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FELL A TREE IN '73

It's a happy new year for trees, according to the Department of the Environment. A DoE circular has been sent to all local authorities, promoting the slogan "Plant a tree in '73" and offering them grants to plant trees in treeless areas.

However, when the *Ecologist* asked if local authorities were being advised to make felling more difficult, DoE said no. "We are being much more positive than that", said a DoE spokesman. "We are concerned only with planting." He refused to comment on the usefulness of offering grants for treeplanting if felling is allowed to continue unchecked.

The Department is in some difficulty, since it is actively considering schemes for the destruction of woodland, for example the route of the M16 motorway (otherwise known as Ringway 3) through Epping Forest in Essex.

One route being vigorously promoted by the Upshire Preservation Society and Copt Hall Estates Ltd., a private company owning a large slice of country outside the Forest, will go by tunnel directly through it. The advantage of this scheme is that it will leave intact privately owned countryside. The disadvantage is that it will cause much disturbance to the publicly owned Epping Forest.

According to the Essex Branch of Friends of the Earth and the London Branch of the Conservation Society, who are co-ordinating opposition to the spoliation of south-east Essex as a whole, the main objection to the tunnel scheme is that it will damage many of the trees by affecting the sub-soil drainage so vital for them and by imposing on them the toxic fumes from ventilation shafts. There is also the danger that once the scheme is

A

approved a complete tunnel will be found prohibitively costly and it will be abandoned for a cheaper cut-andcover method—which will do extensive damage to the Forest.

Alternative available

An alternative to the tunnel proposal is the Northern Transport Corridor (or Hastingwood/North Orbital route) promoted by the Federation of Northeastern Metropolitan Green Belt Amenity Societies. This body lacks funds, unlike the backers of the tunnel, and is therefore unable to put across its case as effectively as it deserves. For the northern route has real merit. It would deflect traffic from the Forest since its junctions with M11 and M12 would be well away from it. The one or two motorways being planned to link the proposed airport at Foulness with London, instead of being additional to the M16, could be absorbed into it. This would greatly reduce the pressure on Epping, so that it would then be possible to downgrade the A11 which at present runs the full length of the Forest.

The Northern Transport Corridor would encroach on green belt land, but this would be amply compensated for

continued on page 3

OECD "loses" shock report

Worried officials of the Organisation for Economic Co-operation and Development are anxiously turning out their filing cabinets in search of a 200 page report. The report, which presents the alarming implications of likely emissions of nitrogen oxides, particulates and sulphur dioxide over the next two decades has unaccountably been "mislaid".

The document's most important conclusions are: The OECD area (Western Europe, North America, Japan, and Australia) is rapidly reaching the point when it must choose between industrial expansion and clean air. If control policies are kept at their 1968-70 standards then there could be a 70-80 per cent increase in the three pollutants by 1980. Attempts to disperse them by siting industry and power plants in less populated areas or by building taller chimneys are likely to encounter growing opposition, in the first case from ecologists and other lovers of countryside, and in the second from countries where acid rain is affecting forestry and fishing. Countries like Britain which already resort to such practices may be forced instead to remove pollutants at source and to contain industry in already industrialised areas.

During the 1970s, emissions of nitrogen oxides appear set to rise by 69 per cent in North America, 78 per cent in Europe, and 240 per cent in Japan. Because no adequate control technology exists, it is most unlikely that there *continued on page 2*

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Published by Ecosystems Ltd., registered office 11 Mansfield Street, Portland Place, London W1M 0AH and distributed by the Hachette Group, Continental Publishers and Distributors Ltd., 4 Regent Place, London W1R 6BH; Telephone: 01-734 5259; Telegrams: Alibrairi London W1; Telex 25114. Subscrip-tions to: The Ecologist, "Catesby", Molesworth Street, Wadebridge, Cornwall. Printed by The Garden City Press Ltd., Pixmore Avenue, Letchworth, Hertfordshire SG6 1JS.

© The Ecologist, January 1973

OECD "loses" shock report, from p. 1

will be any way of checking these rises other than by stabilising fuel consumption.

Danger point for hemisphere

Emission of sulphur dioxide will probably double-from 23 million tons in 1968 to 47 million tons in 1980. Natural sulphur production in the northern hemisphere is 62 million tons a year, and man-made emissions will grow as high as this during the 1980s -"a transition point", says the report, "to be approached with caution". The cost of reducing the 1980 SO₂ emissions to the 1968 level would be from \$5,800m to \$15,600m capital and from \$2,200m to \$4,200m a year operating costs.

Europe must build 14 oil desulphurisation plants each year from 1974 if sulphur emissions are to be stabilised. "There are serious doubts", remarks the report, "from both the construction engineering and the investment points of view, whether the necessary desulphurisation installations could be built". At the moment countries like Britain have been content to build tall chimneys and burn low sulphur fuels such as oil and gas from the North Sea and oil from North and West Africa. These policies are severely criticised by the report as prodigal of "short life resources". They merely put off the evil day when clean technologies must be introduced, with the eventual effect that their introduction will be that much more difficult and expensive. The report suggests that such technologies be phased in now, so that the clean fuels can be made to last longer. Unless such measures are taken, by about 1980 governments will face the awkward choice of reducing energy demand or persuading their electorates to tolerate an environment significantly inferior to the one they enjoy now.

The OECD report has received little publicity, apart from some coverage in the Observer in July last year. Doubtless this is because it has not been published, though in the normal course of events it should have been by now. The embarrassment of OECD officials is easy to understand, for governments will have difficulty persuading us of their dilemma without such important documentary evidence. Robert Allen

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Pollarded beeches in Epping



M16—Ringway 3 All routes shown are approximate

A M11 route B Hastingwood/North orbital route of M16 C Bell Common route of M16 D Wake Arms route of M16 E Possible interim route to Dartford Tunnel while southern part of M16 is built F Ringway 2 G M12 1 Waterworks Corner 2 Maybank Road/Southend Road Junction 3 Wanstead Park

Fell a tree in '73 from p. 1

by its guarantee of security from development for the Forest. In addition, supporters of the Corridor suggest that the area bounded on the west by the Lea Valley development, on the east by the M11, on the south by Ringway 2, and on the north by the Corridor itself, be treated as an "environmental zone", graded for the diverse recreational needs of the area. For example, go-kart race tracks and areas of intensive visitor pressure could be put together and the bulk of Epping Forest conserved as tranquil natural woodland.

The Corridor's supporters and the many other people anxious for the integrity of one of the most important tracts of publicly owned broadleaved woodland in England are hopeful that the Department of Environment's concern both for the conservation of trees and for a rational transport policy will be reflected in its decisions on Epping. the Department However, seems anxious to avoid any public participation in them. Last year, it sent a bullying letter to the Urban District Council of Waltham Cross in Essex, threatening to cease disclosing its route plans to the Council if it passed them on to members of the public affected by them.

Robert Allen

Fireproof not cancerproof

It is well known that asbestos causes lung cancer in those workers exposed to it. Now Dr Irving J. Selikoff of the Mount Sinai School of Medicine and Dr E. Cuyler Hammond and Herbert Seidman of the American Cancer Society's Environmental Cancer Research Project have implicated it in the three-fold increase in cancers of the stomach, colon and rectum among the same workers.

They also suggest that low-levels of asbestos dust in the air increase the risk of cancer to the general public. The application of asbestos insulation during the construction of buildings and especially the wearing away of brake linings in cars and lorries release fine particles of asbestos into the air which are then easily distributed by winds. The lungs of people and other animals exposed to such air have been found to retain the particles for some time. New York Times, 5 Oct., 1972.

Lake Snowdonia?

On May 24th 1972 the Liverpool Daily Post reported a Rio Tinto Zinc spokesman as saying that the company had not yet decided to go ahead on copper mining. "If permission was given", he added as an afterthought. He also said that the opencast mines proposed for the Hermon valley in Merioneth would cover an area of from 200–300 acres and be 1,000 to 1,500 feet deep, but a mining consultant on BBC's "Horizon" on May 22nd had stated that the mines needed to be 8–10 square miles to be economic. We can take it that they'll be big anyway.

Curiously, on the same day that RTZ at last admitted that the proposed mines would be opencast, the Central Electricity Generating Board announced that they had chosen Llanberis, under Snowdon, as the site of their new £75 million pumped storage scheme. This would involve the despoliation of a remote upper cwm, designated the upper basin, with a dam 85-140 feet high, and two dams 36 feet high on Llvn Peris (one at each end) as the lower basin. The rise and fall of water level there would be 55 feet. The original river would by-pass Llyn Peris via pipes-creating a potential flood hazard in a district which now floods naturally but harmlessly in heavy rain.

TV tea demand

Basins of pumped storage schemes are involved in a twice-daily cycle of drainage and replenishment (ideally the two basins being separated by 1,000 feet of vertical height) so for much of the time one sees not water but black mud. Thus they can be used for no form of recreation. A CEGB spokesman on BBC Welsh radio of May 25th said the projects would attract tourists and explained the need for pumped storage by the peaks in consumption caused when, for example, after a popular TV programme, people got up to make a cup of tea.

An alternative to the scheme at Llanberis would be a site in Cwm Penamnen at the head of Lledr valley. The man who farms the acres which would be inundated wants to improve his land. The Council for the Preservation of Rural Wales asked the CEGB on his behalf if they could give an assurance that they would not come here for this second scheme within five years. The Board said they could give no such assurance.

Such schemes have effects far wider than the original projects. At Llanberis the upper basin is now a drinking water supply. An alternative would have to be found, and to meet this and the demands for water of growing industries on Anglesey a number of schemes have been proposed, some in popular valleys, others in remote cwms. All except one are in the Snowdonia National Park.

The valley called the Nant Ffrancon (up which the A5 runs) escaped flooding by the CEGB in 1949 only to be coveted by the Water Resources Board in 1972. The relevant plan envisages a dam 1,640 feet long, nearly 200 feet high, and an artificial lake drowning two miles of bottom land below the Ogwen Falls. The farms, dependent on this land as an integral part of their pasturage, would be wiped out, along with the wildlife of a unique glacial valley.

A second reservoir would be formed by a dam in the remote Cwm Llafar on the Carneddau, a valley now bare, wild and beautiful.

It is proposed to draw water from Llyn Ogwen (beside the A5 and below Tryfan). A new dam would raise the water level by 1.6 feet, but a proposed drawdown of only 4.9 feet would result in 22 per cent of the lake's bed being exposed. However, the volume of water could be augmented by a pipeline laid from a lake high on the Carneddau (Cowlyd), necessitating leats collecting water from the southern catchment area of the range and new roads for their construction.

A plan associated with the Ogwen/ Cowlyd scheme is proposed for the enchanting lakes of Crafnant and Geirionydd, although Crafnant would have 10 per cent of its bed exposed in the event of a drawdown of only four feet. Ten feet and the exposure would be 21 per cent. At Llyn Cwellyn in the south, a pumping station feeding an aqueduct is planned for the outlet, the output being augmented by leats constructed to take water out of a remote and beautiful cwm on the south side of Snowdon.

Cwellyn is a Site of Special Scientific Interest and the freshwater life at the outlet would be seriously affected. The raising of the lake level would mean the construction of new roads and destruction of native trees on the shores; the lowering of the level would mean, as with every reservoir, exposure of part of its bed.

Yet another one

West of Snowdon, seldom visited or even seen except by those who need such places, is a small lake, subject of yet another scheme. The dam to make it a reservoir would be 33 feet high and 600 feet long—not small in relation to the lake which is only about 400 yards in diameter. The water is used for rearing salmon but the Fishery Officer says that the scheme would be detrimental to them, and that goes for the rest of the flora and fauna.

The last of these major schemes is outside the park but its effects would be widespread. It is a proposed barrage across the river Conway: a development which would facilitate the creation of a marina at Conway, possibly prevent tidal flooding (one wonders how quickly freshwater floods and melting snow would get away through a barrage—the Conway has a big catchment area with very heavy precipitation)—and embody a "vastly improved road link".

These proposals are based on the demand for water in 2001, but construction would start as soon as possible. The calculation takes into account only a fraction of wastage. If all this could be eliminated demands could be cut drastically.

Wastage occurs first at source where, if existing storage facilities were improved (i.e. among other factors, existing dams maintained) much water could be saved, particularly in a region where rainfall often exceeds 100 inches. Wastage between source and consumer varies between 10 and 15 per cent. On the consumer's premises it is 25 per cent. These are the River Authority's figures.





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Comment

What is "need"?

In calculating the relative costs of rail and road transport, we consider the £100 million or so loss made by British Rail annually as a cost, whereas the £500 million we spend every year on the construction of highways is regarded as output and figures in our social balance-sheet as "production", and hence increased wealth.

Both expenditures must be covered by the taxpayer, and both serve the same function—that of favouring mobility. Why then should one be regarded as something negative, a "cost", and the other as something positive, a "product".

Take a complicated process like the manufacture of a motorcar. One can regard it atomistically and consider each sub-process, such as the manufacture of the battery and the carburettor as involving costs, justified in that they yield an end-product. For the company that assembles the motorcar, however, these products figure as costs.

Now if for the society, of which the company is an integral part, *the process* as a whole is not to figure as a cost, *then an end-product is required*.

What then is the end-product? Does the motorcar really qualify? From the point of view of society can the provision of a motorcar be regarded as an end in itself? The answer is clearly no. Motorcars have no value *per se* but simply as a means of moving things and people about. But is mobility then an end product? What, in fact, is the advantage of moving things and people from place to place? As Gerald Foley points out, it usually implies that they were in the wrong place to begin with.

The need for mobility is thus, to a certain extent at least, a sign of disorder, and the costs involved are but a part of the price we have to pay to restore some sort of order.

At best we can regard mobility as satisfying a need. People need to move about for all sorts of reasons, and therefore, in a democratic country one must enable them to do so. This principle is usually referred to as *consumer sovereignty*. It is perhaps the basic tenet of our consumer society, and provides a justification for most of the social and ecological disruption at present going on.

I think it worthwhile looking into this whole notion of "needs". Clearly in different environmental situations people develop different needs. In our industrial society people appear to need motorcars. There are already about 200 million of them in the world, and at current trends we should have 400 million by the end of the century.

Taking into account the immense damage the motorcar gives rise to: damage to our health and disruption of terrestrial and marine ecosystems as a result of pollution, depletion of resources, destruction of agricultural land, deterioration of the quality of life in our cities, it would appear very undesirable to satisfy this particular need. What, however, is the alternative? One cannot ask a man in Los Angeles to do without his car. The city is designed around it. There are drive-in shops, drive-in banks, drivein cinemas and even drive-in churches. The pedestrian would be isolated from the city's social and economic activities. It is even said that in all likelihood he would be arrested as a vagrant. In such "science fiction" conditions there may be a genuine need for the motorcar.

One might even go so far as to say that in a situation where land values are rocketing it may be difficult to provide the 100-per-cent-mobilised, churchgoing population, living miles from a place of worship, with both a car-park and a conventional church. In such conditions the drive-in church might well be the most reasonable compromise and it would not be an exaggeration to say that there was a genuine need for this unlikely amenity.

One thing is certain: industrialisation creates needs faster than it satisfies them.

As people are provided with cars, the need for roads must increase, further increasing the need for cars, and gradually extending the area within which a person's day to day activities are concentrated. This expansion occurs long before the majority of the population has been provided with motorcars, their need thereby remaining to be satisfied.

Creating needs is in fact very easy. If I were to invent a machine that got people out of bed in the morning, took off their pyjamas and deposited them in their bath, washed them, dried them, dressed them and presented them appropriately garbed at the breakfast table, one could conceivably create considerable need for this absurd device, especially after it had entered into current use in more fashionable circles. Needless to say, the satisfaction of this need would be far more difficult, though considerably less so than that of the world's increasing need for motorcars.

Unfortunately a system can only remain stable within a given range of environmental conditions (see Goldsmith, Edward. A Model of Behaviour, *Ecologist*, 2 (12)).

It is these conditions whose maintenance constitutes the real needs for man. If they are no longer respected there can be at best but an illusion of stability-pseudo-stability one might call it-maintained by the precarious application of external controls: pesticides to control insect plagues, dams to prevent floods, vaccines to prevent epidemics, policemen to prevent massacres. These are crude, and effective in the short-run only. They do not cure the disease but mask it by suppressing its symptoms, and the need for them as reflected in the GNP can but provide a measure of real instability.

Discontinuities bring "needs"

In a self-regulating system, one in which constituent human societies fulfil basic ecological functions, a stable relationship can be maintained at little cost in terms of energy resources and hence in terms of social and ecological disruption. As it is interfered with, so must there be a corresponding increase in the rate and seriousness of discontinuities and hence in the "needs" for external controls. Their satisfaction can only give rise to further changes in the direction of increased instability.

Our government is basically interested in remaining in power, which means obtaining votes. The best way to do this is to bend over backwards to satisfy as many "needs" as it can. What it calls planning is simply accommodating trends, acting as a catalyst in the process of increasing social and ecological instability.

Present-day economics provides a naive accounting system based on the

illusion that the processes involved are giving rise to end-products such as motorways, motorcars and drive-in churches that have a value *per se* as opposed to representing the costs, in the lunatic situation we find ourselves in, of maintaining an ever more precarious socio-ecological pseudostability.

Edward Goldsmith

The sterilisation of Stockholm?

We will not know until after this issue has gone to press, the final details of how the UN General Assembly treated the recommendations of the Stockholm Conference on the Environment. But the main lines of the settlement are already clear.

How did Stockholm fare in New York? The answer of course depends upon one's expectations. At one level, the New York gauntlet was run successfully. The Action Plan of 109 recommendations has apparently emerged intact. So has the Declaration on the Human Environment. Both of these products of Stockholm sailed majestically through Second the (Economic and Social) Committee of the General Assembly, which is also the ultimate overseer of the UN's environmental activities, with all rigging intact. But on the location of the new environmental body proposed at Stockholm, the pass has been lost.

To the surprise and indeed shock of onlookers, Nairobi, Kenya, was voted to be the UN's environmental headquarters. The determined drive for Nairobi by the UN's third world majority came so late in the day that the remaining task-force left over from the Stockholm secretariat, combined with the few Western governments with electorates concerned enough to make them care, were utterly overwhelmed in the flood.

are the implications of What by last-minute Nairobi? Judging attempts by some influential individuals to defer the decision and leave the environment body in Geneva for the time being, the consensus of the betterinformed is clear. It is, they believe, going to be almost impossibly difficult -especially in view of the new body's cheese-paring budget-for Stockholm's successor organisation to exert a major influence where it is needed most. How are UN officials going to influence, or even keep track of, the decisions of the major polluting and consuming powers eight jet hours (two hours time change) from the centre of Europe and sixteen jet hours (a shattering eight hour time change) from New York?

Maurice Strong puts on a brave face when discussing this turn of events. As he puts it, "L can live with Nairobi". If he is to continue with the job of running the UN's environmental activities—as he apparently still hopes to do —he clearly has no option. His pursedlipped staff agree. Yet a Nairobi-based staff on a slender budget will find it very difficult to keep their tabs on industrial countries' scientific research and opinion in this fast changing field.

A leadership role in co-ordinating and promoting environmental standards-setting, and the job of monitoring environmental impacts, were described by the Stockholm secretariat as the chief contribution that the new UN organisation could make. Can this conceivably be achieved from East Africa?

The greatest weakness of the UN's system of Specialised Agencies, which in any case would have to carry out most of the UN's environment promoting, monitoring and standards-setting work, is that they are specialised. They have lacked, conspicuously, in the past, any effective overview of their functions or any central direction of their priorities. As a result they have sniffed at every conceivable issue, but chewed little. Although at first glance Nairobi might seem a good choice, a means of focussing on the environmental problems of the non-industrial countries, many of them are caused by the aid and development policies of the industrial countries and of the Specialised Agencies. The new UN environment body, whose Stockholm charter was by far the most substantial achievement of the Conference, had a real chance of giving the UN system a focus, and perhaps of checking the wilder excesses of the Specialised Agencies. Now it is to be stuck out on an airline limb. There must have been dancing in the Agencies on Nairobi Night.

Strong must now fight to keep a foot, or at least an antenna, in Geneva or New York. Otherwise the Stockholm initiative to give mankind effective eyes, ears and nose to sense our planetary fouling, will fail for want of a sensory cortex.

This Strong is doing. He is spurred on by the real possibility that if all the UN's environment operation is consigned to Nairobi, the US Congress may well baulk at paying up its \$40m share of the new \$100m-over-five-years fund for environmental operations. As it is, Strong has a desperate struggle ahead, between the time of writing this and Christmas, to secure a sufficient slice of the UN's stagnant regular budget to realise his present minimal environment organisation staffing proposals, which, it has been agreed, must be separate from the operational fund. Strong asked for \$1.3m a year, assuming a Geneva base. The rich West, still busy cutting "spare" flesh off the UN's body, appears willing to allow him only a bare \$1m a year. For Nairobi, with a vastly greater travel bill, costly accommodation, and the need for some European base, his estimated needs are close to \$2.5m to do the same job.

The true tragedy will be if he is sent to Nairobi on less than his proposed budget. That really would be a oneway ticket to oblivion. If it turns out that this is all that he does get for the one and only global environmental organisation, then the UN system and all who rely on it will be the principal losers.

MP joins anti-French bomb protest

The Labour Member of Parliament for Durham has announced his intention of joining New Zealand's Prime Minister when he sails into France's Pacific nuclear testing grounds.

France, who conducted atmospheric tests of nuclear weapons in the summer of last year despite strong protests from New Zealand and other countries with Pacific coastlines, has stated that she will go ahead with even bigger tests this year. Mr Norman Kirk, newly elected to the premiership of New Zealand, has promised repeatedly to take a frigate into the testing grounds should France begin such tests again.

Guardian, 29.11.72

Gremlin

Cast off

Up with your rods, bait your hooks. The DoE has officially announced that the improvement of the Thames Estuary has resulted in the return of many species of fish (see The Environment-Great Britain. 1972. HMSO). So what was all that nonsense on the BBC's "Down to Earth" a few months ago when Britain's top anglers assembled, poles in hand, for a day's fishing under Lambeth Bridge? Eight hours and not a bite? Well, as one of them remarked, things must be getting better: a couple of years ago no one would have been daft enough even to try to catch fish under Lambeth Bridge. Ouite so. What else has changed?

Pipe cleaners

Perhaps surprisingly, the DoE is a bit worried about those extra 17 million motor cars to be on the roads by the year 2000. In one "Happy Birthday DoE" publication, the Department points out that the stuff coming out of exhaust pipes might not be very good to breathe. So if there are going to be twice as many cars "further action" may have to be taken "to guard against any danger". Now when Alice was asked by the March Hare whether she wanted another cup of tea, the bright girl explained that she could hardly have another cup until she'd had the first. Of course everyone's in favour of "further action". The further the better. But further than what?

Quick Marsh

Come on then, own up. Who was the wag down at the DoE who wrote in their latest new glossy, *Transport and the Environment*, that the new generation of faster-than-ever trains would be able to run on "virtually existing tracks"? And which R and D man came to the conclusion that "virtually existing tracks" were just the sort of tracks for a virtually existing railway?

Oops

In the past year of operation the Department of the Environment has

aged by 100 per cent. Scientists at the Massachusetts Institute of Technology have calculated that at this rate of linear increase in ageing, by the year 1989, the DoE will be 262,144 years old. This will mean that in the foreseeable future the DoE will have embodied all of the knowledge amassed by man since our Swanscombe ancestor pegged out in Kent. Using a scaled-up model of Anthony Crosland's cerebral cortex to represent dangers inherent in the oversimplification of world ecosystems, the scientists were able to deduce that anyone purporting to represent the environment would disintegrate at a rate commensurate with that of the environmental destruction caused by his policies. The Prime Minister has now moved Peter Walker to the Department of Trade and Industry.

Half Nelson

The idea of having a treaty to stop countries dumping dangerous stuff in the oceans made us all very happy. Especially when it included a ban on the dumping of agents of biochemical warfare. There was a bit of a problem over warships though: military vessels aren't covered by the treaty. And what sorts of vessels cart agents of biochemical warfare around? You guessed it-military vessels. Don't worry about a thing says the treaty: military vessels are going to be controlled by their parent states. Could we be forgiven for thinking that it all seems rather like old times? Kismet, Hardy. And a bloody awful Kismet at that.

Econuts

The Council for the Preservation of Rural England has sent out a leaflet about a poster design competition it is running. In it, the CPRE describes itself as endeavouring to "ensure that not a single acre is lost unnecessarily through greed, indifference or bad planning and that change, which is inevitable, is for the better whenever possible". It's this sort of extremism which gives ecology a bad name.

Zuckermania

RTZ, the world's first conservationist mining company, is reeling from a massive assault by ex baboon expert, Lord Zuckerman. The good Lord has started a new craze, Zuckermania, and now has a large following. Zuckermania, for those few still unmarked by it, is an irrational love of National Parks and Areas of Outstanding Natural Beauty, backed by the absurd belief that they are likely to be more pleasing to our grandchildren than an assortment of abandoned mines, ghost villages, and "restored" spoil heaps ("the one painted green represents spring, the yellow one autumn... of course the Ramblers will love it").

Plan your family and your garden

The Family Planning Association now markets its own brands of contraceptives, a twin pack of sheaths and spermicidal foaming tablets called Two's Company, and a sheath called Forget-me-not. Further floral contraceptives from FPA will include Lady's Bedstraw, Common Storksbill, Bastard Balm, Bladder-seed, Mind Your Own Business (or Mother of Thousands), and Deadly Nightshade.

And now, live from Cornwall ...

(The *Ecologist* has moved. Allaby, Allen, Bunyard, and Goldsmith, and various of their kith and kin have now taken up their positions across the Tamar. This then is the first instalment of an everyday story of urban folk, and their struggle to wrest a precarious living from the hostile land ...)

Bunyard is the world's first subsistence scrap farmer. Clearance of his land has revealed bumper crops of oil drums, corrugated iron, rubber tyres, and engine blocks. It took six lorry trips to remove it all. Who said mining is a dying industry in Cornwall?

Upon this rich earth, Bunyard keeps a goat. As is proper, Mrs B milks it. Or rather she milks half of it, the other half responding only to Bunyard. The goat is a hearty eater: the other day it strolled into the sitting room and ate up all the alabaster eggs.

As he practices the ecological word he preaches, Bunyard has a van that won't go up hills (Cornwall is nothing but hills) and a pony and trap that does. Every time the pony meets Goldsmith's dog, it bolts. The last time it bolted Mrs B and the kids were aboard and Bunyard, who was not, had to jump into a ditch to avoid being run down. The pony is called Susa, which Bunyard says is Hebrew for mare, but probably means old cow.

The ecology of housing

by Amos Rapoport



What is built is more important than how it is built. And in deciding what should be built, purely physical standards are much less important than maintaining cultural integrity. The author shows that by forcing us to depart from the confines of conventional design, the ecological approach to housing can lead us to an architecture which is socially supportive rather than destructive.

My contention is that the decision about the forms of space organisation to be used (which are assumed to be the essence of design) have been arbitrary. The variables which need to be considered in making these decisions are very numerous, and include perceptual, symbolic, social, territorial, implementational and physical criteria as well as those which could be classified broadly as cultural. I concentrate solely on the cultural variables. While I draw my examples from both industrial and so-called primitive cultures to show their general applicability, I argue that these variables become particularly critical in the case of developing countries. There are four major steps to my argument:

 Accepting that social change to western forms in emerging countries is neither inevitable nor desirable. I assume that the rich variety of cultures, value systems and life styles typical of most developing countries will survive.
 There is a link between culture and built forms, and the forms of the physical environment can be supportive or destructive of life styles, values systems, and cultures.

Monrovia, Liberia

3. The stress in most housing design has been based on health, climatic, economic and technological criteria, but this is too limited, and, in many cases, absolute housing and planning standards are extremely questionable. 4. Variables related to traditional social organisation, family structures, symbolic values, cultural definitions of environmental quality and the like, should be considered, and there is a need to see housing in the broadest social context—what could be called the cultural ecology of housing.

Survival of other cultures

A great variety of cultural groupings is typical of many developing countries. There are many languages, world views, ways of life, family and social structures, and a correspondingly wide variety of traditional and village forms. These must be considered in all decisions relating to these countries. There is obviously a value judgement implicit at this point—that traditional values and organisations are important and actions should be designed to help

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them survive. They give the world richness and variety, i.e. they are good in themselves, and the loss of any one of them is equivalent to the final destruction of a species. One can in fact argue by analogy to ecology, that complexity and species diversity lead to stability. Eiseley1 has in fact argued persuasively for the need to have a multiplicity of cultures in the world. He points out that archaeology and history show that many cultures have failed, died and been forgotten. A variability of approaches to the future may be needed for the survival of humanity; putting all our eggs in one basket may be dangerous; choosing one channel for development unsafe. "An event is taking place which would never occur under biological circumstances; a single monstrous 'animal' is being born on which we are placing all our hope for mankind."2

We assume that our own culture is superior to all others—yet nature likes to keep very diverse species for stability. Eiseley described how many cultures consciously refuse ours, yet are doomed by its forces. He questions change for its own sake, and also whether Western technological culture is the only one—in view of the current ecological crisis one may well doubt it. He concludes that even given their poverty, high death rate and the like some of these cultures may provide a quality of life we cannot match.

It could be assumed that many such cultures could teach us something about the varieties of the good life for example, that quality of life is not necessarily identical to lots of consumer goods, it may be that economic growth and technology are not the only values—or even the right ones.

One question which could be posed is: "Can some measure of development in economic terms, in health and the like be achieved without corresponding changes in style of life, culture, cognitive categories and social and symbolic structures?" Without becoming involved in economic argument I am prepared to argue that slow change is preferable to fast change because it may prevent the demoralisation caused by change which is too fast.3 Slow change may help arrive at a new synthesis of economic growth and preservation of cultural identity. In order to achieve economic growth it may well be necessary to allow for the effects of culture. Several suggestions

have been made along these lines in relation to Asia⁴ and Latin America⁵ although the stress has been on how to achieve such growth rather than how to help cultures survive.

Similar thoughts emerge from the study of inter-personal relations within formal organisations in our own culture. Conflicts are often found between technological and social aspects of production lines or organisational structures. In most cases the technological aspects win out, but one could argue that stressing the social aspects is preferable, both for the individuals concerned and possibly for technological efficiency.6 Economic modernism is similarly in conflict with traditional values. Usually the latter are shattered, their roots destroyed, the place of living moved away from the land of the fathers. The imperatives of productivity may be resisted by traditional forces7 but economic criteria usually win. But need they?

It is thus possible to question both the inevitability and desirability of technological, economic and social change to Western Style. I accept without attempting fully to justify it, that traditional cultures need to be helped to survive.⁸ Then the question is "What are the design implications of taking a position of cultural relativism?"

Design and behaviour—general considerations

Given the possibility of different cultures surviving, what is the relation of space organisation and built form to culture? Before we can discuss this, a brief look needs to be taken at the effects of environment on people. The literature on this is voluminous and controversial.9 In summary, as manenvironment studies have developed the views of this subject have undergone several changes, starting with a position of environmental determinism -that by redesigning the physical environment one could "redesign" people's lives, there was a reaction to views held by some social scientists stressing the importance of the social environment and the unimportance of the physical environment. Currently a more balanced view is accepted-that there are effects from both the physical, socio-cultural and psychological environment.10 In fact most of the models are multi-dimensional, stressing the impact of the physical environment on the individual directly and also indirectly through its effect on the social and psychological environments. Ittelson¹¹ proposes seven areas of influence while Lawton¹² proposes that the environment is an ecological system with five components comprising: the individual, the physical environment, the personal environment (friends, family, authority figures), the suprapersonal environment (grouping certain individuals with specific characteristics), the social environment.

In all these models the physical environment is seen either as a catalyst or being neutral, supportive or destructive of given behaviour, life style and values.13 The instances of immigrants in new environments preserving forms of dwellings similar to those of their original home can be understood as supportive in this sense.14 Similarly the way spaces are organised differently in whole landscapes-the notion of cultural landscapes-can also be understood in this way. The function of the physical environment as a factor in helping transitions has received at least implicit recognition in the concept of the "halfway house" in the work of Richard Meier on Asian cities and Anthony Ward on workshops for the blind.15

Accepting the fact that the physical environment is not the only factor involved, it might be of value to consider several examples to show the interaction of the physical environment with behaviour and culture.

How physical form is related to behaviour

The relation in this category is of two kinds:

(i) Forms can be seen as reflecting cultural forms and behavioural and social characteristics.¹⁶ Many specific examples can be given of the close link of technical activities and their religious and social significations. For example, the building of houses is more than an economic or technical activity: it is frequently co-operative and this co-operation sets up networks of obligations, solidarity of community, etc. A change to building carried out by experts for cash may lead to disruptions in these social arrangements-a substitution of the moral order by a merely technical one¹⁷ with far ranging consequences. Similarly layout of villages-say around a dance groundreflects the social structure of a community as does the way dwelling space is organised. For example, the Kuma of New Guinea¹⁸ build separate houses for men and women. Women's houses are designed to allow for their taking care of the pigs—the focus of the ceremonial life of the people and their prized possessions—and are located close to sweet potato gardens and the bush and near the ground.

(ii) Changes in the environment can be shown to change behaviour. The underlying notion here is of the environment as a behaviour setting which through expectations affects behaviour.19 Harrington20 points out how the conditions of a Glasgow tenement, the space organisation and crowding have a major impact on use of space and time, and on both family life and larger social relations-largely through the effect on women. In a similar vein, Le Vine21 discusses the relation of crowding and house arrangement to aggression, as shown by the incidence of witchcraft and mediated by the relationships to multiple wives in three African tribal societies and also shows that with increases in density, caused by changes in agriculture, changes occur in the degree of aggression and incidence of witchcraft.

How changes in physical form may affect culture

The classic instance is Levi-Strauss' description of how Bororo culture in Brazil was weakened by missionaries primarily through destroying the village structure.22 In a contemporary setting there is the study by Richards and Dobyn²³ on how the change in the physical setting of a group of clerical workers in an office changed their subculture, their behaviour, morale and efficiency. There are many examples of the general occurrence of ethnic clustering in cities and settlements in many countries and periods (Italians, Greeks, Lebanese, etc. in Australia and the United States: different groups in Calcutta, Israel, etc.). This clustering provides mutual support, and support of specialised cultural and educational facilities which help maintain the culture. The breaking up of such clustering, say by re-housing, may lead to the weakening and eventual loss of culture and language.24

Panoff's study of the Maenge²⁵ shows that their settlements are closely linked with religious and social organisation and values as well as use of land, and fishing rights. The introduction of cash crops helps to break down community constraints but requires a different settlement pattern, thus the destruction of this pattern may destroy the whole socio-cultural structure.

In making the decision as to what is to be done, consideration must be given to either preserving this structure—or ignoring it in favour of Western norms.

Importance of chains of consequences of even minor environmental changes

A single example will suffice—the now often told case of the introduction of piped water into North African housing by French architects. The result was resistance by the inhabitants; investigation showed that for women in purdah the daily visit to the village well was the only social occasion. The provision of taps eliminated that important social occasion, the women were unhappy, complained to the men who then took action.

The discussion above may be a general formulation by accepting linguistic models being proposed where the environment is seen as a form of non-verbal communication.²⁶ By decoding its messages the inhabitant is given clues as to the expected and desired behaviour patterns. The environment can then be seen as a code where the designer encodes messages which the user decodes. Unless the symbols of the "language" are shared no communication is possible.²⁷

Inadequacy of the current approach

Laporte, discussing housing in Puerto Rico, comments on the difficulties created by this gap in communication between those who encode and those who decode-the designer and the user. Jöerges makes the same point.28 This is partly the case in our own culture, and there is much recent evidence suggesting that attempts to impose designers' values and standards on the public have not worked because they represent different sub-cultures.29 The problem is much more severe when designing for other cultures. Designers generally seem unaware of this problem, and assume implicitly that the users should learn the designers' code rather than vice-versa.

If we accept the view that the environment can be understood as a code, as a system of non-verbal communication through symbols, as supportive or destructive of given culture and life styles, it would seem to follow that any approach based solely on economic criteria judged on Western values, scales, technology, materials, services, health, climate would be

American slum: Harlem



inadequate. Yet most approaches to the design of the physical environment in developing (and developed) countries are based precisely on these criteria.

Decisions are thus taken on the wrong grounds, neglecting psychological and socio-cultural variables. For example, Michelson³⁰ points out that the life style and image of the users are much more important than economics in designing for low income families, while Rainwater³¹ similarly argues for a whole new approach to designing for low income families. The key to deciding how to build seems to be an appreciation of socio-cultural variables.³² ³³ ³⁴ One needs to begin by understanding the culture, world view, values, social organisation, symbol systems and the like of those for whom one designs. In this connection it is useful to restate the scale of the

> concrete object use of object value object symbol object

and stress the importance of the value and symbolic objects in environment choices and decisions.³⁵ Since all these factors are highly variable, it is important to take a cross-cultural approach to any theoretical study and a culturally relativistic approach in design. The weakness of most work so far—both in the analysis and design of housing and community space organisation has been its ethnocentric approach.³⁶ The cross-cultural and relativistic approach, long at the core of anthropological thought and theory, has recently had a major impact on psychology generally,37 perception,38 social psychology, aesthetics and many other fields. Yet this development has had little impact on architectural and planning theory, and even less on their practice. It is still generally assumed that values, standards and designs can be transposed from one culture to another. Yet there is much evidence to the contrary, with which we are all familiar-whether it be the application of English new town standards in Israel or Le Corbusier's work in India.

In a survey of the developing world Abrams³⁹ gives many examples of the mistakes made by outside experts and emphasises the need to preserve social networks and social accountability through tribal and other groups which can impose restraints and sanctions on behaviour. He examines the role in the design of housing of the street, of self-help, of small production units, of different attitudes to wives and points out how the neglect of these vitiates most projects. He mentions the role of squatter settlements, and others have pointed out that one of the main advantages of these is to provide a familiar social environment.

The study, by the anthropologist Peattie,^{40 41} deserves close attention by architects and planners. She questions

American suburb; Northvale, New Jersey



by comparing the "slums of hope" of Latin America with the "slums of despair" of the United States. She points out the difficulty of defining "slum" in view of the fact that the Latin American ones are physically much worse than those in the United States, but have a different social effect. The reason, briefly, is that housing must be seen in its total social context. A house is more than a place to live in-it is a base of operation for entry to a new life and preserving certain values. For people in that position physical standards are less important than location, preservation of mutual support, acquisition of skills and saving of money. She gives examples of the problems generated by the imposition of unrealistically high standards. These standards are often imposed to eliminate eyesores which offend middle class attitudes. This latter point, and some of the others, have been made by Oram regarding New Guinea.42 Abrams43 discusses the difficulty of defining substandard housing and the dangers of a rigid housing policy while Fraser⁴⁴ also questions the concept of absolute standards and argues for the need for relative ones-i.e. seen in context (what he calls relative habitability). Marris⁴⁵ points out that slum clearance in Lagos brought more hardships than benefits and discusses the neglect of traditional villages forms and the importance of preserving kinship structures intact (for security of the old) and the importance of allowing marginal traders and craftsmen and so on. I have recently shown that even purely "physical" standards are culturally variable to a surprising extent-even in Western cultures.46 The general conclusion from all these studies is that absolute and generalised housing and planning standards are not very useful and that values have to be considered. In many cases a consideration of values may lead to effects apparently contrary to the ones which I am advocating. In many developing countries, for example, high prestige and positive value attached to new forms and materials, and many instances can be given from North Africa, Peru, Japan, the South Seas and elsewhere of culturally and climatically undesirable houses being highly regarded. This is still a sociocultural variable fitting into the schema proposed, and it may be due to the low status accorded traditional cultures and

the role of housing standards, generally

life style. We need to consider cultural values in either case and if, on other grounds, the preservation of traditional forms seems indicated the way is shown to how this can be achieved—by stressing the positive values of traditional ways, which becomes a political, educational and implementational problem. Many of the changes are in the realm of materials which are less important than the basic organisation, as I have shown recently for the Navajo and Pueblo Indians.⁴⁷

Cultural definition of environmental quality

Since we design in order to achieve a better environment, the definition of environmental quality is a critical link in the argument—what is a good environment, for whom and in what context. What should be clear by now is that environmental quality is a variable concept.⁴⁸ As one example, one could consider the cultural variability of a concept such as privacy.

This notion of the variability of environmental quality forms part of the rapidly growing field of environmental perception and the perceived environment, which deals with perception and cognition, selective perception and the effects of beliefs on environmental decisions. I draw attention to the growing role of this concept in man-environment studies, as well as geography. The complex issues which are raised-the role of value systems, of sentiment and symbols, the action of mental maps, images and schemata -form some of the mechanisms which link the socio-cultural and physical environments via the notion of environmental quality. If it is accepted that the perception of the environment through the sense is an essential step in the definition of environmental quality, then Wober's work on sensotypes⁴⁹ would suggest that even the selection of sensory stimuli and cues which come from the environment is culturally variable. Thus the nature of environmental quality is not obvious or self-evident but needs to be studied for any given group in all its variability and culture-boundedness.

Generalising all these differences, the definition of environment quality can also be seen as forming part of the notion of cognitive differences, the categorisation involved in perception and evaluation. Some of the findings of ethnobotany, ethnogeography and the like on the culturally defined variations in categorisations seem quite relevant to a study of "ethnoarchitecture" or "ethnoplanning". Such categorisations may be applicable to taxonomies of space in terms of definitions of domains-private/public, home/street, front/back, man/woman. dwelling/ community, and so on. In other words the cognitive domains of a culture may correspond to the concrete regions of everyday life.50 The effects of categorisation have been accepted in psychology, geography and anthropology-I suggest that they have relevance to design also.

Littlejohn's analysis of the Temne house⁵¹ makes quite clear that this house can be understood by understanding the culture and using its spatial categories. Members of the culture "see" space not in the mathematical, geometric and physical terms of Western man but in terms of "closing off" a sacred space from the profane, to use Eliade's nomenclature,52 which makes such space habitable. At a larger scale, and in the context of a Western culture, the study by Fried and Gleicher53 comes to a similar conclusion regarding the categorisation of "neighbourhood" and "slum" by working and middle class people-a study confirmed by many others since.

Some suggestions for a new approach

The complexity of the variables, their

interactions with each other, with other variables and with the larger environment, suggest that an ecological point of view needs to be adopted which would include as much of the larger context as possible. Some of the proposed models for such human ecological systems have already been discussed briefly, as has the notion of habitat selection, based on perceived environment quality and habitability, and as opposed to passive acceptance. There is also the question of what habitat people would select, for which purposes and why, as well as the possible distinction between what people want and what they need. The designer must be able to know these wants and motivations.

A good example of these factors in relation to hospital design can be given. In some cultures the whole family may wish to accompany a patient to hospital. Their presence may decrease alienation, and may be desirable even if medical policy is opposed to it and nurses dislike it (the design of our own hospitals is frequently for the benefit of management, the convenience of staff and ease of management rather than the benefit of the patients). The consequences of having the family present has major implications for space organisation. In Papua-New Guinea this "guardian" problem has been of concern for a long time. The Port Moresby general hospital, it was reported in March 1970, has decided

African slum: Senegal



to build a special dwelling for guardians. The specifics in a given culture may also affect the ward (if the family want to be close), cooking and food preparation (if they want to feed the patient). It could be argued that people would accept any housing with which they were provided and would adapt to it. This is probably the case, but there are social, cultural and psychological costs and stresses involved. An environment which is inhibiting rather than supportive or one which provides the wrong signals (or conflicting ones) and is difficult to decode is less desirable than one which meets these needs. If we use a linguistic analogue and regard the environment as a means of communication, then we need some redundancy (which in language is about 50 per cent).54 The extra load imposed on people by having to learn to decode every detail could be serious-particularly for a people in the throes of change and transition. An environment which is in conflict with traditional cultural patterns-whether of groupings, of space definition, of symbolism, religious meaning or family structure -may well be the factor which might lead to collapse of that culture.

Consider a villager (whether in Africa, Latin America or Asia) moving to the city or entering modern life. He may be seen as caught between two culture systems:

a family based system rooted in the traditional, personal culture.

a job based system rooted in an impersonal and rational culture.

There is a basic conflict set up, of different time-scales, different values, rhythms and orientations.55 In overcoming this conflict the physical environment of the house and neighbourhood may be supportive by helping with leisure time activities, food, music, religion. It may also help by retaining social and ethnic clustering and networks. Even urbanising people-such as the middle class in Africa-are resistant to change up to a point, and tend to preserve extended family groupings,56 in the same way that in India caste and ethnic groupings are preserved.57 It is thus clear that we need to understand the culture for which we are designing, its traditional patterns and the likely (and desirable) ways in which it may develop to a high degree of specificity. It is the specific patterns of eating, sleeping space and time organisation, role of women, family structure and the like which have an impact on design, not any universal generalisations of basic needs.58

There are three problems which need to be solved for satisfactory design:

(a) There is a cultural and communication gap between designer and user which makes it difficult fully to

African suburb: Ibadan, Nigeria



know the culture and its design implications in sufficient detail.

(b) The great variety of cultures and the fact that they are changing rapidly and at different rates—complicates acquisitions of this knowledge.

(c) As a corollary to (b) it must be accepted that there exist many different stages of change and levels of acculturation within a given population. In the same way as too broad generalisations are not useful regarding "needs", it is not very useful to generalise those related to culture changes at one macro-level.59 The most likely response to these problems may be twofold-to use consultants and available data to find out as much as possible about the given culture, and to design in an openended, interdeterminate way,60 providing the maximum of environment choices-both in terms of design and habitat selection. This means fixing some infrastructure and over-all space organisation-done within the known limits of the given cultural contextwith the rest of the development left to the inhabitants as individuals or as a group. In this latter connection openendedness also becomes a matter of involvement with the environment.61 The success of Barriadas and other squatter settlements, the changes in the South West native township in South Africa and the like, suggest that tapping the potentials of involvement by the inhabitants is an important consideration.

One of the major differences between these squatter settlements and designed projects is that they automatically reflect the specifics of the situation. This is shown by the differences between such settlements in different countries, between different settlements in the same country, between areas belonging to different villages and cultures in the same settlement. This, in many cases, assures their success, and also needs to be considered when they are being studied.⁶² They could, in fact be greatly improved by sympathetic aid based on cultural variables.

Conclusion

From this rapid survey of some of the cultural influences on design, it is clear that we need to understand the underlying structure of a culture and its relation to the physical forms before we can design. This knowledge must be specific rather than general both for design and implementation, and open-

endedness may be an important consideration. We must study the vernacular forms since they show most clearly the relations between life styles, values and physical form, the relation of social structure to dwellings, dwellings to the larger environment and so on. The traditional housing and settlement forms, and their associated social and cultural patterns, should be seen as the point of departure rather than being ignored. As early as 1940, Mukerjee63 pointed out that the traditional forms of India were more relevant than the new, and examined the shortcomings of the new formsbut the process of design was not affected. As another example, the compound form of housing and villages in Africa is often related to lineage and is the historically derived stage for socio-cultural patterns.64 In the latter case the questions which need to be asked before designing would then include:

(i) How important is lineage in preserving desirable/understandable characteristics of the group?

(ii) What is the symbolic meaning of space?

(iii) How essential is the spatial arrangement and symbolism for this lineage arrangement?

(iv) What is the relation of the larger arrangement of marketing and shops, compact plan vs. scattered, social and economic function of pedlars or shopping, of ethnic and other clustering and homogeneity to the lineage pattern?

(v) How should any new development be organised to influence the desired end-e.g. the preservation of the family lineage structure?

(vi) What is the feedback through testing of alternatives, including the relative success of alternatives in habitat selection, attractiveness and ability to change and be modified?

In conclusion I will discuss the approach proposed in terms of one of the many possible aspects of social organisation closely related to culture -the family. The major types of families are:

the joint family-the largest (examples being India, China, Middle East, Balkans);

the stem or extended family-common in much of the traditional world;

the nuclear family-the one generation family typical of Western industrial cultures.

I have stressed the need to consider

specifics: in this case it is the specifics of the role of women and the nature of extended family ties as a mutual support network. For example, the extended family pattern often means that older people enjoy positions of status unlike those in the western nuclear family. Family solidarity may provide a form of social security and mutual help, and may have advantages for mothers in freeing them from constant child minding and giving them a chance to earn money. It also helps to socialise, acculturate and control children. All these factors can be most important. Such family networks (as well as tribal and ethnic ones) may also help in aiding new arrivals to the city -or to the urban culture-to adjust and generally provide support by acting as a form of "halfway house".

It has been argued that with urbanisation there is a strong tendency towards the nuclear family. This has recently been questioned, for example by Freed and Freed.65 They argue that urbanisation and industrialisation do not necessarily result in the breakdown of the joint or extended family, either generally or specifically, in India. Similarly, there is evidence that in Japan the extended family has survived urbanisation, while Boxer⁶⁶ points out that in Hong Kong the traditional villages, by preserving lineage organisation, land tenure and the inheritance system, have helped rather than hindered the process of rapid urbanisation and industrialisation. At the same time Young and Wilmott⁶⁷ among others have shown the importance of extended families and kinship ties even in Western industrial cultures (or subcultures within them).

What is generally clear, is that some forms of housing design are fatal to the joint or extended families, and may make these family forms impossible even when their extension is desired in ways very similar to the impact of design on ethnic and cultural clustering. It then becomes essential to consider the forms of space organisation needed to preserve the given family structure (if it is desired) rather than to design for Western norms and affect the family structure by default.

This approach to housing is as valid for developed countries as for developing ones. It is equally valid in any culture or area when designing for groups within it, and particularly for groups lying outside the norms of the designer's culture-as has been demonstrated for Italian-Americans by Brolin and Zeissel⁶⁸ using data from Gans. The argument has deliberately been kept general and theoretical and its purpose has been to raise issues which could be tested for a number of specific contexts.

This clearly is the next step.

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An interview with **PAUL EHRLICH**

by Nicholas Pole

Paul Ehrlich, with his wife Anne. has now added a second edition of Population, Resources, Environment to the list of environmental books he has written or co-authored. It was in 1968 that The Population Bomb was first published. Much has changed since then, as he acknowledges in this interview, but ever since the enormous success of that book forced upon him the role of a leading spokesman on the environmental crisis, he has continued a hectic programme of speaking and writing on the subject.

As Professor of Biology at Stanford University, California, he is currently working on plant-herbivore interaction a study of plants and pests and the mechanisms that each evolve to combat the other. The Green Revolution has made possible vast stands of a single crop, and the purpose of his research is to prevent these stands from being wiped out by a single pest species.

The dogmatic approach

Ehrlich takes to population control has brought upon him a great deal of criticism, not least from other environmentalists. and recently he has become involved in a hard-fought debate with Dr. Barry Commoner, who maintains that population growth is not a serious cause of environmental deterioration. Besides dealing with that debate. he also gave Nicholas Pole his views on subjects that included John Maddox, the editor of Nature, A Blueprint for Survival, the MIT Limits to Growth study, and the continued use of DDT.

Nicholas Pole is the editor of the recently published *Environmental* Solutions.

Have you in any way changed your view of the environmental crisis since you wrote *The Population Bomb*?

Well, I think I'm always changing my view of the crisis as more and more data come in. From the point of view of its seriousness, I've not changed my view at all; or if anything, I've become slightly more pessimistic. From the point of view of whether something might be done about it, I'm somewhat more optimistic. But the general picture, I think, has remained quite constant, and I think most of my colleagues agree with me.

Pete Seeger said recently, "Ehrlich's recent papers show a different tone of voice than what he wrote two or three years ago." Do you agree with that?

I think he's right. We all change our tone of voice as we try and impress people with different things; for instance, when I wrote my first major piece on the environmental crisis, it seemed to me that the population component was being very badly neglected, and I called the book *The Population Bomb* even though it deals in great detail with things like DDT. Now I think that most people in the United States, although not in Britain, understand that population growth is an enormously serious problem, so obviously one changes one's tone. In fact, we've had some recent evidence that the campaign to make people aware of population growth has actually had an impact on birth rates. Because one changes one's tone it doesn't mean the character of the crisis is changed; we're in a process of public education. For the same reason, one wouldn't say the things one can say now in the USA in Britain, where they are four years behind the United States. You pitch your educational programme to the level of the students.

What exactly was the data you got in Washington on the ZPG movement?

Data from the President's Population Commission Report indicated that there was a correlation between the number of children that people had and their expressed concern over the population problem. Previously there hadn't been any sign at all that the current downturn in birth rates in the United States was due to that: it could easily have been due to the economic situation. Data like that are difficult to interpret but at least now there is some sign that a change in attitude has been produced by the great debate we've managed to generate over this problem in the last four years. I hope the sign is accurate.

You would still stand by the statement you made in *The Population Bomb*, "We must have population control at home, by compulsion if voluntary means fail"?

Oh, absolutely. We must have population control anywhere in the *world* by compulsion if voluntary means fail, because population growth has to be stopped. But the question is "will voluntary means fail?" The answer is, of course, we haven't even *tried* voluntary means of any substantial sort except passing out contraceptives, which is not a programme of population control. If governments try any of the noncoercive means and they fail, then governments will clearly turn to coercive measures. That's what we're trying to avoid.

When I interviewed Rudi Hapke of ZPG, she told me this, in reply to the question "If voluntary means fail, how far do you think the government should go?" She said, "Some people tell me that I have more faith in mankind than they've ever seen, and I can't think that that kind of voluntary programme would not work,

but if it doesn't work, then I guess my feeling is that there would be nothing more you could do."

Well, I tend to agree with that in the following sense: It depends on what you mean by compulsory. It could very well be that if population growth doesn't stop, then the very act of trying to move towards some sort of compulsion would pull society apart anyway. I agree with Rudi that there is no reason whatsoever to believe that you cannot change people's attitudes by non-compulsory means guite readily in countries like the United States or Great Britain to achieve changes in the birth rate. I think we're seeing it already in the United States and we'll see it soon in Great Britain. So let's wait to argue about whether or not compulsion might be necessary after we've tried just a little bit of non-compulsion in this game.

Why do you say Great Britain is four years behind the USA?

That's just from my experience in talking to people over there in the scientific community. In the general public very few people seem to understand the problem.

An English environmentalist, Francis Arnold, argues against putting such a desperate emphasis on population control because he says people will only behave responsibly towards a society which is itself responsible and that we should build a more responsible society, rather than move towards coercion.

Well, again, nobody that I know is moving towards coercion. When you say that if voluntary methods fail then we will move towards coercion, you're talking about perhaps 30 years in the future after an awful lot of things have been tried and have failed. Nobody, to my knowledge, no responsible person, is suggesting that we move towards compulsory population control anywhere in the world today. But that is clearly what is in prospect in the middle range future if we don't start now with more palatable programmes. After all, population control takes a long time if it's going to be done by limiting births. There's a tremendous time lag in the system, a minimum of 50 or so years before population growth will halt after the average family size has been reduced to replacement level; and so not

to start now is the grossest kind of irresponsibility.

In the latest edition of *Population*, *Resources*, *Environment* you still cite the Paddocks "Triage" system of dealing with overpopulation in UDCs. Don't you think this might be a morally and politically over-simplified solution?

The Paddocks have essentially come face to face with what is bound to be a problem sooner or later if we continue on the current course. We will be facing all kinds of moral problems because immoral people, like the leaders of the Catholic church 30 or 40 years ago, prevented us from taking the steps necessary to avoid a population-food crunch. Now we're faced with questions that are extremely serious. There are a whole lot of moral questions involved in the environmental crisis. Should we continue to keep death rates down in the under-developed countries by using DDT? Or would it be more moral to let those people die instead of running a risk of having even more people die as a side effect of the continued use of DDT. I prefer to ask, wouldn't it be more moral to stop wasting an enormous amount of money on armaments and so on and achieve the control of malaria in the under-developed countries by putting in more money, and at least temporarily, using more expensive methods to do it? These choices will have to be made. As far as triage is concerned, the question the Paddocks ask is a very serious question. If you have a limited amount of food to distribute, to whom do you choose to give it? This is the kind of question that the so-called moralists would like to duck. I am reminded of Malcolm Muggeridge who told me on a TV show that people starving to death in India were playing their part in God's great drama. Well, that is one point of view, but I'm afraid I can't take that point of view. I think that one has to do whatever can be done to keep the people we now have on the face of the Earth in the best possible condition. But, when you have limited resources, this means allocating them, and that involves moral decisions which a great many so-called moralists are unwilling to face up to. I think the Paddocks showed great courage in facing up to the possibility. They've been mercilessly abused for it. I don't necessarily say they are right in their time scale or

in the answers they come to. What I have always said is that this is the kind of thing we'll be up against; maybe this is the sort of thing that ought to be done. If it isn't, then let somebody else propose a better way of allocating limited resources.

What is your attitude to Barry Commoner's latest book, The Closing Circle?

Dr Commoner did a great service in this country in his attempts to show that there is great damage from the fall-out from atomic tests. He also brought dramatically to the attention of Americans the problems with inorganic nitrogen fertilization; I think that if you look at the first editions of The Population Bomb or Population, Resources, Environment, you'll see that he is cited there and that we have been very much in favour of what he was doing. About two years ago he started tromping around the country saying that all of our problems since 1945 were due to technological errors and strongly implying that the way I wanted to solve the environmental problem was by killing people. After he did this long enough many people began

asking why I did not respond. Unfortunately it then became necessary to get into a debate with him. I and my colleagues tried privately at great length to convince him that a debate would be counter-productive and that we all shared the same goals, but he continued and continues to insist that the only significant factor in producing the environmental crisis is technological error. This view can easily be shown to be incorrect. You cannot say exactly what component of the overall crisis is caused by population growth, what component is caused by affluence, and what component is caused by technological errors, because all three interact multiplicatively to produce the total impact on the environment. The contributions of each vary with which measure of environmental deterioration is used. Taking the most general measures of environmental deterioration, such as total energy consumption or production, it turns out that population growth alone is a factor on the same level of magnitude as the combination of technological errors and affluence. But it's preposterous to try to sort out which of three multiplicative factors is responsible for the whole thing, when

quite obviously we have to attack all three. In other words, to say that any one is much less important than the others implies we can ignore it, and thus disregards the fact that as long as any one of them keeps growing the impact on the environment is going to continue to grow and we will run into grave trouble. Discussing environmental impact is perhaps best done in a context set by the MIT Study of Critical Environmental Problems, where they estimated that ecological demand, that is, impact on the environment, was increasing at little better than 5 per cent a year, or doubling about every 13 or 14 years. What that means is, if the signs of ecosystem disturbance that we saw in, say, 1970 at the time of Earth Day indicated that the system was loaded, say, half way to capacity, then in 1984 the system will collapse (assuming current trends continue). Or, if you want to be optimistic and say that it was only 1/30th loaded to capacity in 1970, then the collapse will be somewhere around 2040. In other words, with that kind of exponential growth in the impact on the environment, only someone who doesn't understand exponential growth would say that we



can safely ignore *any* of the factors that are involved. I greatly regret that the debate has developed with Commoner because I fully agree with him that we must change our technology. He has pointed out many errors in our technology—as have I and as have many other people—and I wish he would simply concentrate on them and not say silly things that denigrate the role played by population growth or increased affluence in generating our problems.

In replying to Commoner in One-Dimensional Ecology (see Ecologist, August 1972) you say that the environmental crisis began when man first began herding and cultivating, or possibly even before that, and from that time he was "steadily and probably irreversibly eroding the capacity of the planet to support human life". Now that sort of talk has got you accused of advocating a return to the stone age.

No, absolutely not. You do all kinds of things in the process of practising agriculture which endanger the ecological systems of the planet. You erode certain aspects of the capacity of the planet to support human life and at the same time, of course, you increase other aspects; but the general trend since the agricultural revolution has been downhill. More and more simple, unstable systems have replaced complex, stable natural systems. That doesn't mean the trend has to continue to be downhill. We can learn to do things better if we can manage to keep the artificial systems relatively small in relation to the natural systems of the Earth, at least until we understand how to run the whole thing without fear of a crash. Man has now become a global force in the ecological systems of the planet. A substantial percentage, something of the order, I believe, of 5 per cent of net global production occurs in agricultural ecosystems. If you look at the mobilization of materials on the planet, of everything from gravel to iron to phosphorus to nitrates, man is already a force on the same scale as natural forces or much larger. The growth of our agricultural ecosystems represents a threat to the capacity of the planet to support human life, because the larger they get the greater is the chance of widespread collapse. We started out a long time ago on our present course. There are large areas of the planet that have been very nearly destroyed by man's agricultural activities: a lot of the Mediterranean Basin, the Tigris and Euphrates Valleys, certain parts of the Amazon Basin and so on, and we're continuing down that course. It becomes irreversible when we laterize soil, when we force populations of plants and animals to extinction, and when we plant huge monocultures and lose genetic variability in crops. If we were very clever we might do other things which would help ameliorate the results of having made these irreversible changes. We haven't been very clever.

Do you agree with Donald Aitken that your argument with Commoner "in no way diminishes the environmental movement"?

Not entirely. We have very large, powerful enemies in the supporters of the status quo and industry and government. I would very much rather have seen the Ehrlich-Commoner differences ironed out, at least as far as possible, in a scientific forum before putting on a debate which allows the enemy to play one person against another and waste energy. John Holdren and I have wasted an enormous amount of time in dealing with Commoner's preposterous hypothesis. I think Aitken made a brave attempt to smooth over the argument, but it's difficult to disguise the fact that when Commoner says population growth and affluence are unimportant he's just plain wrong. If Commoner wanted to stop broadcasting that notion, I would be delighted never again to start the debate.

You are attacked from another quarter by John Maddox in his new book, *The Doomsday Syndrome*. What is your impression of the quality of his argument?

It's hopelessly incompetent. I feel he has done a great service in bringing together all of the really preposterous mistakes that are made by what we call the "environmental backlashers". In fact, the quality of the book would shame a competent journalist—it's almost one long mistake. For instance he apparently thinks that the big environment problem is air pollution, when in fact, from the point of view of an ecologist, that's one of the relatively trivial problems. Energy must be expended to keep air pollution aloft; it's amenable to rather rapid techno-

logical cure and is just a symptom of some of the things we're doing, rather than something ecologically serious. He discusses the matter of the Green Revolution and does not understand the great threat of the loss of genetic variability in crops; he doesn't understand genetics. His discussion of the demographic transition shows the most elementary kinds of errors. For example, he's very prone to talk a lot about birth rates without understanding that the birth rate itself isn't significant, it's the relationship of the birth rate to the death rate. He seems to have a fixation on Lake Erie-this seems to be endemic in England. If it's still possible to get a trash fish out of Lake Erie in the quantities we used to get high quality fishes, this proves that the environmentalists have exaggerated. In fact, it's amazing that most of the criticism of environmentalists implies that they should never make errors. But there are going to be continuing errors in the statements of environmentalists because they are dealing with systems that we don't understand completely and where there is a great deal of uncertainty. One can ask "what about the errors that were made in the past by Mr Maddox? Where was Maddox when all this was developing? What has he been doing for the last 20 years while we were battling to get more sensible pest control systems used instead of the 'broadcast spray' system?" Maddox may be England's Rip Van Winkle syndrome. Suddenly he woke up and found out that his cosy little world was said by some people to be in trouble. So he charged to the defence of the status quo. Maddox is also careless when he cites others. In many places he totally misinterprets things which I have said or done. For example, he implies that I am one of those who have argued that crowding resulting from population growth is a cause of individual disorientation and psychological disturbance and social tension and upheaval, and he then goes on to cite Calhoun and his rat experiments. In fact, it is my own research with Dr J. Freedman which has thrown the greatest doubt on the validity of Calhoun's work for human populations. Our work has been published in England in the New Scientist so he should have found it. He also says, "Dr Ehrlich is against sterilants in drinking water but for compulsory sterilisation by other means." I challenge him to

find where in my writing I say I am for compulsory sterilisation by any means. Do you want me to go on?

I think you have fairly well dealt with him. His original editorial in *Nature* was prompted by the *Blueprint for Survival*. Do you have any major disagreements with the *Blueprint*?

None. I have a number of minor disagreements with it but again, in my view, what we can see now and what the Blueprint clearly brings out are certain directions in which we must move. The question of the details of how we do it is something to which we have to give a lot of thought. But it's really silly to haggle over those details when you have an excellent document pointing the directions out. I would gladly have put my name with those of the 36 British scientists who signed it. Something we often say in the United States is that you cannot win through to elect decent politicians, or to survival, if you insist on agreeing 100 per cent with everybody you work with. You have to do it on 75 per cent or 65 per cent agreement, and I agree with the Blueprint for Survival at least 90 per cent.

Is it realistic, as in the case of Britain, to base a judgement of over-population on the food-producing capacity of the land, or is this too simple a standard, given modern communications and transport systems?

I think that in general that's one of the major things that one ought to consider because the entire planet is overpopulated so it is not possible to count on food sources outside your political unit being accessible forever. Japan is in a terrible bind because she is so extremely dependent on fisheries and food imports. When the fisheries collapse and the other nations just don't have the food to send to Japan, all the amount of foreign exchange in the world isn't going to help her. So I think one of the elements that ought to go into considerations of over-population nation by nation is whether or not that nation can reasonably feed itself from the land within the nation and with the basic resources of the nation. There is enormous need for phosphates for fertiliser, and high quality phosphate rock is getting to be short in the world. Also it may not be possible to get what is needed fast enough by imports-there are problems of time scale and so on. So I think that food selfsufficiency is one of the considerations, but only one. You can always say that

if we learned to live on less food we wouldn't be overpopulated, and that's quite true. You can go from a state of underpopulation to a state of overpopulation without ever changing the number of people. At any given time you judge whether or not you are overpopulated by the effect of the behaviour of the number of individuals present on the various life support systems. Now, it's quite clear that England, the Netherlands, and the United States are badly overpopulated. In the United States it might very well be possible by changing American behaviour to support 209 million people on the resources that we have. In England it would be marginal; that is, it might be possible to support 56 million Englishmen if vou changed to a very different life style, but I wouldn't count on it. In the Netherlands it is clearly impossible to support 13 million Dutchmen. So here are three overpopulated countries with three different probabilities of being able to become not overpopulated without changing their population size.

What is your opinion of the report of the President's Commission on Population Growth and the American future?

The Report was very hopeful in the sense that, having heard all the evi-



dence, a group composed mostly of laymen bit the bullet and came up with a very good set of recommendations, many of them politically unpopular. They for instance heard Commoner and the majority of them simply rejected his view that population is unimportant as a source of environmental problems. They made two recommendations which Nixon has turned down already: one was for access to abortion on request and the other for free access to contraceptives. This is not surprising since Presidents always turn down the reports of their commissions if their commissions do an honest job. As with the Blueprint, I don't agree with everything the Commission said, but it was certainly a better report than I would have hoped for.

You seem to put a lot of faith in taxation methods as a discouragement to having large families, but do you think that they are of much value in the borderline area where a family is deciding to have two or three children?

No, I don't, and I have considerably less faith in taxation methods than I had some time ago. I have learned a lot about the social system and about what is possible. I'm always amazed when someone quotes something out of the 1968 edition of The Population Bomb which disagrees with something I say today and implies that I'm contradicting myself. A lot has happened in the last four years. A lot of new data have become available. I've learned a great deal, and I and many other people have done a lot more thinking since. We do want changes in the tax structure that make it clear that the government is no longer promoting reproduction, but the changes must be made on the basis of a tax deduction. Another serious problem which I was much less sensitive to when I wrote The Population Bomb is the fear of poor people that governmental measures will be taken which discriminate against them, and most tax measures would be of that sort. So I am less anxious to see tax changes and more anxious to see things like women's liberation pushed as a means of lowering our birth rate.

What is your opinion of the *Limits* to Growth study?

I think that it is a much misunderstood

document. I think that it is a good popularization of a first attempt to model the world system. There are technical difficulties in the modelling and there are great difficulties in the level of aggregation of the data used, but it was made quite clear that the people who did the work were very much aware of those difficulties. The Meadows understand what the shortcomings of their work are, and I think that most of the criticism has been preposterous. The point is that the explicit model that the Meadows set up is a hell of a lot better than the implicit models that are used by Mr Nixon and the British Government and Mr Maddox and so on. You can take the Meadows assumptions and say, "I don't like this one, let's change it and run the model again".

The issue of DDT has come up again recently, with several eminent scientists passionately defending its continued use in UDCs.

Maybe the most distinguished person who has done that is Norman Borlaug. Concern about discontinuing its use is partially justified. One of the great improvements in the lives of people in the under-developed countries has been the control of malaria in many areas. often through the use of DDT, and sometimes through the use of antimalarial drugs. If you understand that for a long time malaria was, and possibly still is, the single most serious disease in the world, that's a very important thing. It would be difficult simply to stop using DDT in underdeveloped countries if there were no other way of dealing with the disease. Unhappily, its continued use involves some chance of permanently reducing the life support capacity of the planet, maybe of changing the oceanic ecosystems and seriously reducing fish catches, and thus posing a lethal problem for UDCs. But "fight malaria or save the environment" is a false dichotomy. We should phase out DDT throughout the world because there are better controls already known, and others could be quickly developed, which would pose smaller environmental threats. The hooker is that DDT is cheap and man has not vet made the moral decision that it is more important to spend money controlling malaria in under-developed countries than it is to fly B-52s to bomb the hell out of some of those same countries. When we make that decision, then this phony dichotomy will disappear. The extra money we may have to spend might be considerable, but it is peanuts compared to what we are wasting on space programmes and wars.

In your latest book you call for a new political party, possibly growing out of Friends of the Earth or ZPG; yet ZPG's comparatively small membership is declining and Friends of the Earth's is increasing only very slowly. So how do you think the environmental movement can best get its message across politically?

Well, that is *the* problem. I agree with most of my colleagues that the scientific content of dealing with the environmental crisis is very small. The question is, how does one get political action? At the moment we are in an



economic recession and there is a considerable backlash against the environmental movement. We are lucky to be holding our own. The only thing that is certain is that, as long as we continue the way we are, things are going to get worse and support will again swing back to the environmental movement. I believe that one of the ways of getting political action in the United States is by banding together the people who are really distressed at the way things are going and forming a grand new political movement in the way the Republican Party sprang up more or less around the issue of slavery in the middle of the last century. I don't know how probable that is, but we are really struggling to find ways to change the political system, because that's where the blockade is. It isn't at the scientific end; I think the war is really won there. We know the direction we want to go in and how to start, the question is how do we move the people and the politicians? It is a terribly difficult job. I only have to point out that the horrors of the Vietnam War have been well known to a large segment of our population for a longer period than the environmental crisis has-these horrors are much more real and obvious and involve less scientific analysis-and yet we still haven't managed to get political action to bring that single war to an end. Getting action on the environmental crisis is a very tough problem, and if we don't solve it we're just not going to make it.

Do you think overspecialisation is a danger to the scientist's perception of the environmental picture?

Oh, yes, I think that's the single largest factor. In most scientific 'disciplines we train people very narrowly and actually make it very difficult for them to take a broad view of anything. Ecology is one of the few areas which hasn't done that, maybe because ecology is a relatively diffuse area that has not had enormous successes such as have been experienced in molecular biology and nuclear physics. Ecological systems are extraordinarily complex and difficult to come to grips with. In many ways they are more parallel to the sort of things that psychologists deal with. Much of the criticism of ecologists can be traced very directly to people who simply do not have the background to understand what's going on.

We are trying desperately here and at other universities to build the kind of inter-disciplinary groups which will permit, for instance, physical scientists to gain the kind of background they must have to deal with environmental problems. Some, like John Holdren, have done that very successfully. It is not that the problems are esoteric, but that they require a certain inquisitive turn of mind.

A surprising number of British scientists damn you as a prophet of doom, so here's your chance... what is your most optimistic view of our course in the next 35 or 40 years?

Well, if one of these people went to his doctor and the doctor said, "Look, sir, you have cancer of the liver and if you are going to have any chance of surviving we've got to operate right now," I assume that this character would say, "Don't be such a pessimist, just give me some aspirin and I'll go home and feel better." I am neither an optimist nor a pessimist as far as these things are concerned, I'm a diagnostician. The most hopeful prognosis that I can make is that mankind will see fit to have the operation, that we'll take the chance and really change our ways. I hope that we will control our population. Although there would be an enormous amount of difficulty in making the transition because so many of the dangerous processes are already in train and our time is so short, I hope that we will, on a planet-wide basis, win through to a much better life. That's the most hopeful thing I can say. But I would be a very bad scientist if I said I thought there was any way that the kind of life that I and my opponents treasure can persist if we continue on the present course. I'm very optimistic about what we could do; I tend to be, on the basis of the evidence and the stubbornness of the defenders of the status quo, quite pessimistic about whether or not enough people will see what has to be done in time for the course to be changed.



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The conservation of Cornwall

by Henry Pool and John Fleet

During the Middle Ages and through the dawn of modern history, periodic plagues associated with primitive sanitation constrained city development. Effective drainage systems and improved transport, introduced during the last century as a concomitant to the industrial revolution, however, led to virtually unrestricted urban growth. Progress, Growth and Bigness became accepted as self-evidently desirable goals. It is only now that the fallacy of these goals is becoming apparent as laws of diminishing returns begin to take effect. Although the mushrooming of cities is a world-wide phenomenon, it is most marked in the United States, where 90 per cent of the population now consists of city dwellers. The susceptibility of these urban conglomerations to complete dislocation by failure or sabotage of any of the complicated services which comprise their necessary infrastructures leads to the inference that their evolution has been analogous to that of the once-prevalent giant saurians. And the difficulty of achieving any sense of meaningful community identification in these amorphous population masses inevitably encourages a spirit of anarchy. With such qualitative and quantitive change in cities since the days of the Classical

Both authors are members of Mebyon Kernow. 26 Greek or Italian Renaissance city states, any valid link between the concepts "city" and "civilised" becomes tenuous in the extreme.

Sadly, the term "civilised" has acquired patronising connotations. Nevertheless, the derivation of the word—civis:city —has some validity. Initially, a city necessitated a reasonable degree of specialisation, with production well beyond the level of subsistence farming and a consequent increase in leisure bringing with it the opportunity to cultivate interests not strictly utilitarian. In the Greek city states, where the concept originated, the social structure, based on slavery, further enhanced the leisure possibilities of those who availed themselves of Helot labour.

In the far South West of England, Plymouth provides a small but interesting example of the insidious effects of modern urban growth. Mention of Cornwall's neighbour across the Tamar brings to mind the colourful small harbour town of the Elizabethan sea dogs and the Pilgrim Fathers. Since those days it has grown steadily. By the second decade of this century it had already absorbed its urban neighbours, Devonport and Stonehouse and had attained County Borough status. As a naval base it was heavily bombed-its centre virtually destroyed, along with that of Devonport-during the last war. Its Council rose to the occasion and a new Plymouth, (but not Devonport) arose from the ruins of the old. It absorbed the urban district of Plymstock to the east. Still growing rapidly, it attained a population of a quarter of a million and, by encouraging multiindustrial and commercial developments it began to show ambitions of becoming a Liverpool of the West. As different circumstances apply in each case, it would be invidious to suggest what might be the optimum size for a city but as far as environmental factors apply, bigness is emphatically an undesirable quality. On the plane of human ecology, American type urbanisation erodes any sense of community to such an extent that some of the bigger American cities have violent crime rates which exceed those of the United Kingdom as a whole.

With their outlet for further expansion eastwards blocked, to a large extent, by the mass of Dartmoor, the City Fathers began to look westward, across the Tamar and into Cornwall, for the acquisition of further land. They had done so before, once as far back as the early years of the century and again when the Abercrombie Plan, on which the city based its post-war rebuilding, envisaged the absorbtion of Torpoint and Saltash. That part of the plan was dropped in the face of fierce Cornish opposition and for a time thereafter it seemed that a modus vivendi had been reached, even though Cornwall's unique character received no official recognition.

The Cornish Nation

For of all the Celtic lands within the United Kingdom, Cornwall is the least considered in terms of national identity. The establishment of the Tamar Border in the tenth century, by treaty with Athelstan of Wessex, was followed by long centuries of semi-independent subservience, first to the Saxons, then to the Normans, and finally to the English. Today she retains only the status and legal position of a English County and is effectively a part of England; though many people east of the Border will be aware, vaguely, that the Cornish are in some way, "different", slightly Welsh, perhaps, few are prepared to accept that she requires any special consideration. Thus, when the Redcliffe-Maud Commission, having noted the emergent power of Plymouth,

proposed that the city should be made a full "Unitary Authority", it was quite able to suggest, in addition, that a substantial part of South East Cornwall be given to this new Authority and so revive the City Fathers' dreams of Indeed Derek western expansion. Senior went much farther; in a widelypraised minority report, he put forward a scheme for a "city state", in which Plymouth would control a large part of South Devon and the whole of Cornwall, with the exception of one small district, which was to be given to Exeter! Equally, if one is to believe recent rumours, the Crowther Commission on the Constitution expressed some surprise at being approached by a Cornish deputation, with the request that Cornwall be granted the minimum of full provincial status, when the new regional structures were under consideration.

Be that as it may, the present Government, in its White Paper and subsequent Bill on local reorganisation, has at least recognised the administrative entity of Cornwall by proposing that her Council retain full local government powers within unchanged borders. Moreover, the White Paper and Bill propose that Plymouth should be drastically "cut down to size" by making her a Secondary Authority, partly subordinated to a new, enhanced, Devon Council centred on Exeter. These proposals, when made public, produced a reaction bordering on the hysterical among the City Fathers, one even hinting at a possible taking to the streets in the manner of Derry's Bogsiders. After a few weeks, the more frenetic posturings were replaced by a high-pressure advertising campaign in the form of large-spread displays in local newspapers. These were in a sequence which endeavoured to "sell" the Plymouth-Cornwall "We Belong Together" aspects of the Redcliffe-Maud Report. They were financed by the City Council. Simultaneously, the Council put forward, as its counter-proposal to the White Paper, a scheme for a "Tamarside County", in which Plymouth would be the administrative centre of a large area of South Devon and East Cornwall. So the long wrangle started again and with it, yet another threat to Cornwall's integrity.

No doubt the city's expenditure in these strategems will be the subject of much future recrimination, for there is evidence that they stemmed very largely from pressure within the Council House, the Plymouth man in the street remaining singularly apathetic to his ultimate form of administration. Further, from among those in previously "absorbed" areas, such as Plympton, there is a fair measure of resentment of the city's stewardship since it assumed responsibility for their affairs. In terms of real demand there may be little to fear from Plymouth's empire-building ambitions but there remains, even so, the real danger that determined pressurising may succeed in winning a sympathetic hearing in influential quarters.

One factor, however, which may thwart any ultimate green light for Plymouth's expansion west of the Tamar is Nationalism. The Cornish are a Celtic people and remain so, despite the constant assertions that Cornwall is a part of England and her people English, assertions which might well have been expected to have had an adverse effect on her native culture and traditions. Yet the opposite is true. All down the years the Cornish have maintained an independence of thought and outlook, sometimes subdued, sometimes breaking out in spectacular fashion. And, as the external pressures imposed by the present century have increased, so has this independence, finding, ultimately, its expression in the two National Movements—Mebyon Kernow (Sons of Cornwall), and the Cornish National Party.

Visitors to Cornwall may well come across "alphabet" paper serviettes which show pictorial representations of various Cornish words. Should they enquire about the many exotic-sounding place names, they would discover that the derivations are Celtic, not English. Thus, to quote three familiar

Looe (photo: David Hills)



examples. Penzance means "Holy Headland" (Pen Sans), Hayle, "Estuary" and Porthscatho, "Boats' Cove".

The same applies to many Cornish surnames, (which are by no means confined to those covered by the jingle "By the Tre, Pol and Pen, you will know the Cornishmen", referring to the three familiar prefixes, "Tre" meaning homestead, "Pol", a Pool and "Pen", a head.) But once on this subject one could go on indefinitely-Angove, for example is derived from An Gof, meaning "The Smith" and is thus the Cornish equivalent of one of the most universal of English surnames. For those who would know more of these fascinating aspects of the Cornish scene, good starting points could be P. A. S. Pool's booklet, An Introduction to Cornish place Names, (obtainable from the author at 37 Morrab Road, Penzance, Cornwall) and the glossary of Cornish surnames at the end of Dr A. L. Rowse's book, The Cornish in America.

Less exotic but very noticeable among Cornish placenames are those dedicated to saints. These stem from Cornwall's distinctive ecclesiastical history. As in the other Celtic countries, the spread of Christianity in Cornwall followed a "clan" rather than a territorial pattern. Even after the political subjugation of Cornwall in the tenth century and the corresponding ecclesiastical annexation to the Diocese of Exeter, the pattern of Cornish Christianity remained distinctive. The rich quality of its community life can be gauged from the Cornish Miracle Play manuscripts still extant, manuscripts which display a dramatic content and intensity, harsh and realistic, far removed from the artisan charm of so many English plays of the Middle Ages. Ironically, any presentday Cornish student wishing to set about a formal study of these plays will have to enrol at University College, Aberystwyth, where his tutor will be a Breton. Edward VI's Reformation in England was accepted, on the whole, with little hostile reaction. In Cornwall, on the other hand, it met with a great deal of opposition, culminating in the "Prayer Book Rising" of 1549, a rising seriously embarrassed the which government of the day and which was put down only with the assistance of German mercenaries. One of the ideals of the reformers was to provide the liturgy and Bible to the people in their

own language. Although the new rituals, in England, were unfamiliar, the use of the vernacular was a great help towards their acceptance. There was no attempt to realise this ideal in Cornwall. Instead of familiar rituals in a foreign but familiar language, Latin, the Cornish people were given unfamiliar rituals in a foreign and unfamiliar language, English. Later, compulsory attendance at church services helped to spread the use of English but the Church of England had difficulty in taking root in Cornwall. At a later stage still, significantly, the Cornish temperament was found more attuned to the fervour of John Wesley, and it was Methodism that became the unofficial "Established Church" among generations of Cornishmen. By the time Wesley made his appearance, the use of the Cornish language in every-

day speech was confined to a few pockets in the west, so the Methodist vernacular was English, though in Wales, where a similar situation developed, the use of Welsh as the vernacular led not only to a strengthening of non-conformity but also of the Welsh language. In Cornwall, therefore, although there was a "Welsh" type of religion, the services were in English. but what an outlet for the Cornish Celtic fervour these services provided! To this day, the fiery local preachers of the last century are household names in Cornwall and the Cornish Methodist hymn tunes are still sung wherever Cornish people gather.

In February, 1969, *The Observer's* rugby football correspondent, writing of the County Championship semi-final between Cornwall and the Eastlands,

Miners: St. Just (photo: David Hills)



described the Redruth crowd—and anyone who wants proof of present-day Cornish national spirit should attend a major rugby match in which Cornwall is playing—as "a cross between a Celtic Mardi Gras, a Revivalist Meeting and a lynch mob"! Not meant to be complimentary, but the writer was, perhaps, expressing a greater truth than he realised.

Celtic Traditions

Language apart and landscape apart, visitors from other Celtic countries tend to find a certain affinity with the people. Although the movement towards bigger farms has affected Cornwall, holdings are still very much smaller than the English average. Fishing and mining were both activities which helped to preserve a distinctive ethos even though the Cornish language had disappeared. Since the coming of the railways there has been an everaccelerating migration into Cornwall, whilst the rundown of the tin miningnow experiencing a resurgence-and fishing, with the subsequent economic stagnation, led to a steady exodus of the indigenous population. The newcomers have been, until recently, mainly retired people, so that although this movement has tended to push up prices to the disadvantage of the native Cornish, it has not yet led to an "Ulster" situation.

Folkloric customs, mostly of pre-Christian origin, are more widespread in Cornwall than in any comparable part of England. In Padstow, for example, the 'Obby 'Oss tradition gives May Day a greater local importance than any other day in the calendar. In nearby St Columb the annual Hurling -a kind of "all-in" street rugby, once played all over Cornwall, in towns and in the countryside-is a ritual survival of the game that has been codified on a team basis, in Ireland and in Gaelic Scotland, as hurling and shinty, respectively. And all the world knows of the Helston Furry Dance.

When the Saxon wedge split West Wales, as the peninsula was then known, from Wales proper, the pressure against the Celts of the South West was intensified. The earlier Celtic kingdom of Dumnonia (from which is derived Devon), crumbled, many of its people migrating to Brittany, until the frontier was finally stabilised at the River Tamar. Naturally, the later linguistic conquest followed the same

east to west thrust, so that East Cornwall was the first area to be anglicised. Even so, crossing the Tamar has continued to be "going into England" among people, some of whom were unaware that there was a distinctive Cornish language. Fortunately, such unawareness is nowadays very rare, whilst the numbers of people able to converse in Cornish has risen steadily during the present century.

In insisting on our own Cornishness we do not indicate disparagement of our English neighbours. On the contrary, being (albeit against our wishes when the process was first applied) anglicised, we are in a special position to recognise the quality of English culture. We do assert, however, that, as in botany and zoology, the loss of a species would be an impoverishment, so would be the destruction of that unique entity which is Cornwall. It would be meaningless to claim that, ecologically or conservationally speaking, the Celtic Cornishman is any more enlightened than the teutonic Englishman. Yet, given a reasonable measure of autonomy for Cornwall, at the very least, the opportunities for environmental vandalism would be more limited. An administration which would put an end to Cornwall as a distinct entity would put an end to much more besides. This is a context in which Nationalism and spaceship earth thinking tend to go hand-in-hand. The earlier Welsh experience goes to confirm this. Those who judged everything in terms of a rising GNP, the desirability of bigness and the sacrosanctity of the profit motive envisaged a Wales divided like Gaul of antiquity into three parts. The difference was that each of these three parts was to be subordinate to one of the English industrial complexes: South Wales to Bristol, Mid Wales to Birmingham and North Wales to Liverpool. Wales being a partially-recognised national entity, these ambitions never had much hope of being realised. Since the Cornish nation, as such, has no official status whatsoever, it is still by no means certain that the Plymouth threat to her will be thwarted in a similar way and if the South East is lost, what then? How long would it be before the inevitable erosion of her "new" Border areas led to the situation advocated by Mr Senior?

On the other hand, Cornwall as an administrative unit with a greater

degree of autonomy than that vested in a county council could make a reasonable synthesis between the needs of conservation and employment. Canalising parochialism into a meaningful nationalism, the Cornish authority could allow scope for grass-roots participation in an enlightened administration catering for an area whose people have always been well-rooted in their soil. In contrast, the nebulous concept of "Tamarside" would lead to general apathy and to a fatalistic dependence upon the new Liverpool of the South West.

Indeed allowed proper scope, Cornish Nationalism, in the form of concern for a healthy organic community, integrated into its natural environment, could serve as a blueprint for areas with similar problems. The fortuitouslymanageable size of Cornwall, in conjunction with a national consciousness which derives from vagaries of history would be propitious for a unique and fascinating sociological experiment, out of which, perhaps, could stem much of value for the common good.

Engine house near Redruth (photo: David Hills)



Down to Earth

Birds out of balance

To a nation that spends more than $\pounds 1$ million a year on wild bird food, with some bird-lovers buying $\pounds 5$ worth a week, any suggestion that feeding sparrows in winter is unbalancing our ecology is as shocking as a neat oblong on the Census form for "Colour". Yet in 1972 the Essex Branch of the NFU protested at the harvest losses they blame on bird feeding.

Before the grain can be combined it must be dead ripe, so waits longer in the ear than ever before with varieties sown so the fields come ready for the combine in succession. This provides a protracted feast for flocks of sparrows that now move down to the country for harvest as East Enders once did for hop-picking. The extra food is making more *fourth* broods possible so every extra pair that comes through the winter means eight more birds next season, allowing for the 56 per cent average first year mortality.

The modern hen sparrow feeds her nestlings on insects (mainly aphides and caterpillars) for only the minimum four-day period, and after that they must make do on the most quickly gathered convenience food which is bread from sandwich crusts and breakfast crumbs thrown out on millions of lawns and backyards. Bitten buds and slaughtered seedlings are the price of sparrow feeding, and wire pea guards, nylon netting and fruit cages must replace dangles as the population rises.

The majority of food put out for birds is eaten by sparrows and starlings and real skill is needed to make sure that the pair of robins whose territory your garden is have their fair share in winter. Ideally get them tame enough to feed from your hand, with a cagebird food for insectivorous species, or chopped cheese rather than the cheaper bird food which is mainly condemned poultry rations.

If you had maggots in your raspberries last summer, dig between the rows several times between Christmas and March, so your robins can hop from clod to clod pecking up the tiny chrysalids of the raspberry beetle, without the trouble and risk to bees of spraying the blossom even with derris and pyrethrum. Dig over also where you have had carrot fly, onion fly or cabbage root fly trouble, because all have small pupae that the robin's beady eyes are specialised to see.

The birds that can be fed selectively are the tits, great, blue, coal and longtailed, and everyone knows their acrobatics as they cling to fat or peanuts in little nylon nets hanging from the verandah. Try thrusting a long cane into your rosebed, slanting so the fat can hang about a foot above the bushes, not tied to the cane or the starlings will perch and peck. Then, while some of the flock you will gather are waiting their turns to swing and feed, they will search the rough bark at the base of the bushes like patients turning over the colour supplements in a doctor's waiting room, and eat up all the greenfly eggs to give you a summer free from spraying.

This idea can be used for plums, where fat hung from the branches will clear their ladybird-proof aphis, for ornamental cherries to destroy cherry blackfly, and for Viburnum and Euonymus bushes. These are the winter homes of the broad bean blackfly, and though the wayfaring tree (Viburnum lantana) and the spindle tree (Euonymus europaeus) in the hedges may provide ample winter accommodation in the country, your bushes could be supplying a whole suburb with pests. This idea of course also unbalances ecology, but tits breed only twice a year. Their nestlings, like the adults, are 100 per cent insect fed, so the more tits the fewer pests.

Perhaps the most interesting birds we can feed through the winter are the "Silent Spring Blackbirds", the flightless, songless specimens which became common enough to notice in 1971. They are spread too widely, with reports from Braintree, Colwyn Bay, Falmouth, Gunnersbury Park in West London, Maidenhead, Melton Mowbray, Newton Abbott, and Worcester, to be a mutation, and too few and scattered to be a disease.

Blackbirds spend more time on our lawns than any other bird, hopping, listening and tugging out worms, and are therefore in longer contact with selective weedkillers and above all chlordane wormkillers which last in the soil for as long as 15 years. Worms with a less than killing dose add up to danger in blackbirds' bodies, producing not poisoning but hormone disturbances that could affect their feather producing glands.

One report runs: "This blackbird appeared as a fledgling with the usual fluffy grey feathers or down. As it grew its feathers they were the brown colour of a female. However, it had the yellow bill of a male blackbird and curious yellow eyes which were ringed with white. It began to moult and very soon was completely bare round its neck and under its chest and its tail feathers continually fell out as they grew. It was unable to fly but behaved in a strange wild manner and ate everything I put out for the birds voraciously. It could not possibly have survived the winter in its naked state and I assume it is now dead. This was obviously hormone imbalance with mental changes. My vet says he would diagnose this as DDT poisoning, though he did not actually see the bird."

In most cases the birds refledge. Sometimes a young bird will be flightless until better tail and wing feathers grow after a second or third try, but usually they recover enough to find themselves hiding places at ground or hopping level away from cats and rats. Their feathers appear to lack oil and therefore stay wet without the well preened glossiness of a healthy blackbird. They need shelter from rain and snow in which they become wet and bedraggled, and can only fluff out their feathers to dry in the wind, a habit that wins them the common nickname of "Scruffy". When fed and sheltered they seem quite happy though they never sing and none have nested.

The Henry Doubleday Research Association would be glad of detailed reports of "Silent Springers", especially with photographs, and if any of these family pets die, please send the body to Dr R. Hider, Department of Chemistry, University of Essex, Colchester. *Lawrence D. Hills*,



Wherein the Author, sicken'd by Contemplation of this Nation's Abuse of the divine Gift of Water, ventures to dress his thoughts thereon in Rime: for which Departure from his wonted Style he craves the kind Indulgence of his long-suff'ring Publick.

- In Summer, when the City's dusty Heat
- Augments the Stink and Hubbub of the Street,
- Who does not long to shun the Press and Roar,
- And walk in Peace upon a lonely Shore?
- Urg'd by such Promptings I resolved to flee
- And take some Recreation by the Sea;
- To lay aside my long-envenom'd Pen, And charitably view my fellow Men;
- See Reason, Pleasure, Use and Beauty join'd
- In Harmony 'twixt Nature and Mankind.
- Vain Hope! for when at length I reach my Goal
- Mankind already has usurped the Whole,
- Nor lies within my View on any Side
- One single Yard of Sand unoccupy'd, But wheresoe'er my hopeful Eye doth fall
- Sees universal Bodies cover all.
- Man fouls the Land, but fouls the Water more,
- For note what Scents the Sea-wind wafts ashore:
- Here drains the foetid Ordure of the Town
- And myriad Sewers stain the Ocean brown;
- One Cesspool girds the Land from Side to Side,
- And sicken'd Bathers shun the tainted Tide.
- At last, a League away, I find a Spot
- Where Nature seems alone, and Man comes not:

But see, upon the Margin of the Strand, What oily Scum contaminates the Sand; With sticky Pitch the Beach is plaster'd o'er

- Till even Neptune cannot cleanse that Shore,
- While with gumm'd Wings the wretched Gulls succumb
- And what was once their Home becomes their Tomb.
- Far off, behold, the guilty Ship goes free
- Whose filthy Excrements have fouled the Sea,
- And hurries on to take another Load
- Of Oil to keep Death busy on the Road.
- A larger View reveals no happier Tale: The Sea is made the Chymist's Rubbish-pail;
- Two Fates contend for the unhappy Fish-
- To die by Poison, or to grace a Dish.
- For Men demand an ever-growing Share
- Of all the Riches that the Oceans bear, Dismissing Warnings as mere empty
- Chatter:
- "All's mine today, and after me what Matter?
- What Thought should I take for Posterity?
- Posterity ne'er yet took Thought for me."
- Then, as a Fox will through the Henhouse run
- Killing a hundred fowls to feed on one,
- So heedlessly they wanton o'er the Main
- And squander future Wealth for present Gain;
- Far and yet farther seek the finny Prey Which from their ancient Haunts are
 - driv'n away;
- Or, in Defiance of the Holy Book,
- Draw out Leviathan upon a Hook,
- With Blood in Torrents dye green Ocean red,
- And slay God's noblest Work to grease their Bread.
- Nor, turning landwards, will the Trav'ler see
- Fresh Waters fare much better than the Sea.

The shady Pool where Cattle bathed and drank

- Is gone, and in its Place an iron Tank; The Heron seeks the reedy Marsh in vain—
- 'Tis now a Field, its Water scours a Drain.
- Here, where a fish-fill'd Brook with cressy Bed
- Once flowed, now Fish and Cress alike are dead;
- The chalk-fed Springs are robb'd of half their Tides
- To flush the Jakes, or lave the Chariot's Sides.
- The Well is blockt, the village Pump run dry,
- And distant Rivers must their Want supply.
- See here a Town, in whose adjacent Stream
- A hundred separate Poisons blending teem;
- The self-same Water serves them every Day
- To quench their Thirst and bear their Muck away;
- Their downstream Neighbours willynilly drink
- The Washings of the Privy and the Sink,
- And tell them, half in Jest and half in Sorrow,
- "You drink today what we must drink tomorrow."
- Unwary Bathers, in that Stream afloat,
- Need not a Life-buoy but an Antidote. Then, where no kindly River meets their Need.
- They'll build a Lake to satisfy their Greed:
- Raise Dams to make a fertile Valley drown,
- Submerge a Parish to supply a Town.
- Insensate Rebels against Nature's Laws-
- The Earth their Victim, Selfishness their Cause:
- All their Endeavours this one Aim inspires,
- To satiate, not limit, their Desires.

Nicholas Gould

Towards a unified science

The study of "cultural" behaviour

Man has a strong tendency to erect a powerful psychological barrier against any attempt to explain his mental and cultural behaviour in terms of a general behavioural model. In his desperate efforts to maintain a to-him psychologically necessary dualism he has invented at different times all sorts of concepts such as intelligence¹, the mind², culture³, etc., in terms of which a frontier can be established between his behaviour and that of all the other components of the biosphere.

If we examine each of these it is easy to show them to be either meaningless or to refer to qualities which, though they may be more developed in man than in other animals, cannot in any way be taken as constituting a frontier between them.

Perhaps the most recent and certainly the most persistent variation on this theme is the notion that human cultural behaviour is of a totally different nature from any other type of behaviour, and cannot be subjected to scientific examination.

Indeed, the idea that writing symphonies, listening to string quartets, going to art exhibitions, indulging in small talk at cocktail parties, displaying kindness to one's neighbours, contributing to charities, etc., can be explained in terms of the same general behavioural model that also describes digestion, respiration and locomotion, and even the behaviour of lower forms of life such as fiddler crabs and dung beetles, is totally incompatible with man's elated view of himself. Some of the most enlightened thinkers of today find it impossible to accept this principle. An example is von Bertalanffy, the founder of General Systems Theory, who writes:

"Life and behaviour are not simply utilitarian, trying to come to a so-called equilibrium with minimum expense of physical and psychic energy. This is not even true of organic evolution, which often produces fantastic formations, behaviour patterns, colours, and what not, far exceeding mere survival

and economic principles of adaptation. It is even less true of man, where, not by the wildest flight of fancy, can the creativity of an artist, musician or scientist be reduced to psychological and social adjustments, nor can the self-sacrifice of a martyr be reduced to the principle of utility. The whole human culture, whether Greek tragedy, Renaissance art or German music, simply has nothing to do with biological values of maintenance, survival, adjustment, or homeostasis. So far as the idea of any necessary progress of humanity is concerned (the human analogue to the biological concept of evolution), any criticism in our time of atomic warfare and a return to medieval techniques of statecraft would be an anachronism. In fact, the answer to our quest is very simple. Man, as the old saving goes, is a denizen of two worlds. He is a biological organism with the physical equipment, drives, instincts and limitations of his species. At the same time, he creates, uses, dominates, and is dominated by a higher world which, without theological and philosophical implications and in behavioural terms, can best be defined as the universe or universes of symbols. This is what we call human culture, and values, aesthetic, scientific, ethical, religious, are one part of this symbolic universe. This is what man tries to achieve beyond satisfaction of his biological needs and drives; in turn, it governs and controls his behaviour".4

Von Bertalanffy is in fact saying that cultural behaviour cannot be explained in scientific terms. He is establishing a rigid dualism between this type of behaviour and all others, and this we know to be quite unjustified.

Let us look a little more closely into this particular form of the dualistic fallacy.

It is customary to regard cultural behaviour as behaviour that is "learned" as opposed to that which is "innate". We might perhaps ask, what do we mean by "learned"? To this, Pringle provides the best answer I have seen so far:

"Learning is the name given to the

general class of processes by which the behaviour of an animal comes to depend not only on the environmental changes immediately preceding it in time, but also on events which have occurred in the related parts of the environment in the more remote past. Students of animal behaviour distinguish this past into two parts: that period of past time during which the animal has existed as an independent organism, and the rest of past time during which its ancestors have existed. The modification of present behaviour by past events is called learning when those events have occurred during the lifetime of the individual, and instinct when the events have occurred outside this period of time. In the former case, the past events are supposed to have left some trace in the animal (usually in the nervous system) whereas in the latter case the organization of the animal responsible for the observed response is supposed to be innate; that is, to be contained fully in the material substance of its inheritance . . . "5

The only thing wrong with this is that no mention is made of adaptive ontogenetic modifications. If, in accordance with the accumulation principle (6), we regard that system which is the unit of phylogeny as acting as a whole, the latter will undergo modifications within the course of its adaptation to changing environmental conditions. These modifications will occur during phylogeny, ontogeny and everyday behaviour *in accordance with their degree of generality.*

If the word "learning" is to have any useful meaning, it cannot be limited to one particular set of modifications, to the exclusion of all others. From this it must follow that cultural behaviour, in the sense of behaviour "learned" during every day activities and organized in the informational medium of the brain, cannot be regarded apart from that which was learnt ontogenetically and phylogenetically, and if the former are functional and adaptive, and hence can be studied scientifically, then so must the latter.

Development at all levels of organisation rather than constitute a continuous process, proceeds by a series of jumps, which occur as successive levels of complexity are reached. Each time, new principles are required to explain the new type of organisation that thereby comes into being. Behaviour is cumulative. These principles, therefore, do not replace those operative at the previous level, but merely supplement them. Thus a biological organism is explicable in terms of biology but also continues to observe the laws of chemistry and physics, etc.

There is no reason to suppose that when we reach the level of complexity of the human society the jump involved is of a different nature from the previous ones, nor that the new discipline that thereby comes into being is distinguished from those that it complements in any radical manner.

Thus a society is explicable in terms of the laws slowly being formulated by sociologists and anthropologists, but nevertheless continues to obey those of biology, chemistry and physics, and all such disciplines have, or should have, in common the fact that they are instances of the application of scientific method to explaining behaviour at different levels of complexity.

This method consists of building a model and improving it by increasing its information value, so that it becomes capable of interpreting and environmental situations predicting ever greater precision. This with

method is applicable to the study of any aspect of the world so long as the latter displays some sort of order. It can be shown that cultural behaviour, like any other, displays order, and thus can be the object of scientific investigation. Science, and this is the important point, is a method and not a subject.

It so happens that this method was first applied to the study of behaviour at a low level of complexity rather than at a higher one. This has been so principally for two reasons: first, such behaviour is simpler and can therefore be explained in terms of a smaller number of variables; secondly, man has a small psychological stake in the behaviour of such things as atoms, molecules, and cells, and, consequently, at these levels of complexity, the scientist is less handicapped by preexisting subjective classifications, and a priori principles formulated in terms of them.

This does not imply that there is any theoretical reason for not applying the same methods to the study of more complex behavioural processes. It simply means that it is more challeng-E. Goldsmith ing to do so.

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Mercury in Australian fish

Shark fishermen in Victoria, Australia, have been banned from catching and selling school shark over 71 mm (28 ins) long, because an average of 0.9 ppm of mercury, rising to over 2.0 ppm, have been found in the fish. Shark are a popular fish in Australia: last year 3 million kg were caught off Victoria (2 million kg being school shark), much of it for the fish and chip trade.

Australia, like Canada and the US, allows an upper limit for mercury in fish of 0.5 ppm. the other three countries to have fixed a maximum, Japan, the Philippines, and Sweden, allow 1 ppm. Marine Pollution Bulletin, 3 (10).

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Friends of the Earth

Last month's advertisement may have given the impression FOE is declining. It is not. On the contrary, we need more money because our affairs are developing apace and many ideas for new campaigns present themselves. FOE ailing? Mining moles and purveyors of fizz take heed; FOE is *very* fit.

Not that we have never known financial worries. It has to be admitted that paving staff a living wage was, until recently, an uncertain affair. So much so that two staff had, reluctantly, to leave. Pete Wilkinson, who did more than anyone in the early days to put the campaigns on a sound footing, left in November. You have to be slightly barmy to work a fifty hour week for a take home wage of £16. Pete, not unreasonably, decided that two years on the breadline was enough by way of commitment to the future and how about a square meal in the present? Jane Maxwell, one of two super efficient secretaries, also left for much the same reasons.

Although when good people go it leaves a large gap, we decided against finding replacements. As so often happens, even a difficult situation properly exploited, can yield something of benefit. Since FOE now operates with fewer staff-seven now, nine formerly-we have a little more money to "play with". One immediate consequence of this is a degree of security staff have not known before. Never again, we hope, the sombre contemplation of an almost empty petty cash tin backed by a non-existent bank balance, followed by "Sorry everyone, you'll have to get by on a fiver apiece this week".

Secondary effects of having some money to spare are that we have been able to give small grants or loans to some of the local groups. We have also been able to commission papers from people with expert knowledge in fields which interest us. For the record: the total amount of cash available for grants, loans or commissions is in the order of a few hundred pounds (not a few thousand!) and it is dispensed with a miser's view to getting value for money. Applications for financial assistance will not be considered unless accompanied by detailed estimates of costs, very convincing arguments as to

the value of the project and some indication of the competence of the people involved.

Personalities

Two campaigns have now reached a state of such complexity that every ounce of Graham Searle's political acumen will be required to steer them through the reefs and shoals ahead. Accordingly Graham has decided that the supervision of the Snowdonia and Whale campaigns must from now on be his main concerns. Responsibility for office administration and liaison with campaign managers, local groups and the Board of Directors now devolves upon the author of this newsletter. All general communications should now be addressed to Colin Blythe please.

Unabashed plug

The long awaited book Eryri, The Mountains of Longing, co-published by FOE Ltd and George Allen & Unwin Ltd, finally appeared on 23rd November, A case study of Snowdonia National Park, it was delayed in July by eleventh hour protests from RTZ, whose solicitors submitted a nineteen page memorandum of "serious errors of fact". In the view of the author (Amory Lovins) and publishers, RTZ have been unable to establish any serious errors of fact. To short-circuit further argument and to encourage fuller public discussion of the issues raised by RTZ's activities in Snowdonia, the publishers have finally inserted (at the back of the book) a one-page statement in which RTZ put their own case, the merits of which FOE think readers will have no trouble judging. Eryri is "breathtakingly illustrated" (Guardian) with "magnificent" (Times) colour plates, mainly by Philip Evans. The exceptionally high standard of printing has forced the price to £10, but proceeds will aid FOE Ltd's lobbying on behalf of Britain's National Parks. As far as we know, Eryri is the first readable analysis of how a British National Park works, what is going wrong, and what must be done.

Campaigns

Attempts to get manufacturers to realise the shortcomings of their packaging policies will soon receive weighty backing from Jon Holliman's *Pack*-

aging Manual. For the first time the public will be able to do what, up till now, has only been possible for the manufacturer: evaluate different packaging techniques in the light of resource and energy consumption, conversion, transport, printing and advertising costs. The manuscript is in the final stages of production and, though printing, collating and binding threaten to be a mammoth task, publication is aimed at mid-February. We have not yet fully assessed cost but one thing is certain, this will not be one of our 50p jobs! Whatever the final price. however, we are confident that the Packaging Manual will give very good value for money.

The Animals Campaign has seen intense backstage activity. In late October FOE Ltd were fortunate to get the services of J. B. Bransbury, the distinguished Parliamentary draftsman. who has drawn up a Bill which, it is hoped, will lead to an Endangered Species Act. Many MPs have shown great interest in the Bill; if good will were all that were needed, there could be little doubt that the Bill would become an Act this Parliamentary Session. Unfortunately this session is very busy and the likelihood of the Government (as distinct from MPs) allowing time for anything so low on their list of priorities is remote. Pity. Meanwhile time is running out and the IUCN continues adding to the Red Data Book the names of animals who probably won't make it. This is a case where the timely intervention of a member of the Upper House could make all the difference.

On other fronts: Walt Patterson has been weighing the possibilities for a campaign on sewage treatment and disposal; and Amory Lovins and Walt are also studying the safety records of nuclear reactors around the world. If vou don't count the Windscale accident, Britain's safety record in respect of nuclear power is, thus far, very good. However, we should like to rest assured that our leaders will think several times before entertaining any ideas about possibly less well tried designs from abroad. Presumptuous? Governments are capable of making grotesque mistakes, as the state of the world all too clearly shows.

Books

The governments we deserve?

LIVING ON THE THIRD PLANET by Hannes Alfvén and Kerstin Alfvén. W. H. Freeman, £2.20.

ILL FARES THE LAND by Clifford Selly. Andre Deutsch, £2.25. THE STATE OF FOOD AND AGRICULTURE 1971. FAO, Rome, £4.

Professor Alfvén is a distinguished physicist. Kerstin Alfvén is a sociologist. Together they have compiled a broad, general view of life on this planet and its possible alternative futures. The approach is cosmic. That is to say, they view Earth as the third planet in its system, they compare it with its fellows and they attempt to regard it with an Olympian detachment. The concept is splendid. It leads them to consider the probability of cosmic disasters and the likelihood of man's survival following them. They envisage human colonies on other planets, in free space and even the colonisation of other planetary systems. All of this is far in the future, but then, so are such disasters as the demise of the sun.

When they examine man's present situation their detachment leaves them. They are concerned about the proliferation of nuclear weapons and the consequent likelihood of thermonuclear war. They point out, very lucidly, the distinction between natural animal aggression and human bellicosity. They worry about population growth and environmental pollution. The central problem, in their view, is the incompetence of all the world's political systems in the face of the latest in a series of developments of evolutionary significance.

In common with other living organisms, they argue, man began with a "genetic" memory, which determined physical and mental characteristics and, to some extent, behaviour. This was followed by the development of a "synaptic" memory, based on language and the realisation that the accumulated experiences of individuals, stored in the synapses, could be transmitted to others. This was the beginning of education and cultural evolution. Today we are in an age of "cybernetic" memory. We have constructed machines whose storage capacity exceeds that of the human brain so that information can be transmitted and exploited more rapidly than ever. Curiously, one result of the concurrent explosions of information and population is that individually we are growing more ignorant. The Alfvéns cite the increase in the actual number of illiterates in the world which tends to be obscured by the reduction in the proportion of illiterates as a percentage of a given population.

Such a wide canvas can be painted only thinly and a book so short as this cannot really be satisfactory. It conveys little to the reader already familiar with environmental problems, but it is provoking and few will quarrel with its main conclusion: governments cannot cope.

This is Mr Selly's conclusion as well. He has written one of the most important books about British farming to appear in recent years. He is a farmer himself, presumably a successful one, and he describes in great detail the economic history of our agriculture since 1945. He shows how the "cheap food policy" evolved, backed by a complex support system. Governmental manipulation of the market has led to more and more official involvement in food production so that agriculture today can be considered as a seminationalised industry. This is not to say that a laissez-faire system would be preferable, but only that the present system is in need of reform. When consumer demand is manipulated it may become obscured so it is all but impossible for the farmer to know what he should produce. Mr Selly shows how production targets set during the euphoric 1950s, when yields were rising fast, were not attained during the 1960s, and he concludes with a section on the likely effect of Britain's abandonment of the cheap food policy as it prepares to enter the EEC.

It is the Treasury which governs agricultural policy, in relation to a wider "national interest". This requires, for example, that although British farmers may be allowed to believe their efforts contribute to a saving of imports, there must be no question of import substitution: we must go on importing food for trading reasons so that our customers can buy industrial goods from us. It is this national interest that has made some farmers so subservient to processors and supermarket chains that they are reduced to little more than share-cropper status, wedded to a technology that damages the land and degrades the natural environment. His title is taken from *The Deserted Village*: "Ill fares the land, to hast'ning ills a prey, Where wealth accumulates and men decay..."

Mr Selly's solution calls for more government involvement, not less. Since the government manages markets, so determining what shall be grown and how, government has assumed the role of national estate manager. It should accept the responsibilities of that position and begin to manage the estate, rather than simply exploiting it.

If governments are incompetent nationally, internationally they amount to a global disaster in their own right. In common with other UN agencies, FAO is guarded in its criticisms of politicians on whose goodwill it depends for finance and for access to the lands and the people it aims to help. Yet this year there is a note of real urgency in its annual report. The world food problem is not improving. The situation in developing countries is summed up in the foreword: apart from the Far East, where food production continued to rise ahead of population growth, "a greater number failed to raise their food production fast enough to supply their growing populations with more and better food from their own output. There was little or no increase in the total food production of the developing countries of Africa and the Near East, so that in per caput terms their food production fell. In Latin America output grew more, but even there it was just sufficient to keep pace with population growth. Nor was 1970 an exceptional year. Over the entire decade of the 1960s the trend of food production per head showed virtually no increase in any of the developing regions, and actually fell somewhat in Africa." Even where the new "Green Revolution" cereals have been introduced, the report says there have not been corresponding rises in output of other foods and resource problems, particularly shortages of water and fertiliser, are imposing limitations. There are stories, too, of increased yields causing falls in prices,

resulting in hoarding. Acording to a recent report in *The Guardian*, hoarding in parts of India is causing severe hardship among people who are already hungry, but we must not speak of famine for fear of offending the government. The time is past for us to indulge the vanities of politicians.

As part of its contribution to the Stockholm Conference, FAO devotes a large section of this year's report to a study of water pollution. It is one of the best surveys of its kind, not only because of its breadth and clarity, but because it proposes solutions. Its authors describe eutrophication, but explain that it is possible to utilise for food production the plant nutrients that cause it. They call for more efficient and co-ordinated monitoring systems and for more precise evaluations of trends, as well as for more research into remedial measures, particularly with regard to oil pollution. They criticise existing international agreements and call for new and strengthened international river commissions to deal with fresh water and for the registration of pollutant discharges into the high seas, as an interim step in a more comprehensive approach to marine pollution. This, they believe, should be orchestrated by the International Oceanographic Commission as part of the UN Earthwatch programme. They accept the need for a rapid phasing out of organochlorine insecticides, especially DDT, but point out that so far all the alternatives are more expensive.

FAO accepts that the deterioration of the environment is caused by a combination of population growth and increased industrial activity and that it is likely to be exacerbated by the attempts of developing regions to acquire the benefits of modern industry. It is a problem for governments, which must deal, too, with the depletion of resources. It is in governments that the intergovernmental and ever-optimistic FAO puts its trust. It may be justified in so doing but it will take more to convince me than the record of our politicians as outlined in these three widely differing but thematically related books.

Michael Allaby

A guide, philosopher and friend

SURVIVAL COUNT by Gwen Moffat. Gollancz, £2.25.

POLLUTE AND BE DAMNED by Arthur Bourne. Dent, £2.95. ENVIRONMENT, POWER AND

SOCIETY by Howard T. Odum. Wiley-Interscience.

Gwen Moffat is an outdoor person. She works as a mountain guide and writes books and articles on mountaineering. This is a book about mountains and the people who climb them and who live on and beside them. It is an intensely personal story of her search for a home which develops into a wider search for a philosophy, a satisfactory relationship with the environment. It is the guide's search for a guide.

She became aware of the problems of the Welsh hill farmers, threatened by a Rural Development Board which was to be imposed on them. This led her to think more deeply about the environment and she read Robert Hart's The Inviolable Hills, intending to attack it. Instead she was converted to his approach to the improvement of hill farming. She met him, joined the Soil Association and attended the Association's 1970 Attingham Conference. These annual conferences have been discontinued, but for several years they allowed 60 to 80 environmentally aware people to spend four days locked in intense discussion in a country house in Shropshire. I remember the 1970 Conference as one of the most exciting experiences I had had for a long time. I remember Gwen Moffat, too, talking long and earnestly to one person after another.

At the beginning of the book she is a person with a commitment to the natural environment with which she lives in close contact and from which she derives her livelihood. Yet she is not aware of the encroachments of industrial civilisation which threaten it. As she becomes aware, she realises, too, that that civilisation itself is in jeopardy and that the sacrifice of the countryside may achieve no more than a transient gain. By the end of the book she is an environmentalist, touring the country, visiting organic farmers, reading, studying, trying to understand the depth and complexities of man's relationship with his planet.

It is an intelligent and perceptive book and Miss Moffat writes well. It will have a particular appeal to those with a love of climbing and may do much to help them see more of the scenery than just mountains. Gwen Moffat is fortunate. She began her search with a knowledge and appreciation of nature and she was free to travel to meet those people who might help her. Most of us must rely mainly on books.

She might have turned to Dr Bourne. He shares her passion and his is an angry book, written with great vigour. Unfortunately, he identified the central problem incorrectly. In his opening chapter he points out that the legacy of the last ten thousand years is "too many people, too little food, decreasing resources, mounting wastes, derelict land and poisoned air and water". For the remainder of the book he deals only with pollution as though that were the problem rather than a symptom of a deeper malaise. Even then he is sometimes inaccurate. He attacks the use of pesticides without distinguishing between the organochlorines, which are persistent, and others which are not. All are undesirable, but in different ways. He mentions the possible effects of DDT on photosynthesis in marine plants without explaining that DDT is very insoluble in water. The real danger lies in a random association of DDT and oil, in which it is soluble. He underrates the potential of composting urban organic wastes and seems unaware of the extent to which this is practised in some areas, and he falls into the old trap of declaring Lake Erie dead. It is not dead, although it is seriously damaged. The danger is that it may die suddenly, but it has not done so yet.

Predictably, his proposed solutions are no more satisfactory. Having presented a broad picture of a world poisoning itself to death he is confident that all will be well if governments legislate sensibly. The ship is sinking, but there is no cause for alarm since the captain and first officer have their teacups in their hands and there is reason to hope that they may begin baling within the foreseeable future.

Miss Moffat would learn more from Dr Odum, although he makes few concessions to those unfamiliar with the jargon of systems dynamics. A struggle is worth the effort, though, because he has much to say. He shows how energy flows through natural systems and how man achieved a measure of control over them when he learned to focus enough energy to override the solar energy which powers them. His major advance came with the discovery and exploitation of cheap fossil fuels, but unless he can replace them it will be short-lived. The message is clear and as he delivers it he makes several interesting points and a number of helpful suggestions. He explains how activities may be quantified in terms of energy flow and how money acts as a feed-back loop rewarding past and encouraging future energy expenditure. Yet money always flows in the opposite direction to energy so that our economic systems are monitored in reverse against a manmade and therefore arbitrary yardstick which reacts after the event. He suggests economies be measured in terms of energy.

He answers a problem that has worried many conservationists. How do you place a monetary value on an amenity? Dr Odum suggests we calculate its replacement cost. Where the amenity is a natural system it is possible to determine the energy required for it to regenerate and acceptable monetary values can be placed on energy. Thus a particular area that was scheduled for industrial development was valued at \$64 per acre by the developer and at \$590,000 per acre by Dr Odum. He suggests, too, that since pollution tends to deprive individuals of their right to a share in the planetary life-support systems it amounts to murder. He invites us to treat it as such.

Valuable though it is, the book has serious flaws. Dr Odum extends his study of energetics to embrace human societies. This leads him to assume that the harnessing of energy to control nature improves the lot of primitive man who, he believes, always lived close to his Malthusian limits. We know that this is incorrect. From this he deduces that the more power man can control the better and more civilised he will be. Thus our civilisation, based on fossil fuels, is the greatest, followed by Rome, which was based on slave power. He leaves out of account China, India and all the others which reached very high cultural levels without departing far from their solar energy base. According to him, this is impossible. He is contradicting his own central argument and he even goes so far as to suggest that voting power in the UN be allocated on the basis of national per capita energy consumption. This is realpolitik at its most naked. Might is right and Hitler is vindicated.

His confusion continues as he extends the theory still further into religion. He confuses religion as revealed absolute truth and ethical systems. They are usually associated, but not inevitably, and there are philosophical systems which achieve a wide following without ever becoming religions in the strict sense. Nevertheless, he is right when he says the time is ripe for the emergence of a new ethical system, a new set of values more appropriate for survival in harmony with the biosphere than the materialism which leads so many of us to believe that bigger is better.

The search for a guide, philosopher and friend to elucidate the environmental debate may be long and hard. Gwen Moffat has been successful. Those who are still searching may learn little from Dr Bourne, but much from Dr Odum.

Michael Allaby

Franciscan gardeners

CRISIS: READINGS IN ENVIRON-MENTAL ISSUES AND STRATE-GIES, edited by Robert M. Irving and George B. Priddle. Macmillan, £5.00. THE CIVILISED ALTERNATIVE: A PATTERN FOR PROTEST by John Wynne-Tyson, Centaur Press, £1.50.

ECOLOGICAL MORALITY, by Bruce Allsopp. Muller, £1.80. TO LIVE ON EARTH, by Sterling

Brubaker. John Hopkins, £3.30.

It might be interesting to know (probably someone has worked it out) how many trees are annually felled to make paper for books about the environmental crisis. Certainly ecologists are no more immune than anyone else to the modern disease of exponential growth. But however much some of us may long for the day when no more books about man's abuse of nature *need* to be published, at present we are dependent on them : we must have ideas, arguments, facts-especially facts.

Crisis is a collection of previously published readings, mainly on a fairly academic level. The bulk of the book is occupied with the detailed discussion of a number of specific urgent issues, under such headings as Water, Air, Pesticides, and with proposals for immediate action. In a thought-provoking, introductory article, Lynn White traces the "Historical Roots of our Ecologic Crisis", finding them in such disparate elements of the Western tradition as Christianity and the eight-ox ploughboth encouraging man to believe that nature was his to exploit to the limit. "What we do about ecology depends on our ideas of the man-nature relationship. More science and more technology are not going to get us out of the present ecological crisis until we find a new religion, or rethink our old one." White offers St Francis as a suitable "patron saint for ecology", with his sense of the "spiritual autonomy of all parts of nature".

John Wynne-Tyson and Bruce Allsopp devote entire books to the ethics of ecology. The Civilised Alternative is Franciscan in its plea for humility and compassion as the great ecological virtues; but not all of us would agree that vegetarianism is a necessary corollary of the new moral code. (We carnivores should know what we are doing, however: for example, Wynne-Tyson points out that each of us needs as much land for food as would support three vegetarians, and correctly describes meat-eating as "on a world view, a minority luxury habit".) Bruce Allsopp also calls for a new morality, based on "a balanced relationship between man and his environment". He approaches the problem of achieving this relationship by using a garden as a model. A garden is (or ought to

Michael Graham A Natural Ecology

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be) ecologically balanced; man decides its use and character, generally combining utilitarian and aesthetic factors; he does not intervene with complete authority but co-operates with natural processes. The "morality" of the garden is empirical, not legalistic; it does not say "Thou shalt not do x", but "If you do x, then y will happen". The gardener must constantly make valuejudgements, such as weighing shortterm against long-term advantagesforce a plant to flower out of season if you like, but recognise that if you do it will be no use next year. For this analogy to work on a world scale, Allsopp maintains, what we need are smaller autonomous regions, not too big to be considered as "ecological units": the gardeners need to know their gardens

A new religion, new nations... both very desirable, no doubt, and necessary in the long run: but they'll take *time*. Meanwhile, we must rely on wicked old self-interest to save the world, assisted by knowledge of the facts. *To Live on Earth* is as good a manual of those facts as I have seen, and gives you plenty of them for your money. Sterling Brubaker's thesis is

that there are various degrees of environmental threat, which require different approaches. "It is foolish to belabour the offensiveness of discarded beer-cans in the same terms as potential threats to life on earth." So he offers a rough classification of environmental problems in order of gravity (though he admits that "the pervasive interrelatedness of ecological phenomena strains any system of ordering"). Damage to amenities is "the largest, most immediate, most annoying . . . category to deal with" - problems which do not threaten health or survival, but do diminish the quality of life. Then follows damage to human health, genetic damage, and finally damage which threatens the life-supportive capacity of the earth. The various factors in each type of damage are considered in detail, and some policy suggestions made. Brubaker points out that the Category 4 problems -the ultimate catastrophes-are the ones least suited to be left to the experts. "Science is unaccustomed to viewing things whole, and those who attempt that chore are inevitably 'confused'... Thus we are compelled to ponder the voices in the wilderness

warning us of our doom while lacking much of the information needed to evaluate the warnings properly. While we can aspire to repair some of this deficit over time, the speed of change promises that we will never catch up. Meanwhile we must act in ignorance, We must work to reduce the areas of ignorance, even while we devise strategies for action that take it for granted."

Damage to amenities, in Brubaker's view, is the immediate problem; and it is still well within our capacity to control, if we are prepared to pay the cost. But he offers no hope that ad hoc measures can cope with the longer term problems of exponential growth, human or economic. And far from advocating a smaller-scale society, he warns that these ultimate problems will demand more control and larger administrative units: and also—you've guessed it!— a new set of values.

So there we are: our ideal man, it seems, must be a vegetarian Franciscan gardener living in a world state made up of autonomous ecological units and compared with some other possible futures, it doesn't sound too bad.

Nicholas Gould



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A Blueprint for Survival

Comments

From L. J. Macfarlane

The most glaring omission from A Blueprint for Survival is any discussion of how "The Goal" set out is to be reached politically; as distinct from the technical "orchestration" of the parts. While it might be argued that such tactical considerations only arise after the Blueprint has been produced and agreed upon, in my view the failure to give any thought to the vital political implications and aspects of the Blueprint seriously mars both the Blueprint itself and the chance of its being either accepted or applied. The great danger of the Blueprint is that, precisely because of its political weaknesses, the ecological movement will, like so many movements in the past, blossom strongly only to fade away, leaving us to stifle in our own squalor. What pervades the whole of the Blueprint is a grave under-estimation of the difficulties in getting the ideas of ending economic growth through to the mass of the electorate, and still more of getting them accepted. Running through the Blueprint is the rash assumption that the fundamental problems are technical problems. On the contrary they are political, in the same way that the fundamental problems in disarmament are political not technical.

There are two major political dimensions of this problem : the first concerns the position of the working class, and the second that of the under-developed countries. Both positions exhibit the interconnection between ecological goals and political means. Unless the working class can be convinced that the ecological movement is not a middle-class concern; and the third world that it is not a rich nation concern, the movement has no chance of success. But more fundamentally, unless these conceptions are wrong, unless the vital interests of the underprivileged within the privileged nations and of the unprivileged masses of the third world are capable of being protected and realised through the programme of the ecological movement, it does not deserve to succeed.

In my view the Blueprint, while making passing reference to the interests of what constitutes the great mass of the world's population, fails to put their interests at the centre of the proposals. Thus, while the Blueprint speaks of the need for the developed countries to subsidise the provision of expensive substitutes for DDT to under-developed countries, and to provide an emergency food supply as these countries go over to agricultural methods "that are sustainable even at the expense of immediate productivity", no consideration is given to the vital issue of securing a great increase in the standard of living of the people of the third world.

Nearer to home, especially in terms of political viability, is the question of how the Blueprint proposals will affect the position of the ordinary working man (in industry, shop or office). He has become accustomed to steady increases over the last twenty-five years in his real income, which he equates (to a large degree rightly) with a rising standard of living. There is also the position of the large minority in our society whose poverty is alleviated by handouts from a welfare state financed largely by the tax receipts from income affluence. Their problem is a vital and difficult one, in no way met by the analysis of the Blueprint. The issue has to be faced that in a stable, as distinct from a growth, economy, the vital interests of the large sections of the population can be met only by a redistribution of goods and services, i.e. at the expense of the present "material" standards of the middle class. This point is touched on at the end of E. Daly's article "The Herman Stationary-State Economy" in the July 1972 Ecologist. It should not be overlooked that it is above all the middleclass, the professional men, the university lecturers, the journalists, the students who support the ecological movement and that they, like myself, take the products of the affluent society for granted. It is our central heating systems and modern kitchens that the greater part of the British population still only aspires to.

Arising out of these considerations, one comes to the suggestion raised in the Preface, that the ecological movement in Britain may need to assume political status and contest the next

general election. To contest the next election on the Blueprint, as it now stands, would be to invite rejection by the overwhelming majority, on the basis that there was nothing in it for them. But even if the Blueprint were altered. in accordance with the approach outlined above (which would involve a great deal of detailed consideration of issues which I have ignored here), it would still, in my view, be a grave error, under presentconditions and at this stage, to raise the questions of political status and election contest. The ecological movement should act as a pressure group not as a political party, aiming to bring its influence to bear on the government itself, on government and opposition parties at all levels, as well as on public opinion. Modern western political experience, and more especially British experience, shows no instance of a social protest movement which has been able successfully to assume political form. The only criterion of political success for a political party is political power; for only through power can it realise its programme. A political movement which captures a handful of seats in Parliament, becomes less rather than more influential, if by so doing it cuts itself off from the possibility of influencing members of the major parties. In the post-war period the only groups which have made any political impact at all, in terms of seats won, have been nationalist movements and then only on a very limited scale. But nationalist parties have a much stronger and more natural basis of appeal than movements like the ecological movement. More importantly, although both major parties remain committed to the presumption of the need for continuous economic growth, they are, I would submit, open to argument and persuasion, especially in relation to particular issues like pollution and taming the motor car. The change in basic conceptions is likely in any event to take a long time. In the meantime it behoves those who see the need for a change in basic thinking to press their case in every way open to them, including through the existing parties. The Oxford City Labour Party recently passed, by a large majority, a resolution I proposed calling on the National Executive to examine its economic and social policies in the light of the world environmental crisis, and to consider

the extent to which they were grounded on "the questionable assumption of continuously sustained economic growth".

There are several other points on which I would take issue with the Blue-The interesting section on print. decentralisation pays too little regard to the difficulties and drawbacks in terms of what people, and especially young people, currently want. Parts of the document have an oddly elitist ring about them. Thus p 276 talks about "inculcating" the agreed values of the stable society into the educational system. More importantly, a large part of the argument in Appendix B (Social Systems and their Disruption) is based on generalised assertions about traditional societies which are not only doubtful in themselves, but in terms of the doubtful values and conceptions which they imply. Traditional or simple societies are held up for admiration, and emulation, as "self-regulating" societies, marked by an absence of external controls, with compliance to norms ensured by the force of public opinion, the sanction of elders and the fear of ancestral spirits. How many readers are sufficiently familiar with anthropological literature to know that the traditional "self-regulating society of the Eskimos" referred to, far from being remarkably free of social disorder and crime was ridden with bitter quarrels, mainly over women, and exhibited a high incidence of personal violence and murder? (E. Adamson Hoebel, The Law of Primitive Man, 1954). This is far from being an exceptional case. Amongst the peoples of the Eastern Highlands of New Guinea sexual jealousy and licence is a frequent cause of assault and violence, and, in the past, of cannibalism. (R. M. Berndt, Excess and Restraint: Social Control Among New Guinea Mountain People 1962.) The Amba of Western Uganda are so witch-ridden that the social solidarity of the basic group is undermined (Edward Winter in Tribes Without Rulers edited by J. Middleton and D. Tait, 1968).

There are very wide variations too as to the extent to which traditional societies are subject to the control of leaders. The largely leaderless Kiukuru of Central Brazil share the tropical rain forest with other tribes whose headmen have the power of life and death over their peoples. (Gertrude Dale in *Political Anthropology* edited by M. J.

Swartz, etc. 1966.) Even amongst the Eskimos, it was not uncommon along the Bering Strait for leaders to arise who ruled through fear and violence (E. M. Weyer in Comparative Political Systems, edited by R. Cohen and J Middleton 1967). The power of public opinion is not necessarily conducive to social harmony and social integration; nor is such harmony and integration to be desired, if it is realised at the expense of making a scapegoat of small minorities (as with the Jews in medieval Europe), or through the endorsement of false or destructive principles (as with the German conception of Herrenvolk). Indeed it is precisely the great weight of public opinion behind the concept of the affluent and developing society, which has to be overcome.

Lastly I would argue that it is very debatable whether one should aim at securing a highly integrated society, even in terms of one that is decentralised; and I would dispute that the less socially integrated a society is, the greater the need for authoritarian controls. Communist China is a good example of a highly integrated society, with considerable decentralisation of authority to the rural communes, but which yet has a highly authoritarian power structure. On the other hand China has a good deal to teach us, and more particularly the under-developed world, about certain aspects of conservation in rural development. The simplistic association of dictatorship with disintegration and instability cannot be accepted in terms either of the conceptual theory or of practical reality. The whole basis of the argument in Appendix B needs re-thinking. I would suggest that, at this stage, possibly what is required is, not the sort of questionable theorising at present to be found, but rather some discussion of the more immediate issues of how, within the present political structure of the world of nation states, we may set about realising in the Britain of today the practical goals set out in the Blueprint.

L. J. Macfarlane,

St John's College, Oxford.

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