ever deeper and more wide-spread damage our activities are causing to the biosphere of which we are part.

The suggestion, however, that we should deindustrialise is invariably greeted with stark incredulity, 'You cannot put the clock back', 'You cannot stop Progress' – these are the stereotyped responses.

Why one might ask are we so blind to the realities of the world we live in? Why should we refuse to face facts which, by now, should be evident to all thinking people?

One of the answers lies in our extraordinary notion of what is normal and what is abnormal. Indeed, we have come to regard what, in evolutionary terms, are completely aberrant conditions as being quite normal, simply because we have grown used to them, and have been brainwashed into believing that their undeniable distastefulness must be accepted as part of the natural order of things – a small price, indeed, to pay for the benefit 'Progress' confers upon us.

Thus, we have come to regard it as normal to live in urban wildernesses studded with shoddy concrete blocks, gas containers and parking lots, normal to eat tasteless, industrially-produced food, normal that our rivers should be polluted, that the air be foul, that one person in four should die of cancer, that the crime-rate should increase from day to day, that our society should be drifting towards ever more terrifying calamities and that no-one should do anything about it.

Needless to say, in terms of man's total experience, all these things could not be more abnormal, for we have lived in this way for but a very short period and one that is totally atypical of our experience of living on this planet.

The benefits of Progress are equally abnormal. Mass education in factory-like compounds with computers and audio-visual aids, capital-intensive health services in prison-like hospitals with the aid of drugs, X-ray machines and other elaborate technical devices. Package tours to monumental rabbit warrens on the Costa Brava, colour television sets, motor-cars, electric toothbrushes for everyone – all this is new in terms of man's total experience. Nor can they be indulged in with impunity since the absurd paraphernalia of the Modern World must constitute 'randomness' or waste from the point of view of the biosphere. The more, that in fact, is produced the more must the latter deteriorate – and the less can it constitute a satisfactory habitat for man.

Indeed, until we realise this fundamental principle, and revise our priorities accordingly it will be impossible to solve any of the problems facing our society today.

Of these, one of the foremost is over-population – a subject which no-one is willing to face objectively. The world population is nearly four billion, while every year there are eighty million more to feed. World food production is no longer increasing and will almost certainly start to fall. What are we doing about it? In practical terms, nothing. The distribution of contraceptives to people who are not in the least bit interested in using them, is all that can be reconciled with today's crazy set of priorities. Few people even dare consider why the population explosion has in fact occurred. If they did they would have to face the unpleasant fact that modern medicine is one of the principal culprits, for it has radically reduced infant humanity. We have been brainwashed into believing that by doing this, it has done something positive for mortality. We are so far out of touch with reality that most of us believe that it has actually exempted us from the operation of natural selection. Needless to say, this is impossible. Modern medicine has not reduced overall deaths. *It has only deferred them.* In theoretical terms, it has reduced the 'order' or 'negative entropy' of the human populations and hence of the ecological systems of which it is part. The result is that the former is becoming qualitatively and quantitatively more vulnerable to environmental challenges. Instead of allowing the less adapted among us to be slowly eliminated by the normal operation of natural selection, it

has created a situation in which they will simply be eliminated in much larger batches at a slightly later date by famine, epidemics and other disasters. In other words by systematically reducing the stability of populations, societies and ecosystems, we have correspondingly increased the size of the discontinuities to which they must be subjected.

It may well be that the only real alternative is to allow infant mortality, once more, to take its normal toll – a suggestion likely to elicit howls of self-righteous indignation on the part of those brought up on our present set of priorities. Yet in evolutionary terms, it is normal for it to do so; abnormal and counter-productive to prevent it, for by doing so instability is increased.

Take another problem: the pollution of our seas and inland water ways. At the rate at which this is occurring it seems unlikely that our inland seas will survive for more than a decade, while fish from the oceans are likely to be too polluted to eat. Yet we view this apocalyptic situation with almost total equanimity. Are we all mad?

The truth is that industrial undertakings generate waste, and that the number of appropriate dumping sites on land are very limited. Therefore it must be channelled into our rivers or dumped into the seas. We rationalise this by persuading ourselves that it is our legitimate right to use them in this way, and that our limitless ingenuity will enable us some day (regardless of such considerations as the laws of thermodynamics) to make all waste products vanish into thin air.

How does a society develop so distorted a set of priorities? To answer this, one must indulge in a number of theoretical considerations. Thus the most important Principle of Behaviour is that it tends towards stability. This must not be regarded as a point in space-time, but a course or trajectory along which discontinuities and their corrections are reduced to a minimum, i.e. along which, for instance, floods, droughts, famines, epidemics etc. are largely eliminated, as they were among our hunter-gatherer forbears (so long as they remained in their natural habitat).

The process whereby natural systems are kept on this course, is referred to as control. It is ensured in very much the same way at all levels of organisation. In each case, responses are based on a model of a system's relationship with its environment and are constantly monitored in terms of it. By the same token the model is constantly modified so that it becomes increasingly accurate, thereby giving rise to correspondingly more adaptive responses.

What is important is that the information constituting this model must represent the system's *total* rather than just its most recent experience. It is only in this way that its continuity and hence stability can be maintained – only in this way, in fact, that it can survive. (I refer to this as the Principle of Informational Continuity.) It explains why the transmission of genetic and cultural information should be governed by the same basic laws – a fact which no-one seems to have noticed. It explains why both genetic and cultural information should be non-plastic – the former even less so than the latter, for it must reflect the total experience of a species rather than that of a society.

In a stable situation, however, neither type of information can just reflect the experience of the previous generation, let alone that which has been improvised within a single one to deal with a freak situation which may never recur.

But there is another essential principle of control: it can only ensure the system's stability if the environment closely resembles that in which it evolved. Deviations are only tolerable within certain limits. Otherwise, quite clearly, the information upon which its epxerience is based, will cease to be relevant. (I refer to this as the Environmental Limits Principle.)

If a society is geared, as is ours, to the systematic transformation of its natural environment, it will have to 'adapt' to situations for which its experience provides ever fewer precedents. It must in fact increasingly improvise, and it can only do so, by abandoning the goal of stability and continuity – since the information upon which the improvisations are based will no longer reflect the society's total experience (i.e. it will have violated the Informational Continuity Principle).

The responses mediated in such conditions are referred to by Boyden as pseudo-adaptations. They are not true adaptations, as are those which occur within the framework of the Evolutionary process *since rather than solving problems, they merely replace them with new and usually more serious ones.*

Worse still, to rationalise the hectic changes to which we become committed, we have been led to develop a general model, or world-view, in terms of which the relevance of the past is denied, and originality and improvisation are exalted as the ultimate achievements of our species.

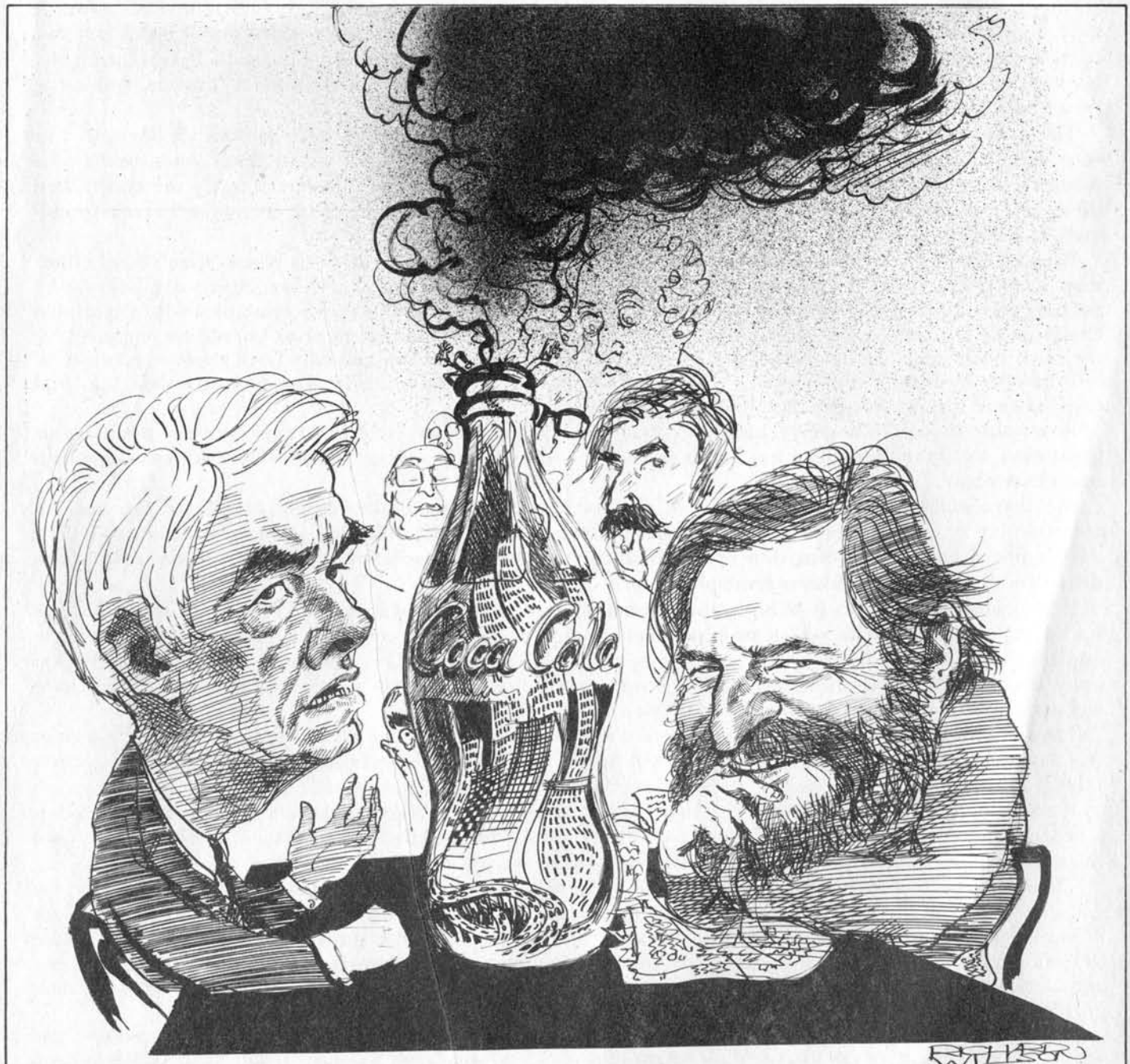
Thus, the mechanism which normally leads man to preserve his environment, functions *indirectly*, by causing him to preserve the model and associated behaviour pattern, whose adoption leads him to do so. When environmental changes cause this control mechanism to break down the model and associated behaviour pattern are then transformed to favour yet further environmental changes. Thus, ironically, *the very mechanism which has been designed to ensure the preservation of our environment gives rise to a chain reaction towards ever greater environmental destruction.*

Only in this way can we explain the development of the aberrant world-view of Industrialism, and hence why we have come to regard as normal those things which are most artificial, most contrived and most obviously undesirable. Only in this way can we explain why the ritual dousing of our farm crops with a witch's brew of toxic chemicals should be regarded as normal and in fact 'scientific', while those who

advocate proved agricultural methods are derisively referred to – even by such supposedly enlightened ecologists as Professor Mellanby – as 'muck and mystery men'. It also explains why those who prefer to eat the sort of diet we have been adapted to by our evolution, rather than consume synthetic foods of which our bodies have had no previous experience, are scornfully referred to as 'cranks' and 'food-faddists'. *Things, in fact, are completely the wrong way round,* and this wrong-way-roundness is institutionalised by our Government's attitude to change. Since to them it appears *normal* continuously to transform the environment it follows that to prevent any part of this process of change on the grounds that it may be ruining our health or damaging our physical surroundings, is construed as an attempt to divert the course that they believe we must take. The onus of proof of damage is thereby made to rest with those who advocate caution while technological change is assumed to be innocent until proved guilty. Our view of what constitutes 'scientific method' makes it difficult, often virtually impossible to do this until the guilt is revealed by some terrible catastrophe such as the thalidomide case or the mercury at Minamata.

Yet we know that the World worked very well without persistent pesticides, food additives, motorways, high-rise buildings and nuclear power stations. It has done so for millions of years. To believe that it works *with them,* however, is a pure act of faith which is, in fact, unjustified theoretically and to a great degree, empirically as well.

Edward Goldsmith



Atlanta 1975.

ATLANTA 2000

by

Robert Hanie

Accepting the truth that world resource shortages are not a myth but an absolute reality that will affect the life of their own city, a group of prominent citizens in Atlanta, Georgia, called in eminent environmentalists to commence a study in depth and a programme of action which encourages all their people to involve themselves in a vision of the future. From this emerged the organisation described in this report.

Atlanta is perched on a ridge of the southern piedmont over 1,000 feet above sea level. Below the piedmont is the accumulated debris that forces of nature have eroded off ancient Appalachian peaks for millions of years and washed eastward towards the sea to form "the coastal plain".

This erosion has also reduced the environs of Atlanta into a vast rolling plain which is punctuated in places by monadnocks, erosional-resistant remnants, which stand like giant rock whales. The best known of these monoliths are called Stone, Lost and Kennesaw "mountains".

A great oak-hickory forest has evolved on the red clay. The aboriginals liked the dank forest. They built communities up and down the Chattahoochee and its rivulets which fall away from the Atlanta ridgeline to the west and along the rills of the Flint River which fall to the east.

One such village clustered around the great spring that formed the headwaters of the Flint at a high point along the ridge where several trails met was called Standing Peachtree.

Today that spring is beneath a 41-storey building. Outside the trails still converge at the place called Five Points. On Peachtree Street and all the roads running away from Five Points, heavy construction T-cranes hover like great praying mantises and whirl their days away assembling the southern megalopolis. Amidst the monadnocks, many of the postage stamp remnants of that oak-hickory forest are being converted into circular or trapezoidal or rectangular buildings.

There are no natural boundaries to Atlanta's growth. But there are, of course, natural limits.

Tucked away in the Healey building, near the heart of the city, are the offices of the Metropolitan Foundation and its director is Frank Robinson, a creative wizard.

Robinson and the foundation perceived the energy problem as a potential crisis in the spring of 1973. Trying to fathom the effects of the availability of world resources upon the future of Atlanta, they issued a call for help.

Five eminent environmental seers answered in June of that year. Jorgen Randers of Norway, co-author of *Limits to Growth* began the discussion held in the austere board room of Emory University, Co-sponsor of the meeting, Edward Goldsmith, came from London. He is editor of *The Ecologist* and co-author of *A Blueprint for Survival.*

Goldsmith was followed by David Brower, President of Friends of the Earth who flew in from San Francisco.

Next came bio-economists John Milton and Peter Freeman, co-authors of *Ecological Principles for Economic Development,* who came from Washington.

Ten of Atlanta's most prominent businessmen gathered on the other side of the table. For two days the environmental gurus unfolded the dynamics of finite resources vs. unlimited growth on a world-wide scale.

They postulated an imminent energy crisis which would be followed by related food shortages – world-wide inflation based upon the non-availability of energy and a possible depression. Goldsmith even discussed precise scenarios for American take-over of Arab oil fields.

Many of the attendants to the meeting, which became known as "Alternatives for a Stable Society", sat in rapt attention as possible futures were unfolded before them. At the conclusion of the seminar the attendants who remained concluded that a global monitoring and early warning device was essential to Atlanta's future and they determined to establish one.

Hugh W. Schwarz, Vice-President for planning for the Coca-Cola Co., agreed to serve as its chairman protem, bringing a piercing world view of bio-economics to its deliberations.

Coca-Cola, the Metropolitan Foundation and a black philanthropist, Richard Rischarde, underwrote its initial budget. They agreed to call it Atlanta 2000.

Not everyone who came to the meeting agreed upon its deliberations. Then came October, and everyone agreed that we had an energy crisis. The premise of Atlanta 2000 had one of the most massive confirmations in human history.

Atlantans drove up to gas stations and for the first time in their lives

heard dealers say, "I'm out of gas."

This September after two years' work and a $100,000 investment, Atlanta will launch the first stage of the Atlanta 2000 programme, focusing on awareness, in the form of the "Atlanta Regional Forum".

The forum will be housed at Atlanta's downtown university, Georgia State. It will launch what is coming to be called in Atlanta "the great debate".

Acknowledging that the energy crisis was just a blip on the early warning screen of nature and that other related crises might yet loom on the horizon, the forum has initially established 12 resource teams: arts, biosphere, communications, economics, energy, habitat, health, learning, movement, governance and technology.

The values resource team will act as the integrative and cross-pollinating device. Each resource team will initially be staffed by a convener-pro-tem, a resource person and a student associate.

These resource teams will form the basis for a full-scale task force whose participants will be recruited from the 15-county Greater Atlanta area. These task forces will be open to the public and will be self-starting in leadership and direction.

They will, in their deliberations, seek to define alternative concepts, devise strategies and examine effects and values in our society.

All this will be assembled into a set of goals for Atlanta for the year 2000. Overall direction for the forum will be provided by its chairman, Dr William Nash of Georgia State University, former chairman of the Department of Regional Planning and Urban Design at Harvard.

What does such a creature as a "citizen's forum" hope to achieve?

In ancient times aboriginal villages were led by two chieftains: the political chief and the spiritual chief. As in the days of the biblical prophet-kings, the spiritual chief spoke out of his dreams and visions.

In Georgia the Cherokee nation incorporated this system of governance into their lives for over a thousand years.

The political chief prevailed only when the spiritual chief saw in his visions that such action was necessary to the continuance of the tribe's existence.

Such was the intimacy of tribal life in its relationship to nature – the source of all life. Such was their understanding of bio-economics.

And such is the reason-for-being for Atlanta 2000 – to embark again upon the ancient quest for vision and to integrate that vision into the body politic and the affairs of men.

Simply, Atlanta 2000 exists to encourage people to dream – to see a vision of themselves and of their city which listens to all the forces of nature and to all the people of the city. Atlanta 2000 is truly premised upon the statement of old: "Without vision the people perish."

What of the results? How will the vision of the people be incorporated into government-at-large? Atlanta 2000 has assembled a third entity in addition to the forum and its board of directors. This integrative device is called the Advisory Steering Committee.

It is chaired by the President of the Atlanta City Council, Wyche Fowler. The Advisory Committee is comprised of the reigning heads of local governmental entities, bureaus and also a sampling of regional politicians. They (and the people at large) are the recipients of the work of the forum.

They were formed to give the forum direction and in order to integrate its proceeds into the mainstream of government.

But since each part of the Atlanta 2000 structure is semi-autonomous, the proceeds of the forum are neither subject to approval nor repression by the other two entities.

Can such a creature work? Can any city which dares to dream survive? We think so in Atlanta. We think a city must dream to survive. We are not so much dedicated to becoming the world's next great city or the world's most ecologically oriented city as we are dedicated to the prevalence of the spiritual over the temporal in the affairs of men, and the quality of life.

Based upon that premise, we are hereby embarking upon a great quest for vision in order to prepare ourselves for the journey into the year 2000.

Conifer Plantations

Research into the changes in composition of forest soils in parts of Central Europe where the indigenous oak and beech stands have been replaced by spruce monoculture show serious degradation and deterioration in productivity.

Soils are formed through the gradual physico-chemical breakdown of rock, by the combined activity of atmospheric conditions and micro- and macro-organisms. This process is influenced by the topographical and ground water conditions present and of course by human activity.

Although many different types of soil exist, each one displays definite physical, chemical and biological properties and a definite productivity. An equilibrium normally exists between a soil and the environment from which it was formed so that any changes in the latter naturally produce modifications in the former and thus also in its productivity. The most important of these changes occur in the composition of the micro-organisms which in turn affects the major bio-geochemical cycles and other elementary bio-chemical processes in the soil. Such a disturbance may not only upset the equilibrium of a soil but also that of a whole landscape.

Other factors such as rock, etc. are relatively stable and rarely undergo significant alteration.

One of the main causes of the above changes is human activity, which can strongly influence the structure and composition of a soil, particularly on arable land. Agronomic farming involving the annual cultivation of land and the application of large quantities of commercial fertilisers is largely responsible for the types of arable soil currently found in Central Europe, most of which were originally forest soils.

It is possible to trace the formation of and changes in these soils by comparing study plots with soil profiles in wooded areas where the structure of the forest stands has been preserved more or less in its natural form, and with soils which have undergone agricultural treatment.

The effects of human activity have been materially different in forest soils as compared with agricultural soils. The results of research obtained so far show that in Europe important alterations in the forest soils have occurred mostly in the region of Central Europe and that these are mainly due to changes in the forest stand structure when the original mixed forest crops were replaced by plantations of either spruce or pine monocultures.

The structure of European forest stands experienced appreciable changes during the Quaternary Period. In the Early Quaternary, the Pleistocene, the whole of North Europe was under ice, the glacier reaching deep into Central Europe as far as the Bohemian Massif range and the northern foothills of the Carpathians. The nearby Alps were also under glaciation. Thus areas under forest became confined to the southern part of Central Europe only, which also meant considerable reduction in the number of existing forest tree species. As the glacier retreated northwards, forest species gradually filled up the vacant spaces in the centre and north of Europe.

During this post-glacial period both the soil and climatic conditions were changing and thus also the structures of forest stands. The following major stages in the development of forest have been recognised for the post-glacial of Central Europe up to the present time:

9000-8000 B.C.:

1. Arctic tundra with groups of birch and pine.

8000-6000 B.C.:

2. Pine stands intermingled with birch and willow.
3. Pine stands intermingled with hazel.
4. Oak forests (mixed stands comprising oak, elm, lime, ash and maple).

6000-2500 B.C.:

5. Spruce forests (retreat of the mixed oak stands followed by considerable expansion of spruce, beech and fir).

2500-500 B.C.:

6. Spruce fir forests (further expansion of spruce, beech and fir: this is known as the Atlantic period).

500-700 A.D.:

7. Mixed stands consisting of fir, beech and spruce (a natural and gradual retreat of beech and fir).

700 A.D.-the present time:

8. Spruce predominating, with pine on drier localities; the period of forest stands under the influence of human activity.

The interval between about 700 B.C. and 500 A.D. may be taken as the comparative basis for estimating existing changes in the forests and soils of Central Europe. The vertical zonality of soils and vegetation has been determined for this and subsequent periods in Czechoslovakia, ranging from the lowlands to the mountain regions.

and Soil Deterioration

by Professor J. Pelisek

Elevation (m)	Zone
100-250	River lowland hydromorphic soils inundated with forests.
150-300	Chernozems largely covered by oak stands — the oak vegetative zone.
200-350	Lowland brown forest soils largely under the oak vegetative zone intermingled with hornbeam.
250-550	Lowlands and foothills alluvial podzol soils largely under the transition vegetative zone of oak and beech.
400-900	Ochre forest soils largely under the beech vegetative zone.
800-1200	Rusty forest soils largely under the vegetative zone of fir and beech.
1100-1500	Chocolate-brown forest soils largely under the vegetative zone of spruce, beech and fir.
1000-1800	Mountain podzol soils: in the lower regions under the spruce vegetative zone, in the upper regions, under the dwarf-pine vegetative zone.
Above 1800 m.:	Sub-Alpine darkbrown and sub-Alpine grey soils above the timber line, covered by grassy vegetation. Detritus and stones.

Each of the vertical soil or climatosoil and vegetative forest zones features distinct water and air dynamics and temperature regimes as well as chemical and biochemical properties and productivity. Thus each zone has its own set of ecological conditions for the forest stands and is at the same time characterised by the rainfall accumulation.

The most significant alterations in the structure of forest stands can be detected in Central Europe; in Czechoslovakia this is especially the case in the lowlands and foothills with elevations of 500-600 m.

Within this range the original forest stands consisted largely of mixed broadleaf forests with predominance of oak or oak + beech intermingled with other broadleaf species, these being mainly hornbeam, lime, ash and maple. These were then gradually replaced by spruce monocultures and occasionally by pine monocultures on sites poorer in minerals. The majority of these changes occurred during the Middle Ages, in connection with the development of the mining industry (13th-16th centuries) and in the 19th and 20th centuries.

The changes in composition of the forest stands were reflected in the forest soils, where productivity was invariably decreased with reciprocal changes in the health condition of stands. Thus the original brown forest soils under the mixed broadleaf stands changed under influence of the spruce monocultures to podzol soils with accumulations of superficial raw and acid humus and other undesirable properties.

This particular transformation has been the object of study primarily in Czechoslovakia, the German Democratic Republic, the German Federal Republic, Poland, Sweden and also in the Soviet Union since spruce produces a highly important raw material for the pulp and other industries. Research undertaken by the author between 1960 and 1972, together with the results of earlier studies and the experience of forestry practice revealed a certain degradation of the forest soils under spruce monoculture in the lowlands and foothills. (These studies were conducted on comparative study plots using the vertical soil zonality as a basis over a range from the valley floodlands to the high mountains, on various sites in Czechoslovakia.) This was indicated by the occurrence of deteriorated water and air regimes in these soils, particularly in the top layer. Distinct differences could also be detected in acidity, the top soil layers having high pH levels compared with those found under mixed broadleaf stands. The highest pH differences were found in the superficial humus. This is due to the raw humus accumulation under the spruce cultures.

The so-called available nitrogen in the soils under spruce monocultures revealed markedly reduced levels when compared with those in the topsoil layers under broadleaf stands as did also the readily available forms of nutrients (calcium - Ca0, potassium - $K_2 0$, and phosphoric acid - $P_2 0_5$) which showed differences of between 30 and 50%.

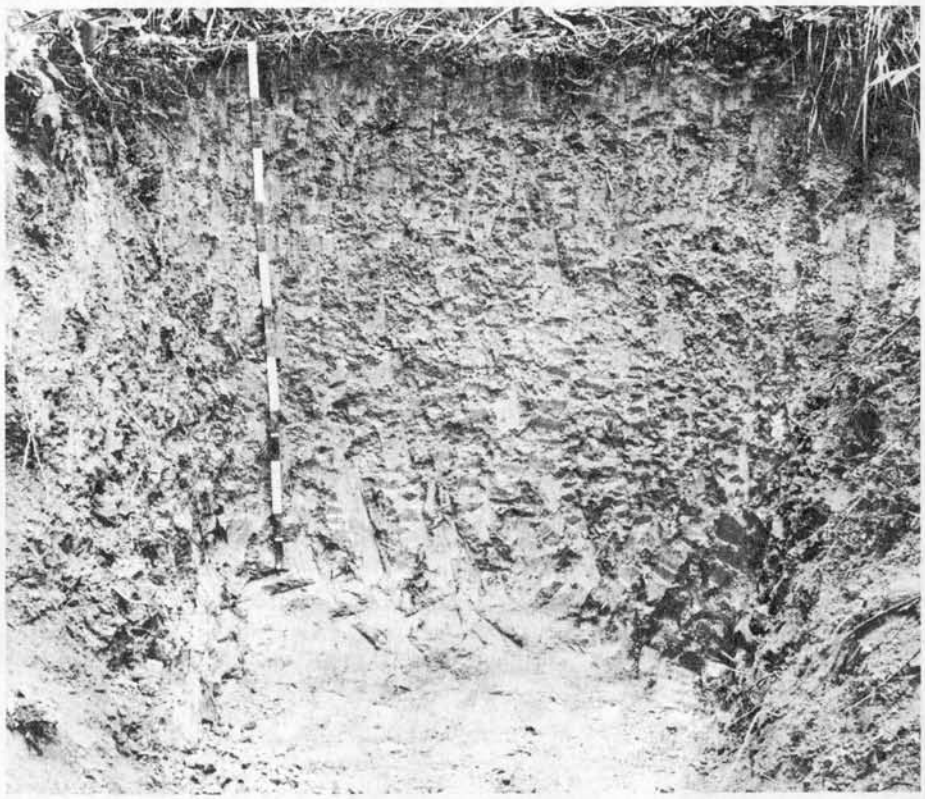
However these studies suggested that it was in fact possible to grow spruce over a range from the high mountains to river valley situations without the risk of soil degradation, but only on certain sites and in certain proportions in the forest stand structure. The criteria determining both site and proportion depend on two highly important factors: the annual dynamics of the soil moisture regime and the supply of plant nutrients in the soil. Thus an increased soil moisture content during the summer season in the soils of valleys, lowlands and foothills allows greater admixtures of spruce to be included in the broadleaf stands without the risk

of adverse effects to the soil. For the lowland oak vegetative zone (100-250m.) an admixture of 20-40% spruce in the broadleaf stands was shown to cause no deterioration in soil conditions on the moister sites. In the oakbeech vegetative zone (250-500 m.) admixtures of spruce from 30 to 50% were likewise found to have no detrimental effects. In the upland zone (500-800 m.) this was the case for admixtures of spruce of 40-65%; in the lower high mountain zone (800-1100 m.) for admixtures of 60-90%; while in the upper high mountain zone (1100-1200 m. and over) pure spruce stands showed no adverse effects on the soil conditions, spruce being a natural species to soils of this range of elevation which is accordingly known as the spruce vegetative zone.

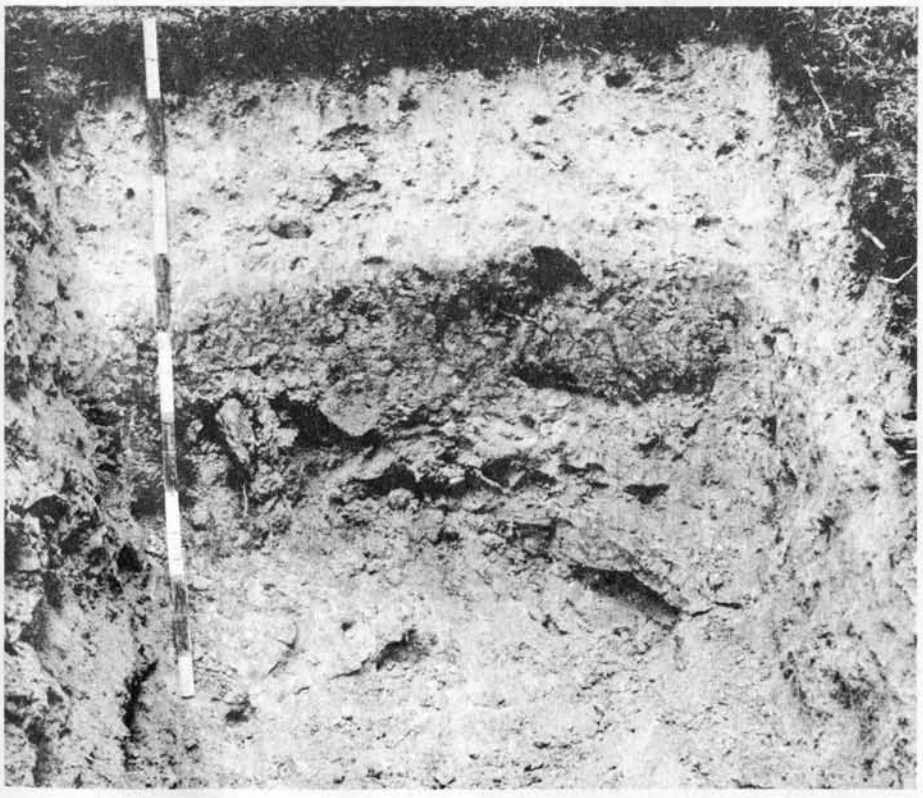
Increased proportions of spruce in the forest stands of Czechoslovakia, as well as of Central Europe, are highly important with respect to national economy. The ideal situation is a higher production of the tree volume in forest stands without a simultaneous reduction in the productivity of forest soils. The degradation process in soils under spruce monoculture in the Czechoslovakian lowlands and foothills involves not only a reduction in tree volume production but also a deterioration in the water regime. It has been estimated that such spruce monoculture is capable of retaining, within the crown layers, 30-40 per cent of the total annual precipitation (which varies between 500 and 600 mm. for this region) compared with 20% by mixed broadleaf stands.

Thus the soil surface under the spruce monoculture receives only some 300-350 mm. whereas under the broadleaf it receives 400-500 mm. As a result the soil under the former not only has a very low moisture level during the growing season (the period of maximum rainfall) but also undergoes a distinct reduction in retention capacity i.e. permeability to precipitation received. Reductions in retention capacity to the lower limits of 15-30% have been recorded for the topsoils under spruce monoculture on the lowlands and foothills, in comparison with mountain regions where this species occurs naturally.

Above and below: a brown forest soil on loess under a natural mixed broadleaf stand (oak and hornbeam and beech) in the foothills of Czechoslovakia.



Above and below: a podzol soil with superficial raw humus and a strongly leached and impoverished top layer, derived from original brown forest soil under the degrading action of spruce monoculture in the foothills of the West Carpathians, Czechoslovakia.



In addition to the direct influence of the spruce monocultures, other factors may also degrade the forest soils and reduce their productivity. These include deforestation of large areas, grazing cattle, removal of the surface humus layer, pollution from industrial emissions, both gaseous and solid, such as the oxides of sulphur and nitrogen and flying ash.

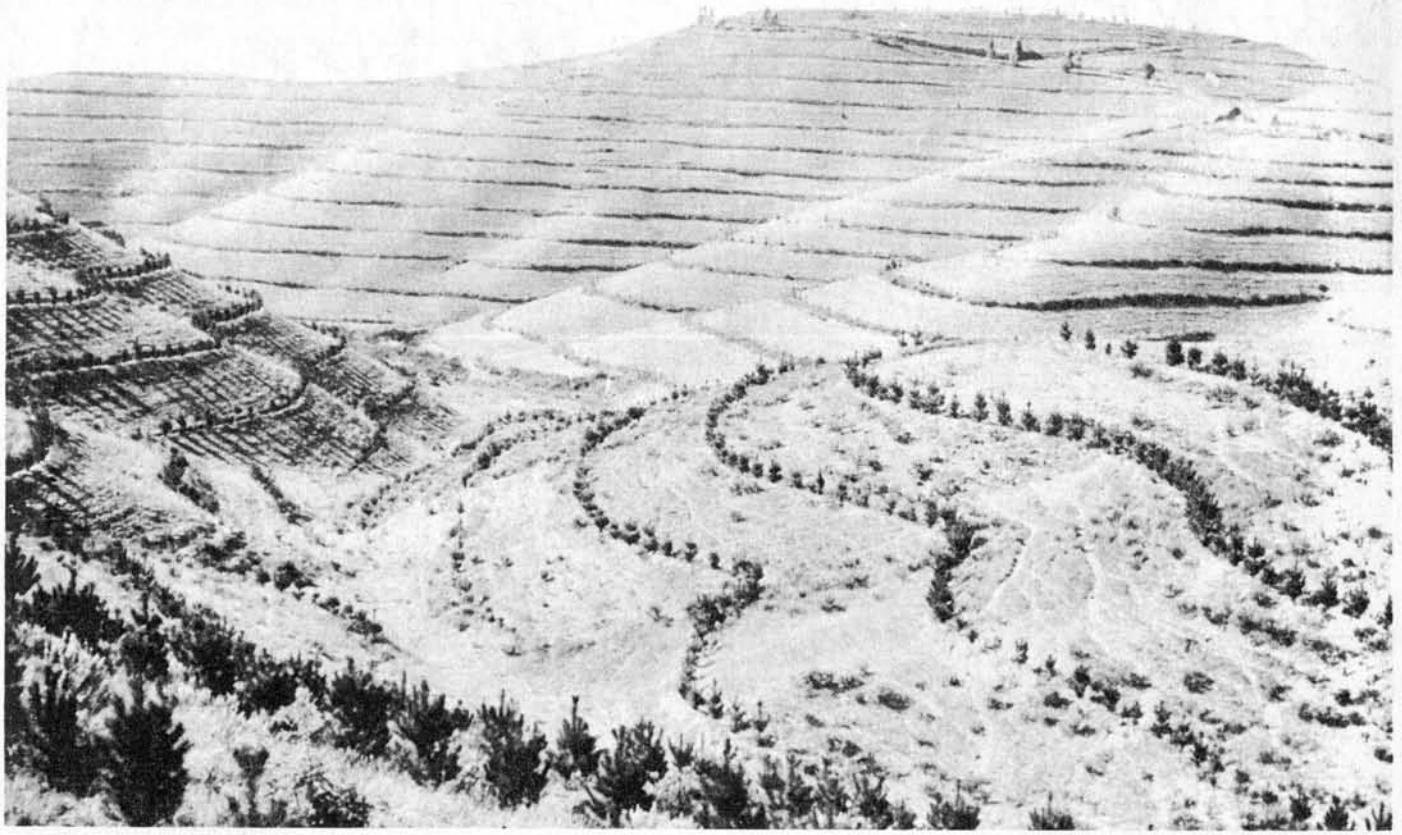
This anthropogenic degradation of soils results in the accumulation of raw acid humus, an increase in the rate of podzolisation and formation of soil conglomerates or ortsteins, further compaction of the soil profile, a reduction in the physiological depth of soil available to the root system, the presence of some toxic compounds (such as ferrous compounds) and a reduction in productivity.

Deforestation and intensified soil erosion by running water and by air represent special situations in the soil degradation process.

The consequences of all the soil degradation processes described manifest themselves as follows: the forest stands produce lower increments and fewer branches. This is followed by decay of the stems until finally no increments at all are produced. This frequently makes both regeneration of forest stands, whether natural or artificial, and reafforestation, impossible. These signs can be seen quite easily in the lowlands and foothills of Czechoslovakia, both under spruce and pine monocultures. Under the latter soil degradation is more distinct and intense, with the subsequent formation of firm layers of conglomerate or ortstein. These layers then impede development of the root system in forest tree species. Pine stands are low in height and produce no increments. It goes without saying that the production of tree volume in such stands is also low.

The author studied the bio-ameliorative action of broadleaf tree species on degraded soils under pine monocultures in Czechoslovakia from 1965 to 1972. Results revealed rising bio-ameliorative effects with greater proportions of broadleaf species in the stand, in the following sequence: oak, hornbeam, beech and lime.

In central Europe the territory of Saxony (German Democratic Re-



The heavy price of deforestation, the result of often thoughtless action in the centuries gone by – when at the same time empires were built and continents discovered.

public) represents a particularly convenient region for the introduction and expansion of spruce monocultures. Research by Meyer in 1959 in this area produced the results given below which indicate the diminishing annual increments and the average stocks of tree volume per hectare:

1847-53 stock 152 cu.m.;
increment 4.7 cu.m.
1864-73 stock 177 cu.m.;
increment 6.1 cu.m.
1874-1903 stock 189 cu.m.;
increment 6.1 cu.m.
1904-1913 stock 185 cu.m.;
increment 4.6 cu.m.
1924-29 stock 170 cu.m.;
increment 2.5 cu.m.

Thus over a period of 50 years the increment appears to have diminished by more than one half of its initial value.

Similar studies by G. Mierlich (1970) compared changes in a pseudogley soil on loessal loam under spruce monocultures with another soil under a stand of oak and beech. A number of differences were observed between the properties of soils under spruce and those under the broadleaf stands. More specifically, the former showed mainly increased acidity, accumulation of raw superficial humus, diminished gross pores and overall compaction of the soils, with distinct leaching and impoverishment of the top A_2 horizon. The nitrogen was also reduced due to the reduced rate of microbial activity; this decrease, under spruce stands, varied within 10-20%. In addition, a reduction in readily soluble nutrients could be detected in the topsoil layers. In general, these results suggest the existence of typical degradation processes in the soils under spruce monocultures.

B. Ulrich, E. Ahrens and M. Ulrich studied the differences between sites under two different species – beech and spruce, also in the German Federal Republic. They reported increased acidity of the soil under spruce throughout the entire depth of the soil profile and an accumulation of raw surface humus and true humus which was nearly double that found in the soil under broadleaf species due to reduced mineralisation of the humus. Higher C/N (carbon:nitrogen) ratios could also be detected, and consequent aggravated conditions for nitrogen nutrition in the topsoil layers. The phosphoric acid ($P_2 0_5$) regime was similarly disturbed.

In Belgium, Manil investigated the extent to which it is possible to deviate the structure of forest stands from natural conditions with special regard to the cultivation of spruce monocultures. He showed that the degrading action of spruce on major soil properties was a highly limiting factor and that this might be overcome by the application of commercial fertilisers.

Troedsson studied the effects of spruce monocultures on forest soils in Sweden in 1972. He concluded that the process of podzolisation in brown forest soils tends to become intensified with increasing age of spruce monocultures up to the level when a distinct podzol soil develops.

Reprinted from *Nature in Focus* No. 19, 1974.

THE Ecology Party newsletter

Formerly PEOPLE

OFFICERS

Secretary:	Clive R. Lord, 44 Upper Batley Low Lane, Batley, Yorks.	*Policy:*	Peter Allen, 16 West Park Road, Leeds 8.
Treasurer:	Peter Murray, 6 South Way, Liverpool.	*Communications:*	Michael Benfield, New Buildings, Trinity Street, Coventry.
Membership:	Elizabeth Davenport, 2 The Old Vicarage, 26 Main Road, Kempsey, Worcs.	*Campaign:*	Vacancy exists. Offers/nominations to Secretary please.
Participation:	Eric Jones, 18 Buttermere Close, Anston, Sheffield.	*Bankers:*	Barclays Bank, High Street, Wavertree, Liverpool.

INTERNAL POLICY (extracts)

- There is no formal party constitution, this developing as has the British Constitution, on the basis of precedent.
- Recycled waste paper is used wherever possible.
- Donations can only be accepted if "no strings" are attached.
- The concept of single individual party leader is not considered appropriate (unless and until one emerges spontaneously).
- Open support is given to like-minded groups.
- All local groups are communications/information centres for the alternatives movement.

SUBSCRIPTIONS

Fixed for the coming year as follows: Full member £4; Joint Membership £6; Associate Member £2. All subs half rate after Conference.

REGIONAL MEETING

1) Are to be held every 10 weeks in different parts of the country.
2) Regional meetings are open to all newsletter readership.
3) Press and all relevant local organisations are to be invited to regional meetings.

NEXT REGIONAL MEETING

Room 3107, Sheffield Polytechnic, November 1st, 1975 (2 mins. walk railway and bus stations) to discuss features of a no-growth society with special reference to unemployment. "Unemployment Policy", "Campaign" and "Open Forum".

NEW MANIFESTO – now available 50p + p. & p. from Treasurer.

ABRIDGED MANIFESTO – in course of preparation.

MEMBERSHIP/PROMOTIONS LEAFLET – now in print. Requests for supplies please to Secretary 10 @ 15p, 25 @ 30p, 50 @ 55p, 100 @ £1.

PUBLICATIONS ON POLICY

Your suggestions for policy discussion documents, papers outlining policy, requests for publications, offers of help etc., should be sent to the director for Policy as soon as possible.

NON VIOLENT RESISTANCE

Occasionally the only way to oppose the oppressive mindless march of beaurocracy is to physically get in its way. Examples of such non violent resistance have been seen in recent years in Japan, Alsace and Normandy amongst other places.
Whilst such movements must be essentially local, it may well be that the locals could do with some outside help in terms of publicity, organisation, paper work etc.
If you have or know of an area or a group who are at present being or are soon likely to be subjected to such pressures please advise the director of Communications. Possible targets may be undesirable industrial development, Nukes, toxic dumping or plants, oil terminals or even just the old faithful, a motorway or other road.

PLAID CYMRU

Agreed to seek discussions with this party re devolution policies. Offers of help please to director for Communications.

FUND RAISING

The Treasurer has in hand a personal appeal to raise £10 from every member. Further details soon. Your help is urgently required to raise the £10,000 necessary for the current years programme. This aims to increase membership, establish 20 more branches, publish a series of discussion papers establish and maintain communications with other parties/groups within Britain and the E.E.C., and promote several open conferences amongst other things. If you *really* believe in what the Ecology Party stands for and *truly* desire its success, then please *give your* support.

THE ECOLOGIST

Negotiations have been concluded to give members of the Ecology Party a 10% discount on annual subscription to the Ecologist Magazine.

cut out and return

To: Elizabeth Davenport,
Director for Membership,
The ECOLOGY PARTY,
2 The Old Vicarage,
26 Main Road, Kempsey,
Worcester WR5 1BR.

THE Ecology Party
Formerly PEOPLE

PLEASE:	*(tick)*
Send further details about the Party	☐
Send Manifesto for a Sustainable Society (50p + p. & p. enclosed)	☐
Enroll me/us to a full/associate/joint membership, cheque/P.O. enclosed.	☐
Accept my donation to the Party funds of £	☐

NOTE: Full membership at £4 a year entitles you to receive the monthly journal and to vote at meetings. Associate membership at £2 a year holds voting rights only. Joint membership of £6 entitles each couple to one journal only. Membership is renewable January 1st.

Cheques/P.O. should be made payable to The Ecology Party

Name .....

Address .....

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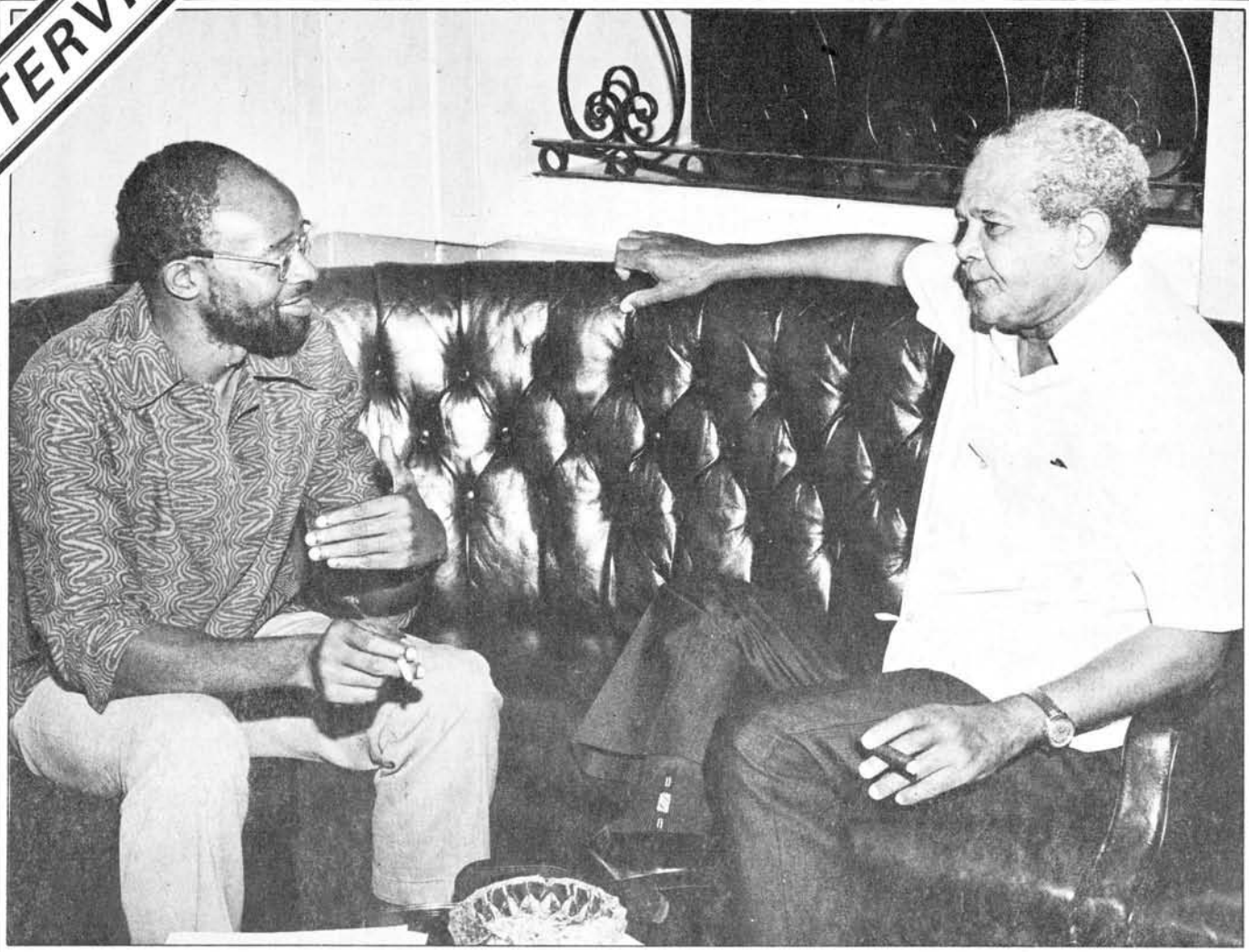
INTERVIEW



In July Jimoh Omo-Fadaka interviewed the Jamaican Minister of Mining and Natural Resources, The Hon. Allan Isaacs.

The Government of Jamaica is getting increasingly concerned about the side effects of past developmental activities on the country's natural environment. The present Government is planning to take immediate action to minimise these side effects by incorporating ecological considerations and by establishing resource management procedures for the planning and control of the country's physical development. Recently the Government approved the establishment of a new organisation – Natural Resources Conservation Authority – to develop the capabilities required to deal, in the short as well as the long term, with ecological and environmental problems affecting the welfare of the country. In this interview with Jimoh Omo-Fadaka, the Hon. Allan Isaacs, Minister of Mining and Natural Resources, who has assumed Ministerial responsibility for the new Authority explains the functions of the Authority and its long-term role in the overall development of Jamaica.

JIMOH OMO-FADAKA: What is the role of the Natural Resources Conservation Authority?

THE MINISTER: The Government action which created the Authority, charged it with the responsibility to advise and help the Minister of Mining and Natural Resources, amongst other things:

To increase public understanding of the country's ecological systems and promote methods for the conservation and development of its natural resources. Conservation does not mean leaving natural resources untouched in their natural state. It means using them in the most rational way without causing undue damage to the natural environment.

To determine policy to be followed and standards to be maintained in the management of the country's resources of land, water, air, flora and fauna in the interest of the present and future generations of Jamaica.

To promote and ensure the wise use of the country's natural resources by the establishment of an ecological review procedure for all relevant development proposals.

To implement programmes for the conservation and development of natural resources.

J. O.-F.: How will the authority's role be put into practice?

THE MINISTER: Firstly, the Authority's role will be that of overall high-level management of the natural resources of the country. Secondly the Authority will be the point of reference for any programme involving interference with our natural resources, and any sort of development involving agriculture, rural and urban development, technology, health, nutrition, housing, employment, education, social welfare and culture. All these activities are strategic to the economic and social development of Jamaica, and all of them will have to be tied up in a neat package of Integrated Development. We want an overall or holistic approach to development, and not a fragmented one. Any official body, or outside development enterprises planning any type of project whether on a small or large scale must refer, if not directly to the Authority, then to the Physical Planning Establishment which also comes under my jurisdiction. I am also Minister responsible for Physical Planning.

J. O.-F.: Does that mean that all proposed projects must be accompanied by an Ecological Review?

THE MINISTER: Yes. What is needed is a set of strategies that will not only solve our ecological and environmental problems in the short term, but will also lead towards a more stable, just and sustainable society in the future. Any programme put forward will have to carry with it an Ecological Review indicating what its proposed activities are likely to do to the air, water and other natural resources upon which our survival in Jamaica depends, as well as how they might be expected to affect socio-economic factors.

No doubt we must on occasions make trade-offs between immediate economic gain and long-term social and ecological well-being. But if we do, we ought to know in advance what these trade-offs are likely to entail. Only in this way can we avoid our past errors, our traditional failure to see how economics interconnect with other systems – social, cultural and ecological. Such an Ecological Review attached to all proposed major policies would help us to avoid unnecessary side effects of development, which of course are much more expensive to correct than to prevent.

J. O.-F.: You spoke about Jamaica's environmental and ecological problems. What exactly are these problems?

THE MINISTER: The socio-economic problems are those of increasing unemployment, under-employment, illiteracy, ill health, bad housing and malnutrition. In a nutshell, poverty. This problem is getting worse. The problems of human ecology are those of the degradation of our social institutions, family life, community spirit, coastal areas, flora, fauna, and pollution of our water. Again these problems are getting worse.

J. O.-F.: Why have you left it so late in the day to tackle these problems?

THE MINISTER: As far as my Government is concerned, you must remember that we came into office three years ago and we began to take official interest not only in ecology and environment, but started looking at the development pattern that was pursued in the country. Previous administrations did not place high importance on ecological and environmental considerations in their development programmes.

J. O.-F.: Are you implying that the problems confronting your country have been worsened by the development policy of the previous Government?

THE MINISTER: Yes.

J. O.-F.: What exactly was their development policy?

THE MINISTER: The previous Government was orientated towards the conventional pattern of development, that is urban development; increasing production of our raw materials and natural resources for export to increase foreign earnings; excessive reliance on industrialisation; large-scale mechanised agriculture and the wholesale adoption of Western patterns of development and technological methods which bear little or no relevance to our indigenous situation and could therefore not help to alleviate poverty.

Our problems are not simply economic upheaval, but something far deeper, something that cannot be understood within the framework of the conventional pattern of development. The old rules do not work anymore. Before we can overcome our problems, we should realise that conventional approaches to development, with orthodox analytical tools, systems of control and remedies, are obsolete. Economics alone cannot solve our problems. For example, any attempt to weaken environmental and ecological controls as trade-offs for immediate profits may worsen our problems. It will be an attempt to mortgage the future for the sake of the immediate advantage.

J. O.-F.: In order to be able to solve these problems, do you think that Jamaica should pursue a different pattern of development which takes cognisance of the economic, social and cultural realities of the people of Jamaica?

THE MINISTER: Well, I think that is what is required, although this might sound drastic to the casual observer. There is no other way. We live in an extremely fragile, infinitely inter-related ecosystem that can be destroyed if we are not careful. We need new economics. The idea of the instant economic solution is just as dangerous as is the comparable idea, popular among certain scientists, that there is for each of our difficulties a neat quick technological solution. There is no purely technological

solution to human problems. Although technology is an important factor in development, it is by no means the decisive one. It is people, not technology that really matter. The fight to alleviate poverty is not to be won by technology and economic power exclusively, but pre-eminently by human intelligence and social organisation. Technology and economic power are operated by the people. What needs to be achieved is a social system in which man lives in harmony with nature and not against it. Technology to suit such a system will of necessity emerge from the people themselves, at grassroots level. Such a technology will be subordinated to social and human needs, and not the reverse as is the case today.

J. O.-F.: You spoke of the indigenous realities of the people of Jamaica. What are these realities?

THE MINISTER: More than 70 per cent of our people live in the countryside, in villages or communities. Their main occupation is small-scale subsistence farming, cottage or village industry on an even smaller scale using simple implements; the social structure is communalistic and the extended family provides an insurance against want or hardship. For instance, up to forty years ago, I remember in my own village we had a very large subsistence community. We were rather sorry for them because they were not in regular receipt of wages. But these people were free and the most independent people in the world because they were willing to live within their local and family community. They were immune from the general vulnerability of the central technological organisation and central organisations in general, including organised labour. They took care of their holdings, and thus produced the necessities of life. They produced a small surplus which they sold into the general market for cash. They were self-reliant and self-sufficient and proud of their achievements. It was a very fine way of life and if we can bring that up to date and let it march with the times, Jamaica will be far less vulnerable that she is today.

J. O.-F.: How can this spirit of self-reliance, self-suffiency and pride be re-activated in your view?

THE MINISTER: The lesson we have learnt so far has shown quite clearly that, given the pressure of time and an increasing population, the conventional urban way to development is incapable of handling problems as deep-rooted as those faced by Jamaica. What is required is not the urban way to development, that is from *top to bottom,* which has caused most of our present problems, but the rural way to development from *bottom up* which actually takes into account the traditional, cultural, social and ecological realities of our country.

The idea is not to keep the people in the rural areas so that they cannot enjoy the so-called 'modern' life of the city, but to provide them with all the amenities of life in their own areas so that they can live a happier and fuller life, which the towns and cities can no longer afford to give them. In fact our towns are breaking down. People who drift to the towns looking for jobs cannot get the jobs they had been led to believe they would get. Our towns are now menaced by all sorts of social problems, increasing unemployment, social irresponsibility and family breakdown and all the ills associated with overpopulated towns and cities elsewhere. The people are becoming demoralised and taking to crime. If the necessary facilities were to be provided for them in their communities, people would not drift to the towns. Development should be taken to the people where they live, in the countryside in a planned systematic manner. That is where the majority of the people live. This can be done through land reform; small-scale agriculture; developing self-help villages that are self-reliant and self-sufficient; developing self-help or appropriate technology for use at village or community level; education and training for self-reliance; low-cost housing using local materials; low-cost medicine; health and medical care; adequate nutrition and home economics; low-cost transport and communication.

In the day-to-day life of its members, co-operative or self-help villages could integrate the totality of the elements which make up the life of the people in the rural areas — food, clothing, employment, housing, education, medicine, especially preventive medicine, security and welfare.

J. O.-F.: In actual fact Minister, what you have been speaking of is what is called *eco-development,* the type of development being patiently pursued by Tanzania, Congo Brazzaville, Guinea Bissau, Mozambique, Zambia, Papua New Guinea and Cuba.

THE MINISTER: Certainly along those lines, adjusted of course, to Jamaican conditions.

J. O.-F.: In other words your Ministry, or rather your Government is receptive to the idea of *eco-development* which takes into account indigenous realities in planning rather than slavishly accepting or imitating the development patterns of the West?

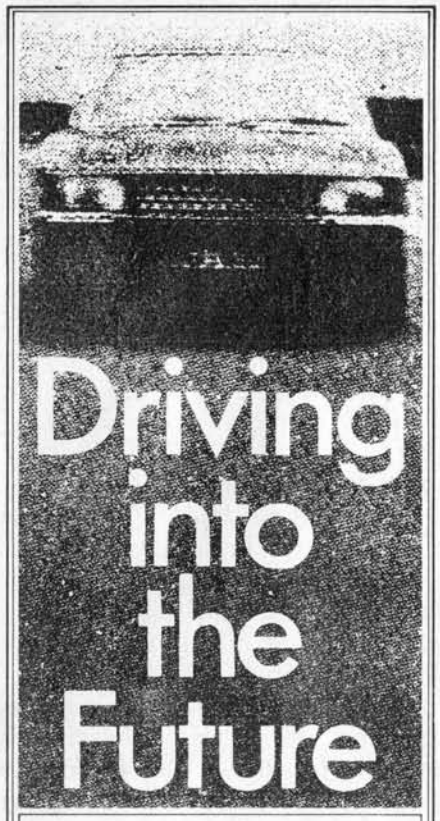
THE MINISTER: I must admit that I heard that word *eco-development* for the first time here in Britain, and it is a very good description of what we are trying to do. Happily we are paying closer and closer attention to the basic ideas of the Third World. We are completely committed to the establishment of a *new* International Economic Order. Our people are making a real effort to understand, and a number of key people all over the country are beginning to recognise this as something of importance. So I am optimistic.

ERRATA

In our INDIA issue Vol. 5. No. 8 (October 1975) the following misprints occurred:-

P.319 *Footnote* CRORE should read 10 million.

p.321 Kaka Kalelkar. The age of this venerated friend of Gandhi's is of course not 19 but 91.



Driving into the Future

An Investigation of the 1974 revision of the traffic forecasts.

by Micheal Senior

In 1973 the news that petrol was not the sort of thing that flows for ever in infinite abundance was brought home to Britain's motorists. In 1974 its cost per gallon rose by about two-thirds. What, it was generally wondered, would be the effect of this on the future numbers of cars? The planning equivalent of bated breath is often quite hard to discern, but it must have been with that that the Department of the Environment's road division and the highway authorities throughout the country waited, early in 1975, for the revised forecasts.

At motorway inquiries and in the planning of the future quality and scope of the road network, up to that moment, the pre-fuel crisis figures of the 1972 revision were still being used. The Transport and Road Research Laboratory's report of these gave the predicted number of cars in the year 1990 as 22 million. Would the 1974 revision make nonsense of any decisions already taken? Its publication at the end of February revealed that it would not. It estimated that there would be 22 million cars in Britain in the year 1990.

One of the most surprising things about this unexpected result is the equanimity with which it has been accepted, as just another of the quirks of nature, by those who awaited it. Perhaps they are seduced by the element of comfort in the discovery that, in this uncertain and unstable world, some things at any rate – traffic forecasts – do not change.

'Plus a change . . .' say the planners sagely. It is left to the more inquisitive among us to wonder how this can possibly be so.

Many people must have the feeling at the moment that as the cost of motoring increases they are tending to use their cars less – and would, as alternatives become preferable, be inclined to possess fewer of them. To see how the report comes to the conclusion that this feeling is mistaken, one must look at the methods which the forecasters employ.

The report concerns itself first with predicting the number of cars per head, expressed as a decimal fraction. This is done by means of the relationship which this figure shows to Gross Domestic Product per head, together with its own tendency to level off towards an assumed saturation point. Having plotted the appropriate curve for future quantities of cars-per-head, the forecasters relate these figures to the population forecasts to arrive at the future number of cars.

Uncertainties at once abound on every side. The 1974 revision report fully recognises the unknown nature of the growth rate of GDP. It therefore takes a middle value of 3 per cent per year, and gives alternative forecasts for low and high values of 2 and 4 per cent. Speculation continues as to what the figure will actually be, and as the report itself points out, the National Institute of Economic and Social Research has recently predicted that the growth rate of GDP in 1975 will be only 1 per cent over 1973. The most one can say is that we shall have to wait and see, a thing which, presumably, forecasters dislike having to say.

Much doubt is also voiced, by the forecasting report itself, about the likely level of the saturation point – the point at which the growth of car numbers will stop. Its height on the graph affects the shape of the relevant curve, and its actual identity seems at present to be a matter of continuing debate.

The third explicit element in the formula – and we shall see that there are some which are not as explicit as they should be – is the population forecast. Those of recent years have shown a very clear and even tendency to be each considerably below the previous one. That is; comparison of the 1969, 1971, and 1973 population forecasts up to the year 2010 reveals a trend in the forecasts themselves. It is for this reason that the recent traffic predictions are slightly lower than the previous ones. For whatever reason (and we are presumably committed to the belief that the most recent prediction is the most accurate) the three recent growth-lines rise each one less sharply and so less far than the others. If the trend were to continue, then a population forecast made in 1975 would be quite close to the horizontal. If that were so then even if the growth rate of cars per person is as predicted, that is if GDP grows at 3 per cent the resulting number of cars would not be.

Both saturation level and population-increase, the report admits, "become more critical as time goes on". Yet "no allowances have been made for uncertainties in either" of these.

No-one could accuse the report of not admitting these defects. The statement on its first page sets a theme which echoes throughout: "These forecasts are subject to considerable uncertainty." On page after page we find such words as "little more than guesses", "various uncertainties", "data are very sparse", "further work is needed", "the need for more research. . ."

There are, however, some more crucial weaknesses in the logic and the economic thinking underlying the assumptions of the forecasts of which the report does not always seem to be aware.

Firstly in arriving at a view of the elasticity of demand for cars and car use, no account is taken of the relative cost of substitutes. "In the past the cost of running a car for those with a car available has on the whole been competitive with the cost of the public transport alternative and the same may be true in the future." It may, but on the other hand it may not, and some discussion of the element of substitutability would be appropriate to any assumptions made about the demand curve. One had imagined that it was a basic economic fact that a rise in the price of one good relative to its substitutes has a substitution effect which can change the shape and position of the demand curve. A shift in the demand curve takes place if either the price of the goods goes up, and its substitutes do not, or if the price of the substitute falls.

Six lines of the seventy-three pages are given to the question of rail freight transport, and of these the first three are: "No proper studies have been made for the purposes of this report of the prospects for rail, water or pipeline transport, and the following assumptions are little more than guesses. Further study would be justified." The next three say that in view of this, a slow increase will be assumed.

The cost of substitutes for motor travel is, of course, amenable to policy-derived changes, and we shall see that this in itself causes the report some difficulty. But this is no excuse for behaving as if these substitutes hardly even exist.

A second major point which arises out of this is that it is of course car use, and not just car ownership, which is the significant question. If people always kept their cars at home, parked perhaps on the front lawn, then we should not be so concerned about how many they owned. The report makes the assumption not only that car use would not be affected by the price of alternatives, but that it would not even be affected by the running costs themselves.

A strenuous effort in fact has to be made at this point to combine the two naturally separate elements of the cost of buying a car and the cost of running it. "The decision to purchase a car (and to run it) is therefore likely to be influenced by the combined cost of purchase and running and one would perhaps not expect to find a strong relation between kilometres per car and the purchase or running costs." But why combine these two separate issues? One may surely decide to use one's car only when necessary. And to phrase the matter as "the decision to purchase a car (and to run it)" is to overlook the basic issue of the decision as to how much to run it. But the report hardly paused to nod at this issue. "It will be assumed that kilometres per car will not, in the medium to long term with which we are concerned, be influenced by cost."

The forecasts are true only if the road-building programme continues. The road-building programme will continue only if the forecasts are true. If one is assured then the other follows. If either is denied then both collapse.

The reasons given for this assumption are hardly such as to encourage us to believe in its validity. "The data on the effect of cost on car ownership and even more so on kilometres per car are so slight that it is at present necessary to use some such over-simplified view." We may perhaps be forgiven for wondering whether, in that case, the forecasts are going to help us answer the question for which we needed them, that is, the explicit question of whether people will in future motor as much as they did. Petrol prices given in the data show a steep rise in a continuing upward trend, of which we are in any case only too aware. The promise held out by a table of forecasts of car-kilometres up to the year 2010 — slightly up, it seems, on the 1972 car-kilometre forecasts for the same period — is at once dashed by the paragraph underneath. "No allowance has been made in the above analysis for any possible effect of cost of motoring on kilometres per car . . . data on the effect of cost on car ownership and use are very sparse." It is felt, the paragraph rather weakly suggests, that as both purchase and running costs rise the fewer people who can afford to own cars will be able to afford to "run them for considerable distances per year." But nothing more is said about this, in spite of the fact that it is "for these reasons" that the report "puts the whole effect of cost of motoring into the ownership part of the analysis" and does not include "an effect on kilometres per car per year."

With this admission we begin to see how the surprising result has been achieved. A little further thought about the matter brings to light, however, an even more disturbing logical twist.

When dealing with the sub-sector of lorries, the report admits that the quantity of road freight is subject to "external factors", among which it mentions "the quality of the road system" and "the various legal and fiscal controls that may be applied". This of course applies not just to lorries, since it is pointed out earlier that "the growth of kilometres per car has closely followed the growth of motorway kilometres", so that the forecasts partly depend on how much motorway is to be built. The report does not, of course, use the assumption that no more high-speed roads will now be built, but rather that the building of these will continue to keep pace with the increase in cars, so that "as measured by the amount of motorway per 1000 cars" it would remain at the 1972 level.

In view of this assumption, without which the forecasts would presumably be quite different, it is interesting to wonder what purpose the forecasts were intended to serve. The direct effect which they have is naturally to be used as a justification for the very assumption without which they would be other than as they are. Presenting the report to the House of Commons on Wednesday, 19th February, the Minister of

Transport made the occasion the opportunity to state his conclusion that "a continuing national road programme is necessary on both economic and environmental grounds."

At once we are involved in a chicken-and-egg situation of bewildering seamlessness. The forecasts are true only if the road-building programme continues. The road-building programme will continue only if the forecasts are true. If one is assumed then the other follows. If either is denied then both collapse.

The report makes no bones about its dilemma. Near the beginning it states: "Future traffic levels are also subject to possible changes in Government policies, for instance on restraint and road provision, for which no proper allowance can be made in this report." It repeats towards the end that its "considerable uncertainties" include "the policies that future governments will adopt towards road building, restraint and public transport. No attempt is made in this report to give a range of forecasts to cover alternative assumptions about such matters."

It need not surprise us if the forecasts are used to justify certain policies; if not as a guide to policy-planning, then what could they be for? What is disturbing is that they explicitly decline to take account of what the situation would be if policies in the future were other than as they have been in the past, and are at present. Mr. Mulley, on the same occasion, mentioned "a substantial shift of freight and passenger traffic from road to rail." But this shift would be a change of which the forecasts which he was presenting take no account, so that to contemplate it is to invalidate them.

If on the one hand the report assumes that government policy will not change, and on the other government policy uses the report's conclusions as a reason for refusing to change, then we may feel that we are being told no more than *'if this goes on, then it will continue'*. It is in any case bad thinking to produce as evidence for a conclusion something which is dependent on that conclusion. As long as the circular situation continues then the forecasts, to the extent that they rely on matters affected by policy, will be self-fulfilling.

If government policy changes, on the other hand, then the forecasts, which assume implicitly that it will not do so, are irrelevant. We shall then need new ones.

The fact that, as the report puts it, "it has not been possible to go far towards producing policy-dependent forecasts" is particularly disturbing in view of the extent to which its assumptions are policy-dependent. The costs of substitutes, the fiscal and legal restraints, the cost of fuel, the extent of the increase in road quality: most of the factors which determine what will really happen in the sphere of car ownership and car use are entirely matters of policy. (Even the cost of petrol is amenable to government influence.)

What was required, then, was precisely the "range of forecasts to cover alternative assumptions about such matters" which, the report says, it made no attempt to make. Only then would the work enable us to see which way government policy should direct us. All this might be of little more than academic importance, if it were not taking place at such a crucially significant historical node. The mistake which is being promoted by the reasoning of this report is thus not just another blunder of the administrative machine. This time it is of fundamental consequence; on it will be based decisions which will govern the way in which our resources will be used, and will thus affect the country's economy in the short-term and the world's ecology in the long-term. It is not a subject on which we can afford to make mistakes. The use of an investigation such as this to support a decision such as that, should warrant the most intensive examination of the validity of the reasoning. Instead the conclusions have been readily accepted: conclusions of a report in which the weaknesses, as outlined in this article, are not hard to find.

Putting Waste Water to Work

by

Lawrence D. Hills

In an area without heavy industry and where toxic metal pollution can be controlled, waste water from city sewage can be sprayed on agricultural land and forestry plantations with remarkable results as Lawrence Hills shows in this description of one such experiment in the United States.

Though a couple of bricks in every one of about 20 million lavatory cisterns would cut our 11 gallons a day each for flushing by a welcome fraction after the driest winter and spring since 1741, they would do nothing to save the fertility we waste with every chain we pull. We pass our surplus potassium in our urine and the major part of this vital plant food goes down to the sea in 3,000 million gallons of effluent every day.

The Middle Lee Main Drainage Scheme near Broxbourne discharges 15 million gallons a day of one of Britain's cleanest effluents into the river Lee. This holds 20 parts per million of potash, or 3,000 lb, and 30 each of phosphorus and nitrogen, or 4,500 lb. each. It is these wasted plant foods that fill our rivers with algae, poison Lake Erie and produce the eutrophication that literally "drowns" the fish for lack of oxygen.

Where the separated sewage sludge is spread on the land by tankers as at Broxbourne, the 30,000 lb of dry matter produced each day holds only 150 lb of potash, 900 lb of phosphorus and 900 lb of nitrogen. Multiply the potash for all Britain for a year and there is only about 3,300 tons of potash (these figures do not include the millions of gallons of untreated sludge discharged direct into rivers and the sea) and of this only half is used on the land. The rest is burnt expensively, or dumped at still greater cost at sea. We are wasting the whole 90,000 tons of potash in our effluent, with 120,000 each of phosphorus and nitrogen. Had the Chinese invented water sanitation in 350 B.C. when they discovered gunpowder, they would have ruined their land from potash starvation and drained it into a desert.

The forest floor never freezes and in winter the pipes and sprinklers spray in the woods, increasing timber production and growing more game food.

Penn State is an American Oxford with more "gown" than "town", for it houses 30,000 undergraduates and staff, and 20,000 people to run the shops and service industries for the University. This area of the U.S. has suffered reduced rainfall every year since 1960 and rising demands meeting an average of 26 inches a year less rain has brought the water table down 60 feet. The work of Professor William Soper of the Institute of Land and Water Resources at the University is therefore of great relevance to Britain, now twenty years more of snowless winters and cold dry springs are predicted to follow the two we have already had.

The people of Penn State produce 3 million gallons of sewage a day, 60 gallons each compared with our 32 for personal needs, but frequent showers add up to more than the bathnights of Britain. Storm water is run straight from roofs and streets into Spring Creek, a tributary of the Susquehanna River, so the sewage which has no lead or cadmium from industry is spared that from the petrol of the parents' Packards and the Volkswagens of the students and staff.

It is put through a normal activated sludge process, but when it leaves the digesters it is pumped along four miles of piping to experimental areas of farm and forest land and spread through spray irrigators. With the knowledge that has been won since the experiment started in 1962, it can be said that 129 acres is enough to take the unseparated sludge and effluent from 10,000 people, giving the land two inches of irrigation every week.

The worked-out farm Professor Soper took over grew mostly the graphically named "poverty grass" *(Dathonia spicata)* but now maize yields are 116 bushels compared with 107 an acre with complete artificials plus the same irrigation with well water. Lucerne hay yields 5.42 tons an acre compared with 2.27 tons from chemical fertilisers, because of the value of the trace elements in the sewage, especially the zinc. The average potash is 18.6 p.p.m., phosphorus 8.5 and nitrogen 19.9, which is a far better balanced fertiliser than any British tanker sludge which will be high nitrogen and phosphorus with a bare trace of potash – we have wasted almost all this vital plant food in the effluent that Professor Soper's system returns to the land.

On the chalk soils blocks of 6,500 acres of land could take the effluent and sludge from 500,000 people and could grow beech and ash woods, barley, wheat, kale and grass, producing record crops without imported fertiliser.

This oak has increased its girth by 83%

In winter the portable aluminium pipes and sprinklers are removed from the range of grain and hay crops on the farm land, and transferred to forestry areas, because the humus of the forest floor prevents the soil freezing in the hardest winters. Though fantastic domes and "icebergs" form when the spray freezes, these thaw and trickle away without runoff. The trees that suit this system best are oaks, which in five years show an 83% increase in diameter compared with the plain water "control", while white spruce merely doubled in height in the same period. Hardwoods suit this system better than conifers, perhaps because of the extra potash they need, and red pine did badly because the trace of boron in the waste water can add up to more than the 1.1 lb an acre at which toxicity symptoms for them begin.

Professor Soper calls his invention the "Living Filter System" because it depends on living soil in both farm and woodland to convert "wastewater" (his term for effluent and sludge together) into drinking water fit to use direct from the wells. It goes on at 10 milligrams a litre of phosphorus – a level that filled Spring Creek with algae and killed the fish with eutrophication – and reached the wells at only 0.04 mg, with 0.5 mg of nitrate, well below the 3.0 mg for drinking safety. Still more important, foot depth samples show only one coliform bacteria per 100 millilitres, compared with the 2,000 which is the American limit for safe swimming. In ten years he has raised the water table by 14 feet, despite the fact that the University alone pumps 2 million gallons a day from the wells that must also supply the rest of the town.

The University of Arizona has developed a different system for the 17 million gallons a day from Tucson's 220,000 people. Here they can use flood irrigation on flat land, though their results would apply also with a sprinkler system. They experimented with large long fields flooded in turn with a total of three feet an acre between November and May, one set with plain water, one with water plus fertilisers, one wastewater alone and one waste-

water plus fertilisers. These are sown with wheat, oats and barley both for grain and to feed green to cattle, with the following results:

Green Yields per Acre with Effluent

	Nothing	Fertiliser	Effluent + Fertiliser	Effluent alone
Barley				
Winter pasture	5.25 tons	8.45 tons	12.33 tons	11.14 tons
Harvested as grain	1,621 lb.	2,619 lb.	2,704 lb.	3,032 lb.
Oats				
Winter pasture	3.13 tons	6.05 tons	8.52 tons	10.93 tons
Harvested as grain	1,385 lb.	1,950 lb.	1,984 lb.	2,346 lb.
Wheat				
Winter pasture	4.14 tons	7.78 tons	9.46 tons	10.81 tons
Harvested as grain	1,075 lb.	1,664 lb.	1,807 lb.	2,201 lb.

The malting qualities of the effluent grown barley and the baking qualities of the wheat were lower, but both were grown for animal feeding. The high winter pasture yield has been used ever since 1956 by a Tucson rancher who grows barley with wastewater and keeps four 500 lb steers an acre on it, gaining 2 lb liveweight a day through the season. The *lower* yields from adding chemical fertilisers are often observed in Britain where this stocking rate has also been achieved by farmers using tanker sludge.

The only European example of the Living Filter System is near Warsaw where Dr. Wiktor Dragun of the Institute of Agriculture is growing poplar *(populus robusta)* for paper making, with flood irrigation once a month right round the year at the rate of 250 mm per hectare or 2 inches an acre, the same rate as at Penn State, but here the sewage is merely put through a settling tank, receiving primary treatment only. Its analysis is 50 mg per litre nitrogen, 12 mg/1 phosphorus, 36 mg/1 potash, and 90 mg/1 of calcium, and the high potash from the use of the effluent explains the doubled rate of dry matter increase from the trees. In addition hay was cut between them for the first five years. The system enables poplars to be grown on poor soil at a profit, apart from the gain from sewage disposal with minimum treatment, and recycled water.

In Britain we already face rising water demand and rivers and chalk streams drying up as the thirsty pumps drain the reserves in the chalk formations round London. Now, with meteorologists warning of a cycle of dry, cold springs and winters, we could well be without the water to fill the reservoirs in the Welsh, Yorkshire and West Country valleys we have won from conservationists, when we defeat our countryside. Bricks in cisterns may well save one lovely landscape, but when the rains fail we cannot afford the thirst of industry and the greedy bathrooms of a booming Britain.

The Living Filter System as used at Penn State could be grafted on to existing activated sludge and heated digestion sewage treatment plants, using the methane from the digesters to power the pumps that would drive both effluent and sludge along pipes to the nearest part of the green belt. This would cut out the problems of the tanker-using Councils, of the risk of a strike of drivers, the fuel consumption of these heavy vehicles in the coming age of costly power, and the traffic congestion getting them in and out of town.

Had the Chinese invented water sanitation in 350 BC when they discovered gunpowder they would have ruined their land from potash starvation and drained it into a desert.

The most rewarding enterprises would be on the chalk land of Kent, Sussex, Hampshire, Dorset, Wiltshire, Buckinghamshire and Norfolk, where blocks of 6,500 acres to take the effluent and sludge from 500,000 people could grow half beech and ash woods and half barley, wheat, pasture and kale for dairy or beef cattle, producing record crops without imported fertilisers. There would be no more interference with amenities for townsfolk in the new beechwoods of Bucks than there is with the deer hunters of Pennsylvania from the sprinklers which would be working only in winter.

Poplar plantations at Hindhead and other barren heaths could take waste water round the year, but mixed farming could build up these poor sandy soils into fertile farms and forests. Heavy clays would be unsuitable, especially because of the sodium, (up to 33 p.p.m.) that waste water contains, which could make them permanently sticky. Toxic metals such as lead and cadmium are a problem where land is to be built on, but not where it is under timber trees or grazed crops. The work of the Grassland Research Station at Hurley has shown that 95% of the 2% of lead that grasses take up is returned to the soil as manure, and of the remaining 5% most is stored in the bones we do not eat. This is why there has been no trouble with stock poisoning on such sewage farms as Stoke Bardolph after 90 years of dairy cattle, and why they do not raise pigs that could eat soil.

The long term answer to this problem is to stop industry from polluting our sewage so that levels like 10 p.p.m. as at Penn State and Kidderminster (England) for lead can be maintained, rather than 1,200 p.p.m. from heavily indistrialised Slough. Potash deposits are just as exhaustible as coal or oil, and we cannot allow our manufacturers to poison our sewers until we must waste 60 times as much as we recover and use on the land.

Britain has imported the fertility of America's prairies in her grain, and from the potash, nitrate and phosphate deposits of the world and poured it down her drains. Even though water flowing down the river Tame can pass through five people before it reaches the sea, we still waste that 3,000 million gallons a day, plus another 500 million from untreated sewage discharged into rivers and our surrounding seas.

America has the answer to the problem of shrinking rivers, wells running dry and dying lakes. How thirsty must we get before we replace the land's life blood running to waste, with clean clear water flowing again in our streams, rivers fit to swim in, and for the borehole pumps that supply our cities, purified by the living filters that are fertile farms and forests?

Report

CADMIUM IN RIVER WATER

As an element Cadmium is relatively scarce comprising only 0.00002% of the earth's crust; as an environmental contaminant Cadmium is widely dispersed and is highly biologically toxic in very small concentrations. In industrialised areas, such as Avonmouth in Gloucestershire, Cadmium has been shown to be present in air and food in detectable quantities. Cadmium is known to be detrimental to human health, causing high blood pressure in low concentrations and testicular atrophy and brittleness of the bones in high concentrations.

Discovered in 1817 by F. Strothmeyer Cadmium was once described as "the unwanted stepchild of Zinc" because of the association of Cadmium with Zinc ores and the resultant problems of refinement. "The unwanted stepchild" however has now found an enthusiastic foster parent in the manufacturing industries and is much in demand. The manufacturing uses of Cadmium include electroplating, the production of pigments and chemicals, alloys, pesticides and semiconductors.

The pollution of rivers and estuaries by Cadmium containing effluent discharged into these waters is a seriously growing problem. The extreme toxicity of Cadmium in river water to freshwater fish was highlighted in the 1972 Report of the Director of Water Pollution Research of the Department of the Environment. In this he states "It was shown in work completed in 1971 that levels of chlorinated pesticides approximately reflect the average levels of the river inhabited by fish. Current attention is focused on the corresponding position for Cadmium." The same report gives further evidence of the toxicity of very low concentrations of Cadmium in water.

In an experiment conducted by the Water Pollution Research team, batches of Rainbow Trout were exposed to varying concentrations of Cadmium in water, continuously over a twelve week period under constant flow conditions. The researchers found that in water containing a minute hundredth of a part per million (0.01 p.p.m.) Cadmium 60% of the trout had died at the end of the test period; those maintained in a concentration of 0.005 p.p.m. all survived. An interesting point to note here is that the 1970 W.H.O. European standard drinking water concentration for Cadmium is 0.01 p.p.m.

What are present Cadmium levels in river water?

Table 1 lists maximum average Cadmium levels found at specific sites in five different river authority areas. (Regional Water Authority areas since April 1st, 1974). The results are taken from toxic metal surveys conducted by these authorities. As average Cadmium levels in river water are frequently below 0.005 p.p.m. these figures are not representative for each authority area, but serve to pinpoint local "hotspots".

Average Cadmium concentrations quoted in Table 1 exceed the highest lethal concentrations in the Rainbow Trout experiment and also the W.H.O. European standard limit for drinking water, maximum values quoted exceed this limit by 10–100 times. Consequently abstration of this water for supply purposes would represent a significant health hazard.

The South West Wales River Authority reports that average levels of 0.24 p.p.m. in the Nant-y-Fendrod, a tributary of the River Tawe are probably due to the presence of non-ferrous metal refining in the area; as an average value for total Cadmium this is exceptionally high.

Cadmium pollution in the Severn Estuary occurs as tidally compressed pulses of Cadmium rich water whose concentration varies monthly; the implications of estuarine pollution are particularly serious, threatening marine productivity in coastal water breeding grounds and seafood for human consumption. Recently high levels of Cadmium have been found in the shore water at Clevedon, Somerset and contaminated levels of Cadmium found in oysters and Patella species of shellfish indigenous to the coast of North Somerset.

The situation is exacerbated by the fact that heavy chemical and smelting industries abound in estuarine areas because they are at present subject to only partial river authority consent conditions.

TABLE 1. Showing Cadmium Concentrations at Different Sites in River Authority Areas.

River Authority	Max. Cd	Min. Cd	Average Cd	Location	Date of Sample
Mersey and Weaver	0.19	0.003	0.02	River Mersey (Warrington)	1974
Mersey and Weaver	0.13	0.004	0.03	River Tame (Stockport)	1974
Lancashire	0.13	Nil	*–	River Calder (Near Burnley)	1969–71
Trent	0.23	Nil	0.03	River Cole (Coleshill)	1968–71
Severn	0.028	0.001	*–	Severn Estuary (North Elbow Bay)	June–July 1973
Severn	0.028	0.001	*–	Severn Estuary (S.W. Redcliffe Buoy)	June–July 1973
South West Wales	1.29	0.05	0.24	Nant-y-Fendrod (Near Swansea)	1972–73

All Cadmium concentrations in parts per million (p.p.m.) equivalent to mg/litre
**Figures not available*

Coastal waters are controlled in a very limited way by local Fisheries Committees and Port Authorities. Significantly, the country's largest zinc smelting works is the Commonwealth smelting plant, at Avonmouth in the Severn Estuary, owned by Rio Tinto Zinc.

The Cadmium consumption of the U.K. in 1971 was 1176 metric tons, in 1972 it was 1354 metric tons. The two main industrial uses for Cadmium are electroplating and the production of pigments which each account for approximately 35–40% of the metal used. The main dischargers of Cadmium containing effluent are the pigment producers and the zinc smelters; the Cadmium cyanide solution used in electroplating happily is rarely discharged because of the expense involved. Acid pickling solutions involved with metal finishing in electroplating, hot tinning and anodising of Cadmium and its alloys may contain high concentrations of the metal when discharged as effluent.

At present pollution inspectors from Regional Water Authorities are prevented from disclosing to the public any information on Cadmium levels in effluents because of prohibition under the Rivers (Prevention of Pollution Act) 1961 which effectively means that pollutant concentrations may only be disclosed once the pollutant has been diluted in river water. More importantly the frequency of toxic metal sampling of river water varies from region to region as do methods of analysis for the detection of these metals. This combination of secrecy and irregular monitoring cannot be used as a means of effective control in the future.

Of a total of 24,100 miles of river in England and Wales, 9.4% are heavily polluted; of these 7.9% are non-tidal and 27.4% are tidal rivers. Cadmium is undoubtedly important in the context of estuarine pollution; the contribution that Cadmium makes to the overall pollution picture is as yet uncertain, as the effects of other heavy metals and all types of physical and chemical pollutants must be taken into account. However, the signs are that effective control measures should be soon taken to prevent Cadmium from becoming an "unwanted stepchild" of this century.

H. Valdez

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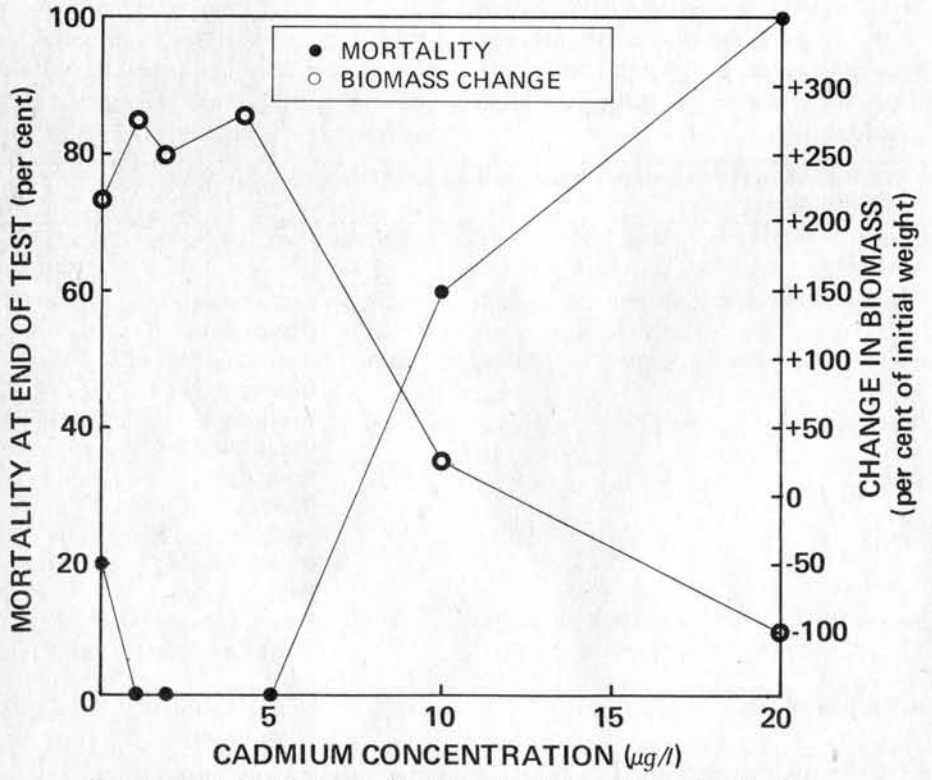


Effect of chronic exposure of rainbow trout to cadmium (µg/litre)

Article 842 and the Italian Bloodbath

The birds of Haiti have disappeared. Birds of prey and insectivores alike have vanished – victims of the slingshot. Must the same fate befall the birds of Italy? Must the chemistry of pesticides take over from the swallow and its fellows?

To try and understand what the people who want to save Italy's birds are trying to achieve means looking at an entrenched opposition sheltering behind a network of national and provincial laws most of which tend to favour the hunters and the snares.

The worst legal prop for the men with the shotguns and the nets is the unrescinded article 842 which dates from Fascist times and which, unamended, gives right of trespass on private land to anyone licensed to carry a gun. This privilege, supposedly based on a boost to masculine virility, does not extend itself to include naturalists, photographers and other harmless visitors. A landlord's only safeguard against having his property invaded by these 'sportsmen' is expensive. To escape the results of the provisions of article 842, he must ensure that his land is surrounded by a fence at least 1.80 metres high or by a ditch not less than 3 metres wide. Except in so-called 'reserves' and in public or private shoots, those with firearms licences can go shooting anywhere away from public roads.

Farmers, young people, intellectuals and professionals (especially lawyers) sought in vain to have article 842 deleted from the Statute Book by an official Referendum. After 3 months, 430,894 valid signatures had been collected. 500,000 were needed, and the figure would probably have been reached had married women signed in their maiden name (instead of leaving it to their husbands) and if it had been possible to include those petition forms which failed to meet the deadline of April 20th 1975.

A baby swallow is regarded as a culinary delicacy

Under Italian law a future referendum on the same subject cannot take place until 1977, but clearly the combined influence of the Anglo-Italian Society for the Protection of Birds (AISPA), the National League against the Destruction of Birds (LENACDU), the National Organisation for the Protection of Animals (ENPA) and many other splinter groups backed by the findings of the 1974 Conference at Amsterdam which inaugurated the Netherlands Committee for the Protection of Migrant Birds, has made a potent impression. The 1,800,000 Italians who have gun licences (nearer 2 million if you count those without licences), at the highest estimate slaughter 220,000,000 million birds a year. Whole species have been wiped out and others are in imminent danger of extinction. These categories also include the gradual extermination of migrant birds which fly across northern countries. But they do not take into account the imponderable number of birds caught in snares and nets.*

Of course, a successful referendum could be no more than a pyrrhic victory. It would still be difficult to pass bird protection laws against the combined lobbies of traditionalists and the powerful supporters of hunting. Italy has the longest hunting season in Europe – last Sunday in August until 31st March (but in some Mediterranean regions extending to 31st May).

If it got anywhere at all, what could a successful referendum initially achieve? After considerable pressure from protectionist societies the Italian Government has spelt out the direction new legislation might have in four proposals:–

(i) total abolition of bird-netting;*

(ii) abolition of shooting from secret hides and with the aid of decoys;

(iii) a complete list of birds to be protected together with a second list of exceptions – instead of the previous system which only listed protected birds;**

(iv) Institution of the principle that birds belong to everybody *(res communitatis)* instead of to nobody *(res nullius)* as previously.

The situation is indeed serious. When antique Italy caught up with the rest of the Western world during the 1960s and lethal firearms together with faster communication became more freely available, the use of pesticides increased dramatically with the usual effect upon the bird population. (Ever since, all bird species, especially predators which used to keep down the poisonous snake hazard on rough ground and in the mountains, have continued to diminish at an alarming rate.)

There will soon be no more black herons. Which species will disappear next? Are all of them under death sentence?

The tangles of Italian State law as opposed to legislation in separate quasi-autonymous provinces present a continuous labyrinth. The EEC report points out balefully that Lombardy, perhaps the worst offender, has successfully applied to the Government in Rome for permission to enact three new regional laws which will once more permit bird trapping without let or hindrance.

State law specifically prohibits hunting of the insectivores: swallows, tits, wrens, robins and nightingales. Others are considered fair game, but vague prosecution of the law permits thousands of swallows to be shot annually and their nests are rifled because a baby swallow is regarded as a culinary delicacy.

Although eagles, falcons and the eagle owl were put on the prohibited list in 1971 and vultures were forbidden to be caught or shot as early as 1939, the killing of all these birds continues. In the Appenines, golden eagles and vultures are being steadily decimated either by shotgun or poison. The peregrines are in danger and the bearded vulture has almost died out.

It is all very well for Emilia-Romagna and Toscana to place all birds of prey and owls under the protection of regional laws, it is the whole country that matters.

The world found millions to help repair flood-ravaged Venice, but who cares about hunting in Italy and the battle the hunters are effectively waging against ecological redress?

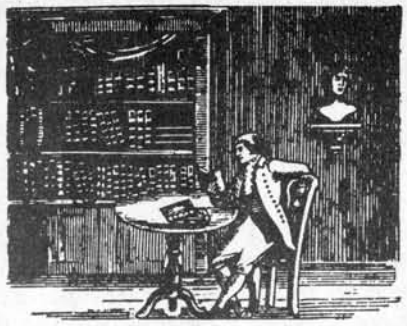
Sheldon Williams

Nightingales

** In 1970 – Nature Protection Year – protectionist societies in Italy collected over a million signatures for a petition calling for the abolition of bird netting, an object which has only been half achieved.*

** At the present time birdcatchers can only be prosecuted if cruelty can be proved.*

***Needless to say, after a bird is plucked it is hard to recognise if it belongs to a protected species or not.*



Books

Humanism and the Human Condition

THE THREE FACES OF HUMANISM, Dr. Catherine Roberts, The Gryphon Press, Llanon, Ceredigion, Dyffed, Wales. 50p.

THE SCIENTIFIC CONSCIENCE, Dr. Catherine Roberts, Centaur Press, Fontwell, Sussex. 1974.

Anyone unfamiliar with the series of *Tracts* published by Peter Abbs would be well advised to read the most recent, *The Three Faces of Humanism* by Dr. Catherine Roberts. The author is a former professional microbiologist who gave up a successful career as a scientist in order to study Greek philosophy and culture and to examine the ethical implications of scientific "progress". The result was a penetrating and critical work, *The Scientific Conscience* which should be compulsory reading, not only for those embarking upon a scientific career, but also for any layman seriously concerned with the problematical future of a society increasingly dominated not, as is facilely but erroneously assumed, by politicians, but much more dangerously, in the long term, by technocrats. She is particularly critical of the dangers arising from "positive eugenics" primarily because of the ignorance of, and disagreement among, biologists as to precisely what constitutes human excellence. The result, she claims, is a blurred vision of what "Brave New World", can or should be achieved. She urges a credo of self-restraint in biological thought and practice or more appropriately an attitude best conveyed by the Greek "sophrosyne". This latter cannot be adequately translated by a single word but encompasses a variety of meanings including "a sane mind, practical wisdom, clear vision, right judgement, self-restraint, moderation and temperance . . . humility, humanity, mercy and modesty." Her most controversial suggestion is that as biologists consider themselves disinterested searchers after truth, and are also so regarded by the public, it should follow that they publish their results "for the sole purpose of contributing to mankind's common store of scientific knowledge". If this *is* the case then such scientists should be willing to publish *anonymously,* thereby reducing the deluge of self-promoting, frequently meretricious publications and at least stem what Samuel Johnson called "that monstrous conspiracy for the destruction of paper."

The Three Faces of Humanism is a more philosophical and in many ways an even more essential work. Recognising that "humanism" is a term capable of being arrogated by anyone concerned however vaguely with the amelioration of the human condition, she argues that contemporary humanism has developed three faces each having an almost totally different focus and foundation. These are: a) The theocentric face, which looks first to Divine Reality; b) The anthropocentric face, which looks first to Man; c) The biocentric face which looks first to Life. She traces theocentric humanism back to Plato who saw evolving man as destined to approach divine reality through seeking a transcendent source.

It is, however, in her criticism of the other two "faces" that Dr. Roberts is most trenchant and ecologically relevant. Anthropocentric ethics, based as they are upon atheism or agnosticism, deny or neglect the existence of divine reality, and therefore must postulate as the *summum bonum* "the maximum survival of human lives, whatever the cost to others." (A creed succinctly epitomised by Swinburne's lines: "Glory to man in the highest/For man is the master of things.") But as Dr. Roberts observes no anthropocentric humanist has satisfactorily answered the question, for *what purpose* shall men live longer? One might fall back on Bergson's "elan vital" but to any contemplative being the ultimate "why?" of existence must make the purely anthropocentric *Weltbild* unsatisfactory in that it poses at least as many questions as it answers. It is, moreover, based upon the reprehensible (and ultimately in view of what is now known regarding the interdependence of all life, self-destructive) biological illusion that "regardless of the pain, fear, terror and prolonged misery they may experience, sentient non-human lives must be utilised and sacrificed in unlimited ways and numbers to promote the physical well-being and survival of the human species." (Pope in his *Essay on Man* (1733) summarised this attitude neatly in the couplet:

Destroy all creatures for thy
sport or gust,
Yet cry if man's unhappy,
God's unjust.)

Biocentric humanism is also stunted in that although it may be concerned appropriately and correctly with the maintenance of all forms of earthly life, a *wholly* biocentric code of ethics is meaningless if life itself is thought to have no meaning.

If certain scientists and scientific attitudes tend to deny the existence of the individual soul and even to classify consciousness itself as an "illusion" then it follows that no higher goal can be envisaged for any individual or species other than the scientifically-controlled prolongation of physical existence for as long as possible. Eventually, of course, no valid discussion of the hypothetical future of man can evade the question of human value and hence the ultimate question must be: Is man worth saving? After all, if he is as destructive as many ecologists assert, then is he not merely a messy, predatory mammal and would not nature be better off without him?

There is, however, another more hopeful side to man's nature and as Dr. Roberts herself remarks of human behaviour: "All the depths have a limit. The heights are limitless." Although, as Teilhard de Chardin pointed out, man is physically very much an animal "so

little separable anatomically from the anthropoids that the modern classifications made by zoologists return to the position of Linnaeus and include him with them in the same super-family, the hominidae", yet he is a being filled with qualities which set him dramatically apart from all other creatures. So far as we are able to ascertain man is, apart from the Deity, the sole custodian of conceptual thought in the universe and this surely confers upon him a responsibility and a very special sort of dignity. The responsibility, if truly comprehended, demands that his thoughts and actions measure up to the uniqueness of his position, exercising the consequent power which he enjoys in a benevolent fashion and recognising that any enhancement of his own life, or enlargement of his material aspirations if obtained *immoderately* at the expense of other forms of life, are defeating not only of self, but, ultimately, of his evolutionary mission.

Concluding a graduation address at Aberdeen University in 1958, the Principal of that University (the late Sir Thomas Taylor) outlined a *credo* which best summarises not only the basis for civilised behaviour but also provides an ethic for the problematic survival of humanity:

> "There are, of course, moral duties which the law will enforce. But beyond the sphere of duty which is legally enforceable there is a vast range of significant behaviour in which, for various good reasons, law does not and ought not to intervene . . . Now this feeling of *obedience to the unenforceable* is the very opposite of the attitude, which is common enough, that whatever is technically possible is allowable . . . This power of self-discipline, whereby men deliberately refrain from doing everything that is in their power to do all along the range of human possibilities, is the very opposite of the fatal arrogance which asserts, whether in government, science, industry, or personal behaviour, that whatever is technically possible is licit. The Greeks had several words for this saving virtue . . . All through history men have needed it to preserve them from the temper which hardens the heart and perverts the understanding. For our generation it is nothing less than the prime condition of survival."

Such "obedience to the unenforceable" is, by definition, not easy to practise or inculcate, particularly in an age characterized by escalating violence, intemperance and social and ideological polarisation, but it appears to be the sole hope for man's continuing existence on this planet – a fertile but delicate oasis in the deserts of space – and, as yet, our only individual and collective home.

Duncan Williams

The Ethics of Diet

FOOD FOR A FUTURE: THE ECOLOGICAL PRIORITY OF A HUMANE DIET, by Jon Wynne-Tyson. Davis-Poynter. £3.50

Meat-eating, at least to the extent to which we indulge the habit, is a manifestation of the orgy of overconsumption to which our pursuit of crude material gain has led us. Many people find it repugnant and none more so than Mr. Wynne-Tyson, whose book is a passionate attack on his carnivorous fellows.

The strongest arguments in favour of vegetarianism or veganism (the total abstention from eating any animal product) are moral. This has always been so, since the abandonment of meat-eating for ethical reasons first began, probably in the first millenium B.C. Vegetarianism has always been part of a total lifestyle. Mr. Wynne-Tyson points out early in his book that far more is involved than eating habits and that the word "diet" once meant "a way of living or thinking". For this reason I find the latter part of his book more persuasive than his early chapters. He cites the works of religious teachers and philosophers who have urged their followers to give up the eating of meat in order to facilitate their spiritual development.

The earlier sections are weak because Mr. Wynne-Tyson is too defensive and allows himself to be drawn into an argument based on anthropological, medical and nutritional evidence that at best is sparse and equivocal. There is neither reason nor need to suppose that primitive man ate no flesh and it does not help to dismiss clear evidence that he did as no more than local aberration. Nor can one assert both that our present knowledge of human nutrition is rudimentary and that meat-eating is invariably harmful. Either everyone can make categorical statements or no one can. I am not convinced that meat-eating is a primary cause of illness and the grouping together of all diet-related diseases in such a way as to suggest that all of them are connected in some way with meat-eating does nothing to persuade me.

The author seems to admit the weakness of the argument by shifting to safer ground and showing that normal good health can be maintained on an exclusively vegetarian regime. Few would dispute this, though doubts remain about the entirely vegan diet.

If all of us were to become vegetarian, could the world be fed? Unhappily, the world is both more complex and less wicked than ardent vegetarians believe. Just as livestock husbandry is not necessarily cruel, so there are large areas of land that are needed for food production but that can grow only poor pastures. Nor is it true that we import vast quantities of food from developing countries. In 1973, our only significant food import from India was of 137,000 tonnes of oilcake and meal, representing eight per cent of our total supply of that commodity. We could do without it, but could India do without the foreign exchange it earned?

Our food problem, perhaps that of most of the world, is not a shortage of protein, but a shortage of calories. Mr. Wynne-Tyson explains this lucidly, at the same time dismissing fears that a vegetarian diet must necessarily be deficient. In Britain we could grow all the grain we need to provide protein, supplemented by some legumes and some animal produce, but we would be short of vegetable fats. Suggestions that we should learn to eat soya and other exotic beans are unnecessary, because we do not need the protein, and impractical, because we cannot grow them here commercially.

In the end the moral argument

remains, and for those persuaded by it Mr. Wynne-Tyson gives useful advice on achieving a well balanced vegetarian regime, including lists of foods and their nutritional content and nutrients and their sources and roles that is convenient, helpful and as accurate as nutritional knowledge permits! If we are to learn to live in harmony with the world, the days of the steak-house on every street are numbered. Let us not imagine, though, that by changing our eating habits we have put the world to rights. Vegetarianism, or at least partial vegetarianism, makes sense, but it is no panacea.

Michael Allaby

The Darkness Ahead

THE END OF AFFLUENCE – A BLUEPRINT FOR YOUR FUTURE, by Paul R. Ehrlich and Anne H. Ehrlich. Ballantine Books, N.Y.

Beautifully timed (by accident or design?) to catch the wave of anxiety on the heels of energy crises and soaring inflation curves, comes this latest book by Paul and Anne Ehrlich. In their words: "Getting people concerned about a problem is half the battle", and there is enough solid depressing fact here to add more than a few grey hairs to any head foolish enough to be even mildly optimistic about the survival chances of Western society.

Excellently written, its obvious American slant should not deter British readers; the data come from around the world and the parallels to Britain are in any case obvious. There is a wealth of up-to-date information on U.S. and world food and energy prospects, detailed analyses of Japan and Brazil, an excellent and comprehensive section on nuclear risks and much more – more than enough well-argued evidence to support Ehrlich's thesis that "We are facing within the next three decades the disintegration of an unstable world of nation-states infected with growthmania".

"In the 1960s" they write, "it became more and more apparent to concerned observers that mankind was rushing toward disaster. It was still unclear, however, what would be the precise form of that disaster, the time of its occurrence, and the pattern of socio-political response to it. But it was all too clear that the political system was not generating the rational, planned, change required to avert catastrophe".

Thus, in Paul Ehrlich's earlier *Population, Resources, Environment* (1970) it was argued that concerted political action could save the day. He urged the exercise of political pressure in the form of "massive campaigns" to induce the U.S. Government to assume its responsibility to halt the growth of the American population and to restore a quality environment in N. America through de-development. *How to Be a Survivor* turned to the idea of Consumer Power. "We need grassroots power and one way to grassroots power is through a consumer movement". Both books proposed, as did *Blueprint for Survival,* the creation of a political party with an ecological outlook, a suggestion which in Britain led to the formation of PEOPLE. (Now the Ecology Party).

The End of Affluence contains no such suggestions for broad political action. The very guarded optimism of the earlier books is gone. Why? "In the early 1970s the leading edge of the age of scarcity arrived. With it came a clearer look at the future, revealing more the dark age to come. But more important, it revealed the hopeless inadequacy of society's response to a diffuse and slowly evolving crisis". The conclusion is: "The time for warning is past. There may never be an organized social response to humanity's peril".

Faced with the imminent threat of disaster and with Government's inability to react appropriately (politicians *must* lie to remain in power), what does the concerned individual do? The Ehrlichs concede that the success of *The Population Bomb* is unlikely to be repeated. Population growth could be and was affected by individual decisions (in which selfishness clearly played a large part). "The other factors – increasing affluence and the use of faulty technologies to support that affluence – cannot so easily be affected by individual action. The entire society is locked into a way of life that will take decades to change, just as it took decades to develop".

A timely, thought-provoking book – disappointing for me only in that much of the argument is based (perhaps understandably considering the intended audience) on an appeal to self-preservation, so that, as a consequence, the "Blueprint for Your Future" is for me a negative" response to the needs of the age, a plan for expedient *reaction* to crisis rather than a plan of action for building the new society: the difference between planning the most economical use of your car and planning a life-style without one.

Paul Carline

Beginning the 1984 Bypass

MEMOIRES OF A SURVIVOR by Doris Lessing. London: Octagon Press, 1974, 182pp.

As a diarist of the future, Doris Lessing has described an urban drift into savagery which seizes the imagination. She describes a:

> combination of the bizarre, the hectic, the frightening, the threatening, an atmosphere of siege or war – with what was customary, ordinary, even decent.

Her *Memoires of a Survivor* are persuasive because so much of them is plausible in the light of present trends. She notes, for instance, that the story of a single kidnapped child, with police combing suburbs and countryside in their hundreds in search of victim or captor, is flashed over the news alongside accounts of the massed deaths of thousands. The first, the concern with a single life, the need to punish the individual criminal, represents the reality we cling to. The other remains a remote interruption of the even flow of civilisation. Then there are the innumerable citizens groups, which in her narrative:

> came into existence right up to the end, for any ethical or social purpose that you could think of : to improve old age pensions at a time when money was giving way to barter . . . to reason with the gangs of hooligans as they came through the streets . . . to 'restore a sense of decency to sexual practices'; to agree not to eat the meat of cats and dogs . . .

Our own tacit agreement that "nothing much, or nothing irrevocable is happening" makes reality the enemy as much for us as for her characters. Do we not, like her heroine, see the greatest threat in comprehending the significance of encircling events? Are our own defences not, like the playacting of her children, "a way of keeping reality a long way from our weakness"?

Perhaps. But it is often, and persuasively, argued that the kind of crackup described by Doris Lessing is nothing more than the *gotterdammerung* of a defeated bourgeoisie, the death groan of a failing elite, whose cherished values and quality of life cannot be enjoyed by all, and must therefore be bulldozed down by mass society.

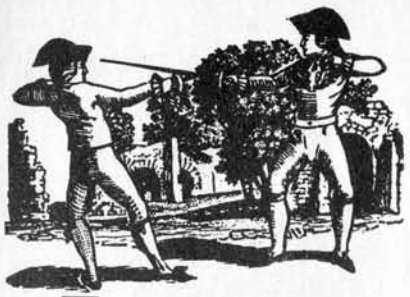
Such science-fiction futures may seem remote as well as frightening. But they remain a haunting possibility, at least for the rich elite, a fantasy-release from the struggle to cope with sagging 20th century industrialism. The urge to play Faust, or Sorcerer's Apprentice is strong in most of us. Yet more people than science-futurists may believe are aware of the hidden costs of techno-paradise, the political traps which they gloss over. Who will control all this power? The energy power, the resource power, the economic power, the financial power, or the power that controls all of these and draws its strength from each: the political power that must inevitably be held by technology's managerial elite? "They" throughout history have set the boundaries to ordinary people's personal fulfillment with their control of culture, their ambitions, their offerings and inducements and their demands. "They" will do so in the future, to the extent that "they" are permitted to do so by our exercise of political and technological choice.

The problem of political power is inextricably linked to that of technological choice. If, in every generation of human history, power has been perverted from its ostensible or legitimate uses, and has corrupted its possessors, are we to believe that unimaginably greater concentrations of force in the guardians of nuclear fuels and wastes, the controllers of the electronic media of communication or even expression, the men who will be bargaining with proliferating nuclear bombs, will not produce larger and larger scales of corruption and manipulation? Since Hitler we have seen the opportunities for human debasement – like those for excitement – grow with each new scientific breakthrough. That is commonplace. But few are aware of the opportunities that the biological revolution offers for debasement. Biological engineering offers the means for exacting predictability from unpredictable humanity.

In *Memoires of a Survivor,* "they" – the established elite – manage to blind themselves to the utter ineffectualness of their efforts to control events or to produce solutions. From their protected enclaves they flit to high-level conference after conference, whirling above the gang-ruled suburbs in their shiny helicopters. For Lessing, the image of growing disorder and breakdown predominates over the spectre of arbitrary central control. The police and troops are there, somewhere, but as in minor traffic accidents today, they prefer to look the other way unless a large assembly of people or gang-march implies a threat to the forces of law and order. This is a peculiarly English expectation: that authority will remain in the background, content to preserve itself and its fiction of control. The experience of history, however, is that pervasive and dictatorial control follows breakdown. Authority abhors, and quickly fills, political vacuum.

Both the popular paths of future prediction, the pessimist and optimist, point to the squeezing out of character and caprice, the ascendancy of more and more authority and control. If credence is given to either view, then the need for new social and political mechanisms that will check arbitrary and centralized power in both its technological and managerial or political manifestations, becomes the most vitally urgent need for Western society: the change of course essential if we are to bypass 1984.

Brian Johnson



Letters

Irrational Aid

Dear Sir,

Although I think that development aid as at present administered would not reduce destitution even if it were quadrupled, it might be argued that we should nevertheless give aid because the poor countries want it. Who are we to judge other people's needs, especially when what they are asking for is something we already have? That is a valid point only if you believe that our industrial society is better than rural life in a poor country *at its best,* or better than that life could become.

To refuse aid, when most of it goes on setting up modern industry in the big cities, is not a paternal approach. It is not saying as an adult does when refusing matches to a three-year-old, "I will not give you them because in your hands they would be dangerous, although with me they are safe because I'm older". Industrial development is like a defective car. Our family (the West) has two of these cars, which are dangerous because they have defective brakes. The defect is a serious design fault and no ordinary repair can overcome it. We have been using the cars a long time, believing them to be safe. Now we have discovered these serious defects just at the same time as our neighbour, who all this time has been having to walk, asks us to give him one of our cars. We feel we ought to, in a way, because not only should we share and be generous, but we owe our neighbour something in return for what we took from him about the time we got the cars. But we refuse, because we know the cars are defective and if he used one he might have a serious accident. However, we ourselves have got so used to riding we cannot bring ourselves to walk and instead we go on using the cars. This is quite irrational. If we are going to refuse the gift on the grounds of safety we should cease to ride ourselves. As it is, we infuriate the neighbour by continuing to ride, trying to justify ourselves by claiming that it is necessary for us to take the risks because we are sure we have forgotten how to walk.

The World Development Movement behaves, it seems to me, as though (A) there is nothing fundamentally wrong with the cars, and (B) that it doesn't need to give up one of its own cars, but that cars for the neighbour can be obtained from the dealer down the road, and all we have to do is provide the money.

My view is that there is something seriously wrong with the cars, and I should sell them for scrap and with the proceeds buy bicycles for myself and my neighbour. I should then pedal along beside him, discussing with him as we go whether it is possible to design a car which is not seriously defective. *As it is,* I continue to ride about in the dangerous car because I'm trapped in it – another of its defects is that the doors won't open.

Who will open the door for me and help me to learn to walk again?

Yours faithfully,
Jim Haigh,
Corby,
Northants.

Editorial Philosophy in Question

Dear Mr. Goldsmith,

Congratulations on the fifth anniversary of *The Ecologist.* Events have conspired to incline the influential to listen to its message, boldly and forthrightly put forward, in a way which might not have been expected five years ago.

I have enjoyed the way in which the magazine and you have challenged the scientific and technological consensus, something which very much needed doing. In some respects, however, my enthusiasm has led me to overlook reservations about the underlying philosophy of the magazine.

It seems to me that by substituting the ideal of an ecologically sound "survival" for the uncritically accepted ideal of economic growth, you have accepted the framework of utilitarianism with its elevation of security, subsistence and abundance as the proper goals of human rationality. If, as you state at the end of "Religion in a Stable Society" (The Ecologist, November, 1974, p.325) the only criterion of truth is its compatibility with the stability of the social system, then its validity is made dependent on something other than itself and its nature is perverted in so doing. Human reason, in this view, as in the utilitarian, can never be dignified above the rationalisation. Needless to say, the contempt for rationality on the part of advertisers and propaganda experts today, is a consequence of this position.

The statement "It is forgotten, for instance, that information is organised for *one purpose only:* so as to provide a model of a system's relationship with its environment, and there is only *one possible reason* for building such a model, and that is for the purpose of mediating adaptive behaviour," could well have been spoken by Gletkin in *Darkness at Noon,* a man whose sincerity in this irreproachable belief was promptly regarded by a truncated survival value within the context of the Stalinist social system. Whether that social system was as ecologically sound as that of a tribe in New Guinea is beside the point. That truth may be declared false merely on the grounds that it does not conform to the *perceived* requirements of the social system is an invitation to a personal, if not a social disaster. The distinction between "objective" truth and "subjective" truth, once allowed, requires for its resolution a totalitarian solution, as Koestler's Rubashov was led to discover.

Yours sincerely,
Thomas Merriam,
Basingstoke Technical College.

Immunity from Foot-and-Mouth Disease

Dear Sir,

In his review of "Organic Farming" in your July issue, Robert Waller says that during the last outbreak of foot-and-mouth in this country, there was no evidence that organic husbandry rendered animals immune. A short time ago, an

article in "Nature et Progres" reported that there are areas in Brittany apparently completely immune from foot-and-mouth, and it is believed that this is due to soil-dressing with Maerl (a product based on seaweed with carbonate of lime and other additives, including small amounts of phosphoric acid and nitrogen, about 7% magnesium and certain oligo-elements).

Careful investigations have been made to substantiate this theory. One example concerns a holding treated with Maerl, from which a small area had been carved out and farmed separately by a different owner. This part received no Maerl, and suffered an outbreak of foot-and-mouth among its cattle. The disease, however, was completely contained, although this strip was completely surrounded by the Maerl-treated holding, where cattle were only separated by railings and could come close and sniff the affected animals. People also had to cross the larger holding when coming and going from the foot-and-mouth area.

Numerous other such examples are given. It is believed that the value of Maerl depends on its magnesium content and oligo-elements (it is pointed out that magnesium itself should not be regarded as an oligo-element). It is considered that these build up resistance to foot-and-mouth and that immunisation can be effected by a correct daily ration, by treating the soil itself as well as by addition to feed.

Mr. Le Floch, Director of the Ecole d'Agriculture, after 20 years' observation, concludes that finely ground Maerl is valuable for its magnesium content, which is absorbed by the cattle and passes into the bloodstream, where it is liberated by the presence of iron, thus permitting the production of haemoglobin. The magnesium so liberated becomes the chief catalyst of the body's fluids and makes use as necessary of the oligo-elements, most of which are found in Maerl.

It would be interesting to know if this theory applies to any farms in the U.K. which have remained unaffected by foot-and-mouth. One furtherspoint of interest is that an absence of tuberculosis in cattle is also reported in areas which have been free of foot-and-mouth for some time. The author asks if the cause of T.B. might also be a mineral – possibly magnesium – deficiency? This could perhaps explain why both badgers and cattle in certain areas are tubercular. There is no doubt about the value of magnesium as a protection against certain other diseases.

Yours faithfully,
Joanne Bower,
Hon. Secretary,
Farm & Food Society,
London, N.W.11.

Cordon Sanitaire in the Sahara

Dear Sir,

I was interested to read the long letter from Mr. Raikes of Rome referring to my article of October, 1974.

Mr. Raikes' main query is about the water underlying the Sahara. This is far too large a subject to be discussed or dismissed in a few lines.

The brackish water where it occurs is not deeper than two to three metres under ground and suitable trees thrive on it. An aquifier is a body of water contained between impermeable layers of rock like the Nubian aquifer which begins in Egypt and then flows south westward under the Sahara. For anyone in doubt on the subject, I would suggest as preliminary reading Robert P. Ambroggi's excellent article *Water Under the Sahara* in the May, 1966 issue of Scientific American.

It would be insane to plant trees in the Sahara proper. The first step is to establish the green wall around the desert. Then planting can be extended between oases and the wall and, like a spider's web, gradually filled in.

I am happy to have this opportunity to restate my case. If some fearful plague were raging in the Sahara, the whole world would rush to throw a cordon sanitaire around it. Starvation, except when caught by a roving T.V. or fund raising camera, lacks drama. Nonetheless, thousands of people and animals are dying every year. This is not necessary.

I have been proposing this cordon sanitaire of trees around the Sahara and other deserts since 1958. This is not only a humanitarian concern. It is strictly in the practical interests of the wealthier nations. North Africa was once the granary of Rome and can be re-established as such. The longer we hesitate the more pasture and arable land will fall in productivity. Reclamation is far more costly than conservation.

Yours faithfully,
Wendy Campbell-Purdie,
Bou Saada Trust.

Gnashing of Teeth

Dear Sir,

It is very curious and indeed unusual for an editor of a reputable journal to accept comments on a report which has no reference and to which readers in general have no access. We are referring to your Report on what is called the Gwynedd Dental Health Study (Ecologist, May 1975, p.143). The report referred to was one made privately to the Gwynedd Area Health Authority and was concerned with dental health in Anglesey and in Bangor/Caernarvon. An expanded version of this report was published in the British Dental Journal, 4th March, 1975, pages 165-171. Those who are interested may care to read the article and to assess for themselves the distorted comments made by your reviewer.

There are several other extraordinary features associated with your 'Report'. For example a person who reviews a paper might be expected to have done a little homework on its subject matter, and also one generally expects a reviewer to adhere to the usual academic courtesies. This particular review shows serious deficiencies in knowledge and is couched in offensive language. If someone wishes to make a public demonstration of his lack of knowledge he could at least do it politely.

There are so many mistakes in the review that it would be tedious to deal with them all. We have selected one or two of the more important ones.

We are accused of "quite deliberately" excluding from the examination those children resident in Anglesey who had not had fluoridated water, the suggestion being

that this would be a satisfactory control group. But as half the island's water was fluoridated in 1955 and the other half in 1964 there *were* no children who had no fluoride exposure; this is why we looked at the children "next door". It should be remembered that there have been hundreds of independent scientific reports from many countries over the last 35 years the sum total of which has provided overwhelming evidence about the effect fluoride, either natural or artificial, in reducing the prevalence of dental caries. The Anglesey study is merely local confirmation of a fact well known to all workers in this field.

Your reviewer quotes some statistics reported annually to the Medical Officer of Health as evidence that the proportion of children needing dental treatment has not changed since fluoridation. Leaving aside the obvious disadvantages of such a measurement because of standardisation difficulties, this crude method is not likely to show differences; for example, children who only required cleaning of the teeth would score exactly the same as those who needed to have ten teeth extracted.

One final point. Your reviewer suggests that five year old children of Bangor/Caernarvon have lost twice as many teeth as the five year olds of Anglesey because of tooth eruption and tooth shedding differences. This really is a howler. He does not know that the 'm' of dmf is "missing due to caries". Neither does he apparently know of the work that has been carried out on tooth eruption and shedding in fluoridated districts.

"Scientists who encourage public fears on the basis of incomplete or ill-digested evidence constitute a serious environmental problem". Your reviewer said this in a letter to New Scientist on 26th June, 1975. On this point, at least, we are in full agreement.

Yours faithfully,

D. Jackson,
Professor of Children's and Preventive Dentistry, University of Leeds.

P.M.C. James,
Professor of Dental Health, University of Birmingham.

. . . Professor Scorer Replies

Dear Sir,

My criticism of Professor Jackson's comparison of the teeth of children in Anglesey with those in Bangor and Caernarvon was made of the version sent to the Gwynedd Area Health Authority which was written for consideration by the Authority was it was sent by a third party to your journal with my agreement.

Professor Jackson says there are mistakes in my review and proceeds to select one or two of the more important ones. I correctly pointed out that he had quite deliberately not studied those children in Anglesey who had not had a full exposure to fluoridation, and it is not a mistake to suggest that if he had examined them he might have found something interesting if fluoride does have the effect he claims.

He then goes on in his letter to you to commit the prime sin of the pro-fluoridationists, namely to assert that there is no doubt about the effectiveness of fluoride because of previous numerous studies, so that, apparently it is not necessary in this case to observe the disciplines usual in properly conducted statistical studies, namely to examine likely alternative hypotheses which could explain the observed facts.

He assumed that if children's teeth in Anglesey were better than in Bangor it was because they had fluoride in the water. I merely pointed out that the statistics of examination and treatment of school children over many years in Anglesey had shown no improvement after fluoridation was introduced and that probably the Anglesey children's teeth had always been better than in Bangor where the water is softer and there are many urban influences which might also account for it. When, in reply, Professor Jackson argues that the statistics in question would not necessarily reveal any effect he is merely interpreting the figures according to his belief, not proving anything. That is the whole trouble.

He then asserts that "The Anglesey study is merely local confirmation of a fact well known to all workers in this field". Logically the Anglesey study does not confirm anything because the proper tests have not been made to be sure of any explanation. In a latter to an M.P. who raised the question the Minister, Mr. David Owen, wrote (about Professor Jackson's study) "This survey did not prove a causal link between fluoridation and the better standard of dental health in Anglesey, but generally confirmed the findings of other reports . . ." It seems that one is entitled to regard it as *confirmation* if it seems to support the hypothesis. The fact that Bangor is "next door", as Professor Jackson says, does not make the comparison a good one because very many other factors are very different beside fluoride.

The report said "The results of the investigation are abundantly clear". This is utter nonsense; it is only clear to the prejudiced believer, and it was because of the sloppy logic that I criticised it in words which the author naturally dislikes.

Anyone who tries to find where the studies are which this report is said to confirm finds the same sloppy logic throughout. Furthermore, when harmful effects of fluoride are brought up the logic is suddenly tightened up and "it is not proved that the effects were due to fluoride and could well have been due to something else". Although it is never proved that they were due to a particular something else they are dismissed as evidence of harm by fluoride.

It is often claimed that there is an enormous mass of proof that fluoride works, but this is quite unture; all the evidence is of a kind similar to the "confirmation" found in Anglesey. It is also claimed that fluoridation is the most researched of all public health measures, but it cannot compare in scale and effectiveness with the world-wide anti-smallpox campaign which, it was reported recently, had completely banished the disease from India.

In one of his annual reports after fluoridation had been going for a few years the chief medical officer of Anglesey referred to the "dramatic" effects of fluoridation. When I asked for the evidence I was told by Dr. David Owen that he was not referring to any facts obtained in

Anglesey but merely to what everyone knew must be the case in Anglesey because of studies made elsewhere.

The public is being subjected to a Ministry supported campaign to get all water supplies fluoridated, and should be told that it is not based on adequate studies and that the effectiveness has certainly not been proved. The campaign seems to be based on a commitment to a policy inherited from 20 years or so ago.

Yours faithfully,
R.S. Scorer,
Imperial College of Science
& Technology.

Apples and Sheep

Dear Sir,

The time has come I think for farmers to be thinking in terms of three dimensional agriculture. As a farmer I am fortunate enough to have a quarter acre paddock where a few sheep are kept through the year. I have noticed that even with no fertiliser I am able to keep more sheep per acre in the orchard than anywhere else on the farm.

The grass grows better under the trees and does not dry up so quickly in the mid-season. In addition the leaves help manure the ground. Will we see in the future, grass fields planted with fruit trees, so that two crops can be taken off the same acreage with little or no loss in yield of both of them?

Yours faithfully,
J.L.G. Symons,
Goadby.

Whose Hands on the Plough?

Dear Sir,

The developments envisaged in Michael Allaby's article in your (most excellent) Birthday Number, i.e. that many people shall return to the land and that a healthy rural society shall be reborn, would be most desirable. Where I think he is wrong though is in his assumption that the returning workers shall be farm labourers working on the existing large farms and estates.

Lessen the dependence of farmers on machines and chemicals, by substituting manpower, and you lessen the need for large farms, I do not think the modern city worker is going to be lured – or even driven – back to the country to be a hired labourer working for a big farmer. Maybe there will always be some people who *prefer* to be labourers, with no responsibilities, financial anxieties, and a weekly wage packet, but most people will only return to the land if they can be owner-occupiers, and most people will only put the great effort required properly to serve the land if they can feel that it is their land, and that they are working for the land and themselves.

An intelligent, educated, and sophisticated peasantry will produce more good food from the land – and keep the land in better heart – than any proletariat of landless labourers.

Yours faithfully,
John Seymour,
Fachongle Isaf,
Wales.

Stunning Cruelty

Dear Sir,

All organic farmers should surely feel that the right ecological attitude to the land they farm and all the stock upon it, requires of them a special sense of responsibility and a genuine caring for and humane treatment of their animals which cannot end suddenly at the farm gate when the purchasers lorry goes through it.

What are we to say now, therefore, when it is revealed that slaughter houses actually owned by the N.F.U. or the Fatstock Marketing Council which it largely controls, permit the most diabolical methods which must surely be illegal in this country? (see *News of the World* 3.8.75). It is reported that lambs are hung up by the back legs on an endless chain passing the slaughterman who knifes their throats, *without* pre-stunning be it noted, and they carry on to the skinner with hardly time to lose consciousness before he sets about them.

Every organic farmer should belong to his or her respective union, be it Scotch, English or Welsh and make his strong disapproval known in no uncertain terms. If we don't do this, we can hardly protest against the exporting at present of thousands of our sheep to the E.E.C. and beyond.

Yours faithfully,
Peggy Goodman (Mrs.)
Corwen, Wales.

Conservation Weekly is Wanted

Dear Sir,

Is the Conservation movement failing? Has the bandwagon passed? People seem to have come to accept that there will always be an environment movement somewhere in the background, fighting for the good of everyone and getting nowhere; the sense of urgency and enthusiasm has gone. At the moment the movement consists of countless tiny to medium sized organisations and groups all shouting about tiny to medium sized issues with tiny to medium sized voices, few of which are heard, but even those that are heard only achieve tiny to medium sized advances.

I am often told that this is because Conservation covers such a wide range of subjects and types of people that we need many separate groups to attract everyone; but something else I notice about talking to representatives of various groups (People, N.V.A., F.O.E., Con Soc, etc.) is the similarity of their basic ideas and aspirations. The alarm is going off; nearly all the environmental groups are experiencing financial difficulties, many are giving up or have given up their newsletters, this will probably lead to more apathy, lower membership, and more difficulties.

The time has come to unite, and I believe we can have it both ways; gain leadership without losing individuality. We believe in decentralisation, but even a decentralised society must have some kind of central control and co-ordination. Surely what is needed is a central council, consisting of representatives of all groups whose aims come under conservation; which would meet regularly to discuss co-ordinate and centralise the movement; perhaps

to compile a manifesto for survival (or better still, adopt the People party's manifesto), a very clear, comprehensive, ordered set of policies. The council should need very little money. Each group could pay a small subscription for administration, meeting places, etc. Each group would remain totally independent but would add its ideas to the consensus of the council and would hopefully be influenced by it. There are countless societies for the preservation of various places and things, who, if we could show them in a printed manifesto that we were sympathetic to their aims, would add their numbers to the movement as a whole. We need to convince them that they stand little chance of preserving anything in the present growth-mad world. Presumably there would have to be some check on the sincerity and validity of any groups wishing to join.

Secondly, but in the same vein, what the movement needs is a central all-embracing newspaper. We must amalgamate all the countless newsletters, most of which are putting their groups out of business through postage costs, and start an actual newspaper to be sold weekly at newsagents at a low price. The paper could include all national and international news, or perhaps comments on news issues already reported in other papers. Its up to *F.O.E., Cin Soc, Soil Assn.,* and *The Ecologist* to make the first moves towards the council and the newspaper or the movement will stay in the background.

We have a group in Guildford which we decided to call 'Movement for Survival' in memory of your brave but failed attempt at unity in 'Blueprint for Survival'.
Yours faithfully,
Chris Parr,
Loxwood, Sussex.

Editor's Note: The original (1972) Movement for Survival has been incorporated into The Ecology Party (formerly People Party) and all requests for information about it are dealt with by them. *Blueprint for Survival* is still being widely read not only in English but in sixteen translations.

700 Soil Association Students

Dear Sir,

Congratulations on your excellent Birthday Issue.

Robert Waller's review of the Rodale 'Year Book of Agriculture' has allowed him to indulge in some negative and ill informed criticism of the Soil Association. If he were to turn to page 226 of the same issue and read the review by Ruth Lumley-Smith on two Soil Association booklets, he might begin to learn a little of the truth.

Mr. Waller proclaims that the Association cannot win the co-operation of the young. He should visit one of the Association's annual courses at Ewell, which were organised after he left the Soil Association. There he would meet some of the 700 young students who have benefited from these unique courses on organic husbandry. He might try and visit the Association's exhibit at the Chelsea Flower Show if he could get past the 12,000 visitors to the stand.

Public courses are organised to meet the growing demand from the young for practical knowledge about organic husbandry. The Association's educational programme is based upon the experience of its members and is achieving real results for the benefit of the organic movement as a whole. The principles and practice of organic husbandry have never been written up in simple form for ready reference and the Association is trying to remedy this omission by publishing a series of booklets on various aspects of the subject. The demand for these booklets runs at over 15,000 per year. The Association is doing something positive and prefers to be judged by results.
Brigadier A.W. Vickers,
General Secretary,
Soil Association.

Bob Waller writes:

The point I was trying to make in my article that Brigadier Vickers finds so negative, is that in order to appeal to the young, the Association has to take part in *political issues,* such as the one I commented on in my article, the destruction of the family farm by the multinational companies. Of course I recognise the right of the Association to choose its own policy; but members should be allowed to hear all sides of the argument. I believe the French and American organic movements have been more successful because they engage themselves in the broader social issues that must be faced if the organic philosophy is ever to be anything more than wholefood buns and compost grown vegetables.

This month's authors

Robert Hanie is Executive Director of Atlanta 2000 Inc, a non-profit making regional citizen's organisation.

Professor J. Pelisek is a lecturer in the Faculty of Forestry at the Brno Institute of Pedology and Geology, Czechoslovakia.

Michael Senior is actively engaged in a number of organisations including Transport 2000, Snowdonia National Park Society and the Conway Civic Society in North Wales. Author of *Portrait of North Wales* and *Portrait of South Wales.* (Robert Hale)

Lawrence D. Hills is Director of the Henry Doubleday Research Association and an Associate Editor of The Ecologist.

Sheldon Williams is a free-lance journalist and visual arts writer living in London.

Nicholas Valdez, B.Sc., is at present studying social administration at the London School of Economics.

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Constructive information for alternative lifestyles with diagrams besides 2,000 listings. Borrow for postage-returns refunded. £2.50 inclusive from N. Saunders, 65b, Edith Grove, SW10.

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WIDOW, 62, artist, meditator, potter, gardener, would like to find a community where integrity, personal and ecological, is of first importance. Country and quietness essential. Independent means. Mod cons. unnecessary. Box No. 00.

MEETING

THE LANDSCAPE INSTITUTE
Following its announcement in February of its intention to create new classes of professional membership open to those in the land sciences and landscape management, the Landscape Institute (incorporating the Institute of Landscape Architects) is currently discussing, with invited advisors, the scope and range of present professional activities within these spheres.

A committee of the Institute will hold an open meeting in York on the 8th January to discuss conditions and requirements for professional entry. This meeting should be of interest to land scientists and managers working in the context of landscape planning/architecture, town and country planning and landscape management. Those wishing to attend (accommodation limited to approximately 50) are invited to write for details to:– Peter Smith, School of Landscape Architecture, Leeds Polytechnic, Vernon Road, Leeds LS1 3EQ.

CONFERENCE

Conference: 'FOOD SUPPLIES – OUTLOOK FOR BRITAIN', 8 and 9 January 1976, at the University of Manchester Institute of Science and Technology. Joint meeting of the Royal Society of Health and the Society of Chemical Industry. Further details may be obtained from the Conference Department, Royal Society of Health, 13 Grosvenor Place, London SW1X 7EN.

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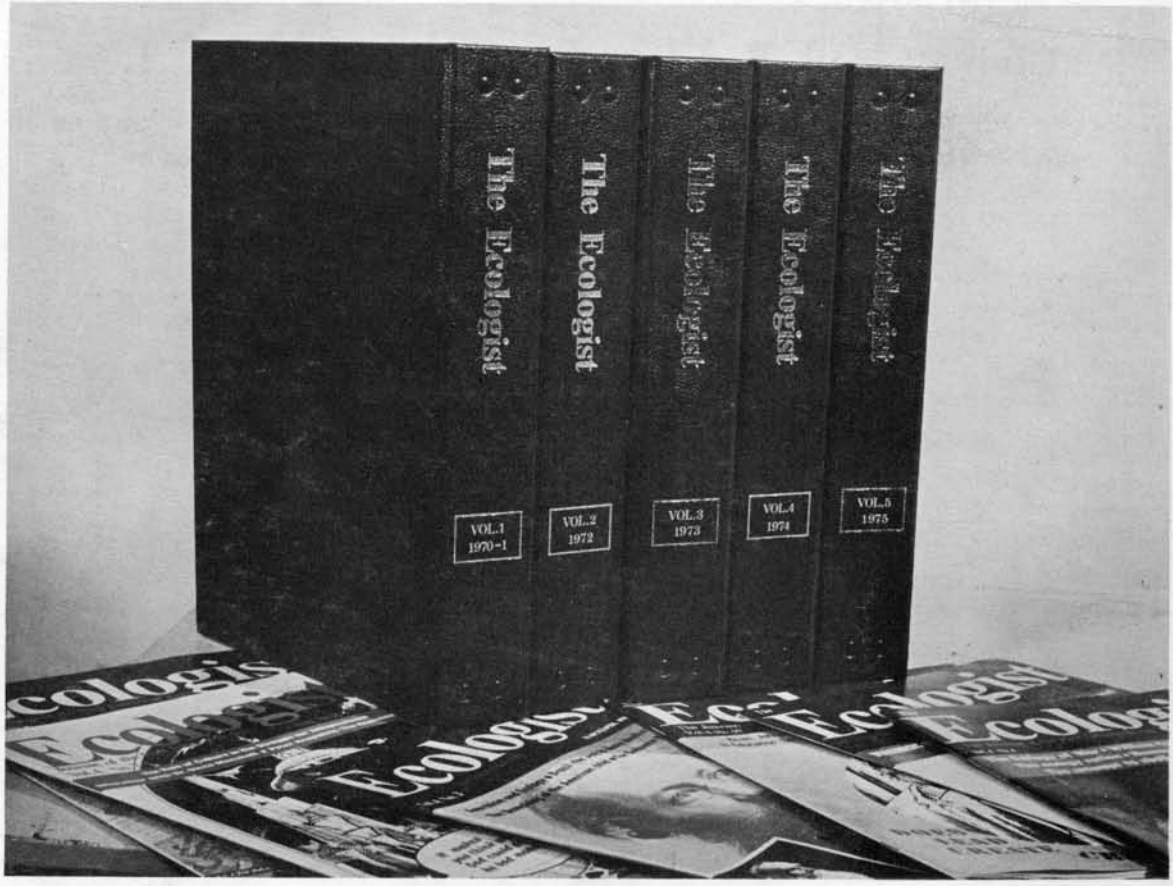

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