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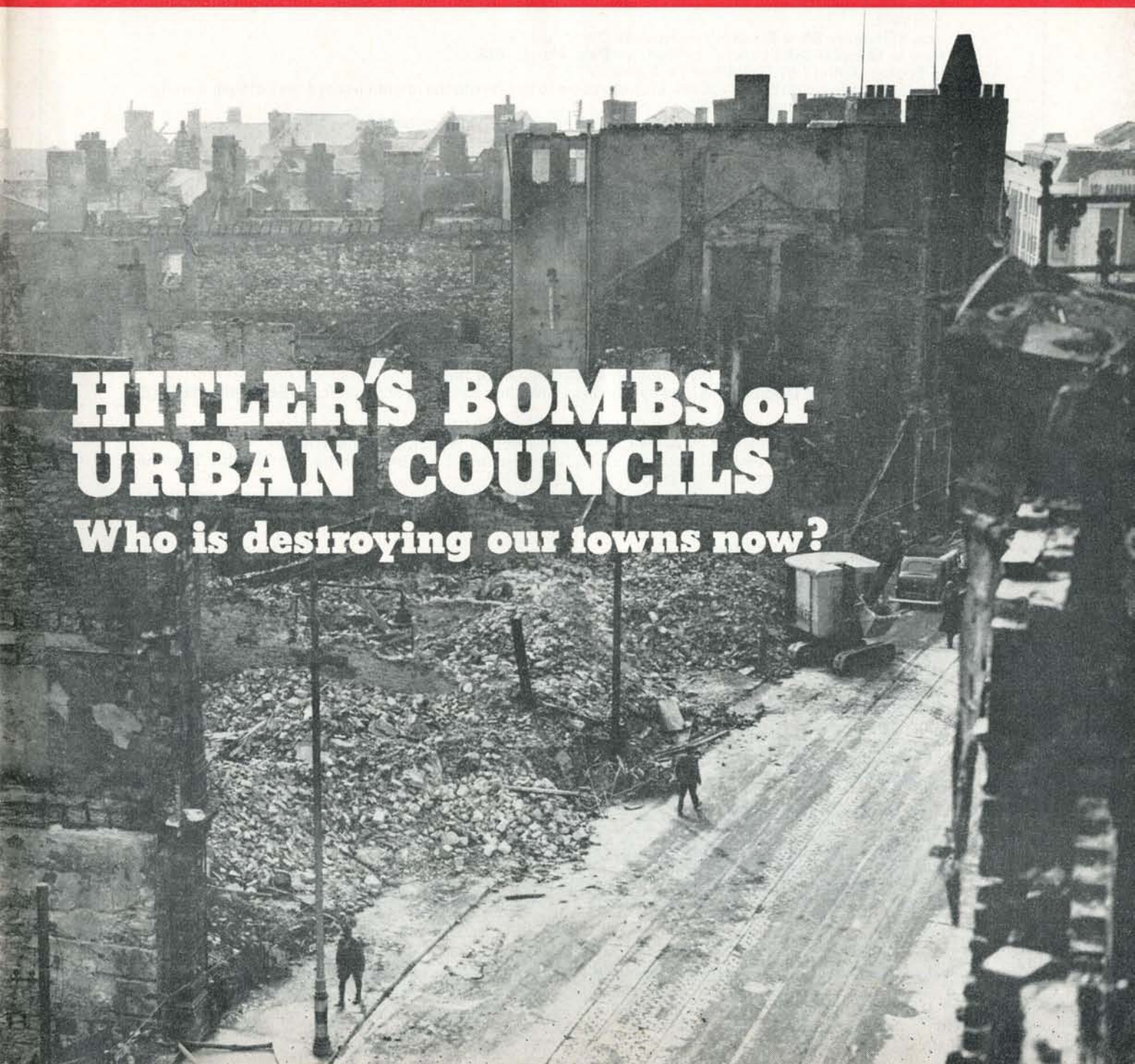
Why School Won't Work ▪ The Destruction of Towns
Is the Earth's Climate Changing? ▪ Parenthood: Right or Privilege?



## HITLER'S BOMBS or URBAN COUNCILS

**Who is destroying our towns now?**

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# Comments

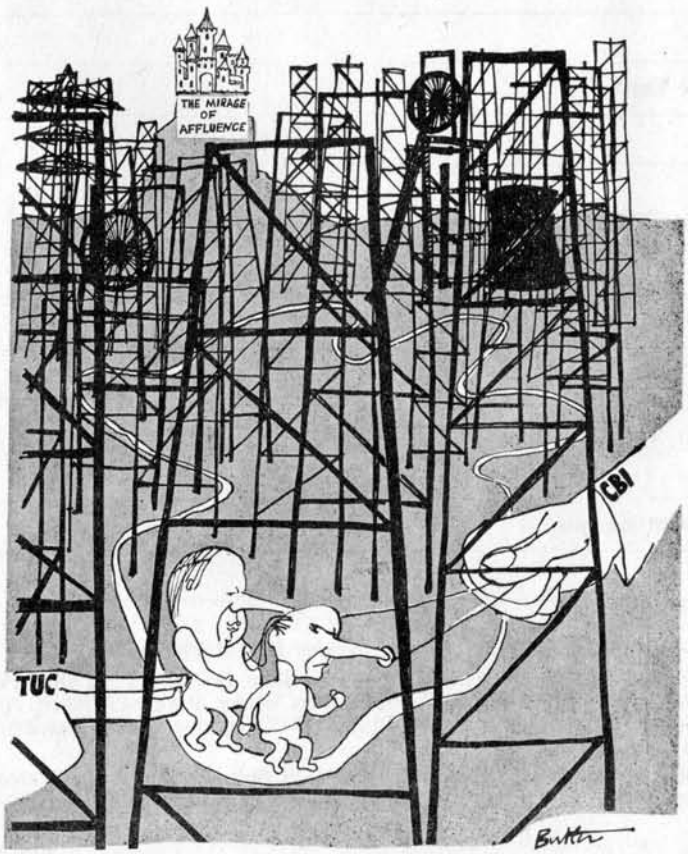
## Taking the Government by the Nose

What a sorry Government ours is. Confounding itself and the people it is supposed to govern in meaningless schemes for expanding the economy and for sustaining the vestiges of growth, it dithers and vacillates when confronted with reality. Indeed its policies take little account of the plain insurmountable fact that the raw products upon which we and our manufacturing industries depend are not only costing more, but increasingly they are going to be in short supply. Nor is it just oil which is soaring in price—iron ore, copper, natural fibres, animal feedstuffs and fertilisers are following the same upward spiral, making a nonsense of the Government's phase three. Morocco for example, which supplies Britain with 75 per cent of its phosphates, has recently quadrupled the price. Yet can we see the Government spending any of its precious time on schemes to conserve phosphates by the simple expedient of putting sewage back on the land?

Not once has the Government anticipated an event and acted in a rational manner. It needed no great insight to foresee an oil shortage if not now then some time in the future. Nevertheless the government insisted on its laughable policies of growth instead of establishing in their place a regime of optimising resource use. Oil should never be consumed idly in the internal combustion engine for the dubious satisfaction of one or two generations of a few privileged men. If anything it should be conserved as a valuable raw product for chemical syntheses. But there has not been one hint from the Government that the motor car or other profligate consumers of oil should be phased out of existence. Quite the contrary, the Government has continued to give its backing to such harebrained schemes as Maplin, Concorde and the Channel Tunnel, while at the same time making no real decision. Events have done that; for lack of Treasury money has forced the Government to put the brakes on such schemes. The fact that the Government keeps its options open shows the limitations of its thinking.

Being governed by a strong hand bears its own dangers. Those in the corridors of power are apt to assume that they know best, and none of us want the dictatorial regime of a Greece, Chile, or even of a Soviet Union. But to have a Government so weak that it dances to everyone's tune louder than its own is a recipe for chaos. Such weakness of the kind that Britain portrayed when the Arabs singled out Holland for its oil embargo has no excuse, and if Britain through total self-interest can disassociate itself from one of its close allies and main trading partners, then it deserves no better in return. And in these days of political uncertainty there is no guarantee what will happen tomorrow.

Moreover the Government's inability to make decisions in the face of events is an open invitation for private enterprise—however selfish and ruthless—to take over. Big construction firms now dictate where they wish to site the building of the platforms for North Sea oil, and despite strong local opposition to the plans, the Government demurs. And when the CEGB tells the Government that it wants the American light water reactor to boost its nuclear power programme the Government goes into a



huddle from which it is not to emerge for several months. And what of the evidence that such reactors are not safe? Will that be heeded?

What we are getting from Government are mindless plans for growth. What we need from Government are plans to reduce our dependency on inputs of raw materials, which in essence means limiting growth. The Government hopes that the present oil crisis and the coal shortage will blow over. It may—temporarily—but next time, say in 15 years, when the dependency on those energy resources is twice as great, the fall will be much more than twice as far.

In conclusion one fiction must be laid to rest once and for all: the fiction that thermonuclear fusion—if it is achieved—will solve man's energy problems. It is pie in the sky to think that there is a technological solution to the uneven distribution of resources, to man's greed, to his aimless pursuit of a materialistic utopia and finally to an inept government.

*Peter Bunyard*

## Energy and GNP

It is frightening how little people have understood the implications of the energy crisis. Most people think it will simply mean that we will have to save fuel, use smaller cars, heat our houses more sparingly, etc. They fail to realise that unless we go on increasing energy consumption every year, economic growth cannot be maintained, and if it isn't then our economy will collapse, and since our society is organised around its industrial activities, then this will collapse too. The key correlation which our economists and politicians should be examining today is that between increased energy consumption and the growth of GNP. Indeed, if industrial society is to be kept going, the greatest priority today should be discovering how to bring about the maximum increase in the latter with the minimum increase in the former.

One of the people who appears to have looked at this most carefully is Joel Darmstadter, Senior Research Associate with Resources for the Future and principal author of *Energy in the World Economy* (1971).

In a recent article he shows how this relationship has changed in the US in the last century and emphasises its key significance. "Whether a 4 per cent rate of growth in GNP means a 3.5 or 4.5 per cent growth in energy consumption," he writes, "could spell the difference in US energy growth, in the year 2000, equal to this country's total annual level of consumption within the past few years."

Between 1880 and 1920 in the US, energy consumption increased by an average of 5.6 per cent while GNP increased by no more than 3.4 per cent. In the succeeding 40 years, between 1920 and 1960, energy consumption grew by no more than 2.1 per cent, while GNP increased at a rate of 3.2 per cent. What accounts for this change? To begin with, according to Darmstadter, the first period was characterised by a rapid growth of the manufacturing industry, which requires a very high energy input per unit of activity. The developing countries are passing through this stage at the moment.

The reduction in the rate of increase of energy input to that of economic growth, Darmstadter attributes, among other things, to the rapid rise of electrification, which greatly increased the efficiency of factory operations. This occurred in spite of the low efficiency of electricity generation, which however has since been substantially improved. Thus, in 1925 it took over 2 lbs of coal to produce 1 kWh while in 1960 it took less than 1 lb. Also, during this period steam locomotives were replaced by more efficient diesel engines.

Between 1960–65, US energy consumption increased at the average annual rate of 3.6 per cent, while GNP increased by 4.8 per cent. Since then, there has been a sharp reversal. Between 1965–70 energy consumption rose by 5 per cent, per annum, while GNP only rose by 3.2 per cent. In 1970 energy consumption rose by over 4.5 per cent, while GNP actually declined. The trend, therefore, is now towards a less efficient use of energy for the purpose of generating GNP. Why has this occurred?

One reason appears to be that progress in increasing the efficiency of electricity generation has ceased. Indeed, it has declined from 32.5 per cent in 1965 to 30 per cent in 1970. It doesn't appear that electric power use by household/commercial and industrial sectors can be incriminated. On the other hand, the energy used for transport purposes increased substantially from 3.3 per cent per annum to 5.3 per cent. In addition, there is a tendency for basic energy resources to be consumed for uses other than the generation of power, in the petrochemical industries for instance. Usage for this purpose increased at a rate of 3.3 per cent during 1960–65 and rose to 8.1 per cent during 1965–70.

According to current projections made by the Bureau of Mines and the Federal Power Commission (FPC), energy consumption in the US during the period 1969–2000 is expected to increase by 3.5 per cent per annum—slightly above its long term historic rate of 3.2 per cent since 1900, though below the average figure of 4.3 per cent recorded during the 1960s. Electricity consumption is expected to increase by 6.7 per cent during this period, which is somewhat below its rate of increase during recent years. This means that that part of energy consumption going into electric power generation will increase from 25 per cent in 1969 to about 50 per cent by the year 2000. At the same time, it is expected that GNP will increase by 4 per cent per annum.

There is still considerable doubt as to what will happen to our key correlation (energy consumption and GNP), in the opinion of Darmstadter. The recent unfavourable trends, he considers, may have been related to such things as the Vietnam War and the disproportionately rapid growth of high powered cars, also to the growing use of electric heaters and air conditioning devices, which consume a very considerable amount of energy. A lot of questions remain to be answered. For instance, are there likely to be further improvements in electricity generation efficiency? Will the shift towards services and leisure industries reduce energy consumption? In the meantime, Darmstadter regards the Bureau of Mines and FPC projections as slightly optimistic. If anything, energy consumption levels are likely to be higher than expected.

Needless to say, Darmstadter is talking about the fuel requirements to keep the American economy functioning at the rate which appears to be necessary to keep everybody happy. He does not take into account the inevitable increases in the price of basic fuels, and the actual shortages which are already beginning to occur, and which can only become more serious.

*Edward Goldsmith*

Historic buildings to go

By our own Reporter

MR RIPPON, Secretary for the Environment, has agreed to the demolition of a row of listed buildings fronting Chesterfield's ancient Market Square, to make way for comprehensive redevelopment.

The inspector who conducted an earlier inquiry, Mr W. Berridge, found that the ...hteenth-century buildings. ...41-45 Low Pavement, ...both of archi... interest," ...insic

which collected over 30,000 signatures in a petition to save the buildings. Outline planning permission for the redevelopment, a joint venture between Chesterfield Corporation and the Hammerson Property and Investment Trust, had already been granted after a previous inquiry.

By r... g ... buildings ... to force

and if restored "could make a substantial contribution to the character of the market place in its present form." their retention would "ne... be feasible nor justifi... the context of the r... ment, which would ... tally alter the are...

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# The Destruction of Towns

by James Stevens Curl

In spite of increasing public outcry and the valiant efforts of many amenity groups, the destruction of our historic cities continues unabated. The ancient city of Lincoln is at this moment being irretrievably ransacked. Bath, one of the finest cities in Europe, is being systematically destroyed, 2,000 Georgian buildings having been bulldozed in the last few years. Winchester is to be ruined to make way for a new motorway, and London is rapidly being turned into one vast building site. Why all this devastation? One can only assume that this terrible sacrifice we are making must be in the name of some lofty ideal.

As James Stevens Curl[1] shows in this article this lofty ideal is nothing more than economic growth for whose end-products; more washing-up liquids, electric toothbrushes and plastic buckets we are exchanging our cultural heritages.

Everything seems to conspire towards the perpetuation of this vandalism: the greed of developers, the philistinism of local councils and the pusillanimity of government.

The loss of buildings of architectural and historic interest has prompted the Council of Europe to designate 1975 as European Architectural Heritage Year in an attempt to awaken the interest and pride of the European peoples in their common architectural legacy. Such an awakening is also intended to draw the attention to the tremendous dangers which threaten old buildings and towns, not only of redevelopment, demolitions, or the rapacity of the requirements of the motor vehicle, but of ham-fisted or ignorant alterations to existing structures. Heritage Year aims to protect buildings of architectural or historic inerest and to assure for them a living role in contemporary society.

It is significant that an international and official recognition of the importance of old buildings would never have come about had not the destruction-rate reached such mammoth proportions. No official legislation or action ever gets under way until disaster strikes. In the early years of the nineteenth century it was argued that it was the inalienable right of the individual to dispose of his rubbish as he wished, even if this involved emptying his chamber-pot into the street. The free parish pump, situated strategically in the church yard, provided water which was thought to be fit for human consumption. Any proposals to provide public sewage systems, or drinking water, for which a tax could be levied was strenuously resisted by the proponents of individual freedom. It needed several major cholera epidemics to get Victorian public sanitation laws passed through parliament. The care of the sick needed the scandals of the Crimean War hospitals to get official apathy changed to action. The grisly surgical operations of the murderer Jack the Ripper were necessary before Public Housing Acts could be accepted by a lethargic Establishment. A catastrophic rise in the death-rate due to smog was necessary before the air enactments were made law. The contemporary environmental disasters need to be universally recognised before a proper action is taken to preserve and conserve what is left of our architectural and historical legacy. I have pointed out the historical truths of the necessity for disaster in my book *European Cities and Society* (1970).

European Architectural Heritage Year is concerned to preserve and enhance the character of all towns and villages so that individual buildings of merit are kept in their context and not isolated. It is hoped that each country in Europe will prepare conservation show-pieces of international importance for the Year, but undoubtedly just as significant is the opportunity for Local Authorities, Amenity Societies, and individual people to conserve their own treasures from the past.

Why are buildings being destroyed? The answer lies in the political situation which has placed a group of people in power who are not trained in aesthetics and who have no knowledge of the importance of proportion, style, or even of communal memory. Areas which once had strong identities and large populations, such as Stepney, for example, have been deliberately

destroyed, creating rootlessness, social problems, and visual squalor. The decision-makers responsible for widespread destruction of old parts of the fabric of our nation do not love character, variety, richness, and above all, quality. The Puritans, it seems, are with us always. The great mixture provided by old settlements offends the tidy minds of the zoner, the sophister, the calculator, and the compartmentalist. The whore-house next door to the church would strike horror into the timid breast of the tight-lipped Puritan, and the symbolic aspects of the profane and the sacred side by side would no doubt pass straight over the head of such an observer. The Magdalene and the Madonna are, after all, but two aspects of the same thing.

Democracy, of course, has thrown up enormous problems. An elite and cultivated patronage has been succeeded by an uninformed and visually illiterate body of elected representatives, who, perhaps (*pace* Freud), react against their backgrounds by ordering the bulldozers into action. The agreeable little street of terrace-houses with the pub on the corner is not grand enough for the up-and-coming councillor, who must eliminate all traces of his "'umble past".


*Canterbury Cathedral* *Photo: J. S. Curl*

Again, wholesale clearance and rebuilding is appealing to those desirous of building monuments to themselves. The acres of low-rise houses (which were perfectly capable of being updated to modern standards) had to go so that massive slabs, palely imitating the inhuman structures of the Swiss Jeanneret,[2] could go up at an enormous expense. The gratification of ego, not to mention the vast profit-motive, was guaranteed to provide a sense of smug achievement. The cost in human terms, however, will not be apparent for years yet. The "economic life" of such structures will assure for them a longer existence than the pleasant little buildings they replaced, and the cost of demolishing them will be appalling. Beware of making models of reality, Goethe warned us, for they *become* reality. The models provided by the arch-egotists and destroyers of thousands of years of tradition have become not a drawing board Utopia, but a nightmare-world. The political overtones, of course, were paramount in ensuring the necessity of adopting the tower block and the concept of mass-housing. The association of the architects of the so-called "modern movement" with socialism, guaranteed the adoption of their monstrous dreams by politicians of leftist persuasion.

Since the beginning of the century and indeed since the 1875 "bye-laws" housing, the problem of providing dwellings has been based on minimum "objective" standards usually of a sanitary or a cubic nature. The term "slum" has in turn become a term of abuse, applied equally to housing which does not fit the pre-conceived notions of what is proper, as well as to dwellings lacking basic amenities. Officially recognised "slums" correspond numerically with the amount of housing a government intends to demolish plus an amount it has decided to clear at a later date.

Clearance of whole areas has proved profitable not only to municipalities, but to large buildings contractors. The designation of a house as a "slum" has enabled authorities to acquire it at ludicrously low rates, whereas the

addition of modern sanitary equipment and some minor repairs could have made it perfectly fit. The legislation controlling rents and taxation has driven the private-enterprise landlords (who once provided the majority of houses in this country) to a position where the provision of mass-housing has passed to the state and to the local authorities. Crippling taxation and ludicrously low rents have left owners of property no income with which to carry out even necessary repairs, let alone modernisations. To some extent, new housing grants have altered the picture, but it is already too late, for the private landlords have been forced out of providing cheap housing, while the grant system has created inflationary problems where building tenders are involved.[3]

## Slum clearance

The false economics of clearing areas which once were thriving communities near town centres has left almost every municipality with a situation of near disaster. Huge estates have been built on outskirts, with few local facilities such as shops or pubs, while the difficulties of travelling to work create a demand for transport which is short-sightedly founded on the philosophy of car-ownership. The walk to work has been replaced by the drive to work. The social costs of this approach have never been evaluated, but with a coming energy crisis and the financial problems of car-ownership, the true costs of redevelopment are likely to make bankruptcy the norm.

These areas near town-centres have all too often become wildernesses of car-parks and office blocks. Offices and shopping centres may on the surface provide a higher tax-base for the municipality, but the costs of roads, the social costs, and the fact that such areas become "dead" at night and "honeypots" for crime and vandalism, create their own cost base.

Chasing out the middle- and working-class as the city expands and becomes uglier in the end reduces the tax-base, while expenditure increases on the provision of services, education, welfare, combating crime and vandalism, roads, car-parks, and on already over-stretched resources. The psychological importance of living in a beautiful area creates a pride and civic awareness that is painfully missing in a sea of car-parks and offices, or in the wilderness of a modern battery-hen estate.

The Puritan ethic assumes that utilitarian things are virtuous and beauty is wicked. The concept of cost-benefit analysis has been a useful ally of the destroyers. The difficulty of evaluating Stewkley Church is well known, but the same principle applies to the humbler terrace, with its pleasant proportions and sense of place. The communal memory of a lived-in street can be destroyed overnight and that cannot be measured. William Morris argued that the humbler buildings were just as important as the masterpieces, because each needed the other in juxtaposition, and formed the Society for the Protection of Ancient Buildings to further his aims.

Many areas, communities, and buildings are destroyed to cater for stop-gap measures for roads we cannot afford. We are planning for 35 million cars in 30 years time, but what if we do not have any, if bankruptcy and a no-oil situation intervene? We will only have deserted weed-covered concrete, and no historic buildings. We are creating a demand for further cars; creating a need faster than we can satisfy it. The economics, in terms of financial disaster and the using-up of resources, will stop that demand, but we will in the meantime have destroyed our civilisation.

The spiritual nature of the society ruled by cost-benefit analysts will not be fertile, and "culture" will be singled out as a thing apart, screened to make sure it is acceptable to the regime. Indeed the holders of power and the controllers of finance determine the function, the form and the quality of the environment.

Many Institutions and societies ostensibly interested in conservation have allied themselves with the powerful dominants, and have an interest in obtaining the patronage of the holders of power. Today, more than ever before, the established specialists who are patronised by the power-groups create the environments in which we live. That these specialists have done enormous harm to our cities and towns is self-evident. They have betrayed the trust given them, and they have sold their integrity for financial gain.

The dominant monuments of our time, such as the skyscrapers of housing and the great monopolies, demonstrate the impact upon the face of a town by dominants of a society. The separation of spiritual and aesthetic awareness from purely utilitarian function, has created a lack of unity. The loss of sensibility and of scale have resulted in a debasement of humanity. The mediocrities, unaware of the enchantment of poetry, concerned only with attitudinising and the mean, are fast creating a hero-less civilisation peopled by mod. con. troglodytes, earning their living by serving machines, pulling levers, and pressing buttons in a mindless series of specialised compartments.

It has been pointed out that one of the inevitable results of an economy bent on over-production and ever increasing Gross National Product is the need for a periodic carnival of destruction. If we suddenly find ourselves drowning in a sea of plastic gnomes, then something has gone seriously wrong with the whole philosophy of production. We must challenge the official view that more production is necessary, as the obvious result would be the use of natural resources to the point where they become exhausted and we have a surfeit of expendable consumer goods.

## Pedestrian subways

The environmental correspondent of *The Times* has criticised the "squalid, ill-lit concrete rat-runs" known as pedestrian subways. Certainly the grimness of many of our so-called underpasses invites fear and disgust for those who use them. I can recall a wall of a particularly unfortunate building put up by an eminent member of the Establishment which invited some clever slogans which were considerably more interesting than the building itself. The first of the slogans declared that "God is dead" and it was signed "Nietzsche". A few days later somebody else had written "Nietzsche is dead" and it was signed "God". Some observers of the contemporary scene have looked upon outbursts of graffiti as representing "an encouraging humanisation of the brutally impersonal environment", and another commentator has looked upon the defacement of degrading advertisements in the New York Underground as "stunningly beautiful and socially heartening—a kind of people's concrete poetry". Official vandalism is often carried out because of the alleged pressing needs of "the many", for the "public good", and for other nebulous aims. The fact remains that "the public" is made up of people, and

*Northampton Square, built 1802, destroyed by 20th century developments* *James Stevens Curl*

it is now becoming abundantly clear that very much of our new urban development is totally unsuited to the all-round needs of human beings. Any environmental asset which we have, simply must be conserved because of genuine psychological necessity, and those who destroy such assets for whatever spurious reasons they would care to give, must be classified as vandals.

All those who are directly concerned with the environment should read the new book on vandalism which is edited by Colin Ward[4]. Part of the problem as the text of *Vandalism* points out is that not enough people, including the vandals themselves, recognise what actually constitutes vandalism. A youngster who smashes a telephone kiosk is readily and universally classed as a vandal, but developers who employ a demolition firm to bulldoze historical and totally irreplaceable structures are seen as businessmen or as democratically responsible authorities carrying out legitimate business. "Moreover, the vandalism of the frustrated youngster, who for no apparent reason is intent on smashing up his own immediate environment, is seldom related to the vandalistic model set by the developers, or to the unacceptable environment so widely provided by developments". While there may be contrived acts of vandalism, including the destruction of the Euston Arch, many Public Authorities have been vandals through shortsighted inadequacies. The fate of the Georgian Squares of the East End of London is a case in point, for large scale demolitions of squares which could have been restored has involved not only London's loss but the Nation's as well. In other cases, listed buildings of quality have gone for lorry parks and the provision of dismal little areas of open space. Here a more sinister thought springs to mind, namely that many buildings of quality appear to go to satisfy some intrinsic hatred of worth.

Despite all the lip-service paid to conservation, destruction and erosion will continue unless a fundamental change in the climate of evaluating environment takes place. That something is beautiful or noble should be enough to protect it.

There is no need to conjure with figures based on false economics or half-baked philosophies. Above all, the tyranny of the economist's approach to urban civilisation must be broken. You cannot measure the unmeasurable, nor can you replace the culture of centuries at a stroke. Our Civilisation is in peril. The vandals are not only through the gates; they sit in positions of power.[5]

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2. Le Corbusier.
3. I have obtained tenders for jobs on grant and non-grant bases. Where grants are involved, tenders were up to 20 per cent higher than where grants were not involved. The higher figures probably reflect bureaucratic delays, inefficiency, and procrastination.
4. Ward, Colin, ed. *Vandalism.* The Architectural Press Ltd. 1973.
5. See also Curl, James Stevens, *Op. Cit.*


**Victorian Architecture:**


*Its Practical Aspects.* David and Charles, Newton Abbot. 1973.

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# The Urban Crisis

## by Leonard Taitz

The urban crisis is not just a problem that made ex-Mayor Lindsay's life a misery, it is, to a varying extent, with us everywhere. Though it may differ in many superficial respects (often the more visible ones) from country to country and from continent to continent, its basic features are surprisingly similar, so much so that one can regard the process of urban deterioration and eventual breakdown as a single one.

Dr Taitz points to the mechanisms involved and makes a few suggestions as to how the process can at least be slowed down.

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It is increasingly apparent that people are becoming disenchanted with what is happening to the urban environment. The view has been expressed that when one looks at what is being produced it is easy to believe that those who plan and design our cities actually hate them.

It is the architect who receives most of the brickbats, something not really surprising when one examines most of the buildings erected during the last two decades. I am forced to this conclusion as an admirer of the Modern Movement but one who has become sufficiently disillusioned with it to admit that for the most part it is a dismal failure. I keep asking myself why this should be—and have come to the conclusion that the gross ugliness so typical of the physical appearance of our cities is rather like the rash in smallpox, an outward manifestation of a very serious, perhaps fatal disease—the Urban Crisis.

The roots of this crisis lie in a series of vicious cycles which perpetuate themselves and each other figure 1.

Thus we find the City—constantly losing population and affluence to the surrounding suburbs—and reacting by doing precisely those things calculated to aggravate the tendency. It is thus caught on the edge of insolvency with a progressively deteriorating environment, camouflaged by the shortlived successes of clean air regulations and the removal of the worst of the old slums. These successes are shortlived because of the future threats already obvious in the US but only beginning to be apparent in this country.

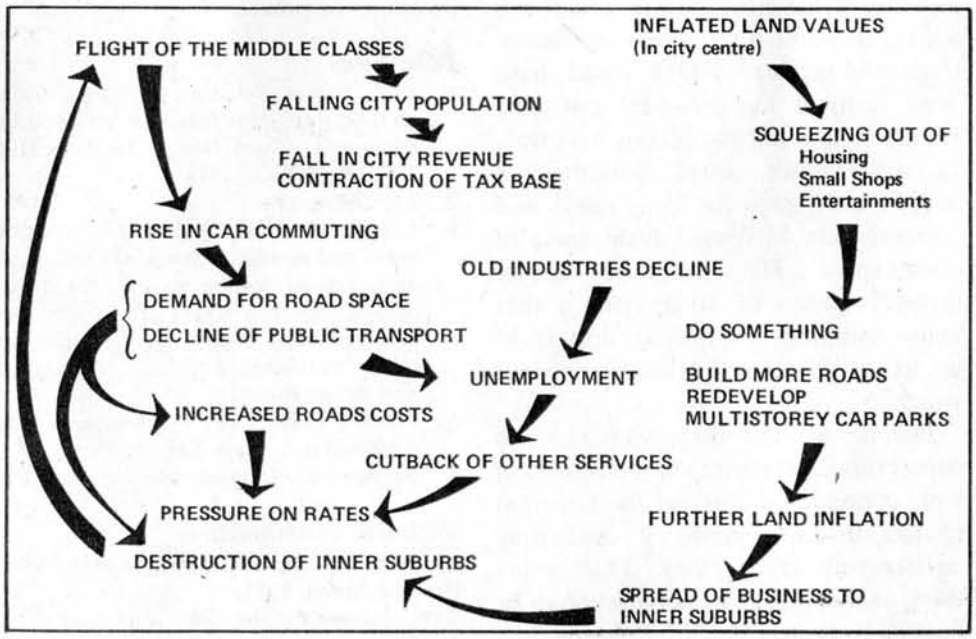



*Figure 1*

The great problem lies in the fact that the future of our cities is being determined not by long term considerations based on sound principles of overall planning, but on the essentially short term aims of the Estates Officer and the Highways Engineer, who, when the cry goes out to "do something", respond in ways appropriate to their respective callings.

The Estates Officer seeks to recoup the income lost due to the flight to the suburbs. He does so in a way which completely ignores the intangible costs and benefits of operations based on simple book-keeping principles. The Highways Engineer seeks to avoid road congestion by major road construction. Somewhere between these powerful spending departments, the planner is squeezed, making largely ineffectual efforts at proper land use allocation and valiant attempts to prevent complete environment squalor figure 2.

The results of the process are huge, out of scale, badly designed and ugly buildings in a leash of traffic-jammed roads.

### Lack of aesthetics

Whatever the reasons may be it would appear that in the latter part of the 20th century we are, for the most part, incapable of designing decent buildings. Several possible reasons for this spring to mind. I suspect that the answer lies in a combination of factors. Among them one might include:

(1) Most architects are just not good enough to design on the scale demanded of them. Certainly most large new structures in our cities seem to have been designed by individuals without either aesthetic sensibility or artistic integrity.

(2) Too many architects are businessmen first and professionals only second.

(3) They are all too willing to subvert themselves to the developers desire to maximise profits.

(4) Cost yardsticks mitigate against decent building standards.

This last proposition put forward as an excuse does not explain why architects accept commissions they know will produce poor results.

Whatever the reasons, the message is clear. No building of quality from the past should be sacrificed without the most searching inquiry. We are not capable of replacing them decently.

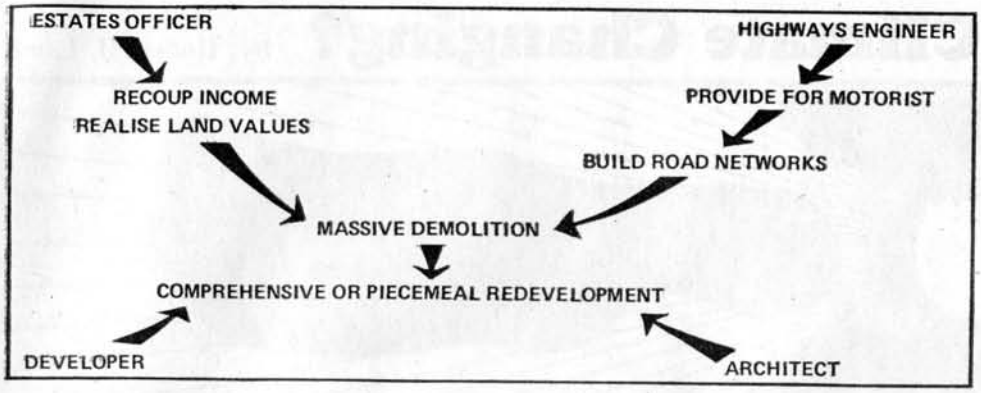



*Figure 2*

## Some wider implications

The world is faced with a resource and energy crisis. We shall be lucky indeed if inevitable shortages do not too radically disrupt our social and economic life in the next few decades. If we are to do so we will have to accept considerable changes in our life style and our expectations. Even then, unless there are some virtually miraculous technological advances, it is difficult to see how some sort of crunch is to be avoided, not only of energy but also of the aggregates needed for the Construction Industry. In these circumstances it seems pure folly to pursue policies which maximise energy and aggravate demand, which creates pollution, waste other non-renewable resources and damage the quality of life by replacing pleasant or potentially pleasant townscapes with the harsh reality of most modern development. Furthermore, such policies push us dangerously fast towards untried technologies such as breeder reactors.

The dilemma which faces us is the old problem of the conflict between personal consumption and the environment.

In the context of urban development, present trends appear to reinforce all this. How the low density conurbation largely dependent on private cars will cope with the high cost energy world of the future is difficult to imagine.

## Conclusions

The tragic irony of the situation lies in the fact that all the piecemeal steps which are being taken in response to the current urban crisis are worsening the plight of the cities. They tend to produce effects which are opposite to those intended. Attempting to cater to the motorist leads to a reduction of access to the city centre for most people. It certainly does not increase it. (Despite massive road construction round its centre, the City of Birmingham has an extraordinarily low level of commercial activity for a place of its size). Redevelopment raises rentals and forces small businesses out of the centre, thus reducing its attractiveness for the shopper. The forcing of commercial activities into the inner suburbs and their partial destruction by ring and radial roads accelerates the centrifugal forces which are causing the depopulation of the cities.

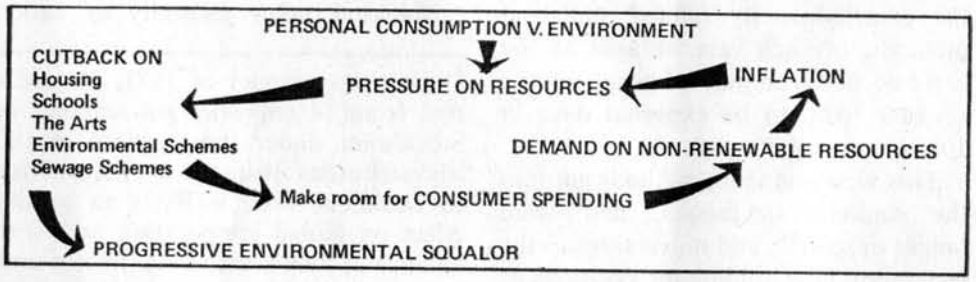



*Figure 3*

## The alternatives

(1) Stop catering to the city centre motorist. Cancel major road schemes. Provide Park and Ride facilities from the outskirts of the city.

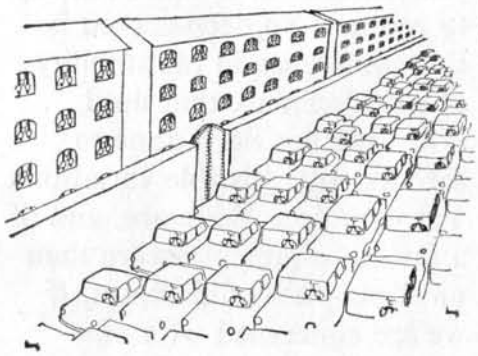
(2) Transfer resources thus released into other public services, particularly public transport.

(3) Build or rehabilitate housing near the city centre for all social classes. The current tendency to find any excuse for demolition should be replaced by a policy which leans over backwards to save old housing.

(4) Stop wholesale demolition of the central area. Adapt old buildings for new purposes.

(5) Land released by the abandonment of massive road interchanges could be used for large scale developments still required.

Finally, those architects who feel the need for a challenge could devote their skills and energy to the task of converting city centre car parks to more useful purposes.



## This month's authors

**James Stevens Curl is a chartered architect and town planner. He is architectural adviser to European Architectural Heritage Year 1975 for Scotland and has written the following books: European Cities and Society, Victorian Celebration of Death, City of London Pubs, and Victorian Architecture.**

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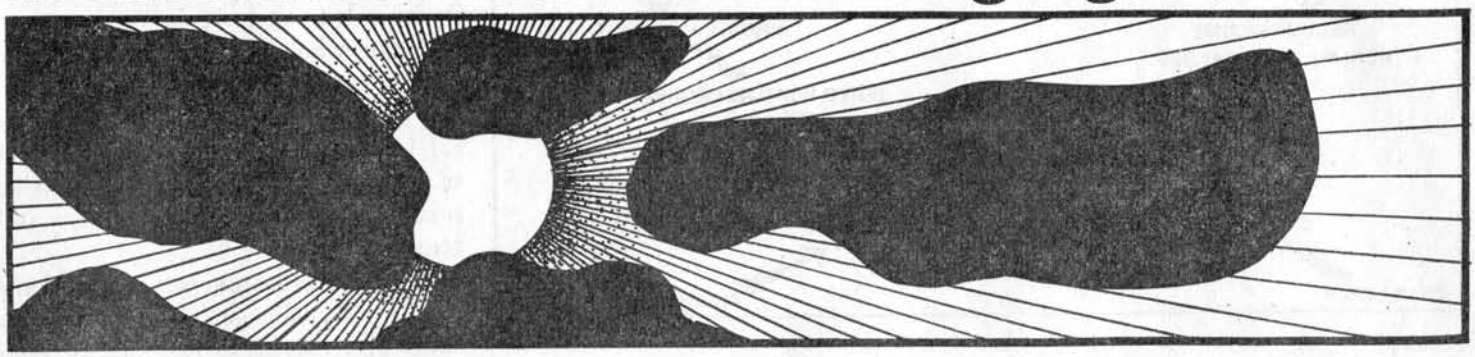
**George Foley is a lecturer at the Architectural Association. He has contributed a number of articles to the Ecologist.**

**Garrett Hardin is professor of Human Ecology at the University of California. He has written a number of books, his latest being Stalking the Wild Taboo.**

# Is the Earth's Climate Changing?

by Hubert H. Lamb.



We take the weather for granted, and assume it will change but little from year to year, decade to decade, century to century. So deep-rooted is this confidence in the stability of world climate that until now little has been done to forecast any possible variations. Yet variations there are, and of a far more radical nature than most people would expect. If we are concerned with our survival it is essential we study long-term climatic trends.

In this article* Professor Hubert Lamb, who has probably done more work in this field than anyone else in Britain, examines the factors which must be taken into account if we are to predict our climatic future.

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At the beginning of this century, and right up to the Second World War, the view of climatology accepted alike by the leading figures in meteorology and in the community at large was that, though there had been significant changes of climate in the geological past—ice ages and interglacial periods somewhat warmer than now (not to mention the many millions of years of the Earth's history in warm geological eras with a little or no ice even at the poles)—climate was now essentially constant and had been so for at least the last two thousand years. Descriptions of the climates of Britain, Germany and southern Russia by Roman and Greek writers in classical times were so similar to the impressions of visitors from the Mediterranean countries in modern times that they seemed to prove the point: evidently nobody stopped to think that the countries at both ends of the journey might have been either colder or warmer than now. Granted that the variations of weather from one year to another produced alternate times of ease and difficulty and occasional disasters; but these were taken to be just random variations about the mean or, at most, the product of cycles of no more than a few years duration (and somewhat capricious amplitude). Hence, any table of climatic statistics comprising the weather observations of 30 years or more was thought to be an adequate basis for future planning (and even for the calculation, by refined statistical methods, of such rare hazards as the extreme flood or gust of wind, or the severest frost, to be expected once in 100, 200 and 500 years).

This view and these methods got into the standard textbooks, and were taught in schools and universities to the generation now holding the positions of responsibility in government and industry in most countries. The methods were, of course, sound enough, provided the series of observations data were really representative for the period in mind; but this has come to be seriously questioned. In many areas the methods are still in use, pending a better understanding of climatic trends and changes.

## Climatic warming

The need for a reassessment has become clear for a number of reasons.

Fig. 1, based on computations in the United States from surface air temperature observations all over the world, shows that from the 1880's to some time after 1940 the Earth's climate was becoming generally warmer. The global warming over those years amounted to about half a degree Centigrade, but in the Arctic it was much stronger and amounted to several degrees between 1920 and 1940. The ice on the Arctic seas decreased in extent by about 10 per cent and decreased in general thickness by about one third. Glaciers in all parts of the world were receding, opening up new pastures and land for cultivation, while the melt-water swelled the flow of the mountain rivers in spring and summer. The greater warmth increased the length of the growing season by two to three weeks in England. The wild flora and forests, the cultivation of various crops, and the ranges of seasonal migration of birds and fish, all spread to new regions under the increasingly genial conditions.

Mankind takes naturally to easier

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During the summer of 1971, 30 scientists from 14 countries got together in Stockholm under the auspices of the Massachusetts Institute of Technology to work out what is likely to be the effect on global temperature and heat balance of man's activities, present and future. The object of this study was clearly to determine whether these were on a sufficient scale to cause regional or, worse still, global climatic changes. Their conclusions were very disturbing. "There can be little doubt", they wrote, "that man, in the process of reshaping his environment in many ways, has changed the climate of large regions of the earth, and he has probably had some influence on global climate as well—exactly how much influence we do not know." Professor William H. Matthews was the associate director of the study, which was subsequently published by the MIT Press under the title of "The Study of Man's Impact on Climate (SMIC)". He later summarised the results of SMIC in the International Journal of Environmental Studies, vol. 4, pp. 283–289. Because of their relevance to Professor Lamb's article we have taken excerpts from Dr Matthew's paper. These excerpts have been "boxed" in bold.

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* Based on an article originally published in the UNESCO Courier.

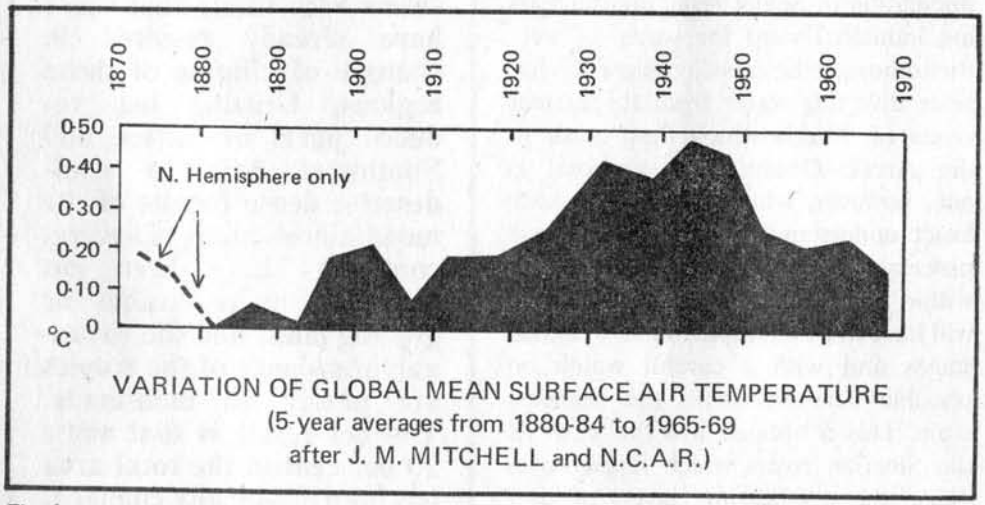
**Perhaps the most significant lesson to be learned from the long history of our planet is that during more than 90 per cent of this 550 million-year period, the earth was free of polar ice. In a sense, we presently live in an ice age and this is an anomaly for our planet. An ice age occurred 250–300 million years ago which lasted 30–50 million years. Following this there was a long period without polar ice, and then there was a gradual cooling that resulted in the beginning of present antarctic glaciers about 5 million years ago. The glaciers in the Northern Hemisphere apparently began about 2.5 million years later.**

conditions. Old habits of wearing heavy clothing and laying in food stocks for the winter in northern lands were more and more given up, and often unkindly attributed to the outmoded mental attitudes of the nineteenth century, while the climatic improvement affecting most of the developing countries in temperature (and higher northern) latitudes passed unnoticed for some time.

Once the climatic trend *was* noticed, speculation began about the causes and possible future consequences. Some of the first scientific work on the subject, published in the 1950's, attributed the warming to Man's activity, in particular to the output of carbon dioxide from the burning of fossil fuels (coal, oil, etc.) which increased the quantity of this gas in the atmosphere by almost 10 per cent in the first half of this century. Carbon dioxide is a minor constituent of the atmosphere, only about three parts in ten thousand by volume: but its effects on the heating of the Earth are important. It is much less transparent to the out-going long-wave radiation from the Earth (which it therefore traps and re-radiates, partly back towards the Earth) than it is to the incoming radiations from the sun (which it allows to pass almost without loss). The effect is therefore something like that of a glass-house, a radiation trap, holding in heat which the Earth has received. It was calculated that a doubling of the amount of $CO_2$ in the atmosphere should increase the overall temperature of the Earth by 3° to 4° C (Plass, 1956).

## Recent climatic cooling

It soon became clear, however, that carbon dioxide was not the whole story. Despite increasing production of this gas, with more and more industrialisation and the ever-increasing burning of oil and other fuels, the temperature trend reversed, as Fig. 1 shows. For the past 25 to 30 years the Earth has been getting progressively cooler again. Around 1960 the cooling was particularly sharp (see Starr and Oort, 1973). And there is by now widespread evidence of a corresponding reverse in the ranges of birds and fish and the success of crops and forest trees near the poleward and altitudinal limits. By 1972 the glaciers in the Italian Alps were reported to be generally advancing for the first time for 50 years. Moreover, the longest temperature records available in various northern countries from the early eighteenth century (in England from the late seventeenth century) show that the previous warming had a very long history, traceable from the beginning of the record through various shorter term ups and downs (including the mild episode in the 1860's and '70s indicated at the extreme left of Fig. 1). This meant that the warming began before the industrial revolution and could not be altogether attributable to the effects of human activity.




VARIATION OF GLOBAL MEAN SURFACE AIR TEMPERATURE
(5-year averages from 1880-84 to 1965-69
after J. M. MITCHELL and N.C.A.R.)

*Fig. 1*

**One of the most clearly evident influences of man on the climate is the pollution of the atmosphere through urbanisation and industrialisation activities. Even in the most remote places in the world it is possible to detect traces of man-made contaminants. Urban climates are modified by the injection of particles, gases, and heat into the atmosphere, and by changes in the albedo and roughness of the earth's surface.**

Thus, quite recent climatic trends have forced us to recognise that climatic changes and fluctuations are forever going on, even in our own time, and that we have to reckon with changes brought about both by natural causes and the actions of Man. The decline of prevailing temperatures since about 1945 appears to be the longest-continued downward trend since temperature records began. In face of this, and the increasing scale of human activity, and the many new types of pollution put into the atmosphere (Matthews *et al.*, 1971) by industrial processes, bomb tests, high-flying aircraft, rockets and so on, the question of what we should expect the climate to do next is often asked. But it is not easily answered, and the improvement of knowledge and understanding has become an urgent task.

Investigation readily shows that the general wind circulation over the globe undergoes continual variations of vigour and to a certain extent of its basic pattern, ranging from great predominance of the "zonal" westerly and easterly currents to considerable prominence of "meridonal" (southerly and northerly) flows which are accompanied by stationary "blocking anticyclones" at certain longitudes, straddling the middle latitudes zone that is normally the zone of prevailing westerlies. These

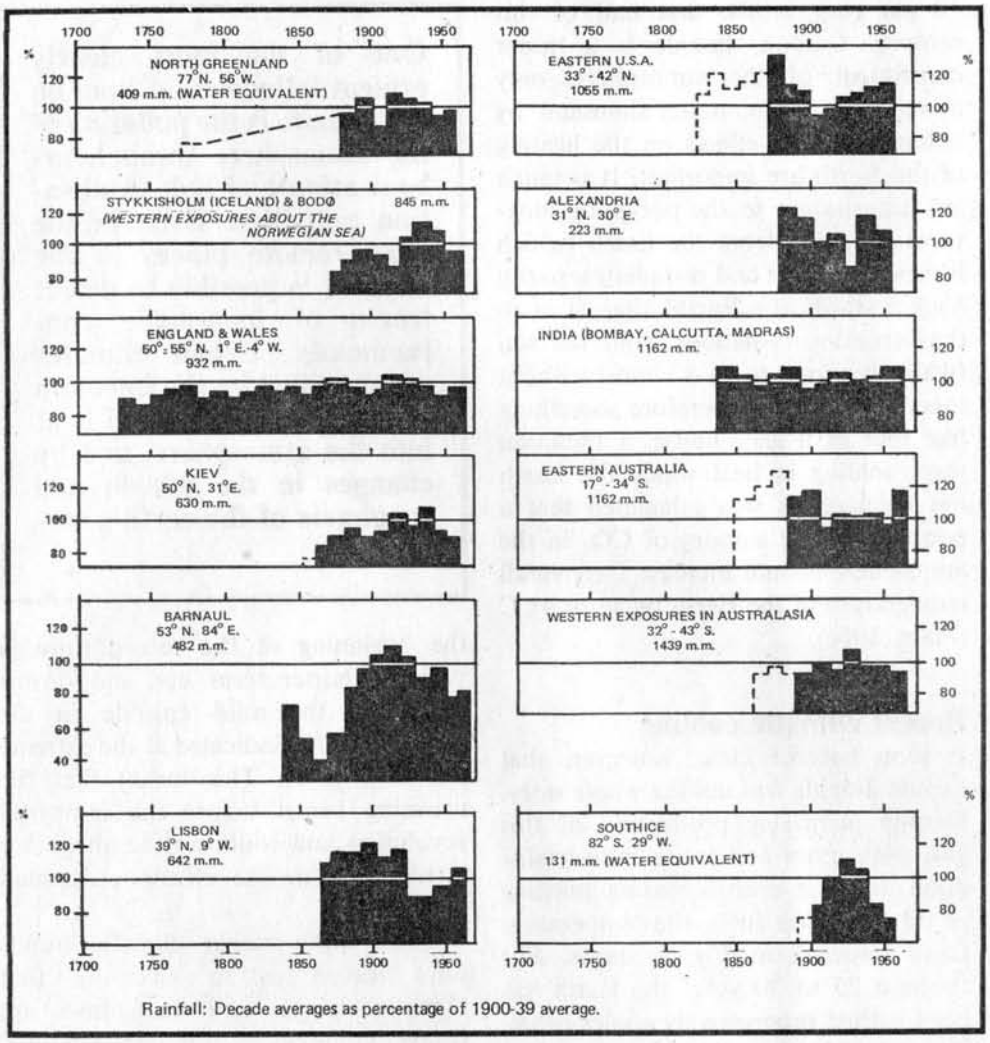



*Fig. 2*

changes are the "mechanism" by which climatic changes are brought about, whatever the ultimate causes may be (Lamb, 1972). And the effects are by no means confined to temperature and the extent of snow and ice.

## Dangers of diverting water

Fig. 2 shows, among the successive 10-year averages of yearly precipitation in many parts of the world, the figures from about 1840 for Barnaul (53° N, 84° E) in Central Asia, near the Soviet grainlands brought into cultivation in Kruschev's "virgin lands" campaign in the 1950s. The decades of global warming in the early part of this century were a time of abnormally maintained vigour of the zonal wind circulations, and they seem to have been marked by exceptional transport of moisture-bearing winds from the Atlantic all across Europe and onwards as far as this area of central Asia. In previous decades in the nineteenth century and again after 1950, the precipitation at Barnaul was less by a substantial percentage. As the average annual downput of rain and snow between 1900 and 1940, equivalent to a rainfall of 482 mm/year, was just enough for agriculture with careful management and some artificial irrigation, the provision of enough water in that region, as in a number of other parts of the world, in the long term raises anxious problems. With the rising population of Soviet Asia, and increasing industrial need for water as well, the authorities have been obliged to consider diverting water from the greater rivers of Siberia which flow north to the Arctic Ocean. This proposal is one, however, which demands a more exact understanding of the large-scale processes of climate than is so far within our reach. If it is undertaken it will have to be attempted in very limited stages and with a careful watch on possible side-effects on the grandest scale. This is because it is the water of the Siberian rivers which largely provides the ice-bearing layer of low salinity on the surface of the Arctic Ocean: if that ocean were converted into a normal salt-water ocean with an open surface, free of ice, most of the Arctic would be on average 10° to 20° C warmer than it now is (and over 30° C warmer in the winter time). This change could alter the whole pattern of the wind circulation, and hence the distribution of rainfall, over the northern hemisphere. A recent experiment (Newson, 1973) with a mathematical "model" of the atmospheric circulation suggests that the winters would actually become colder over the northern hemisphere landmasses in middle latitudes. And other studies (Drozdov, 1966) have suggested, apparently in agreement with this, that the rain and snow-bearing cyclonic disturbance would be largely diverted into the Arctic, leaving many continental regions drier than before.

This problem of the water needed in the arid lands in central Asia is one point (and there must be others, especially in other areas of low rainfall or great evaporation) at which our understanding of climate becomes involved with the human population explosion and presents mankind with a dilemma which may be very hard to solve. The great internationally organised observation network set up by the World Meteorological Organisation in the World Weather Watch (WWW), involving the use of satellites and many fixed observation points in all the world's oceans as well as in Antarctica, greatly improves our ability to monitor

**For thousands of years before the Industrial Revolution, agricultural and animal grazing practices have had a profound influence on large regions of the world, and it seems very likely that these have already resulted in changes of climate of those regions. Grazing has reduced parts of Africa and Southwest Asia to semi-deserts; dense forests of the mountainous areas of several continents have been cut down to make arable or grazing land; and the savannah grasslands of the tropics are nearly all man-made. The net result is that some 20 per cent of the total area has been drastically changed, with a consequent change in the heat and water budget. Some proposed activities, such as major deforestation in the tropics, could also have significant impacts on regional climate.**

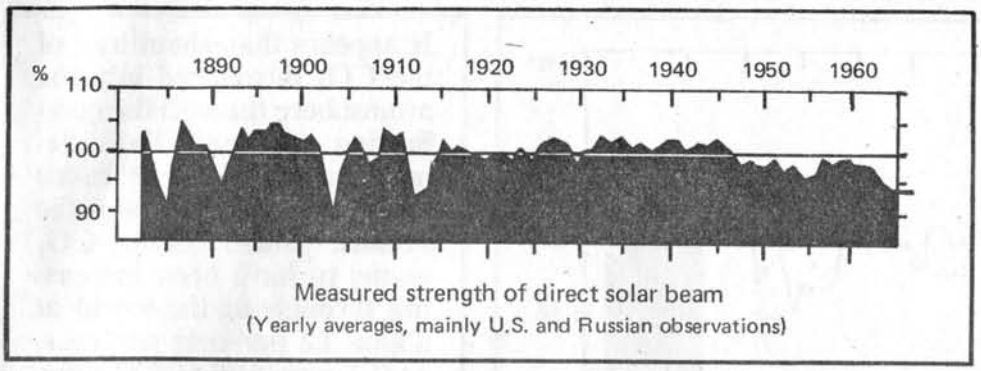



*Fig. 3*

the symptoms of climatic change as they occur and wherever they are most clearly seen. And the Global Atmospheric Research Project (GARP) scheduled by WMO for the mid 1970s should improve our understanding of the large-scale atmospheric circulation and its interactions over the whole globe. But there is a great need also to establish the facts of the past record of climate in as much detail as possible, to give climatology the longest possible observation base for investigating the natural climatic fluctuations and their causes. Moreover, the causes are known to go beyond meteorology as ordinarily understood. To identify them, and indeed to reconstruct the facts of the climatic record in past centuries and millennia, will entail an exciting collaboration between many branches of science and learning.

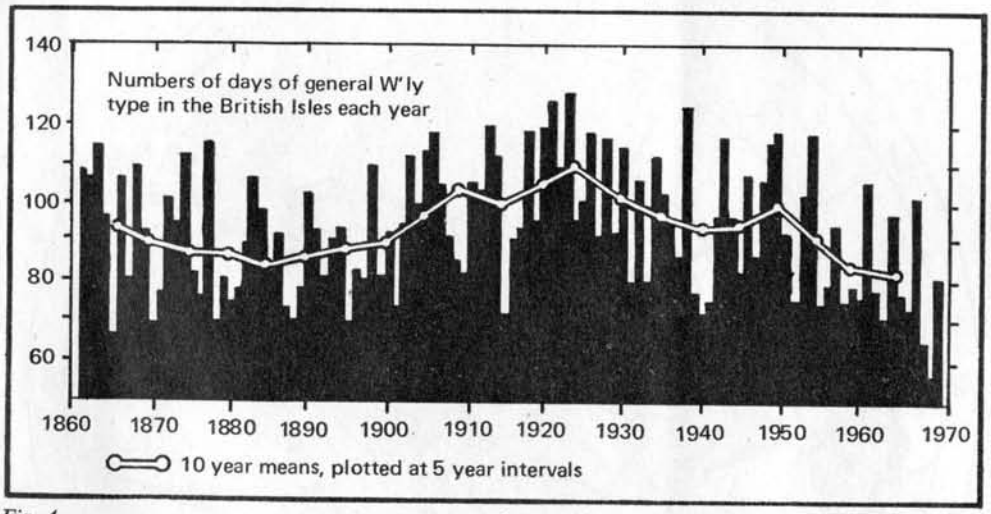



*Fig. 4*

The measurements of the strength of the incoming solar radiation available from 1883 to recent years (Fig. 3) show very clearly the effects of great volcanic eruptions which put up persistent veils of dust into the high atmosphere in 1883, 1888, 1902, 1907, 1912 and 1963. And from comparison of the temperatures and wind circulation patterns prevailing in the years immediately following these and other great volcanic explosions in the eighteenth and nineteenth centuries (Lamb, 1970), the effects upon climate, though temporary, are seen to be real and in some cases drastic. But Fig. 3 (from Pivarova, 1968) also shows a gradual decline in strength of the solar beam since 1945 which may have to be attributed to the sun itself (though some leading meteorologists both in Russia and the USA have suggested that it is due to man-made dust in the atmosphere resulting from industrial processes and partly from bad agricultural practices in the savannah zone). There is probably no need for undue alarm about this, because similar changes affecting climate and the global wind pattern appear to have occurred many times before; and what we are witnessing may be a recurring fluctuation of the solar output, apparently tending to repeat itself at about 200 or 400 year intervals (see Lamb, 1972). The effects are, however, likely to be world-wide and to pose awkward problems wherever we are exploiting climatic resources (such as water or summer warmth) to the limit.

Fig. 4 shows the number of days each year from 1861 to 1970 with the general zonal current of the westerly winds of middle latitudes sweeping across the British Isles. Particularly noticeable are the high frequencies sustained between about 1902 and 1938,

**Man can affect the climate by altering the hydrological cycle through manipulation of surface waters by building dams, irrigation, creating lakes, draining swamps, and diverting rivers. The latter practice may have profound effects. The diversion of water from one region to another can convert substantial dry desert or semi-desert dry areas to irrigated farmland, and three-fourths to nine-tenths of irrigation water is evaporated. Control of river discharge into some ocean areas could greatly influence the rate of freezing or melting. Such activities coupled with intentional dusting of sea ice to hasten melting could have serious regional and even global repercussions.**

at the height of the global warming, and the marked decline in recent years to previously unrecorded low levels in 1968 and 1969 (and again in 1971). Fig. 5, which presents the 600 years long history of the frequency of the south-westerly surface wind reconstructed for England (based upon strictly daily observations in London from 1669), broadly parallels the record of Fig. 4 in the last hundred years and seems to indicate a marked decline of the westerlies, as in recent years, recurring at about 200-year intervals. Apart from their possible ultimate origin in a long term fluctuation of the solar energy available, linkages have been demonstrated between the changed patterns of the atmosphere circulation and corresponding persistent anomalies in the circulation of the ocean (Bjerknes, 1969; Lamb and Ratcliffe, 1972; Namias, 1969, 1970). Because large volumes of warmer or colder than normal sea water cannot be reduced to normal at all quickly, these have persistent effects on the wind circulation which are useful in forecasting.

## Increasing ice

Among the effects of the changes of climate and the wind circulation in recent years which have given cause for concern are

(i) a renewal increase (especially since

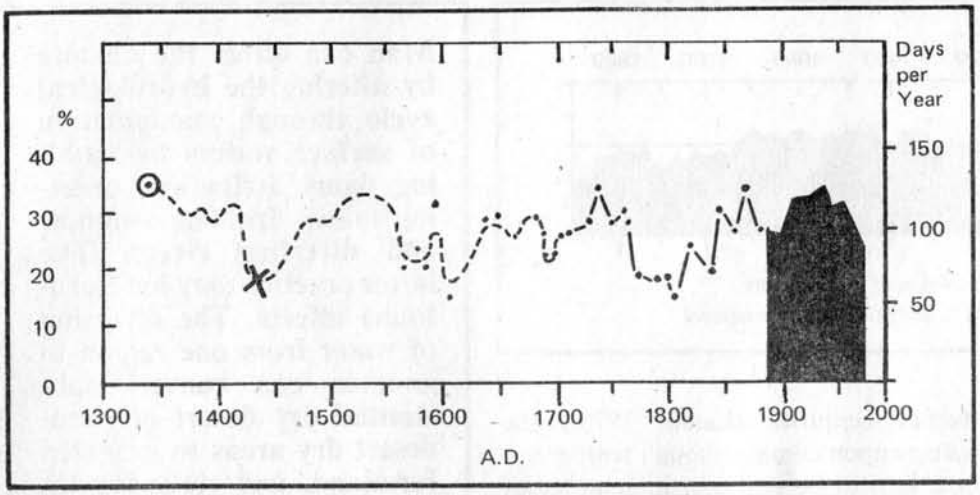



*Fig. 5 Number of days with SW surface wind in eastern England. (Ten year averages reconstructed from various data, including an early weather diary about 1340 and daily observations in London from 1669).*

**It appears that about half of the $CO_2$ introduced into the atmosphere through the combustion of fossil fuels remains and the rest is taken up by the biosphere and the oceans. Since 1958, $CO_2$ seems to have been increasing throughout the world at about 0.2 per cent per year, or 0.7 ppm out of 320 ppm. Present models and projected energy demands suggest that by the year 2000 A.D. the $CO_2$ concentration will be 375 ppm and that this could result in an increase in global temperature of 0.5°C. Doubling of the present $CO_2$ concentration could effect an increase of 2°C which would be a major modification of the climate and could trigger other warming mechanisms and possibly lead to irreversible effects. There could, however, be negative feed-backs such as increased cloudiness which would counteract the warming trends.**

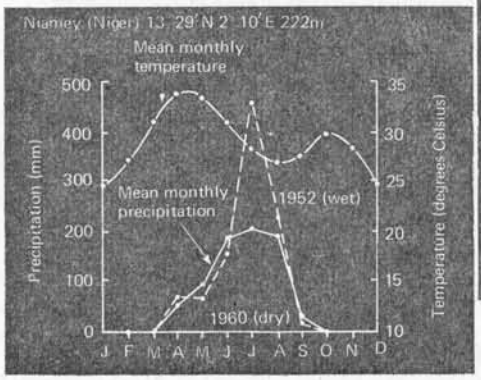
1961) of the Arctic sea ice, which has created difficulties on the northern sea routes in Soviet and Canadian Arctic waters and has produced some bad seasons on the coasts of Iceland and Greenland.

(ii) A substantial rise, also since 1961, in the levels of the great lakes in eastern equatorial Africa and, more recently, of the Great Lakes of North America.

(iii) The increasing drought afflicting the zones of Africa just south of the Sahara, and some other countries in similar latitudes, as well as dearth of rainfall over periods of several years at a time in various sectors in middle latitudes.

(iv) Some 200-year extremes of temperature in individual cold winters in various parts of the northern hemisphere and in the warmth of summer 1972 in northern European Russia and Finland.

The most serious effects have undoubtedly been the long-continued droughts and deficient rainfalls in various parts of the world associated with shifts of the world's anticyclone belts. Fig. 6 shows the distribution over the northern hemisphere of changes of prevailing atmospheric pressure in the 1950's and '60s from the averages of the first 40 years of the century. Pressure became higher, and the situations therefore were frequently anticyclonic and drier, over most of the Arctic, particularly the Arctic fringe. The change amounted to 3 millibars over part of Greenland. A belt of lower pressure than before in middle latitudes, particularly near 40° N (where the change was minus 2 millibars in some areas), marks a shift of the cyclonic disturbances and rainfall towards lower latitudes than before (there was also some increase of cyclonic disturbances



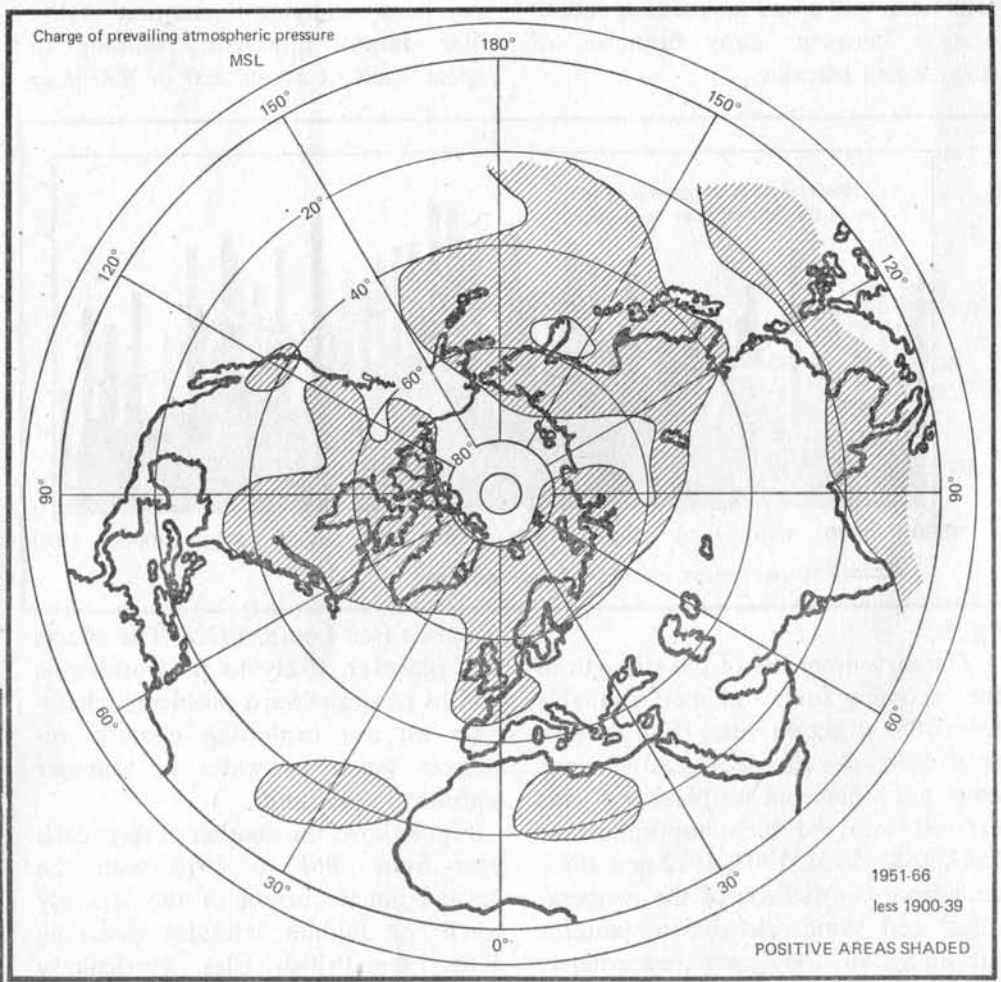




*Fig. 6 Change of prevailing atmospheric pressure (at sea level) over the northern hemisphere from the first 40 years of this century to 1951-66.*
*Areas with higher pressure, and more anticyclonic character, in 1951-66 shaded.*

in the inner Arctic, near the pole). The subtropical anticyclones associated with the desert belt were correspondingly displaced somewhat towards the equator, and the equatorial rainbelt seems to have been restricted in the range of its seasonal migrations. In consequence, rainfall increased in Africa close to the equator, causing the lakes to rise, while drought began to afflict places nearer the fringe of the desert belt no longer reliably visited in summer by the "equatorial" rains. Rainfall at eight places in northern India, the Sudan and at 16° to 20° N in West Africa averaged 45 per cent less in the years 1968–72 than in the 1950's. In all these areas people have been driven from their homes by the continued failure of the rains and in the Cape Verde Islands at the same latitude in the Atlantic an emergency was declared in 1972 because of the last five years of drought. There are indications that corresponding shifts have taken place in the anticyclone and cyclone belts of the southern hemisphere and that the droughts affecting Zambia, Rhodesia and parts of the Transvaal in recent years are essentially part of the same phenomenon.

Since 1970 the areas of increased cyclonic disturbance in the inner Arctic has grown in size, and the belt of increased pressure and more anticyclonic influence has expanded to embrace most of the zone between 45° and 75° N, where droughts may also be serious to the many densely populated countries. At the same time, the shifting positions from month to month, and from one year to the next, occupied by the main anticyclone in the belt have introduced an abnormal variability of temperature and precipitation. A similar development may explain the sequence of droughts and floods in different parts of Australia in 1972–3.

All these events have raised an anxious demand for ultra-long-range forecasting of climate, which calls for intensified effort towards understanding of the atmosphere (and its interactions with the ocean) and for further reconstruction of the facts of the past climatic record. A better knowledge of the range and incidence of natural fluctuations of climate is even needed before we can be sure how much of the observed deviations of climate being experienced now or in the future must be attributed to Man's activity. For too long climatology has been a neglected science, considered as a "non-science" in which there was nothing to explain. Now, it is urgent to assemble the facts and survey the longest possible observation record, analysing it in ways that reveal the processes of climatic change, so that mankind can adapt to them and avoid practices that may aggravate the situation. The subject and the processes are not identical with meteorology or those that meteorology is mostly concerned with, although the fields overlap and there is an obvious need for continual contacts between the theoreticians of dynamical meteorology and the geophysical climatologist.

The cost of making up for lost time in climatology will be trivial by comparison with that of the great mathematical laboratories that have been set up to advance numerical methods of daily weather forecasting and our understanding of the short-range atmospheric processes. But the need is pressing if mankind is to solve the problems of the future of energy, food and water for the rising population.

**Until quite recently, it has been assumed that man could not compete directly with nature in the release of heat on a large scale. Now, however, the implications of doubling the world's population by the year 2000 A.D., coupled with an expectation of more energy to be used per capita, suggest that this may change. There may eventually be industrialised areas of $10^3$ to $10^5$ km$^2$ where the additional input of energy by man will be equivalent to the net radiation from the sun; and on a continental scale the present insignificant contribution may rise to 1 per cent of the average in about 40 years. Such developments could cause significant regional climate effects.**

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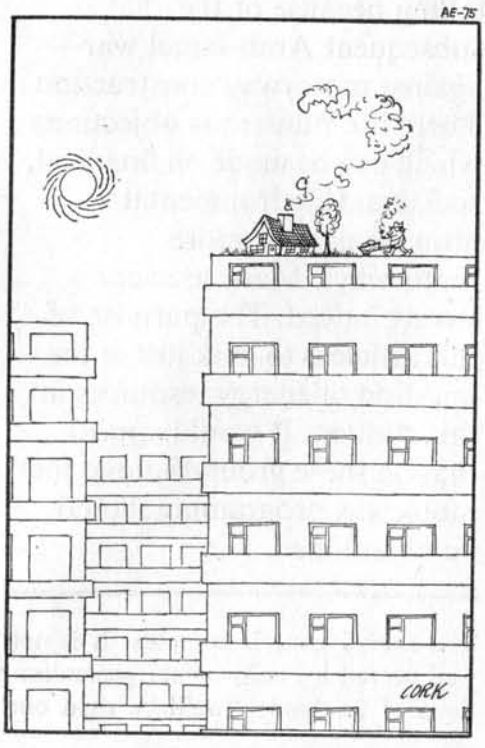

# 5 The Motorway Fallacy

# M1234

by Gerald Foley

The Government's present road construction programme leaves Concorde, Maplin and the Channel Tunnel right down in the bargain basement. The provision of a network of high-capacity roads connecting all centres of population of 250,000 and over, together with new urban roads to "relieve congestion" and meet forecasts of huge increases in traffic levels, is costing at present some £600m per annum. By 1975-76 it will have gone above £700m. This truly astonishing rate of spending is sufficient to pay all our share of the Concorde bills in one year. It is the equivalent of Maplin and the Tunnel complete every three years. In this article Gerald Foley argues the case—even more telling because of the subsequent Arab-Israel war—against motorway construction. There are numerous objections which can be made on financial, social and environmental grounds against more motorways. Many are very strong indeed. The purpose of this article is to look just at the question of energy resources in this context. It would appear that on these grounds alone the motorway programme should be abandoned.

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The energy issue is complex. It is not well served by unfortunate generalisations of the kind: "we'll be right out of oil in 1995". We will not be out of oil then or in the foreseeable future. The danger is that in the dismissal of this kind of misconception the real energy question is dismissed or discredited at the same time. The public inquiry where high standards of numerical accuracy are conventionally demanded is a particular case in point.

The fact we are not going to be out of oil in 1995 does not mean we are not going to be in serious trouble by then. It is evident that we already are. The point is whether building more motorways[1] will make us better or worse off than if they were not built.

## The case for motorway building

Virtually the whole Government case for increased motorway building rests on the fundamental assumption that road traffic will continue to increase over the next thirty or forty years. Beyond then it is expected to level out and continue into the indefinite future at something like the present figure for prosperous parts of the US and other high car-ownership areas.

The latest details of these growth forecasts have recently been published by the Transport and Road Research Laboratory (TRRL)[2]. This document anticipates total vehicle mileage (kilometreage) increasing by about 2¼ times by 2010. Figures like this are used as the basis of most traffic growth predictions on which road planners base their designs. Using the curves provided a planner can predict the "need" for road space in any future year and set about getting it built.

In this same document the question of energy resources is actually discussed. But no problem is seen. The TRRL feels that if conventional resources are running out by the end of the century "there are extensive resources of fossil fuel of other kinds (Natural gas, shale, solid fuel etc) which will become increasingly economic if prices of oil products rise." The conclusion is reached that "while there must remain some doubt about the possibility of providing fuel and road capacity for this quantity of traffic it is not considered these factors will greatly affect the levels quoted."

## Time scale

Current Government requirements are that the calculated "rates of return" on road projects should allow the capital costs of motorway projects to be written off in about a decade. A large project finishing say in 1980 should have paid for itself by 1990. No one however is suggesting one could then abandon the motorway as one might abandon a car that had paid for itself. Motorways are not ornamental except to the most rarified tastes in structural engineering nor are they particularly biodegradeable. And it is difficult to collect them as litter or recycle them for scrap as one might an old bedstead or abandoned ice-cream lorry.

The TRRL forecasts take us through to 2010. We can reasonably suppose the forecasters do not have in mind a precipitate fall immediately beyond that date. We might tentatively edge forward a few decades to 2040 to give us a very conservative notion of the timescale of relevance for a typical motorway project.

If during this time period it appears likely that the motorway will become irrelevant then we should not build it. It is simply not an adequate justification for government expenditure of this order to gesture hopefully towards the heavens and announce that "something will turn up" or that "we'll find a use for them".

## Means of propulsion

The dream of alternative means of propulsion for motor cars continually

recurs in this debate. But there is nowhere any serious suggestion that new roads are planned for vehicles other than those powered by petroleum-fuelled internal combustion engines. In the context of more than doubling traffic during the next forty years it would appear to be the only reasonable assumption: either the increased traffic is petroleum-powered or it will not occur.

Technological fantasies such as hover cars, solar and nuclear powered vehicles can be ruled out completely. The technology does not yet exist for them. Their subsequent mass-production once they had been invented would take many decades. There is no reason to suppose today's roads would be suitable for such unknown vehicles.

Fuel-cell power is a step nearer in plausibility. The technology exists but it has not been demonstrated at an even remotely acceptable level of performance or cost for mass production to be possible. It must remain a remote possibility for the remote future. It is not even apparent that fuel cells would eliminate dependence on petroleum fuels.

Battery power has been demonstrated over a limited range of vehicles such as milk-floats and delivery vans. It is reasonable to suppose the advantages of such vehicles will lead to their further development and extensions in their present use. But in so far as this occurs and they are substituted for present vehicles the effect will be to reduce inter-urban car travel since light battery-powered vehicles will be unsuitable for such travel. Similarly within cities the provision of roads of motorway standard will be inappropriate for vehicles designed as small runabouts. There is no indication that battery technology can break through to the provision of a straight substitute for today's high performance car engines; still less that lorries and other large vehicles could be effectively powered by batteries. In this area of powering traffic at today's levels or those forecast in the future battery power remains as remote a possibility as fuel cell power.

## Petroleum reserves

The question of petroleum reserves is therefore crucial. Even if we were to accept that motorways could be abandoned as irrelevant relics by say 2040 we need to be assured there will be sufficient fuel for the vehicles using them between now and then. Equally importantly this petroleum should be available *as freely* and in relation to other commodities *as cheaply* as it is today. Unless petroleum supplies can expand freely without shortage developing or excessive price rises occurring to meet the expanding demands of traffic, then the growth in traffic cannot occur.

The UK now draws all its supplies from the world petroleum market. Despite the importance of the North Sea discoveries, such dependance on world supplies will essentially continue. The idea of a totally self-sufficient UK drawing all its oil requirements from the endless riches of the North Sea is a total myth (which will be discussed later).

Estimates of total recoverable reserves for the world now appear to be narrowing to a figure in the region of 2000 billion barrels.[3,4,5] This is a theoretical figure based on an analysis of the potential of the oil-bearing regions of the world. It assumes the finances and resources are available without political, environmental or social hindrance to the oil companies to enable them to extract all this oil. It certainly does not imply as some of the more optimistic commentators do, that because a resource exists somewhere in the world the UK will have access to it. The value of the global calculation is rather in the fact that it gives an overall picture and sets, as it were, an upper bound to the possibilities of petroleum supply. Almost inevitably the real situation will be worse because of political and other considerations.

If we have a figure for total reserves the next question is how long they will last. It is not sufficient to divide present consumption into the total because consumption levels are not static. Consumption rises at a constant rate for a while and then begins to slow down and finally levels out at a peak and goes into decline. Since the total volume has to remain constant the peak can only move within a restricted range. It can occur somewhat higher but at the expense of a faster fall-off once the peak is passed. Or it can occur at a lower level provided that there is an earlier slowing of the rise.

The likely outlook for world crude oil production is that its peak will occur in the 1990's. Beyond then a successive reduction in consumption must take place. Countries not themselves strong enough or possessing resources under their own control will have to budget for a reduced oil consumption each successive year. They will have to choose which use sectors they will run down. If transport grows then the run down of something else will be correspondingly accelerated. It is not the situation of unrestricted growth postulated by the TRRL.

Bad though this may appear there is an even more immediate concern. Before consumption begins to decline a "gap" tries to appear between supply and demand. People continue to buy cars, install central heating, book holidays abroad and buy plastic goods. They want to increase the consumption of oil and its derivative products. But production cannot keep pace. Something has to give. Scarcities and price rises occur. It is very important to note this point, scarcities can occur at a time of rising supply provided demand is rising even faster—a situation clearly exemplified in the US this year.

The growth rate over the past few decades has in fact averaged out at eight per cent. It clearly cannot continue at this rate for more than the next few years. Demand in the way it has manifested itself in the past will not be met. Price rises and shortage now appear inevitable as the creaking mechanisms of the economic market sort out who is going to get and who is going to go without. We can see clear signs of the process beginning as oil prices rise and the sellers increasingly dictate the terms on which they are prepared to deal.

## The North Sea

Some hopeful souls see all our problems being solved by the North Sea. There is even occasional talk about self sufficiency and an exportable surplus.

A number of estimates have been made of the North Sea potential. Assuming no more discoveries it becomes clear from the present known reserves that production of these will be *in decline* by 1982. The much-publicised benefits to our balance of payments will not last for more than a couple of years.

If on the other hand North Sea exploration has a discovery rate normal to the industry, that is about 1:20 then production would peak in the middle 1980s.

The most optimistic view is based

on a finding rate of 1:8. In effect this view postulates that drilling to date has been on a totally random basis without any selection of the more promising structures—an unlikely hypothesis. But even with this high estimate on the upper bound of possibility, the North Sea shows itself to be in decline by the 1990s—a decline which will coincide with that of the rest of the world's production.

## Alternative sources

In the TRRL document the suggestion is made that tar-sands, oil-shales, and even coal could provide alternative fuel sources when conventional oil supplies run low. This is a common and superficial view of the situation.

It is necessary, in order to get a balanced picture, to postulate the situation on which exploitation of these resources would take place. The environmental impact of digging either the tar-sands or oil-shales on a scale which would be relevant to world oil production is almost inconceivable. It would appear that production is now economic, with oil prices at $11 a barrel and likely to rise still further. But this does not take into acount all the problems involved. As the mines go deeper and the mountains of hot residue grow higher and the process water supplies become harder to obtain the problems grow greater and the price rises higher. It seems very unlikely that the potential producing countries will have exportable surpluses at prices to satisfy the growing appetites of the British motoring public.

An alternative might be to open new mines and set up a network of coal processing plants throughout Britain during the next decade or so. But there is no indication this is being seriously considered by anyone—except possibly in the TRRL.

## The argument summarised

We are spending an enormous amount of money on providing ourselves with a motorway network and new urban motorway systems. Our primary justification for doing this is that the TRRL and other traffic planners and forecasters believe traffic will increase to over twice its present levels in the next 40 years. Because of these forecasts Government planners are obsessed with the "need" for more and more motorways.

We have seen that world oil supplies are now plausibly reckoned to be in decline during the 1990s. In such a situation traffic growth would not occur and indeed a substantial decline must be inevitable.

We have also seen that a "gap" opening between rising demand and more slowly rising production is the first sign that we may be approaching the peak. Rising prices and shortages are the signs of such a gap. There is evidence that we already are moving into this phase. Prices are rising steadily and it is doubtful if every aspect of the present US supply difficulties can be attributed to the oil companies' duplicity, incompetence and connivance. In fact it is difficult to avoid seeing Europe in a similar situation within the next five years or so.

Shortages would prevent the TRRL forecasts being fulfilled. Rising oil prices would equally do so if in a rather less spectacular way. They inhibit the growth of car ownership by making everything dearer and reducing the amount of disposable income. They reduce motoring by increasing its cost. They tend to exacerbate the adverse movements of sterling in relation to other currencies (because we depend more heavily than most countries on trade affected by oil prices) and thus affect our ability to obtain all the oil we need. For instance half our current balance of payments deficit (estimated as running at £900 million for the present year) can be attributed to the increased cost of our oil imports since 1970.

It is not possible to say which of these factors will dominate. It is possible to be dogmatic and say a combination of them will prevent traffic levels reaching those forecasts by the TRRL. Any planning decisions based on such forecasts are quite unfounded.

In the light of this the only responsible course is to abandon the present motorway programmes. Instead an urgent inquiry should be instituted into how the real transportation needs of the country can be met in a way which takes into account the emerging realities of the world and the national energy situations.


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1 While not strictly in accordance with official usage the word motorway is here used to include any high-speed, high capacity road.

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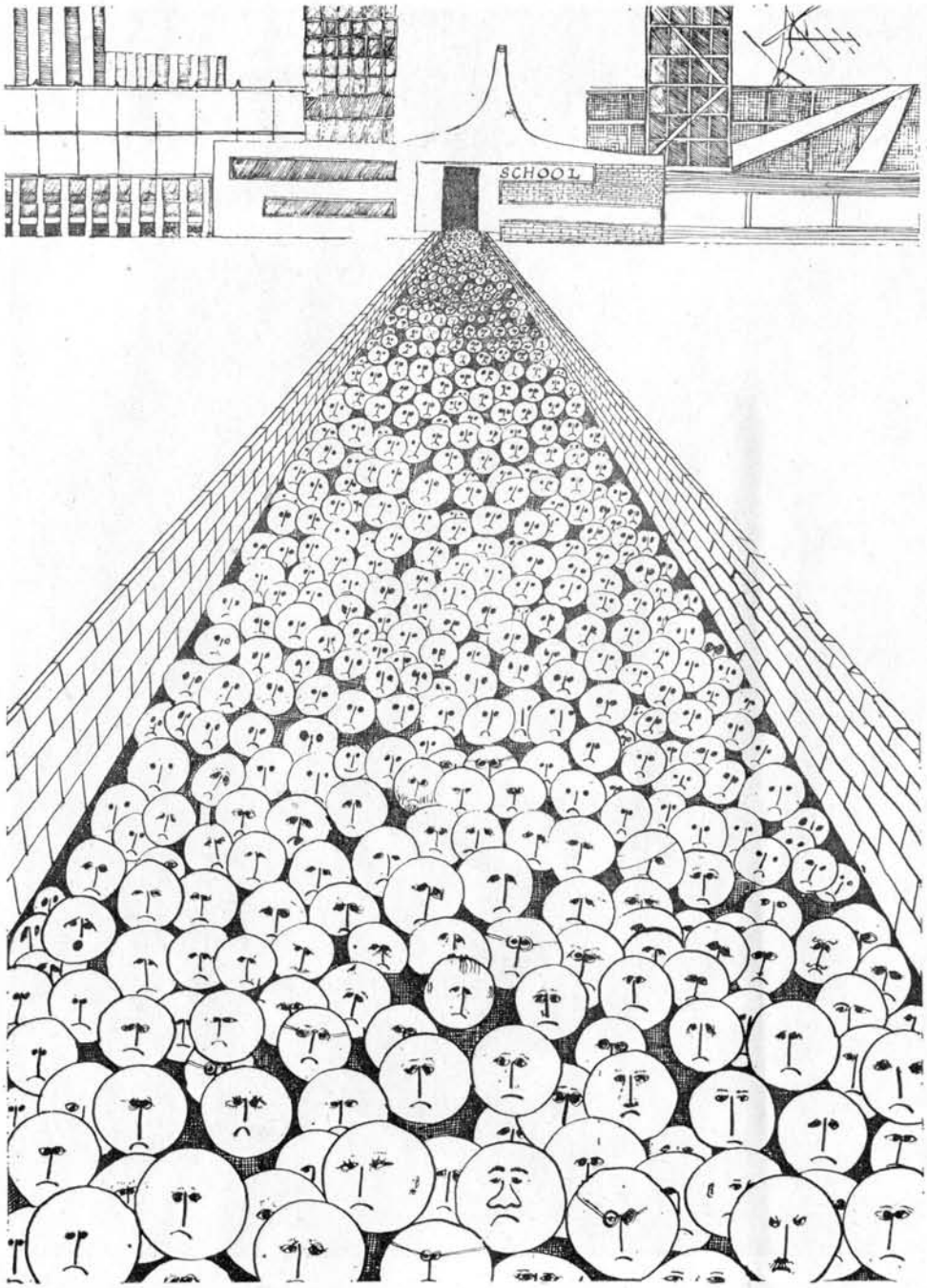


# Education: What For?

by Edward Goldsmith.

Few people today would dispute that education is a good thing. Most would even consider that the more we get of it the better. In fact it is increasingly regarded as an inalienable right of all citizens, regardless of ability. The reason is that we believe it to be the key to success in the industrial world we live in as is "manna" among the Polynesians, "muntu" among the East Africans, "baraka" among the Arabs, a sort of vital force on whose accumulation one's success in life ultimately depends. As a result, we are spending an ever increasing proportion of the national budget on education, and an ever increasing number of our youth are made to spend an ever greater part of their life in educational institutions. What is the result of these efforts?

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Literacy, contrary to what one would expect, is decreasing.[1] According to the British Association of Settlements there are two million illiterates in the UK, and the preponderance of illiterate adults rather than belong to the older generation as one would expect, are aged 25 and under.[2] A recent report on the 'Trends of Reading Standards' confirms what the late Sir Cyril Burt wrote in the 'Black Papers' on education, that standards of literacy are today lower than they were in 1914. What appears extraordinary is that literacy seems to have been going down fairly steadily ever since the State took an active part in education. At a global level, the situation appears even worse. A recent Unesco study of world education reports that the number of illiterates over 15 years of age increased between 1960 and 1970 from 735 million to 783 million, though admittedly the proportion of illiterates over 15 dropped from 44.3 to 34.2 of the adult population (Table 1).

TABLE 1

| | Percentage of drop-outs | | |
|---|---|---|---|
| | Total | Urban zones | Rural areas |
| Columbia | 72·7 | 52·7 | 96·3 |
| Dominican Republic | 69·6 | 48·1 | 86·1 |
| Guatemala | 74·7 | 50·4 | 96·5 |
| Panama | 37·7 | 19·3 | 54·7 |

(Source: UNESCO COURIER, June 1972)

The number of children dropping out of school without taking any examination is remarkably high. Of 613,000 boys and girls who left school in 1970-71, as many as 269,000, or 44.5 per cent attempted no examinations (Table 2). In the North of England, Yorkshire and Humberside, the figure was over 50 per cent.[3] In much of the Third World, dropouts from primary education are as much as 80 per cent of those who enrole, and this in countries in which 10 per cent of children between the ages of 6 and 12 have attended school. This means that only 2 per cent of children pursue their

TABLE 2

| 613,000 school leavers | THE EXAM 'GAP' | | |
|---|---|---|---|
| 4,000 failed all subjects in G.C.E. "O" levels 1971 | 269,000 failed to sit exam | School leavers college courses rose 36% 1967 1971 | Pupils remaining after age of 15 rose from 23% to 52% 1947 1971 |

studies to the end of the primary school programme.[4]

## Discipline

Schools have become far more permissive, the teachers no longer command the obedience they used to. In many schools, especially in the slums of the larger industrial cities, it is increasingly difficult for them to keep order and often attempting to do so occupies so much of their time that little is left for teaching. In many cases teachers are abused and even assaulted by the pupils. In the US violence in schools has in fact reached quite astonishing proportions. Thus, in the first nine months of 1972 there were no fewer than 4,724 crimes in the schools of New York City, including 4 murders, 28 forceable rapes, 496 robberies, and 3,200 burglaries.[5] In January of last year Mayor Lindsay announced a new set of measures to prevent crime in schools, which included increasing the amount spent on school security from 7.5 million dollars to 12.5 million dollars.[6]

## The practical results of education

Although our educational system provides many of the skills required for the functioning of our industrial society, success for those who pass their exams is not necessarily assured. Unemployment among school leavers is high, as it is among university graduates (Table 4). In universities in particular, the courses do not seem necessarily related to the demand for specific skills. In the USSR, as in India and other parts of the Third World, there is a current surplus of engineers; in France of lawyers; in the US of physicists; while throughout the industrial world there is a growing shortage of craftsmen, such as carpenters, and plumbers—the product of a very different type of educational system. In China, university graduates in large numbers are being made to return to the land as farm labourers which we cannot possibly do in a democratic country.

As expenditure on education is increasing much faster than gross domestic product, the economy's capacity to absorb graduates is likely to continue declining. As a result the aspirations of an increasingly small section of the school going public can conceivably be satisfied. The vast majority, condemned to fulfilling functions they have been taught to regard as menial, would be faced with a miserable and frustrating existence in jobs often requiring considerable skills for which they would have had no specific training and for which their education would have rendered them psychologically unfit.

TABLE 4

Unemployed Graduates. (Sources: University Grants Committee A.D. .)

% at 31·12 year of leaving.

| | Total | Arts | Social studies | Science (A11) | pure | applied |
|---|---|---|---|---|---|---|
| 1965/66 | 2·3% | 3·2% | 2·6 | | 1·8 | 1·4 |
| 1968/69 | 4·2% | 4·9 | 5·7 | 3·1 | 3·9 | 1·7 |
| 1969/70 | 5·4% | 6·2 | 6·3 | 4·5 | 5·6 | 2·9 |

& 'Unknown' – 7·7% 1968/69 8·5% 1969/70

This is already happening in the UK where people often simply refuse to fulfil what they regard as low-prestige jobs, which means that society has no choice but to import, for that purpose, people from foreign lands whose education has not imbued them with the same set of prejudices.

Thus in the UK today we must import the waiters in our restaurants from Italy, Spain and Cyprus, domestic servants from Portugal and the Philippines, workers in the construction industry from Jamaica, and bus drivers from the Punjab.

In this way, as irony would have it, the furore for mass education is leading, among other things, to the creation of a caste system—the proverbial epitome of social inequality.

In the meantime this massive educational effort is not making our society a visibly better place to live in. It seems compatible with increasing crime, delinquency, alcoholism, drug addiction, illegitimacy, and all the other problems, which, every year, are getting worse. Take the case of crime for instance. In the period from 1960 to 1968 there was, in the UK, a 175 per cent increase in expenditure on education, while at the same time there was a 90 per cent increase in convictions for violent crimes.

## Costs of education

Even if modern education provides the benefit it is supposed to, it is a luxury that few countries can afford. In the UK, the cost of education has increased from £785 million in 1958-59, which was 3.77 per cent of GDP, to £2,164 million, representing 6.18 per cent of GDP in 1968-69. The country cannot possibly afford to increase expenditure of education at this rate. If we project current trends of the GDP and current educational costs, we find that even if the whole of the government budget—which we can take as roughly 40 per cent of GDP—were to be devoted to education, we would still fail by about the year 2007 to meet foreseeable educational costs (Table 3).

TABLE 3

(£1000 mill.)

| | Gross Domestic Product | Expenditure on Education |
|---|---|---|
| 1958 | 21 | 0·8 |
| 1968 | 33 | 2 |
| 1978 | 47 | 6 |
| 1988 | 70 | 16 |
| 1998 | 104 | 45 |
| 2008 | 154 | 124 |
| 2013 | 188 | 206 |

In the US the cost of what educators call 'equal treatment for all' in grammar and high schools, would be somewhere around 80 billion dollars, according to Illich.[7] According to HEW and the University of Florida it would be 107 billion dollars by 1974, without taking into account the cost of higher education.

In Britain education costs about £2 billion per annum, which works out at about £40 per head. This means that we are already spending on education twice the total income of the average Indian or Nigerian. In spite of this everything is being done by governments and international bodies such as UNESCO to spread western education throughout the countries of the Third World in the full knowledge that none of them can remotely afford it.

Nor for that matter can we. In Britain, there is already a serious shortage of teacher-training establishments, of teachers and of schools. As a result, the whole educational machine is

grossly overstrained. This can only lead to a reduction in its quality and effectiveness as greater numbers of prospective teachers are crowded into establishments ever less capable of providing them with appropriate training, as the proportion of pupils to teachers inexorably rises and classrooms become increasingly overcrowded.

To accommodate existing pressures would already require massive investments. Teachers salaries would have to be raised very considerably to attract the right number of people of the appropriate calibre into the profession and more and better schools built. These funds are even less available as more and more demands are being made on government finances by the National Health Service, the railways, the coal mines, the welfare services, and all the other equally overstrained services of our ever less viable society.

Already cuts in general government expenditure announced in May 1972 are expected to be reflected in further reductions in the funds available for education. In fact, it is feared that the £150 million required by educational authorities to keep existing services up to scratch will have to be reduced by half. It would seem that the point has been reached when it will only be possible to improve our educational system by methods which do not require further investments. This rules out further centralisation and further increases in the capital intensiveness of education. What it implies, in fact, is a complete change in our philosphy of education.

## What is education?

In spite of the extraordinary importance we seem to attach to education, nobody has really considered what it is for, nor why we in fact need it at all. Yet it would appear rudimentary that unless we can answer these questions we are unlikely, except by chance, to devise a satisfactory educational policy. To understand education, like all other human activities, one must look at it in a far wider context than we are accustomed to.

When we talk of education we implicitly refer to our own type of education. It does not even occur to many people that every one of thousands of traditional societies studied by anthropologists has also developed its own educational system, often a very elaborate one at that. Still less do we look at education in non-human animal families and societies; yet in many animal species a considerable amount of information must be communicated to the offspring via the family and sometimes the society. It is known, for instance, that the larger predators, such as the lion and the tiger, must learn to hunt. Those brought up in a zoo would be almost certainly incapable of surviving in the challenging conditions of their natural habitat. Even apparently more modest species must learn—the chaffinch for instance cannot sing unless it is taught to do so. What then is education? Margaret Mead[8] defines it as "the cultural process . . . the way in which each new born individual is transformed into a full member of a specific human society, sharing with the other members a specific human culture". It is in fact but another word for socialisation. It transforms an unspecialised child born with the potential of becoming a specialised member of a very large number of different social systems into a specialised member of a specific social system. In a still wider behavioural context one can compare a child with a cell. Immediately after division it is in possession of the full complement of hereditary material and is thereby capable of a very wide range of responses. Slowly however, it becomes specialised in fulfilling that narrow range of responses required of a differentiated part of a specific organ of the human body. If we accept this definition, then the educational implications are considerable. For instance, the Freudian notion of the community and the family as frustrating and as the cause of various psychological maladjustment must be totally rejected. The very opposite appears to be the case, psychological maladjustment for the most part being the result of various types of social deprivation. It also means that so-called progressive education, in which parents and teachers allow children to do precisely what they like, for fear of "frustrating" them is totally misguided. It is only by subjecting a child to a specific set of constraints that it becomes capable of fulfilling its specific functions within its family unit and later within its community, i.e. that it can become socialised or, in fact, educated. Otherwise he remains isolated, goalless and alienated: increasingly the fate of youth today.

**As a result, the aspirations of an increasingly small section of the school going public can conceivably be satisfied. The vast majority, condemned to fulfilling functions they have been taught to regard as menial, would be faced with a miserable and frustrating existence in jobs often requiring considerable skills for which they would have had no specific training and for which their education would have rendered them psychologically unfit.**

Permissiveness is not a feature of stable social systems. On the contrary they tend to be highly disciplined. Discipline, in fact, appears to be a sine-qua-non of self-government This discipline is imposed by public opinion, but it is often more exacting than that exerted by the vilest of autocrats. Significantly, to the Greeks, liberty did not mean permissiveness but rather self-government. They were free, not because they were permissive, but because they were in charge of their own destinies while the Persians were slaves because they were ruled by an autocrat.

It is not surprising that in a society committed to industrial growth, a process which must inevitably lead to the disintegration of the family and the community, education has come to mean something else, basically the communication to the young of that information which will enable them to fulfil their appointed professional functions within the industrial machine; instruction, in fact, rather than education. There has indeed lingered on a body of information of a cultural and traditional nature which is still taught in our schools and universities; music and literature for instance. This provides, for the most cultivated at least, a necesary cathartic outlet, an escapism from an increasingly intolerable world. Only in this way, however, does it actually influence our behaviour pattern.

Much of this knowledge has been tortured into that shape which makes its communication to the young ever more likely to prompt them to participate effectively in our industrial society.

Thus our Science assumes that it is possible to control nature for man's benefit. It is only this assumption which justifies the current expenditure on scientific research. Our History assumes that the invention of agriculture and the

subsequent development of an industrial society mark the key steps in the rise of man from a state of savagery to one of civilisation, and the heroes our children are taught to admire are those who have done most to accelerate this fatal process.

## Learning as a normal behavioural process

If education is a behavioural process then it is subject to the laws governing other such processes. One such law is that behaviour proceeds from the general to the particular.[9] For this reason it is the earliest phases of education which are the most important. It is during these phases that the generalities of a child's behaviour pattern will be determined while, during the later phases they will simply be differentiated so as best to permit their adaptation to varying environmental requirements.

It must follow that the mother is the most important educator, and the quality of the family environment the most significant factor in determining a child's character and capabilities. Another such law is that behavioural processes are sequential. Their various stages must occur in a specific order. If one is left out, then the subsequent ones will either not be able to occur at all, or will occur at best imperfectly. Thus what a child learns during its formal institutionalised education cannot make up for any deficiency in the earlier phases. This is the conclusion that most serious studies have revealed. Coleman,[10] for instance, whose massive study led him to examine the career of 600,000 children, 6,000 teachers and 4,000 schools, reported in 1966 "that family background differences account for much more variation in achievement than do school differences". This is also the conclusion of the US Government study, "Equality of Educational Opportunities" published in 1964 which stated that, "variations in the facilities and curriculum of the schools account for relatively little variation in pupil achievement. . . ." The most important factor measured in the survey is the home background of the individual child. In fact, whatever be the combination of non school factors, "poverty, community attitudes . . . which puts minority children at a disadvantage in verbal and non-verbal skills, when they enter the first grade, the fact is the schools have not overcome it." One of the greatest problems that teachers have to face today is the proliferation of so called emotionally unstable children. These are exceedingly difficult to teach as they are unruly, undisciplined and unable to concentrate on anything that is not obviously relevant to the satisfaction of their most short-term requirements. These are the children which are the most likely to become delinquents, criminals, drug addicts: the ones that cannot be socialised because the first phases in the socialisation process, those which should have occurred in the home were so deficient. In a society in which the family unit has broken down and whose principal institutions conspire to cause its further disintegration the problem cannot be solved. Pre-school education provides little compensation for ineffective parents. It may in fact be the source of further problems. As Palmer writes,

**One such law is that behaviour proceeds from the general to the particular. For this reason it is the earliest phases of education which are the most important. It is during these phases that the generalities of a child's behaviour pattern will be determined while, during the later phases they will simply be differentiated so as best to permit their adaptation to varying environmental requirements.**

"With the proliferation of pre-school programmes and the tendency to have younger and younger children involved, we are faced with a new socialisation agent which because of the very early age it reaches the child, may be of considerable moment to coming generations. At best, pre-school programmes consuming many hours per week fall short of developing activities which are known to contribute to intellectual, affective, and social development." Characteristically we choose to ignore the pre-school stages of education and reserve the very term for that which occurs at school. In this way, we define the educational problem in precisely that way which makes it appear amenable to the only sort of solution which our society can provide: more and bigger schools, filled with ever more expensive equipment; language laboratories, computers, tape recorders and God knows what, into which we consign our youth for an ever greater proportion of their lives. Every government in turn contributes piously and self-righteously to this fatal process. The present government is intent on further increasing the school-leaving age. Vast sums of money have been voted to increase nursery schools, and creches for working mothers, accommodating in this way the trend towards the further disintegration of the family. In reality, the only possible way to solve the problem is to reverse such trends, restore the family to the position which in traditional societies it has always enjoyed.

## Social stability

Another basic feature of all behavioural processes is that they tend towards stability. Stability is best regarded as a state in which a system can preserve its basic structure in the face of change. It is in effect but another word for "survival" taken in its widest sense. In a stable system, discontinuities will be reduced to a minimum. This is only possible if environmental changes occur within certain limits. If they are too radical or too rapid, natural systems have no means of adapting to them.

The behaviour of human societies are in no way exempt from this rule, yet, in our industrial society, we set out purposefully to defy it. We tend to regard everything that is new as good, everything conducive to change as desirable. Our educational system puts a premium on innovation and originality in all its forms, i.e. it is geared to instability instead of stability.

In a traditional society the opposite is the case. The basic preoccupation of its citizens is to observe the traditional law and to divert as little as possible from the cultural norm. Everything conspires to this end since all deviations are seriously frowned upon by public opinion, sanctioned by the council of elders and, it is believed, punished by the ancestral spirits. Education in such societies as Margaret Mead writes "is the process by which continuity was maintained between parents and children, even if the actual teacher was not a parent but a maternal uncle or 'shaman' ".

When a society becomes unstable, when social control breaks down and discontinuities grow ever bigger, then it is but a question of time before it eventually collapses. It is towards such

a collapse that our educational system, together with the rest of the institutions of our industrial society, are leading us. To avoid it, among other things, education must be designed to promote stability rather than change—but this cannot be done in an industrial society in which the promotion of instability implicit in our notion of progress is the avowed object of public policy.

## Informational feedback

Another feature of behavioural processes is that they involve feedback. Systems can only adapt to their environment because they are linked to it by means of feedback loops. If these loops are severed, if behaviour becomes "institutionalised" then it can no longer be influenced by all relevant environmental requirements and from the point of view of the larger system must become random.

The introduction of random information into the system from the outside must have similar effect. This principle must apply to behaviour at all levels of organisation including that of the human society, and as our society "progresses" so its inhabitants tend to be bombarded with ever greater quantities of it. Obvious sources are television personalities, newspapers, and unfortunately, one must include to an ever greater degree our educational system itself which is ever more isolated from the social process.

A system will only tend to detect and interpret signals which are relevant to its behavioural pattern. This means that random information which is irrelevant to a person's behaviour pattern is likely to be filtered out. It is more difficult, however, to filter out random data in childhood. A child's brain is not designed to encounter it, normally excluded as much as possible from the protective family environment. Also in the child's case it will do more damage by affecting the generalities of the learning process, which will colour the subsequently developed particularities of his world-view.

From the educational point of view, the implications of this principle are enormous. At the present time it is generally accepted that knowledge is good and the more the better. Only relevant knowledge is good, and then only if it is communicated in the correct sequence. Most of the knowledge we impart to our children is "random" and will actually impede the process of socialisation rather than encourage it.

If one wants to be a purist, one can go so far as to say that the invention of writing was actually a blow to the cause of social stability. Quite apart from causing, as Illich points out, a drastic polarisation of society between the literate and the non-literate, it also provided a store of information which entered into competition with traditional cultural information hitherto transmitted orally from one generation to the next. As Michael Allaby points out, it is very much as if a DNA data-bank had been set up to assist in the transmission of genetic information from one generation to the next.

Writing, however, is probably here to stay. It seems unlikely that we shall ever unlearn it. Nevertheless, if we wish to reconstitute a society with any semblance of stability, steps will have to be taken to bring the current explosion in the mass media, particularly television, very strictly under control.

**The apprenticeship system is today unacceptable, largely because we feel that it does not permit "freedom of choice". But is this not a somewhat overrated commodity? When a young man decides to become a doctor or solicitor what does he in fact know about the life-style he has "chosen"? Are such decisions based on the relevant information? Are they not rather the result of some passing whim?**

## Variety

Variety is an essential feature of stability. It is no coincidence that in New Guinea, one of the few remaining areas where small tribal societies have not been too severely interfered with, there are seven hundred distinct cultures, each with its own language.

Such cultural diversity implies that the corresponding societies are real cohesive social units with an identity of their own, and that they have adapted culturally (the only way they can effectively adapt) to the distinct set of challenges of their specific environment. To combat it is to foster unadaptiveness, social disintegration, entropy with all its attendant problems, which no amount of money, or technology can even begin to solve.

In a country such as Britain, regional differences were once marked. People in different parts of the country had different customs, ate different things, spoke with different accents, and felt correspondingly different. In today's industrial society, however, an increasingly centralised educational system contributes significantly towards ironing out these very necessary differences and imposing on it a dull and depressing uniformity.

This uniformity is not just aesthetically offensive but is also socially disruptive, since it prevents the survival of stable local communities.

## Differentiation

It is probably that all the members of a society should be imbued with the same basic set of values and thereby share the same world-view, that there should, in fact, be what the Hellenes called "Homonoia". Otherwise the society can have no integrated behaviour pattern, no means of adapting, as a unit, to the more general challenges of its environment, those which equally affect the various communities into which it is divided. Otherwise, in fact, there can be no real society.

People, however, besides being members of a society, are also members of different professional bodies, clubs, secret societies, age groups etc, as well as of their families. It is their membership of a specific set of such groupings that confers on each individual an identity or status within the society.

In order to fulfil his corresponding functions, the precise nature of the information which should be communicated to him must of necessity vary with each individual. In this way no two people will receive an identical education.

Some of this information, it might be sufficient to communicate to him relatively late in life. This is not the case for functions requiring great skill. For these there appears to be no substitute for the apprenticeship system. Indeed it is not at the age of 19, at a provincial polytechnic, that one can learn to become a master craftsman or a great artist. It is by diligent and painstaking work starting at a very early age, during which time, valuable information that has possibly accumulated over many generations is passed on, mainly via the family Needless to say, the apprenticeship system is impossible in a society which regards social continuity

as retrograde and social mobility as an end in itself, as the very mark of progress and social justice. Today's values are very unadaptive for, by making the apprenticeship system impossible and forcing people into centralised schools, these skills can only be lost and further uniformity promoted. Apart from this, and to return to a previous theme, the stability of the family unit, possibly even more important than that of the community itself, is being effectively destroyed. A child educated far from home in a vast factory-like school and imbued with the values of our technological society, will regard a father, who still plies a rural craft in his native village, with a mixture of pity, disdain and condescension. To me, this is the ultimate human tragedy, especially as he has probably made untold sacrifices to provide his son with that education which he believes will ensure his social and economic advancement. Yet it is the inevitable concomitant of our highly mobile society which our educational system is at least partly responsible for. The apprenticeship system is today unacceptable, largely because we feel that it does not permit "freedom of choice". But is this not a somewhat overrated commodity? When a young man decides to become a doctor or solicitor what does he in fact know about the life-style he has "chosen"? Are such decisions based on the relevant information? Are they not rather the result of some passing whim? How many people actually fulfil in life the functions they were trained for at a polytechnic or at a modern university? At a recent meeting organised by the Department of the Environment on the building industry at Stirling University, the question was put by Professor McKeown to 150 delegates. As expected, only a very small proportion of them had received formal training for the job they were actually doing. I cannot help but feel that the "freedom of choice" to which we attach so much importance is to a large extent an illusion. What someone will actually do in life will be largely determined by the various pressures he is likely to be subjected to as he struggles to survive in an increasingly challenging urban environment, pressures of a more random and probably of a more exacting type than those he would have been subjected to in a traditional family environment but which he has been brainwashed into regarding as intolerable.

## Specialisation of sexes

Specialisation in human society is mainly culturally determined. That based on sex however has a genetic basis, though it is fashionable to maintain the opposite. It is one of the illusions of our society with its fixation on uniformity and standardisation that men and women are for all purposes, but the sexual act itself psychologically and behaviourally interchangeable. One must not be fooled, it is maintained, by the fact that they look different: a morphological difference does not imply a behavioural one. It is surprising that apparently serious people are willing to defend so indefensible a proposition.

**It is essential that it be generally understood before any further irremediable damage be done to the delicate fabric of remaining relatively stable societies, that education cannot be transferred from one society to another, and that it is not something that can be imported or exported like cheese or brussels sprouts. Instead it should be a process for ensuring the continuity of a cultural pattern and maintaining a social structure and way of life which may have taken many thousands of years to develop as an adaptive response to specific environmental conditions.**

Men and women look different for the very good reason that they are different, and the present-day attempt to iron this out is naive, disruptive and ultimately condemned to failure.

Significantly, in every traditional society known, there is a clear division of labour between men and women. The exact functions fulfilled by the different sexes vary from one society to another. The same theme however runs throughout. Women are responsible for looking after the children for which function they and not men are biologically and psychologically adapted. The notion that bringing up the children should be shared by husband and wife takes no account of the fact that only she is capable of feeding the child and also that mother's love is very different from the father's. As Fromm[11] points out, a mother's love is unconditional. A child can commit the most heinous crimes without it being affected in any way. This is not true of the father's love, which is given on condition that the child behaves itself. This must imply that the child must be psychologic stronger and must probably reach a certain age before it can tolerate the substitution of the father's love for that of its mother. In nearly all traditional societies other functions undertaken by the women not directly connected with bringing up their children, tend to be in the home or in its vicinity, while the men wander further afield. Thus in a hunter-gatherer society it is the women who do most of the gathering and the men the hunting.

The relationship between a man and a woman is clearly not symmetrical. They require very different things of each other. The woman depends on the man for protection, which is normal since he is usually bigger, stronger, and more aggressive. It is also his role to provide her with the stability which she particularly needs. The father tends to be the boss. The Matriarchal society which people often talk about is not to be found among traditional societies. Many are matrilineal, which means that inheritance is via the mother, others are matrilocal which means that married couples live with the wife's parents. Some are both at once, and in such cases the wife's influence is probably greater than in others but she still does not run the family. The only matriarchal societies known are to be found in the ghettoes of the larger American urban conurbations. Here the men are largely unemployed, incapable of fitting into the mainstream society and psychologically prevented from fulfilling their functions as fathers and husbands. Marriage is rare, most unions are temporary, and it is the mother who must take upon herself the responsibility fo bringing up the children. This situation is aberrant. Such societies have reached the final stages of disintegration and are hovering on the verge of explosion.

In our industrial society women tend to be subjected to precisely the same education as men and are encouraged by every means to compete with them. This can only mean the further breakdown of the family unit which depends for its survival on a strict division of labour among its members. The normal relationship between men and women

is, and must be, one of co-operation not of competition.

It must mean condemning our children to a large measure of social deprivation since their mothers, forced to work in offices and factories, sometimes many miles away from their homes, cannot conceivably devote to their children the time required to ensure their proper upbringing. This tragedy can only be reflected in further increases in delinquency, crime, drug addiction, alcoholism and the other manifestations of social maladjustment.

It must mean encouraging the further expansion of our energy and resource-intensive consumer society, since women are thereby ineluctably drawn into the cash-economy and must become increasingly dependant on creches, bottled milk, convenience foods and labour saving domestic appliances.

It must also mean further damaging the health of the population since bottled milk is a poor substitute for human milk, and convenience foods contain several thousand potentially harmful chemical additives and have been so modified that they but imperfectly satisfy man's basic human nutritional requirements.

It must also mean an increasingly large number of ever more maladjusted women who are being forced by their education and other social pressures to wage an unequal struggle against their natural instincts. It is hardly surprising that more than 50 per cent of teenage girls entering hospitals today, as Professor Ivor Mills points out, are the victims of attempted suicide.

## Relevance of education to life-style

It is an important feature of traditional education that it is totally relevant to the life the young will afterwards lead. The accent is on practical matters but also on the cultural traditions of the social group. The latter's relevance to the problems of every day life is not immediately apparent to most of us who have been misled into regarding a culture as a random pattern of superstitions and irrational practices. A new approach to anthropology—cultural ecology—is rapidly revealing that a culture is in fact a control-mechanism —that its status vis-a-vis a society is that of the personality vis-a-vis the individual.

The colonial powers attached very little importance to the cultural pattern of traditional societies and suppressed many of their essential features. Instead, they imposed upon them an alien educational system designed to transform them into the goalless and alienated inhabitants of an anonymous mass society, exclusively geared to the dehumanising goals of mass production and consumption. As Middleton[12] writes, "the learning of genealogies of the families and clans, as among the Ashanti and the Baganda, the recognition of social groupings in hierarchical tribal settings and of their reciprocal relationships, the hearing of tribal history in praise songs and legends told at tribal gatherings—these were forms of direct learning which had no place in schools but had set times and places in a traditional situation." All these activities were not deemed worthy of figuring in the curriculum of institutionalised western schools. They had no place in that set of universal verities that we are foisting on these people. With the institutionalisation of education the tendency is to isolate the educational process from the social one. Rather than to be an integral part of it and subjected to the same modifying influence that will enable society as a whole to adapt to changing environmental requirements, it becomes subjected to a different set of modifying influences, of a mainly arbitrary and non-adaptive nature—those imposed by the prevailing—in our case aberrant values of the day. As Coleman[13] says, "This setting-apart of our children in schools which take on ever more functions, ever more extra curricular activities—for an ever longer period of training has a singular impact on the child of high school age. He is "cut off" from the rest of society, forced inward towards his own age group, made to carry out his whole social life with others of his own age. With his fellows, he comes to constitute a small society, one that has most of its important interactions within itself, and maintains only a few threads of connection with the outside adult society. Consequently, our society has within its midst a set of small teenage societies, which focus teenage interests and attitudes on things far removed from adult responsibilities and which may develop standards that lead away from those goals established by the larger society."

It is also true that teachers, both in schools and universities are increasingly isolated from the real world. The Assistant Masters' Association[14] recently complained of just this, pointing out that teachers pass their childhood in the classroom, their adolescence in the college and then adulthood back in the classroom. How can they know anything of the outside world? This tendency can only be accentuated with the further institutionalisation of the educative process. Eventually it must destroy the social continuity which is the basis of education in traditional societies. Cultural information, as is already partly the case, will cease to be transmitted from one generation to the next, only technical information will be. Instead, each new generation will be called upon to work out its own solutions to problems which are ever more challenging, and whose precise nature they are ever less able to comprehend.

## The dynamics of education

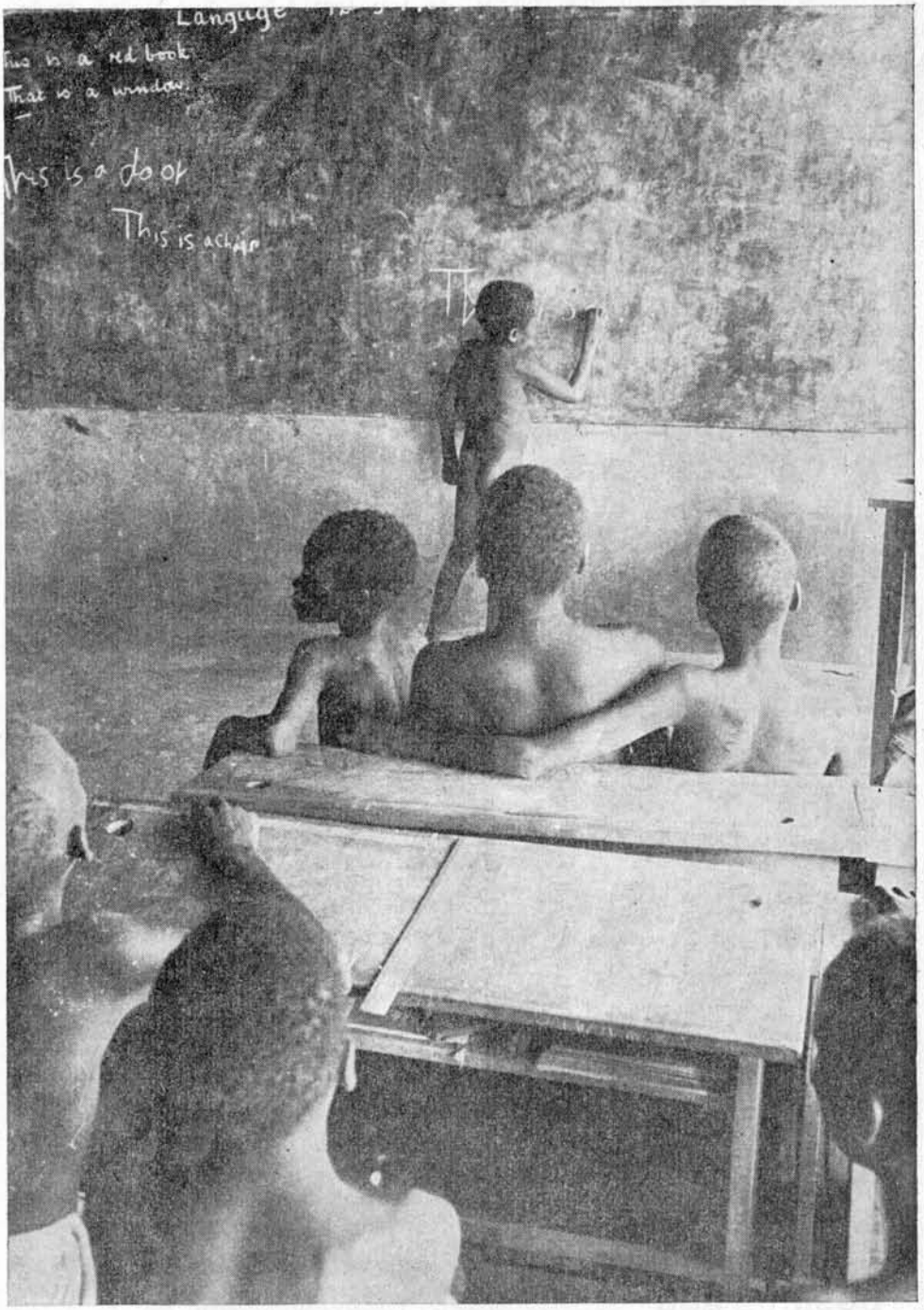
Another of the unfavourable aspects of modern education is that a child is regarded as the passive recipient of information. When the educational process is part of the social one the child is an active participant in it. As Rahm[15] writes . . . "the child is not a passive object of education. He is a very active agent in it. There is an irrepressible tendency in the child to become an adult, to rise to the status of being allowed to enjoy the privileges of a grown-up. . . . The child attempts to force the pace of his 'social promotion'. Thus, at five or six years of age a little boy will surprise his mother one day by telling her that he wants to be circumcised. The mother will hear nothing of it and threatens to beat him if he repeats the request. But the demand will be made with increasing insistence as the child grows up. In former times it was the clamour and restiveness of the adolescents which decided the older section of Chaga society to start the formal education of the initiation camp." The social process is a dynamic one, and to introduce a child into it is sufficient to ensure his education. Institutions are largely unnecessary. Instead learning is something that takes place like any other behavioural process, so long as the conditions are propitious. As Illich writes[16] "By definition children are pupils", and "learning is a human activity which least needs manipulation by others. Most learning is not the

result of instruction. It is rather the result of unhampered participation in a meaningful setting. Most people learn best by being 'with it', yet school makes them identify their cognative growth with elaborate planning and manipulation." Illich regards the child as a typical victim of consumer society, and institutionalised education as a specific type of merchandising. The "school"—sells a curriculum—a bundle of goods made according to the same process and having the same structure as other merchandise. The distributor/teacher delivers the finished product to the consumer/pupil, the reactions are carefully studied and chartered to provide research data for the preparation of the next model which may be "upgraded", "student designed", "team taught", "visually aided", or "issue centred". To anyone who has studied the learning process in animals, human or non-human, it is apparent that this type of education is useless. Learning depends on active participation. In addition, the brain is so designed that it forgets information irrelevant to one's behaviour pattern. The brain is not a store, but an organisation of information, and information is organised in accordance with its relevance. Academic information which does not have obvious relevance to our daily lives is unlikely to be registered more than superficially, nor can it be expected to outlast its usefulness for examination purposes.

## The export of education

Since we regard our way of life as a model for all other societies, and those who have not yet achieved it as being backward, barbaric and ignorant, we have come to identify education with our particular type of education. People who have been subjected to the traditional education of their own non-industrial society, we regard as "uneducated". In other words we regard the information imparted in our educational establishments as expressing (a) a set of indubitable truths, (b) the only possible set of indubitable truths, (c) one that has universal applicability. A more intolerably presumptuous attitude is hard to imagine, nor for that matter one that is more naive or that reflects a greater ignorance of scientific and social realities.

Needless to say, if education is identified with socialisation, then each society must require a different type of education. Thus the programme which will transform a Bini child into an adult member of his society capable of fulfilling his specific functions within a very distinctive African kingdom cannot conceivably be the same as that which will enable a baby Eskimo to learn its equally specialised but very different functions as a member of a family and small community geared to survival in the inhospitable Arctic regions which they inhabit. A Bini with the education of an Eskimo, is from the point of view of his society, uneducated, as he would be were he to have been exclusively subjected to western educational influences even were these to result in a doctorate or a Nobel Prize.




*Young Turkana boys from East Africa being indoctrinated with an alien culture.*

It is evident that the spread of Western science-based education throughout the world must lead to the disruption of all other cultural systems. A society subjected to this sort of cultural imperialism finds itself inevitably deprived of a means of renewing itself, since its youth, imbued with a totally alien set of values, trained to fulfil irrelevant functions, is taught to expect material comforts which can never conceivably be provided. Youth is thus condemned to drift into a cultural no-man's land, from which it can neither retreat nor advance. It is essential that it be generally understood before any further irremediable damage be done to the delicate fabric of remaining relatively stable societies, that education cannot

be transferred from one society to another, and that it is not something that can be imported or exported like cheese or brussels sprouts. Instead it should be a process for ensuring the continuity of a cultural pattern and maintaining a social structure and way of life which may have taken many thousands of years to develop as an adaptive response to specific environmental conditions.

## Conclusion

It is not by further centralising education or rendering it more capital-intensive that one can combat "ignorance" or in any way improve the state of the society we live in. Nor is it by forcing more and more of our youth to spend an ever greater part of their lives in the factory-like compounds into which we are at pains to transform our schools and universities. Education is the process of socialisation. It is the communication to the young of that information which will enable them to fulfil their functions as members of their family and community. Ignorance can only be regarded as a deficiency in this process. It is not due to a shortage of educational establishments, to a lack of teachers, to a shortage of funds for providing them, but rather to the breakdown of the family and community: the necessary environment of the educational process, without which it is but an empty formality. One cannot socialise people when there is no society for them to be socialised into. One must first re-create a society. To do this, one must re-establish those conditions within which the family and community can once more become self-regulating units of behaviour. This basically means deindustrialising society, for with economic growth, the tendency can only be in the opposite direction, as every one of its institutions conspires to bring about their disintegration. Instruction in modern technologies is no substitute for education. It can give rise to a mass society which, for a while, may display a considerable degree of affluence but not to a structured stable or happy one. There is no solution in vacuo, nothing educationalists can do by themselves. Education is an indisassociable part of the social process. If this is deficient then education must be too. Nothing short of a total reorganisation of society can provide us with a satisfactory educational system, and this must first of all involve the development of a decentralised society in which each community is allowed to develop its own cultural pattern and its own decentralised educational system for transmitting it from one generation to the next. Only in this way can our youth learn to fulfil its family and communal functions, only in this way can our society renew itself and hence survive.


**One cannot socialise people when there is no society for them to be socialised into. One must first re-create a society. To do this, one must re-establish those conditions within which the family and community can once more become self-regulating units of behaviour.**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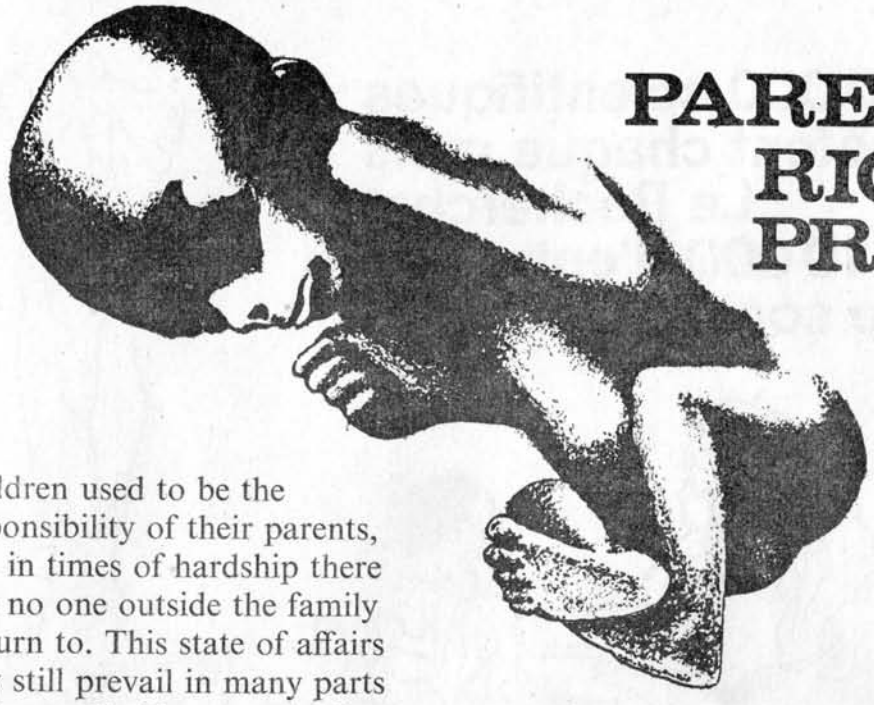

# PARENTHOOD: RIGHT OR PRIVILEGE?

by Garrett Hardin

Children used to be the responsibility of their parents, and in times of hardship there was no one outside the family to turn to. This state of affairs may still prevail in many parts of the world. However, in the modern western society children have become the responsibility of the state and parents no longer feel that ultimate obligation towards them. As Garrett Hardin says, "power to produce children resides in the family. Responsibility for taking care of children resides in the state".

This way of thinking makes population control at the grassroots extremely difficult. Here the *Ecologist* prints extracts from "Parenthood: Right or Privilege?" a chapter in Garrett Hardin's book *Exploring New Ethics for Survival* by permission of Viking Press.

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"I fear," said Carl Linnaeus, "that I shall not have any undergardeners this summer to do daily work, for they say they cannot work without food, and for many days they have not tasted a crust of bread. One or two widows here are said not to have had any bread for themselves or their children for eight days, and are ashamed to beg. Today a wife was sent to the castle (i.e. to the dungeon) for having cut her own child's throat having had no food to give it, that it might not pine away in hunger and tears."

We learn as much about history from what is not said in contemporary documents as from what is. Reading between the lines of this letter written by the great biologist (who perfected the basic system still used for classifying plants and animals) we learn much about the attitudes and social system of the eighteenth century.

Welfare payments are not mentioned in this letter, written March 17, 1772. Not only did they not exist—it never occurred to the writer that such things should exist. If poor people didn't have money to buy food they would just have to starve. The fact that it was not their fault was irrelevant and was not mentioned. It is obvious that Linneaus himself, and all his wealthy associates, would have plenty of food. This also assumed without mention. That the wealthy might help the poor a little is indicated by the reference to begging; but only a little. Of course, only a small proportion of all the too numerous poor could be helped because the fundamental shortage was of food, not money.

**Exploring New Ethics for Survival**

That a mother might kill her child to prevent its suffering was regarded as natural (or almost natural), but law and order had to be upheld, and so such a mother had to be put in jail. Periodic famines like that of 1772 were part of the "natural order", and poor people would just have to take account of them in their decisions. They would have to save for a rainy day; they would have to avoid having too many children to feed. No state welfare would save them; and private philanthropy was a marginal thing.

To some extent poor people did take account of the fact that there would be little help for them when times got tough. Their planning was not perfect simply because they were fallible human beings; but they did prepare for hard times. The family was the unit of responsibility and power—power to determine the number of children produced, and responsibility for taking care of them, disposing of them, or helplessly watching them die if there were too many. The large family of eight to sixteen children that most people think was typical before Margaret Sanger's time was, in fact, common only in America, where an ever-expanding frontier made it possible, and in Europe during Victorian times only, i.e., in the nineteenth century. Before that, European families were much smaller. Four children in the family was commoner than 12.

It may be a mistake to speak of "population control" in such a society; there was no conscious control by the whole community. There was, however, something that might be called family population control. Knowing that it could obtain little help from the community, the family assumed the responsibility of keeping its numbers down to a level near the "carrying capacity" of that portion of the environment to which it had access. Many such individual family decisions produced a sort of aggregate population control for the whole community.

How did the family implement its decisions? In many ways. To begin with, no one ever spoke of a "right" to marry. If there were many children in the family, it was expected that quite a few of them would remain single. To marry without the tacit consent of the elders of the family (principally the father) was to court economic and social disaster. Romantic love was for

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the well-to-do only, and even among that tiny minority it was regarded as a dangerous aberration.

Among the poor, celibacy was common. Some of the celibates went into the Church as priests or nuns, others went into domestic service, where a lack of personal family obligations and distractions was a great advantage—to the master.

Celibacy and chastity were not synonymous. For the males, prostitutes gave an escape from parenthood. The extent of prostitution was sometimes astonishing. In Rome, in 1527, it was conservatively estimated that there were at least 1,500 prostitutes out of a total population of only 55,000 people. La Mont Cole's empirical rule tells us that about one-half of any population is between the ages of 15 and 50; and about one-half of these are ordinarily females. So the population of females from which the prostitutes were drawn should have been 13,750. That would mean that 11 per cent of the eligible women (one in nine) were prostitutes. This is surely an underestimate. The holy city had a large population of priests, thus diminishing the proportion of women in the total population, which means that considerably more than 11 per cent of the adult female population followed the "world's oldest profession".

## Prostitution

Even if not intended as such, prostitution serves as a means of population control. There is a limit to prolificness, and one prostitute serves many men, whose fecund attentions are thereby diverted from legitimate wives. In addition, for a variety of reasons (not all understood) prostitutes as a class are less fertile than wives. Sooner or later gonorrhea seals their Fallopian tubes shut, putting an end to the threat of pregnancy. Sterility is, of course, a professional asset.

For females other than prostitutes, celibacy used to mean almost complete chasity. The abstraction called "virginity" was quite literally a valuable property, not alone of the woman "possessing" it, but even more of her father, who had a daughter to sell in marriage. The higher the economic status of the family, the more valuable virginity was. When a young woman "fell" and produced a child—irrefutable evidence of her spoiled condition—the most barbaric sanctions were imposed upon her.

Delayed marriage, lifetime celibacy, prostitution, venereal disease, and sanctions against bastards and the mothers of bastards constituted a powerful system of population control operating at the family level. To mitigate any one element in such a system was to diminish its effectiveness in keeping population under control. The importance of these factors in controlling population was seldom recognised; but thoughtful men did realise that the officially abhorred institution of prostitution played an essential role in the system of virtue (as it was called). Such an insight is half way to more important demographic knowledge. Napoleon, for example, remarked that "prostitutes are a necessity. Without them, men would attack respectable women in the streets." The Victorian scholar W. E. H. Lecky in a famous passage in his History of European Morals

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(1869), justified the apparently ineradicable profession by systems analysis:

"Herself the supreme type of vice, she is ultimately the most efficient guardian of virtue. But for her, the unchallenged purity of countless happy homes would be polluted, and not a few who, in the pride of their untempted chasity, think of her with an indignant shudder, would have known the agony of remorse and despair. In that one degraded and ignoble form are concentrated the passions that might have filled the world with shame. She remains, while creeds and civilisations rise and fall, the eternal priestess of humanity, blasted for the sins of the people."

One of my happier fantasies is that I may someday have the pleasure in Heaven (or Hell) of introducing Mr Lecky to Kate Millett, Betty Friedan, and Simone de Beauvoir and then standing back to enjoy the fireworks.

For those who did not remain celibate there were still defences against a personal population explosion. Mere delay of marriage has considerable effects; the older a woman is at the time of marriage, the fewer children she will produce, statistically speaking. After she is married (even if not before) her fertility can be diminished by contraceptive measures. Until modern times methods of contraception may not have been very effective, but they were better than nothing. Contraceptive recipes are to be found in Egyptian papyruses dating from about 1550 B.C. During the past few centuries in Europe coitus interruptus ("withdrawal") has been the most common method of birth control in daily use.

## Abortion

Many demographers estimate that the most widely used single method of birth control throughout the world now, and for centuries, has been abortion. Laws made by men have forbidden the practice of abortion in recent times in Europe, sometimes specifying the direst of punishment. The practice was, until the nineteenth century, hardly affected by harsh laws and theological thunderings. Practice was confined to the female subculture; only women could be aborted, and the operation was carried out by women; the pregnant woman herself, a woman friend, or (more often) a midwife. In the nineteenth century the two subcultures began to grow together, and male physicians took over the legalisation of abortion that continues to our day. The illegality of the operation has not altogether prevented it; France and Italy, both nominally Catholic countries, have long had a rate of illegal abortion undeniably greater than the birth rate.

Before the development of modern medicine, abortion was somewhat dangerous. A woman finding herself unwillingly pregnant might rationally conclude that she would rather let the pregnancy proceed to term and then solve the problem. There was one more method of family population control; infanticide.

Most people think of infanticide as a practice of "savages" only. But the studies of the eminent historian William L. Langer abundantly demonstrates that it was quite common in Europe as a method of family population control clear down to the end of the nineteenth century. Infanticide in Europe was not overt and frank, as it often is among "savages"; it was disguised, and the discussion of it was under a taboo—the "civilised" way of doing such things.

Parents did not usually kill their own children but turned the job over to a specialist, who nominally ran an infant nursery or "baby-farm". As Langer says:

"The least offence of these "Angel-makers", as they were called in Berlin, was to give the children gin to keep them quiet." For the rest we have the following testimony from Benjamin Disraeli's novel Sybil (1845), for which he drew on a large fund of sociological data: "Laudanum and treacle, administered in the shape of some popular elixir, affords these innocents a brief taste of the sweets of existence and, keeping them quiet, prepares them for the silence of their impending grave. Infanticide," he adds, "is practised as extensively and as legally in England as it is on the banks of the Ganges; a circumstance which apparently has not yet engaged the attention of the Society for the Propagation of the Gospel in Foreign Parts."

It was also customary in these years to send babies into the country to be nursed by peasant women. The well-to-do made their own arrangements, while the lower classes turned their offspring over to charitable nursing bureaus or left them at the foundling hospitals or orphanages that existed in all large cities. Of the operation of these foundling hospitals a good deal is known, and from this knowledge it is possible to infer the fate of thousands of babies that were sent to the provinces for care.

## Illegitimacy

The middle and late eighteenth century was marked by a startling rise in the rate of illegitimacy, the reasons for which have little bearing on the present argument. But so many of the unwanted babies were being abandoned, smothered or otherwise disposed of that Napoleon in 1811 decreed that the foundling hospitals should be provided with a turntable device, so that babies could be left at these institutions without the parent being recognised or subjected to embarrassing questions. This convenient arrangement was imitated in many countries and was taken full advantage of by the mothers in question. In many cities the authorities complained that unmarried mothers from far and wide were coming to town to deposit their unwanted babies in the accommodating foundling hospitals. The statistics show that of the thousands of children thus abandoned, a significant proportion was the offspring of married couples.

There is good reason to suppose that those in charge of these institutions did the best they could with what soon became an unmanageable problem. Very few of the children could be cared for in the hospitals themselves. The great majority was sent to peasant nurses in the provinces. In any case most of these children died within a short time, either of malnutrition or neglect or from the long, rough journey to the country.

The figures for this traffic, available for many cities, are truly shocking. In all of France fully 127,507 children were abandoned in the year 1833. Anywhere from 20 to 30 per cent of all children born were left to their fate. The figures for Paris suggest that in the years 1817–1820 the 'foundlings' equalled fully 36 per cent of all births. In some of the Italian hospitals the mortality (under one year of age) ran to 80 to 90 per cent. In Paris the Hospice des Enfants Trouvés reported that of 4,779 babies admitted in 1818, 2,370 died in the first three months and another 956 within the first year.

**The system of the commons we now live under separates power and responsibility. It is an unstable state. If we want civilisation to survive, and if we are unwilling to go back, then we must go forward. We must take the next step in evolution and bring power and responsibility together once more. This time in the community. The community, which guarantees the survival of children, must have the power to decide how many children shall be born.**

Disraeli was an important political figure and well known writer; one might expect his acid remarks to provoke a storm of protest and a flurry of action. But they did not, probably because most practical men recognised the necessity of infanticide if the family was to continue to act responsibly.

The word is used advisedly, in the best Frankelian sense. The family, and not the state, used to be responsible for the care of the children produced. For the state to have prevented the family from doing away with a redundant child—redundant because in excess of what the family could probably take care of in hard times—without at the same time taking over the care and feeding of the child would have been an irresponsible act on the part of the state, since it would be the parents who would have to suffer the agony (in Linnaeus's words) of seeing the child "pine away in hunger and tears" at some unknown future time of general want.

This appears to be the typical evolutionary path of our attempts to deal with the heartrending problems of poverty:

1. The first stage is one of isolated acts of individual philanthropy, which cannot be converted into a stable political system.
2. In the second stage the need is handled by a system of the commons, the voluntary nature of which penalises people with consciences and subjects everyone to a pathogenic "double bind"; the resulting instability leads to the third stage.
3. In this stage the ideal of law is adopted: "mutual coercion, mutually agreed upon." The voluntary feature of giving is abandoned, and people are freed from the "double bind" of an appeal to conscience. In the first stage —which held sway in Europe for many centuries—population was controlled by a private-enterprise system, the family. The family had the power to produce children; and it had the responsibility of taking care of them.

## Humanitarianism

Then the growth of "humanitarianism"—of concern for others—led to the evolution of the welfare state in the nineteenth century and twentieth century. Whatever one may say about its virtues (and it has many) the welfare state (as it has evolved so far) has a fatal flaw as concerns population control in that it separates power and responsibility.

Power to produce children resides in the family.

Responsibility for taking care of children resides in the state.

In the words of a pronunciamento of the United Nations, signed by some thirty nations in 1967:

"The Universal Declaration of Human Rights describes the family as the natural and fundamental unit of society. It follows that any choice and decision with regard to the size of the family must irrevocably rest with the family itself, and cannot be made by anyone else."

Notice that this gives the family a

right without any corresponding responsibility. So long as power and responsibility are thus separated, population control is impossible. Not a single nation in the world has its population under control; everywhere there is continued growth. Evolution is incomplete.

In matters of reproduction the system we are now operating under is the system of the commons. Every family can now take from the common store to keep its children alive, but the benefits of having children accrue to the family.

It may be questioned whether there are benefits in having children in the modern world, particularly in a non-farm economy. What are the benefits?

This question is not very relevant. Families act as if something is to be gained by having children. It doesn't matter whether their judgment is right or wrong. Breeding couples who resist an appeal to voluntarily restrict their fertility will produce more children than will those who respond to the appeal. Non-conscience has a selective advantage over conscience.

The welfare state creates a commons for the children to draw upon. The children of the conscienceless will be a larger proportion of the population in the next generation than their parents were in this.

To produce a runaway process ("positive feedback") it is necessary only that the transmission of conscience be hereditary in the most general sense —that children resemble their parents more than they do the population at large. It does not matter whether the "heredity" is genetic—through chromosomes, genes, and DNA—or social—through custom and education. Studies show that the daughters of women who have more than the average number of children for their generation do in fact have more children than the average in theirs—which is all that is required to produce destructive runaway feedback. As Charles Galton Darwin, the grandson of Charles, put the matter in 1959, on the centenary of the publication of the Origin of Species: "a purely voluntary system of population control selects for 'philoprogenitiveness' and results in certain failure of the control system."

In this, as in all matters, on a spaceship, the system of the commons ends in tragedy.

What shall we do? Since we will always live on a spaceship, we must abandon the system of the commons. We must bring power and responsibility together again in the same locus.

We could go back—to the private-enterprise system of population control we used to live under. But do we have the toughness to do so? Can we stand idly by and see innocent children starve to death in hard times? I doubt it.

We got rid of that cruel but effective system of population control for what seemed, and seem, good humanitarian reasons. In adding the idea of the welfare state to the social system, we failed to remember that "we can never do merely one thing". When welfare was added to the political system without changing the right to breed, a system of the commons was brought into being. The combination made population control impossible—save by the ultimate cruel measures of Nature; starvation, mass disease, and social chaos.

The system of the commons we now live under separates power and responsibility. It is an unstable state. If we want civilisation to survive, and if we are unwilling to go back, then we must go forward. We must take the next step in evolution and bring power and responsibility together once more. This time in the community. The community, which guarantees the survival of children, must have the power to decide how many children shall be born.

The conclusion is frightening to people reared in the Western tradition. But there is no escaping it. The dangers of state control are immense. How can we circumvent them? This will surely be one of our major concerns for the rest of our lives, for as far into the future as we can see.

# Friends of the Earth

We're all still a bit breathless at FOE after the string of events which has taken place over the last few months. First the bottle shortage, then the newsprint shortage, now the oil shortage. It's very easy to sit back and say, "We told you so!", but not many people listen and fewer believe you.

The rapidity of events quite honestly overtook us. By the time we had planned a brief campaign to capitalise on a topic, the issue was dead so far as the media were concerned, and another crisis was looming on the horizon. So we're now planning ahead (not too distantly) in order to maximise our input and effectiveness over the next year.

Perhaps the most exciting area of work will be in the energy field. Amory Lovins, our consultant phycisist, has produced a document called "World Energy Strategies" (price £1 inc. p & p), which forms the basis of FOE's energy policy and which we hope to use as our visiting card to energy related industries and other concerned bodies. Ideally we would hope to establish a forum for debate on energy issues which would obviate the need for political stances to be adopted. Such politicking is currently overshadowing, and indeed obstructing, the constructive discussion of an integrated and sustainable energy policy for the UK. It has been suggested that this forum be called "Energy 2000", and we would clearly hope to see participation from management and trade unons.

Newsprint has also been in the news of late. The shortage of this commodity has prompted rumblings from within the industry and has led FOE to take a careful look at the activities of its local groups. They have been quietly organising their own newspaper recycling campaigns as, among other things, a source of income for their various activities. The potential for a co-ordinated national campaign is enormous and by the time this article goes to press we hope to have launched a full-scale campaign to pressurise local authorities into recycling newsprint. Of our 80 local groups, many already have the necessary expertise in this field, and they will be prompted to use the precedent set by those authorities who do recycle newsprint as the tool to bend the attitude of those who don't.

After a year of work, FOE has finally produced its Endangered Species Bill. Months of vetting, argument and amendment have proved successful in so far as Lord Wynne-Jones has agreed to introduce the Bill. Basically the Bill attempts to plug the holes in existing legislation concerning the importation of animals and deals at length with animal products—an area which has received scant attention to date. The Bill could take up to a year to wheeze its way through the channels of bureaucracy, but once it becomes law we hope to see a sharp decline in the despicable trade in animal products.

The FOE Co-ordinators meeting is to take place in London, late in January 1974. A venue has yet to be arranged but it is hoped that the meeting will give us a chance to discuss the development of the local group structure as well as to sort out a list of priorities with regard to the servicing of and liaising with our groups. As they become more effective and sophisticated in their activities, it is fully recognised that the network of groups working at a local level on campaigns affecting their own towns is a very important area of growth (excuse the terminology) for FOE. We are therefore anxious to promote their potential effectiveness in the right direction with guidance from the co-ordinators themselves.

Perhaps the biggest non-event of 1973 was World Environment Day—June 5th. It was one of the Resolutions produced by the Stockholm Conference, but like others it was promptly forgotten when delegates dispersed. June 5th 1974 is also World Environment Day and FOE intend to make use of it. We've thrown a few crazy ideas around, but as yet we haven't decided on a feasible event. Whatever scheme is finally agreed upon, it will clearly need a lot of organisation and co-ordination if it is to be effective.

*Pete Wilkinson*

# Report

## Kenya rejects call for change

Eleven years after gaining their independence from Britain, 6 million people in Kenya—comprising half the population—are unemployed; the income of another two million households is less than £200 a year; one quarter of all children are suffering from malnutrition; and the illiteracy rate is between 80 to 85 per cent of the entire population. During this period Kenya's rate of economic growth has been maintained at between 6 to 7 per cent; an impressive figure, higher in fact than that of most countries in the non-industrialised countries.

Why then has the increased wealth so patently failed to have made a dent in Kenya's problems? Early in 1972 a team of experts from the International Labour Organisation (ILO) visited Kenya at the request of the Government to study the unemployment problem in the country and suggest ways and means of providing more jobs. After an exhaustive survey, the team published a 600-page report in November, of the same year.*

The team discovered that the reason for mass unemployment in the country lay in the structure of the economy which was designed during the colonial period to maintain a tiny minority in great comfort at the expense of the majority. The report noted that the gap between the rich and the poor, since independence, was much greater than in most countries in the non-industrialised world. An indigenous elite has been substituted for the British elite; but the colonial economic structure remains unchanged.

The team's report was that little or nothing could be done to solve the unemployment problem without first focusing attention on the more serious problem of the large and widening gap between the rich and the poor. It made a series of recommendations which would involve fundamental changes of policy in departments as diverse as health, education and fiscal control. The sum total of these measures, if implemented, would transform the way of life in Kenya. In effect the government of Kenya was invited to undergo a peaceful non-violent revolution. In the report ILO suggests that in order to raise the

general level of incomes, the salaries of the top 25 per cent of wage earners should be frozen for seven years while the lowest paid workers should be allowed to catch up.

The team also noted that most of the land is owned by big farmers. These farms are less productive than they could otherwise be, either because they belong to businessmen too preoccupied elsewhere to manage them properly or because insufficient capital has been invested by the landowners to develop them. The report recommends the division of such lands into thousands of family-sized small holdings for distribution to landless agricultural workers.

The reports notes that development is concentrated in Nairobi, the capital. It suggests that this trend should be reversed, and that the way to do this and stop the migration from the countryside towards destitution in the towns is to put a ceiling on spending in Nairobi where skyscrapers spring up daily. The report suggests a minimum amount of money to be spent in the rural areas.

The report also states that the Government should discourage private investors both local and foreign (mostly foreign) from setting up Western-style factories in Kenya, using capital-intensive or automated machinery. It calls for the setting up of simple plants using labour-intensive methods which Kenyans themselves could build. Finally the report insists that the Government should use every possible means of controlling population.

After spending 10 months to study the report, the government of Kenya has decided against the revolution. A Sessional Paper published by the Government in September 1973 accepted 60 per cent of the recommendations. But the most radical 40 per cent met with polite refusal and were indefinitely shelved.

The freezing of wages for the top 25 per cent of the wage earners was out of the question. What was needed in the Government's view was more economic growth so that increasing wealth would be available to go round —at a much more rapid pace than hitherto.

The Government agreed that subdividing the land into small family-sized units was a good idea, but would not force it on the nation.

The Sessional Paper however does say that the Government will buy land which is offered for sale on the open market for resale in smaller units.

It is a well known fact that Kenyans tend to hold on to their land for as long as possible. Consequently the amount of land that is going to be available for sale to the Government in this way will be very small indeed, and will make little or no difference to the worsening situation in the country.

The Sessional Paper makes it quite clear that there is no intention on the part of the Government to de-urbanise the country. Things will go on pretty much the same way as before, with development concentrated in Nairobi, to the detriment of the rural areas where the majority of Kenyans live and where abject poverty is most evident in all its worst manifestations. The Government has no intention of dictating to people with money and opportunity where to invest. They must make their own choices. Neither will investors be told what type of industry they should set up.

By offering the Kenyan Government with the chance to opt for appropriate technology at the village or community level the ILO report presented Kenya with an alternative to large scale industry. The Kenyan Government says that no such choice exists as, in its view, Kenyans lack the technical know-how to run small-scale industries and workshops, and that even if the switch from large-scale to small-scale industries and workshops were made, Kenya would still have to depend on foreign capital, technology and personnel to run them.

There is no doubt that all these practical suggestions had they been accepted would have gone a long way to solving the country's unemployment problem. It is a pity that the Government has thrown them overboard. The situation in the country will only get worse.

A situation in which a tiny minority is getting richer and the large majority is getting poorer is bound to lead in the long-run to an unstable situation in which the majority would attempt a violent revolution to oust the tiny minority. The Kenyan Government may have thrown away a very good chance of a peaceful and non-violent revolution.

*Jimoh Omo-Fadaka*

* "Employment, Incomes and Equality: A Strategy for increasing Productive Employment in Kenya". Published by the International Labour Organisation (ILO) Geneva, 1972. 600 pages.

# Books

## Abandon Hope

THE REHABILITATION OF HOUSES AND OTHER BUILDINGS.
Royal Inst. of Chartered Surveyors 1973. 80p.

Even before the 1960s there were chartered surveyors, engaged in tasks of stunning mediocrity. But then, with the age of U-2 (you and me?) and other developments—like urban "development"—the chartered surveyor took on a new profile.

He became an indispensible cog in the machine of city reconstruction. These harmless-seeming men (sometimes now sporting progressive bristles and tufts) could visit a home, measure a few variable, and pronounce the home—in a flash—an evil slum.

This then can be used as the final seal on a Compulsory Purchase Order, enabling a local authority to buy the home and land for a fraction of market rates. After that comes the lovely concrete.

In areas of London and other cities (such as virtually any in England) housing tracts of 1,000 acres could be expeditiously remodelled in coherence with state capitalism, and generous bones for the private developer. After Poulson, silver coffee pots, M-way boxes to the solar plexus, and sewage that wage insidious war on natural systems, one could legitimately expect at least a shade of penance in the RICS report.

However, we don't find it. Instead there is plenty on providing cold and hot water to pensioners, and occasional fascinating facts such as the 800,000 homes without a WC (the Clivus market?).

In conclusion, we can say that this report shows the pupil as not lacking in self-deception, or insane priorities.

*Andrew MacKillop*

## Rape of the Sea

THE LAW OF THE SEA by Elizabeth Young and Brian Johnson. Fabian Research Series 313. 50p.

It is rare these days for a week to go by without some incident involving the Royal Navy and a little tub called the Aegir being buzzed across the water and regurgitated in dramatic form in the column of the Press. But even more rarely is recognition of the international significance of the Icelandic fishing limits dispute. What has up to now been sadly lacking is a definitive work which would enable the lay reader—and indeed the expert—to achieve the perspective against which to judge both Iceland's case, and the merits of the many other innovations and developments currently threatening the wet five-sevenths of the earth's surface. The recently published Fabian pamphlet "The Law of the Sea" provides us with this perspective.

Its authors, Brian Johnson and Elizabeth Young, patiently, and with clarity, explain the many problems and choices which will confront the delegates at the forthcoming Law of the Sea Conference—which itself will be the most important international get-together since Stockholm 1972. The Conference, originally scheduled for Santiago in 1974, seems all too likely to be postponed and relocated (although at the time of their writing the authors had no such inkling) but the pamphlet, at pains to stress the importance of getting to grips with the decision which will have to be made, merely underlines the necessity (particularly for the "developed" nations) of recognising the need for control and for equity in the management of our oceans. The postponement should be seized upon by Britain and elsewhere as an opportunity to construct a coherent and practical philosophy of ocean protection and administration. Whether it will be remains to be seen.

What then, is the authors' main thesis? By far the most fundamental question is the political one of whether, in the interests of long-term benefit and plain old-fashioned fairness, the big nations will undertake to check the unparalleled greed of their quest to take more of the sea's living resources than is sensible, and more of the sea's mineral resources than is equitable. Veterans of Stockholm and of organisations like the International Whaling Commission, are bound to remain sceptical.

But what is required—and what is unlikely to emerge from the Law of the Sea Conference is a truly international UN-style administration of the world's oceans. The authors argue with force that it is only by such means that exploitation of the wet world can be effectively and fairly controlled. Economic benefits should be centralised and then disbursed; no nation, however well technologically equipped has the divine right to steal whatever ocean space has to offer. Britain, Japan, USSR and the USA seem united in their determination to protect this right of theft. Unless they are prepared to question the principles of "freedom of the sea" and laissez-faire then the Law of the Sea Conference is doomed to failure.

Even were the principle of planned sea-use to be accepted, there would still remain myriad questions to be resolved. How far should the sovereignty of a sea-state extend? How could a centralised administration effectively maintain and control military expansionism, fishing, oil exploitation and manganese nodule-grabbing? To each of these matters and authors address themselves, and the arguments they advance exhibit at least the quality of consistency.

It would be quite wrong to suggest that "Law of the Sea" provides all of the answers, but the document must be recognised for what it is—an invaluable exposition of the dilemmas inherent in the management of the last of our planet's great commons. It should be read.

G. Searle.

## Organic Gardening

THE ENCYCLOPEDIA OF ORGANIC GARDENING. Rodale Books, Emmans, Pennsylvania.

Most gardeners find it useful to have at least one basic work of reference, where they can get instant, brief information on anything from cauliflowers to compost-heaps. The *Encyclopedia of Organic Gardening* is that sort of book, but with a built-in bias of a kind which should recommend it to readers of this magazine. The bias is not boringly obtrusive—all gardening is 95 per cent organic anyway, and so is bound to get roughly the same treatment in any work. This book must be judged on its handling of the other 5 per cent. On the whole, it comes out fairly well. *Compost*, for example, gets 11 pages plus separate articles on many compostable materials, which cast an exciting new light on some familiar objects (I bet *you* didn't know that banana skins have a higher potash content than any other common organic matter).

There is plenty of scientific information here, on trace elements and soil and plant physiology: there's even a rogues' gallery of artificial fertilisers. But the information on chemical weed killers and insecticides is disappointingly brief. The organic gardener needs to know about these things, if only, so as to have a good answer ready when people ask why he doesn't use them—just as (I believe) Catholic priests used to have a thorough grounding in all the major heresies. And are *all* chemicals bad, anyway? I've been happily using nicotine (from boiled fag-ends) for years, to kill greenfly, because I read somewhere that it degrades rapidly: now this book tells me not to. Most of us are so ignorant: it's up to books like this to give us the facts.

But on most other relevant subjects the *Encyclopedia* did not disappoint me. Indeed, it contains a great deal of material not normally found in gardening books, but useful to gardeners who take the word *organic* seriously—on livestock of all kinds, for example, from cows to earthworms. It is an American book, but despite the occasional language difficulty (I searched in vain for Marrow and Runner Bean) this is all to the good for any British reader who likes to know about oranges and dates and pineapples even if he can't grow them. It is, in fact, a book not just to refer to, but to browse in. Where else could you find between one pair of covers articles on Dynamite ("if simple precautions are followed, a safe and reliable tool"), Frog farming, Peanuts (which, it seems, will withstand light frosts and can be grown in New England—so why not here?)? Linnaeus, Freezing vegetables and Dutch Elm Disease? *And* as much as most of us need to know about potatoes and lettuce hollyhocks and marigolds, and every other garden plant from Abelia to Zygopetalum!

*Nicholas Gould*

As a service to our readers the *Ecologist* will in future provide a monthly review of articles appearing in selected scientific journals—in the main those covering primary research publications which appear particularly relevant to the general ecological problems that we face today. We are at present covering the following journals: *Archives of Environmental Health, Atmospheric Pollution, Clean Air, Environmental Pollution, Environmental Science and Technology, The Lancet, Marine Pollution Bulletin, Nature, Science, State Veterinary Journal, Food Processing Industry, Food and Cosmetics Toxicology, British Food Journal, Pesticide Biochemistry and Physiology, Pest Articles and News Summaries* and *International Pest Control.* This list will be gradually extended.

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**Polluted snow in southern Norway**
A. Hagen, A. Langeland, *Environmental Pollution, 5* (1) 45 (1973) Sulphate, nitrate, zinc, lead and acidity in snow cause deterioration in Norway's waters. Zinc and acidity pose a particular threat to fish.

**Cadmium uptake from sewage sludge enriched soil**
L. Linnman, A. Anderson, K. O. Nilsson, B. Lind, T. Kjellstrom, L. Friberg, *Archives of Environmental Health, 27* (1) 45 (1973) Toxic Cadmium, a frequent sewage contaminant, is taken up by wheat (and so possibly other plants) when contaminated sewage sludge is used to enrich (particularly acid) soils.

**Effect of china-clay wastes on stream invertebrates**
P. M. Nuttall, G. H. Bielby, *Environmental Pollution, 5* (2) 77 (1973). The deleterious effects of china-clay wastes present in Cornwall's rivers are documented.

**Life form succession in plant communities on colliery waste tips**
C. G. Down, *Environmental Pollution, 5* (1) 19 (1973) The colonisation of undisturbed colliery waste tips is followed from a period when no plants are present (tip age less than 12 years) to one when the entire surface is covered (98 years). As neither grass nor leguminous plants were found to be pioneer plants, their use in tip reclamation schemes may entail a continued programme of aftercare to prevent regression.

**Distribution of caesium-137 in British coastal waters**
D. F. Jefferies, A. Preston, A. K. Steele, *Marine Pollution Bulletin,* 4 (8) 118 (1973) Routes taken by the very low levels of caesium-137 entering the Irish Sea from the Winscale nuclear fuel processing plant have been mapped to show how pollutants in general entering coastal waters disperse. Unexpectedly, contaminated water was found to hug the coasts of Scotland and Ireland, suggesting coastal waters are under a greater threat than was thought.

**Danish seabird disasters, 1972**
A. H. Joensen, *Marine Pollution Bulletin, 4* (8) 117 (1973) Documentation of the seabird victims of oil pollution around the Danish coast in 1972.

**Rainfall patterns and atmospheric circulation**
D. Winstanley, *Nature, 245* (5422) 190 (1973) Rainfall records from the Mediterranean, Middle East, N.W. India and northern Africa during this century suggest trends over the past millenium and make possible speculation for the next fifty years. Pertinent to our response to the drought situation south of the Sahara, and for long term planning in general.

**Radiation spill at Hanford; anatomy of an accident**
R. Gillette, *Science, 181* (4101) 728 (1973) Documentation of a leak from one of America's nuclear waste storage tanks which continued unnoticed for 51 days leaking 115000 gallons of highly radioactive material.

**Toxic metal fumes from mantle-type camp lanterns**
K. Griggs, *Science,* 181 (4102) 842 (1973) New gas mantles examined in America contained 600 micrograms of toxic beryllium, most of which was volatilised and became airborne in the first fifteen minutes of lantern use. Ignorance of this phenomenon creates an unnecessary health risk.

**Estimates of air pollution in the U.K. 1971–72**
*Clean Air,* 3 (10) 10 (Summer 73) Estimates of total quantities of the major air pollutants released in the U.K. include a total figure for sulphur dioxide of 5.93 million metric tonnes.

**Environmental impact; controlling the overall level**
W. E. Westman, R. M. Gifford, *Science 181* (4102) 819 (1973) A rationing system for society is described controlling environmental impact while maximising personal choice.

**Restoration of mercury-contaminated bodies of water**
A. Jernelov, H. Lann, *Environmental Science and Technology, 7* (8) 712 (1973) Methyl-mercury, formed in the environment from man-made mercury wastes, is the major mercury contaminant of fish, etc. Methods for dealing with mercury polluted lakes by cutting down methylmercury formation are presented together with a documentation of mercury pollution in Sweden.

**Insect control with pheromones**
J. L. Marx, *Science, 181* (4101) 736 (1973) Brief summary of an approach to insect control which utilises new knowledge of the natural systems of chemical messages (sex attraction, etc.) with which insects regulate their lives.

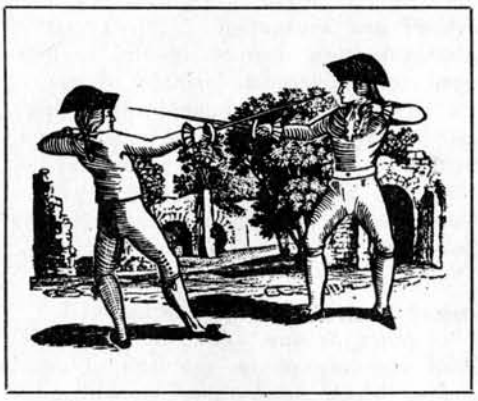
**Removing phosphorus from waste water**
S. L. Daniels, D. G. Parker, *Environmental Science and Technology, 7* (8) 690 (1973) *Removing nitrogen from waste water.* C. E. Adams, *Environmental Science and Technology, 7* (8) 696 (1973). Two useful technical summaries relating particularly to the U.S. situation.

**Long distance transport of sulphur dioxide pollution**
H. Zeedijk, C. A. Velds, *Atmospheric Environment, 7* (9) 849 (1973) High atmospheric sulphur dioxide levels observed under certain weather conditions in Eindhoven, the Netherlands, arise from industry in the German Ruhr, 100 KM away.

**Lead pollution in Britain, past and present**
J. A. Lee, J. H. Tallis, *Nature, 245* (5422) 216 (1973) Lead analyses from peat samples taken at different depths and from present day and 19th century (museum) moss samples reflect historical changes in environmental lead levels. A peat profile from the Snake Pass, Derbyshire, downwind from Manchester, shows a massive and sustained increase in lead from the AD 1460 level onwards, corresponding to regional industrialisation and the rise of the Derbyshire lead industry.

**Workers do it themselves**
D. H. Wegman, G. T. Theriault, J. M. Peters, *Archives of Environmental Health, 27* 105 (1973) Results of a union initiated survey to determine the prevalence of asbestosis (a lung condition associated with inhaling asbestos particles) in an American wall-board manufacturing operation show definite evidence of lung disease. The company had refused to release X-ray film.

**"National Survey" air pollution samplers.**
R. A. Barnes, *Atmospheric Environment,* 7 (9) 901 (1973) While air pollution samplers used in the U.K. National Survey of Smoke and Sulphur Dioxide give good results for sulphur dioxide are open to doubt unless "care and precision beyond that which might be expected of most laymen", who frequently operate them, "is employed".



# Letters

## Politics and the environment

Sir,

With regard to the recent Liberal revival and the current publicity of Liberal philosophy, particularly that of "community politics", I am surprised by the lack of comment in the *Ecologist*, in view of the common ground shared.

The environmental movement has always maintained that questions relating to population, resources, etc. transcend party political boundaries, and no party in Britain has dared to consider openly, or even acknowledge, the extent of the problems. Certainly the DOE, established by the Conservatives, has taken steps to reduce pollution, but its terms of reference lie within the overall Government strategy and more radical action can hardly be expected. On the Labour side, the supposed conflict between environmental protection and the standard of living of the workers is only now beginning to be resolved. The Liberal party has, I understand, produced a more perceptive analysis of the situation, and an environmental programme which is slightly more relevant than the others.

However, it is now another aspect of the discussion which has come to the fore, with interesting implications; the success of community-based political action, initiated by the Young Liberals emphasising the individual and his role in the local community, seems to me to indicate more than disenchantment with Conservative and Labour policies. Obviously it parallels community action taken up by people with a common cause, whether they form a squatters' association or an anti-road-development group. These movements surely suggest that a climate of opinion exists which offers at least a toehold for the promotion and acceptance of some of the ideas of the Blueprint for Survival.

I don't wish to imply that, merely on the strength of some common objectives, the environmental movement should be linked with the Liberals. (Although, if, as has been mooted, political action within the existing party system is desirable and/or necessary, perhaps it is not out of the question.) But if such political and social indications are neglected, we may be missing an opportunity to publicise, at the very least, our interpretation of the world situation and our aims. It is an opportunity we can ill afford to ignore.

Yours faithfully,
*Deborah Elton*,
3 Ailsa Road,
Twickenham,
Middlesex.

## Acids rains in Scandinavia

Sir,

I refer to Arild Holt-Jensen's report in the October 1973 *Ecologist*.

I draw your attention to the article in *ORYX* of May 1973 which states:

"Total emissions of sulphur dioxide in the United Kingdom, mainly from electricity power stations (whose emissions have trebled in 20 years) are now at an all-time high at 6 million tonnes a year. This has increased atmospheric pollution to such an extent that lichens have been devastated right across the North European plain, and some countries, such as Denmark and the Netherlands, are now completely devoid of a natural lichen flora".

Yours faithfully,
*Brian Rome*,
25 Avon Way,
Stoke Bishop,
Bristol.

## Fluoridation

Sir,

As from April 1st the decision to fluoridate or not comes away from District and County Councils etc., and into the hands of the new Regional Water and Area Health Authorities—essentially appointed, not elected, bodies.

According to the Department of Health, a main cause of dental decay is the amount of sugar and sweets ingested. It has never been suggested that it is caused by lack of fluoride. Sodium fluoride is not a food, nor a vitamin, but an industrial by-product.

Fluoridation is compulsory mass medication. Not only does this mass medication not cater for individual needs and weaknesses, it undermines a doctor's status, for it removes from him the right to prescribe for his own patients. It also removes one's elementary right to decide what one shall or shall not ingest. It is up to the G.P. to decide, on the merits of each case, whether it is safe or desirable to prescribe fluoride to his patients.

Fluoridation by Health Authorities makes pollution respectable. True, some forms of fluoride occur in the natural water supply—but then so does arsenic, lead, etc. Before the war, efforts were made to remove fluoride from the natural water supply or find alternative sources.

Children, we are told, have a right to the fluoride which will condition their teeth—especially the under-privileged. But children also have a right to go without the fluoride which may prove harmful or objectionable to them in later life.

No case has so far been made anywhere in the world establishing the physical, mental or moral safety of fluoridation beyond doubt. Let those who favour the use of fluoride do so by means which do not inflict their personal medicament upon others. Surely we can, with confidence, trust to our common sense?

Yours faithfully,
*R. A. Boatman*,
4 Hill View,
Highgate Road,
Forest Row,
Sussex.

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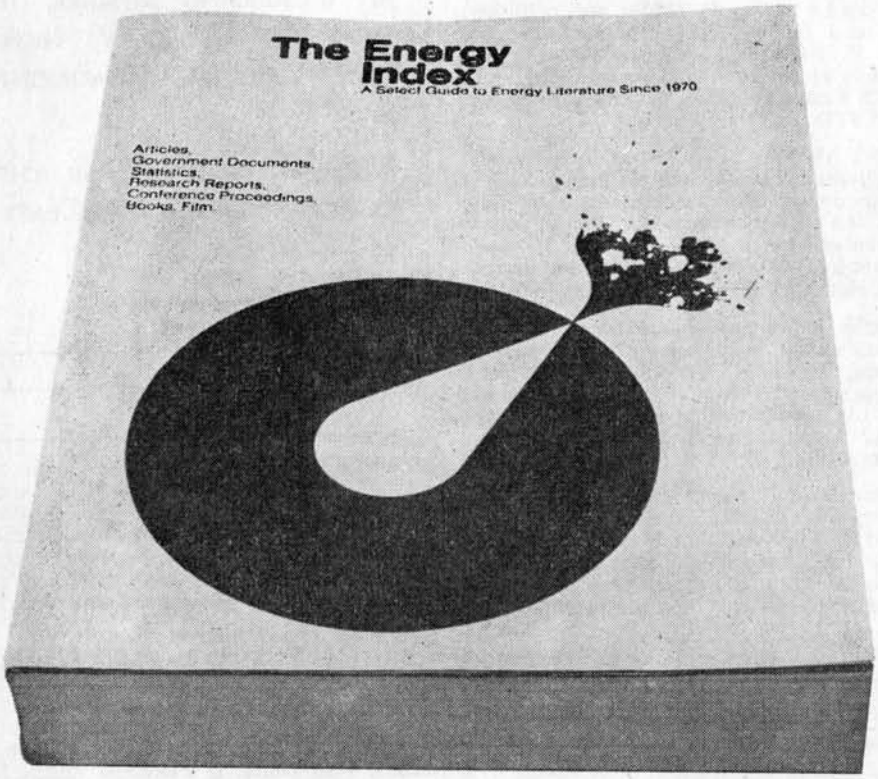


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ECOLOGIST

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