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Floods as Man-made Disasters Taxation and the Future of the Farming Structure The Role of Culture in the Control of Infectious Diseases

Raymond Dasmann on the ROLE OF NATIONAL PARKS

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The Officially Secret Enemy of The Earth

In Britain today Ecology confronts the Department of the Environment across an ever widening abyss of disagreement. Wisdom on one side of the gulf becomes more and more estranged from expediency on the other. The right of the wise to know is sundered by secrecy.

GUEST

Official Secrecy renders the British Government the most secretive government in the whole world. Officially it is true to say that if a civil servant goes home at night and is asked by his wife what sort of day he has had at the office he will be breaking the law if he tells her. How on earth did our government ever come to be so secretive?

Let me take you back to a heat wave in 1889, one of those long hot summers of a bygone age. You may have heard stories that the heat in London could be so great that it drove dogs mad. On one of the Dog Days of August in 1889 Members of Parliament wilted in the sultry heat. You can picture the stiff white collars and sombre suits providing the ultimate agony in a stifling chamber. Not the optimum atmosphere for wise and cool consideration of momentous legislation. In the torrid heat of that summer's day, madness was abroad in the House. Parliament destroyed Magna Carta and Official Secrecy was born. The madness of that day has remained with us ever since. Official Secrecy has become the standard operating basis for all government administration.

The 1911 Official Secrets Act was hustled through Parliament in 24 hours. That must be an all time record. And this legislation which changed the whole basis of government reached the statute book with barely 35 minutes of debate. With the introduction of Official Secrecy true Democracy died. The citizen lost his right to know.

It is interesting to go back and examine why this occurred. In the year 1878, that is eleven years earlier, the Minister for Foreign Affairs was the Marquess of Salisbury. Salisbury had contrived a very shady deal with the Russians. At that time there was a temporary junior clerk in the Foreign Office who happened to be able to speak Russian. His name was Charles Marvin and he was given the task of copying the relevant memorandum. Marvin was so outraged at the enormity of the crime about to be perpetrated by the Marquess of Salisbury that he memorised the document verbatim. Marvin took the story to the Globe Newspaper. In the House of Lords on 3rd June 1878 Salisbury denied the authenticity of Marvin's revelation. Earl Grey expressed his relief in these words: "It appeared too monstrous to be believed".

Subsequent events proved the truth of Marvin's press release. Salisbury did not rest until he had introduced a law which would prevent any future embarrassing disclosures by civil servants. Thus was Official Secrecy born, not, you will notice to protect the country from foreign enemies, but to conceal the treachery of its own leaders. Thus has Official Secrecy been used since its inception. The culmination of these abuses came to a head in 1970 when the Government's role in the genocide of the Ibos of Biafra was exposed by Jonathan Aitken. The Sunday Telegraph of 11th January 1970 published the Scott report. The importance of the Scott report was this. Throughout the war in Nigeria the British Government had repeatedly denied supplying the arms and ammunition with which General Gowan was exterminating the people of Biafra. The lies told to the House of Commons were important for the deaths of two million people were involved. The Scott report revealed the truth. Jonathan Aitken had a rougher ride than Charles Marvin as a result of this exposé. The price that Aitken had to pay for defying official secrecy in order to expose bestial brutality was a year spent in fiercely contesting criminal proceedings. There are few men of Aitken's calibre with the requisite wealth and influence to fight such a battle. Secrecy today shields from public view many iniquities. It is one thing to expose infamy abroad, but a tyrannical bureaucratic government is far more sensitive regarding its misdemeanours nearer home.

How does Official Secrecy affect us?

The bonny face of Scotland is pitted and scarred with senseless savagery. Gigantic sores desecrate the Highlands. Purposeless wanton destruction results from secret scheming that went awry. The ecologist, like every taxpayer, pays for this insanity out of his own pocket with no right to know who has spent his money or why such devastation was produced. Without the right to know he is impotent in the face of catastrophe.

A motorway is to bludgeon its way through a beautiful valley. No-one is told why. It is planned in secret and those whose lives will be ruined have no right to know until it is too late and their homeland disappears beneath the concrete.

A city has a green belt, a place to breathe for its highrise prisoners, and out of the pleasant plain mushrooms a factory. What secret wheeling and dealing obtained the sanction of the Department of the Environment? Anthony Crosland is not accountable; secrecy can hide the perfidy perpetrated on those unfortunate denizens of the concrete jungle. What negotiations, what agreements were made behind the paper curtains of secrecy that deprived the citizens of the right to breathe? Every citizen in the land, every ecologist in the land, has the hand of the bureaucrat deep in his pocket to pay for the banger in the sky that consumes oxygen by the ton for every minute of flight. So deep is that hand in his pocket that he himself will never be one of the tiny clique of hyper privileged Concordians. The secrecy by which he has been robbed is too costly an abuse to be permitted.

The ecologist and the man in the street, although they may not overtake the sun in the sky, can demand that right to know and regain control of those who rob their pockets or at least to know what the robbers intend to do with their plunder. Without a veil of secrecy it is possible the robber would be too abashed to be so flagrantly insane. The ecologist stands guard for posterity upon our environment — what hope has he to fulfil that terrible responsibility whilst the destruction of the environment is planned in secret? The ecologist can legitimately demand that all men claim their rightful access to information. Official Secrecy debars them of that right and threatens the very existence of our children.

It enables the Government to put out propaganda on nuclear energy that is misleading and slanted. Those in positions of power and authority consistently fail to inform the public of the dangers of exploiting nuclear energy. Many different radioactive isotopes, including rain-soluble gases, are by-products of nuclear fission and re-cycling of reactor fuels. Increasing quantities of these isotopes are getting into the environment as a result of ''planned releases'' and accidental escapes. They are deadly in their delayed effects. Radioactive isotopes are accumulated and concentrated by biological processes in plant and animal tissues, and by physical processes in the soil, silts and water systems. When this radioactivity is ingested it enters the body fluids of the individual who then has every organ of the body including the gonads and in a pregnant woman the foetus continuously irradiated from their own circulating body fluids.

The long term genetic effects of continuous lowdosage irradiation are incalculable and could be utterly catastrophic for the human race. Once mutations appear they are likely to be progressive and uncontrollable. A secretive government does not want the people to know. The bureaucrat believes that what the people do not know will not harm them, and what they do know may harm the bureaucrat. If the nuclear programme for Britain goes ahead many thousands of tons of plutonium and other high radioactive substances will be transported on the roads of Britain. Plutonium has a half life of 24,000 years; if only one pound of this substance escaped into the atmosphere its ability to produce cancer of the lung could render the earth uninhabitable for 250,000 years. The man in the street is entitled to know the liabilities of nuclear power and to be a party to decisions which can jeopardise the future of the human race.

Freedom of Information legislation will restore to all of us our right to take responsibility for the care of our heritage. These islands are home to many people. They have been and may still remain a pleasant place to spend our days. Only the freedom to know and the freedom to take responsibility for the future can save this sceptred isle, this fortress built by nature for herself.

Edward Hamlyn, M.B., Ch.B., Consultant to the All Party Committee on Freedom of Information and Privacy at the House of Commons.



"DAD, ARE KILLER-WATTS WHAT WE GET FROM NUCLEAR POWER STATIONS?"



Those who have grown up in Europe or North America, and have assimilated the view of history proclaimed in those civilizations, know that once there was a paradise on earth and it was called the South Pacific. For more than two centuries adherents of western technological culture have been fleeing from the supposed benefits of their culture in search of that paradise or its remnants. The more they have searched. the farther it has receded from their vision. Finally, in desperation, they have attempted to recreate it in the tourist lands of Hawaii or Tahiti. But the new model has not been pleasing to the soul.

The Search for Paradise

More than a century ago, the European invaders of North America were pushing into what they called the wilderness of the West. Most were concerned only with the problems and perils of each day, but a few could see the realities about them with a vision that transcended the purely utilitarian. George Catlin, the artist, was one of these who was greatly disturbed by the destruction of the North American bison and its consequences for the future of the Plains Indian people. He had a proposal that he hoped might save both wildlife and people:

'And what a splendid contemplation too, when one . . . imagines them as they might in the future be seen . . . preserved in their pristine beauty and wildness, in a magnificent park, where the world could see for ages to come, the native Indian in his classic attire, galloping his wild horse, with sinewy bow, and shield and lance, amid the fleeting herds of elks and buffaloes. What a beautiful and thrilling specimen for America to preserve and hold up to the view of her refined citizens and the world, in future ages! A nation's Park, containing man and beast, in all the wild and freshness of their nature's beauty!'' (Nash, 1968). This proposal made in 1832 is

commonly regarded as being the first request that a large area of wild America be set aside as a national park. Let us ignore for the moment the obvious chauvinism, since this characterized most 19th century Europeans. Catlin's was no modest proposal, for he wanted the entire Great Plains from Mexico to Canada set aside for the protection and use of those people and animals to whom it rightfully belonged. At the time there was no receptive audience. The West was being won by those to whom, in Catlin's words "power is right and voracity a virtue". Viewed from the other side, however, the howling wilderness that these narrow men were trying to subdue looked quite different. In the words of Chief Standing Bear of the Oglala Sioux Indians (McLuhan, 1971):

'We did not think of the great open plains, the beautiful rolling hills, and winding streams with tangled growth as 'wild'. Only to the white man was nature a 'wilderness' and only to him was the land 'infested' with 'wild' animals and 'savage' people. To us it was tame. Earth was bountiful and we were surrounded with the blessings of the Great Mystery. Not until the hairy man from the east came and with brutal frenzy heaped injustices upon us and the families we loved was it 'wild' for us. When the very animals of the forest began fleeing from his approach, then it was for us the 'Wild West' began.'

The National Parks Movement

Forty years after Catlin's time, in

1872, the Congress of the United States proclaimed the world's first national park in the Yellowstone region of the territory of Wyoming. Eighteen years after that, shortly after Christmas in 1890, the Army of the United States surrounded and massacred most of the last independent band of the Sioux Indians at a place called Wounded Knee in South Dakota. A survivor, Black Elk, stated:

"... something else died there in the bloody mud, and was buried in the blizzard. A people's dream died there. It was a beautiful dream ... the nation's hoop is broken and scattered. There is no center any longer, and the sacred tree is dead" (Brown, 1971).

Later, half of Catlin's dream was realized. The animals were given the first national park. The Indians had a different appointment with destiny.

The national park movement, started at Yellowstone, has been generally regarded as a great success. When many of us met at Grand Teton and Yellowstone, in 1972, we noted that there were more than 1200 national parks or their equivalents throughout the world that met the high standards of the United Nations' List (IUCN, 1974). The centennial of the national parks movement was a stirring occasion for those of us who favour conservation. But I wonder how many noted that in the following year, 1973, a band of Oglala Sioux and other Indians seized and held the town of Wounded Knee, South Dakota, for many months, in a dramatic protest against treaty violations. They were asking, among other things, that the lands that had been guaranteed to them by solemn treaties wth the United States government, be in fact given back to them. Some of these lands are in national parks (Burnette and Koster, 1974).

These things are mentioned because I believe that this is a good time to re-examine the entire concept of national parks and all equivalent protected areas. To begin with, those who were responsible for the creation of the system of protected areas in the United States, including national parks, national forests, wildlife refuges and many other categories, were attempting to establish buffers against the greed and rapacity of their fellow citizens. In the 1850s Henry David Thoreau had proclaimed the necessity for protecting at least some areas in which nature could remain intact against the destructive forces of civilization. In the 1860s George Perkins

Marsh wrote about the devastation being created by deforestation and the misuse of lands (Nash, 1968). During the decades before Yellowstone was set aside, and until the first national forests were reserved in the 1890s, it was not only the Indians who were being massacred. In the 1860s, because of heavy use by domestic grazing animals, virtually the entire native grassland area of California was knocked out, and the grasslands that developed in its place were dominated by exotics from Europe and Asia. A good share of the hardwood forests of eastern America had been cut down and similar destruction was starting in the West. Farming lands, particularly in the American South, were misused and abandoned in an eroded, infertile state. Wildlife was being slaughtered everywhere.

It is little wonder that those concerned with conservation of nature attempted to set some areas aside, and it is remarkable that they were as successful as they were in doing so. But is there not cause to wonder that it was accepted that those lands outside the national parks were going to be beaten and battered, or used in such a way that any hope for the survival of wildlife in their vicinity was to be considered an idle dream? Is it not strange that it was taken for granted that people and nature were somehow incompatible, and that the drive for profit or power must take precedence over any concern for the kind of world in which people live? People were not always that way. Pehaps it would be well to listen once more to Chief Standing Bear of the Oglala Sioux (known in his day as the Lakotas) (McLuhan, 1971):

"Kinship with all creatures of the earth, sky and water was a real and active principle. For the animal and bird world there existed a brotherly feeling that kept the Lakota safe among them and so close did some of the Lakotas come to their feathered and furred friends that in true brotherhood they spoke a common tongue.

"The old Lakota was wise. He knew that man's heart away from nature becomes hard; he knew that lack of respect for growing, living things soon led to lack of respect for humans too. So he kept his youth close to its softening influence."

Here in the Pacific, if one is to judge from the writings of the early European visitors and invaders, much of the same attitude toward nature must have prevailed. Sir Joseph Banks, who accompanied Captain Cook in his explorations of the Pacific, grew quite ecstatic about the ways of life of the island people and the balance that existed between humanity and the natural world. All who visited the islands before the traders, the raiders, and the missionaries did their evil work, seemed to share that opinion. Among the Australian aboriginal people was a sense of responsibility that was continually renewed by the visions of Dreamtime through which people were restored to unity with heaven and earth (Meggitt, 1974).

Ecosystem People vs Biosphere People

In an earlier paper (Dasmann, 1974), I have postulated that there are two types of people in the world, ecosystem people and biosphere people. In the former category are all of the members of indigenous traditional cultures and some who have seceded from, or have been pushed out of, technological society; in the latter are those who are tied in with the global technological civilization. Ecosystem people live within a single ecosystem, or at most two or three adjacent and closely related ecosystems. They are dependent upon that ecosystem for their survival. If they persistently violate its ecological rules, they must necessarily perish. Thus a hunting people who continually kill more wild game than can be produced by the normal reproduction of wild animal populations must run out of food and starve. A fishing people who persist in overfishing will destroy their base of support. Those who practise subsistence agriculture must develop some means for keeping the soil in place and for restoring its fertility. Island people have lived under particularly strong restraints, and could not tolerate any great increase in their own numbers, since the resources of islands are not only limited but tend to make their limitations obvious. Only continental people can develop myths of unlimited resources.

Biosphere people draw their support, not from the resources of any one ecosystem, but from the entire biosphere. Any large modern city is the focus for a network of transportation and communication that reaches throughout the globe – drawing perhaps beef from Argentina, lamb from New Zealand, wheat from Canada, tea from Ceylon, coffee from Brazil, herring from the North Atlantic, and so on. Local catastrophes that would wipe out

people dependent on a single ecosystem may create only minor perturbations among the biosphere people, since they can simply draw more heavily on a different ecosystem. Consequently, biosphere people can exert incredible pressure upon an ecosystem that they wish to exploit, and create great devastation - something that would be impossible or unthinkable for people who were dependent upon that particular ecosystem. The impact of biosphere people upon ecosystem people has usually been destructive. Even if the intentions of the biosphere invaders are the best, and they seldom are, their effect is to break down the local constraints, the traditional practices that have held the delicate balances between humanity and nature, and thus allow ecosystem destruction to take place.

Indiginous Societies Displaced

Here in the Pacific we see some glaring examples of what happens when ecosystem peoples are brought into the biosphere network. The people of Nauru would never have thought of mining their island out from under themselves, until they were tied into the trade and transportation of the biosphere network. The same applies to other phosphate islands. No ecosystem person would have thought of taking the top off New Caledonia to get at the nickel. until he was sucked into the biosphere network. In Australia there is an enormous uranium deposit, an estimated 1 per cent of the world's known supply, on aboriginal land at a place called Gabo Djang. According to Robert Allen, this is known to the Aborgines as the Dreaming Place of the Green Ant, and if it is desecrated, the Great Green Ant, one of the powerful spirits, will come down and ravage the world. Queensland Mines Limited offered the Aborigines the munificent sum of \$7,425 in 1971 for the right to mine this 300-million-dollar ore supply, but later raised the offer to \$891,000 along with more than 13 million dollars in royalties. The offer was for a long time refused, but in December 1974 it was reported that the people had agreed to sell. The biosphere people have again triumphed and that much more uranium will be turned loose to do the work of the Great Green Ant in ravaging the world (Allen, 1974). Admittedly, some of the ecosystem people who sell out to the biosphere network become very rich, which permits them to go somewhere else to live -

so long as there is a somewhere else that the biosphere people have not destroyed.

Biosphere people create national parks. Ecosystem people have always lived in the equivalent of a national park. It is the kind of country that ecosystem people have always protected that biosphere people want to have formally reserved and safeguarded. But, of course, first the ecosystem people must be removed - or at least that has been the prevailing custom. The consequences are almost always destructive to the people affected. Colin Turnbull's book The Mountain People is a particularly disturbing account of what happened to a hunting-subsistence-agriculture people when they were pushed out of Uganda's Kidepo Valley National Park (Turnbull, 1972). A similar, but perhaps less severe, disintegration took place among the elephanthunting Waliangulu who were displaced by Tsavo National Park - a park that has subsequently suffered from a plague of elephants (Gomm, 1974). As Tururin, chief of the Pataxo Indians of Brazil, has put it We Indians are like plants: when changed from one place to another we don't die but we never fully recover. We will not leave here because even before the reservation existed we already lived on this land. It may be bad, it may be good but it's our land." But in Brazil the previously isolated ecosystem people are being threatened or destroyed by the massive drive for the exploitation of Amazonia - a process far less benign than any effort to create national parks (Supysáua, 1974).

It is characteristic of wealthier biosphere people that they do not want to stay at home. They wander the globe always searching searching for something they seem to have lost along the way in their rush to capture the resources of the world and accumulate its wealth. Thus they give rise to the tourist industry, and this in turn provides a financial justification for creating and maintaining national parks. In these parks the wanderers can see some of the wonders that they left behind, and can pretend for a while that they have not really destroyed the natural world - at least not all of it. They will pay highly for this experience. But for some reason the money nearly always tends to be channelled back into the biosphere network. It does not go to those who were once ecosystem people and who have the strange idea that what is now called a national park is really just the land that was home.

This situation must not continue. National parks must not serve as a means for displacing the members of traditional societies who have always cared for the land and its biota. Nor can national parks survive as islands surrounded by hostile people who have lost the land that was once their home. Parks cannot survive in a natural state if they are surrounded by lands that are degraded or devastated by failure to obey the simplest ecological rules. Today, with the increase in human numbers and the enormous pressure being exerted on all ecosystems, one of the distinctions between ecosystem and total biosphere is being broken down. No longer can biopeople remain sphere buffered against the breakdown of particular ecosystems. A drought in India or North America now has global repercussions. The entire biosphere is now becoming as closely interconnected through human endeavour as the most delicately balanced ecosystem within it. Not just national parks but nature conservation in its fullest sense are now becoming absolutely vital.

Few anywhere would argue with the concept of national parks, but many would argue with the way the concept has been applied — too often at the cost of displacement of traditional cultures, and nearly always with insufficient consideration for the practices and policies affecting the lands outside of the park.

Establishing National Parks in the South Pacific

Here in the South Pacific there is no doubt that more national parks, or something equivalent to them, are badly needed. There is some question, however, about what kind of national park, and how it is to fit in with the patterns of life, and the necessities of life, for those people who inhabit the Pacific. I would suggest that the ideal national park for the Pacific islands would be fairly close to what existed here before the invaders from Europe and Asia took over. I do not propose, however, that we attempt to turn back the clock. I am suggesting, however, that in going forward we take into account some rules that should be mandatory for those agencies, national or international, responsible for advocating or creating new national parks.

1. The rights of members of indigenous cultures to the lands they have traditionally occupied must be recognized, and any plans for establishing parks or reserves in these lands must be developed in consultation with, and in agreement with, the people involved. Papua/New Guinea has been taking some noteworthy initiatives in this direction, and I trust that their government will continue along this course. Furthermore, the Australian government has now fully recognized the rights of its Aborigines to their lands, including full control of mineral rights.

2. Recognizing the long-prevailing balances that have existed between people and nature in areas where traditional societies have remained isolated from the influence of biosphere cultures, the establishment of fully protected areas in which these people can maintain their isolation for as long as they wish to do so should be encouraged. Such areas will do much to further the conservation of nature, and equally important, will protect ways-of-life that are in balance with nature. We all have much to learn from these traditional cultures. In this respect there are some examples to follow. The Manu National Park in Peru shelters an isolated Indian tribe which, for the present at least, remains undisturbed. The Odzala National Park in the Congo provides a home for Pygmy peoples. In Botswana and South Africa the 6 million hectares of the Central Kalahari Game Reserve and Kalahari Gemsbok National Parks permit the Bushmen to continue their traditonal hunting life. There were once some good examples in Brazil also, but I am afraid that these are being brushed aside in the sacred name of "development" (Supysaua, 1974). 3. Wherever national parks are created, their protection needs to be co-ordinated with the people who occupy the surrounding lands. Those who are most affected by the presence of a national park must fully share in its benefits, financial or other. They must become the protectors of the park, whether they are directly employed by the park, receive a share of park receipts, or are in other ways brought to appreciate its value. Without this, we will find that we are entering a waiting game, at best. The people outside the park will await the change in government or the relaxation of vigilance that will permit them to invade the park.

4. Land use in areas surrounding parks must be compatible with the protection of nature inside the park. This too will require negotiation and understanding among the people who own or occupy these lands. It cannot be effectively accomplished by some sweeping government decree unless the lands are unoccupied.

This is not a comprehensive list of rules, but only an attempt to emphasize those rules which have been far too generally ignored in the establishment of national parks in the past. However, if national parks are really to survive, and if they are going to accomplish their objectives, then we must have more than just a set of rules concerning the parks and their surroundings. I cannot see much hope for the future of either parks or people, unless some of the old sense of belonging to the natural world, of being a part of nature, and not hostile to it, is restored. In an article prepared for Planet Drum, Jerry Gorsline and Linn House have made this comparison:

'We have been awakened to the richness and complexity of the primitive mind which merges sanctity, food, life and death where culture is integrated with nature at the level of the particular ecosystem and employs for its cognition a body of metaphor drawn from and structured in relation to that ecosystem. We have found therein a mode of thinking parallel modern to science but operating at the entirely different level of sensible intuition, a tradition that prepared the ground for the neolithic revolution; a science of the concrete, where nature is the model for culture because the mind has been nourished and weaned on nature; a logic that recognizes soil fertility, the magic of animals, the continuum of mind between species. Successful culture is a semi-permeable membrane between man and nature. We are witnessing North America's post-industrial phase right now, during which human society strives to remain predominant over nature. No mere extrapolation from present to future seems possible. We are in transition from one condition of symbiotic balance – the primitive to another which we will call the future primitive . . . a condition having the attributes of a mature ecosystem: stable, diverse, in symbiotic balance again. . . . If we wish to integrate our cultures with nature we do so at the level of the ecosystem which everywhere has a common structure and progression but everywhere varies specifically in composition and function according to time and place'' (Gorsline and House, 1974).

I would propose that the answer for nature conservation in the South Pacific, as elsewhere, will be found to lie in the direction of "Future Primitive". This does not mean the rejection of the best of modern technology, but it does mean the avoidance of the worst. It does mean using the tools and energy that are still available to create something permanent, to create a way of life that can be sustained. In such a way of life, nature conservation would necessarily be taken for granted, since people will recognize that their future depends on the health and diversity of the natural world.

Already some of the handwriting is beginning to appear on the wall. The airlines are in serious trouble; the tourist industry is struggling to survive. No future can be built around a national park system that depends on the big jets arriving around the clock and pouring their loads of wealthy Asians and Europeans into the island scene. Unless some miracle fuels are invented soon, the big jets will be increasingly empty and some day they may not come at all. The economies of the technological biosphere society are in a chaotic state - and no two economists can agree about their future direction. Those who live in the Pacific and who have any sense of prudence would be wise to look to their own resources, their own levels of population, and to turn back to examine some of the old skills and ways of life that have been left behind. Not too long ago most people the Pacific were ecosystem in people. Now I would propose that the future belongs to those who can regain, at a higher level, the old sense of balance and belonging between man and nature.

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Floods as Man-made Disasters by Maurice Arnold

The periodic onrushes of streams and ocean waves frequently bring economic disaster and human trauma. We call such occurrences 'natural disasters', articulating a human penchant for dealing with effects rather than causes. But in the main the real cause of damage is faulty land management and unwise governmental programmes, which in turn usually result from a failure of decision-makers to understand or apply rational planning precepts about riverine and estuarine systems. Undue reliance on structures to control the water's great energy is the product of that failure, and the reliance in turn tends to produce further disasters and tragedy.

This paper will present reasons why the structural approach to flood control seems not to have been effective, and why other nations should follow the lead of the more enlightened ones which guide land use in flood-plains and co-ordinate relief programmes in such a manner that they do not increase the risk of floods.

The flood-plain is the land area which, lying near to a water body, absorbs the excess energy of high water caused by unusual run-off and/or tides. The one-hundredvears plain - that area which has a one per cent or greater chance of being flooded - in the United States is estimated by the U.S. Task Force on Federal Flood Control Policy (1966)* to occupy about 5 per cent of the nation's total land surface. The proportion in other nations varies substantially and statistics are not available for all nations, but from one to twenty per cent seems a reasonable estimate for this discussion. Lands that are subject to a significant flood risk are thought to occupy about 7 per cent of total lands in the United States (White et al., 1975).

Probably, the humans living on flood-plains have decreased in numbers over the years — until recently. Historically, Man located many cities on flood-risk lands, for often he had no real choice: he was tied to the water's edge for economic and technological reasons. As these reasons became less compelling, when floods came, humans probably tended to move from the high-risk lands, while others, when migrating, moved to high ground. Then came improvements in our ability to control floods by structural means. Populations-at-risk, and others, were encouraged to stay or return to the flood-plain — unless strict land controls had been instituted downstream. Thus, those countries which relied on structural means to combat floods apparently underwent an increase in flood-risk populations, and this was associated with an increase in damage potentials.

In the United States, for example, the size of the population that is subject to flooding appears to have increased since 1937 (the year in which the Government adopted a structurally oriented national floodcontrol programme). Despite expenditures well in excess of 12 thousand million dollars since then, the population seems to be more endangered than ever. Countries with little or nothing in the way of flood-control programmes, while sometimes suffering disasters of headline proportions, do not seem to have had as much of an increase in relative populations-at-risk as the United States. Nations and locales which rely more on land management than on flood control, do not seem to have experienced an upswing in danger. Clearly there is a need for correlation between the extent of the risk and the selection of flood-control devices. Specifically, the choice of structural means without proper land management as a corollary may cause damage and losses.

Effects of Principal Flood-Control devices

The means which we use, singly and in combinations, to control or contain excessive water-energy, are the dam, the channel, the levee, the sea-wall, and flood-plain management. The dam is a favoured device for controlling run-off by nations that use land-management do not techniques (Fig. 1). Its reservoir is effective for a period maybe 50 to 100 years - depending on the level of flooding which it is designed for, on the sedimentation capacity, and on the other uses that are made of this artificial lake. Its ability to control floods diminishes progressively, and eventually the reservoir will fail as a flood-control device unless Herculean efforts are made to dredge and bulldoze sediment from its bottom and upper reaches.

While the dam is favoured, the channel is more frequently used by structure-oriented officials. The channel - also called a canal or lateral - is simple, as the stream is ditched, straightened, and generally concreted (Figs. 2, 3 and 4). Obviously, its protection is limited to the area where the channel is located: it increases the need for protection downstream, as it adds to water velocity or quantity below. Rather than being called a floodcontrol mechanism, the channel is more properly termed a 'floodthreat-transfer-device'. Its life is determined by design and construction methods, by the amount of maintenance it receives, and by the nature of manipulation upstream. As can be inferred from Fig. 4, its maintenance is apt to be very costly.

The levee — a lineal dam — is popular in lowlands. Its effect on flooding is like that of the channel, and the degree of effect varies with the width of the levees in relation to the stream and flood-plain. Its life is dependent mainly upon design, location, maintenance, and upstream activities.

Sea-walls and groynes (also called jetties) are used to reduce wave action by absorbing and redirecting the energy of the sea (Fig. 5). Both are referred to here as 'sea-walls', as their purpose is similar when used for flood control. Generally, seawalls directly confront waves, while



Fig. 1. White Rock Lake late in 1967. The broken white line pointed to by the arrow in the foreground indicates the old shoreline of headwater of stream entering from left where sedimentary filling has surfaced extensively. Large cars on the highway in the foreground indicate scale.

groynes may cut across the main current or lie parallel or obliquely to its flow. Their effectiveness as floodcontrol devices depends for the most part on their design, maintenance, sediment charges, and severity of wave action.

Flood-plain management is becoming more and more used in the United States and many other countries. It is basically a landmanagement tool, and the term refers to a regimen in which the flood-plain is kept essentially free from structures. It generally does not alter flooding patterns, as its purpose is to preserve natural means of flood control. It is the only method which is effective in the long run, for if it is planned adequately, its life is not as dependent on maintenance and upstream activity as are the structural alternatives. The effectiveness of these tools depends upon how they are deployed in a floodcontrol system.

Weakness of the Structural Strategy

Logic and evidence, although incomplete, seem to argue against deploying only structures; there now seems good reason to think that structures should rarely be employed for flood control. The case against relying solely on a structural strategy to abate floods rests on the following four main arguments: it is insufficiently effective in the long term and is often counter-productive in that it encourages human occupation of the flood-plain; it causes severe and unnecessary losses of resources; it discourages the economic use of land; and it is not costeffective.

The effectiveness of structures when used alone has been a source of controversy in the United States for over a century. In the last two decades, however, the advocates of dams, channels, levees, and seawalls, have modified their views perceptibly. The evidence against structures has mounted as the structures have aged and more information about them has become available. Morgan (1971) alleges that the great flood of 1927 in the lower Mississippi was due in large measure to levees and not to unduly large run-off. Belt (1973) points out that the damaging flood at St. Louis in 1973 contained less water than a

previous flood which had done less damage despite construction meanwhile of an upstream system of dams and channels on the Missouri and Mississippi Rivers. These critics are now being joined by many others.

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Yet, it is undeniable that structures do give short-term local relief, and this is perhaps why they constitute a significantly vulnerable point. For protection encourages increased occupation of the flood-plain, introducing the elements of future disaster that may be more serious than if nothing had been done. The local relief sets in motion a vicious cycle of flood losses, flood protection, further flood-plain occupancy, further losses, further protection, etc. Commitment to structural solutions can only mean further commitment. The cycle is demonstrated in Denver, Colorado, a city which has several dams (in-place and under construction) and channels for flood protection. Yet these structures have made Denver more susceptible to flood damage than ever before. Observers of the Denver scene conclude that construction of floodprotection works has hastened the development of the flood-plains, and thus structures begat development which begat more structures. Denver's flooding prospect is repeated many, many times throughout the earth where structures are



Fig. 2. Shoal Creek, Illinois, before channelization. The natural stream is of varying width, with wide stretches containing run-off and creating fertile conditions for biological diversity and concomitant natural beauty.



Shoal Creek after channelization. The channel carries away the water, thus unleashing energy and transported material downstream, and adding to lowland troubles. With the removal of water and often severe erosion, the upland area may become both biologically and aesthetically unattractive.

the primary means of flood control.

Results are another valid basis for evaluating effectiveness. Regretfully, there are two obstacles to obtaining usable statistics and information about results. One is the paucity of reliable, pertinent statistics; happily, this is slowly being remedied in some nations. Another is the difficulty of determining just who would return to live in the floodplain after a disaster - even if there were no flood-protection prospects. We know that many people want to return, especially after experiencing trauma; but others would leave if they did not have an investment to return to. Florence, Italy, has seen its flood-plain occupants return over a dozen times in 500 years. Sikka (1973) indicates that the heaviest flood damage in India's history, in 1971, was caused largely by reckless occupation of the floodplain. But many of the victims of the 1972 flood at Wilkes-Barre, U.S.A., would have resettled on higher ground if governmental programmes had offered a practical choice.

Since 1937, the year of adoption of a 'comprehensive' (actually structural) flood-control programme, the U.S. losses from flooding have apparently not been reduced despite Federal expenditures of over \$12 thousand millions for structures and further great amounts for flood relief. The average annual amount of property damages has risen from \$350 millions in the nineteen-thirties to \$1,500-\$2,000 millions more recently (U.S. Office of Emergency Preparedness, 1972), and is increasing faster than applicable rates of inflation. The numbers of lives lost have decreased, on an average annual basis, but may now be on an upswing. The potential for major catastrophes has increased during this interim, in the view of many authorities (White et al., 1975). In 1972, Hurricane Agnes hit areas of the Middle and North Atlantic drainage basins and the



Channelization project in need of maintenence: concrete lining of White Oak Bayou, Houston, Texas, showing deterioration after few years of use. Human figure in middle-distance indicates scale. Photo: National Resources Defense Council

upper Ohio, causing more damage (\$3 thousand millions) than any other single natural disaster in the history of the United States. The areas hit were the same ones that had been the subject of elaborate construction programmes.

These facts seem to idict the U.S. flood-control strategy, which relies on structures even today, although incentives for better land management are now coming into use. One might offer the rejoinder that disaster costs and potentials might have been greater without the strategy, but the experience of countries which rely more on land management suggests that the rejoinder is incorrect.

Structural methods require commitments of resources. Reservoirs require flooding of lands which are highly productive for farming, mining, and animal habitats. Channels tend to make streams sterile as regards fisheries and de-water the flood-plain (cf. Fig. 3), radically reducing the value of the stream and bank areas for conservation purposes (contrast Fig. 2). Sea-walls probably encourage occupation of estuarine wetlands, and to that extent reduce the potential of the oceans' and seas' food supply, while reducing the opportunities for recreation (cf. Fig. 5). Urban areas are deprived of valuable parks and open spaces which they badly need in cities, and which are so vital to human emotional and physical well-being.

Against these losses must be balanced the benefits of greater cropping and more intensive land occupancy which are made possible by structures. Moreover, the dams might have been built anyway though perhaps with less capacity, since few dams are built solely or primarily for flood control. Thus many of those that are built for flood control are probably needed only to give short-term flooding relief to buy time so that long-term landmanagement objectives can be attained.



This sea-wall along the New Jersey coast, by cutting into the ocean, redirects flooding patterns. Photo: Robert P. Martin; U.S. Bureau of Outdoor Rereation.

The increased intensity of farming that is practised in many de-watered flood-plains requires an increase in the use of energy, and subjects the stream to increased pesticide and nutrient burdens. Therefore, the practice of intensifying farming in lowlands is at least questionable for many situations. As for land occupancy, it is rare indeed that intensive flood-plain settlement can be justified - for reasons that are given elsewhere in this paper; and as for a dam buying time to accomplish better land management downstream, the time is scarcely ever used. In fact, dams seem to be conducive to complacency, rigidifying existing land uses and stimulating insecure development in almost all instances. Correction of fundamental land misuses then generally becomes politically impossible - until the next occasion of flooding. At that time, rationality is difficult to achieve; we have learned through experience that most people in trauma apparently expect immediate action to deal with effects rather than with causes.

Regrettably we do not keep ledger sheets of benefits and losses of floodcontrol programmes, and so have to guess. Nevertheless it seems quite evident that, generally, the structural strategy is wasteful of resources — especially when one considers that land-management alternatives might often have been more effective than dams, even if dams would have been constructed anyway and have led to some positive benefit.

The most compelling case against the sole use of the structural strategy lies in the land-use argument, for, as a general guide, intensive use should usually not occur in the floodplain, and moreover all the highly productive bank and shore areas are needed for conservation purposes. Thus, we do not require flood works which narrow the floodway. Some industries that are dependent on water transportation may need to be situated in high-hazard areas, but they should be floodproofed. It appears that most other industries can build on higher ground without serious ill effect on their function or economic position. Obviously, housing should not be placed in high-risk places, and usually monies spent to protect them will simply postpone disaster and make later reckoning more expensive.

Most settlements have enough land for building, so that they do not need to grow into extreme floodhazard areas. This generalisation is, and will probably continue to be, true even for most communities in densely populated countries - until there is a radical breakthrough in food-growing technology or the development of highly stratified economic integration with other parts of the earth or with other planets.

On the other hand, flood-plains are ideal and highly productive for a wide range of conservation uses and for farming, mining, parklands, human habitat, reopen spaces, and other creation, community They are the site of activities. the key links in many food-chains, and provide homes or transition space for numerous birds and other animals. They support a remarkable diversity of plant life, and contain some of the most suitable lands for wildlife conservation. Retaining the flood-risk areas as open lands is a wise investment for humans, helping to conserve high quality water and to achieve better noise control than is possible if stream banks are occupied.

There is wide disagreement about how much land should be set aside for conservation purposes, but the need in all countries probably exceeds the supply of flood-plains many times over. It therefore makes good sense to keep flood-plains open, as conservation uses generally thrive from floods and inasmuch as less suitable lands will need to be set aside for these uses anyway. If the flood-risk areas were devoted to conservation purposes, it would be unnecessary usually even counter-productive to protect them from floods.

Brower (1973) has suggested a method which can be used to reduce flood loss at minimum cost. He would use the least-energy principle, that is, the development which confronts as little water-energy as possible would be chosen. Thus, for flood control, the stream's natural bends and flood-plain would be used most often to absorb the energy of the water flow or waves, and direct

confrontation with the water's force would usually be avoided. The approach seems sound, and would help us to avoid use of the great quantities of man-made or pumped energy which are required for a structural approach to floods.

Some flood-control planners consider a proposed project costeffective - that is, worthy - if the value of the average annual loss of structures in the flood-path before construction of control devices equals or exceeds the annual capitalised costs of construction and mainthese of flood-control tenance devices. Although other factors are now being considered in project evaluation, this cost-benefit approach is basic. The structural approach requires much of society's energy to fight the energy of the flood, and this all translates into money. The structure requires much direct and indirect energy to build and maintain. If it is not the correct answer, which it usually is not, then the energy drain continues for relief programmes and for another answer. Poorly conceived projects can thus eat at a society's capital, depriving other programmes of much-needed finance.

In the United States today, the average annual cost of flooding seems to be around \$3.5 thousand millions - including expenditures for structural construction and maintenance by all levels of government, insurance premiums, and private losses and reconstruction costs. The figure is going up, and if the current strategy continues, it may be as high as \$12 thousand millions annually by the year 2000. Inasmuch as the U.S. programme has been in operation for many years, the figure should be going down by now. It accordingly appears that the U.S. programme is not costeffective; if it were, then after a period of time the losses should go down as total flood-control costs go up.

Thus it seems that the prospects of a structural programme decreasing flood losses are dim, as reduction in losses can occur only if almost all streams are diked and channelised and the shore is sea-walled. Moreover, the nation which devotes itself to structural remedies alone can expect a costly energy drain. If there were no alternatives, such a drain would be regrettable but tolerable, as the cause is good; but inasmuch as flood-plain management is a demonstrated, effective alternative, the drain is only regrettable.

The Political Answer

Too often, flood policies and programmes are based on the assumption that flood disasters result from Nature's actions, not Man's. whereas in actual fact the misery and damage are mostly caused by human error - especially by poor land management and myopic flood-control strategies.

In the United States, we are beginning to question the manner in which we approach flood-control planning, and there is every expectation that this questioning will become stronger and more frequent. Recently, many structural projects have been rejected, and flood-plain management alternatives have been selected in a few instances. In many cases, the answers have been chosen because of political activism by laymen. As with so many environmental problems, the solution is a political one rather than of a technological nature. Electors, tax-payers, and leaders, must insist on better results and accountability - or settle for expensive short-term answers and long-term disasters. Clearly, it is high time to reappraise structurally oriented programmes.

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Taxation and the Future of the Farming Structure

by Robert Waller

The Capital Transfer Tax required to finance the British Government's ever increasing profligacy is likely to force farmers to sell land. The Government regards this as a necessary evil in that it will lead to the break-up of the larger farms which are today regarded as the most economic. If appropriate measures had been taken this trend could have been benificial, since smaller farms can better satisfy the requirements of the post-industrial age. However these measures have not been taken and it looks as though we shall have the worst of both worlds.

For many years now, the farmers and country landowners in Great Britain have been urging governments to reduce the sheer weight of capital taxation which has threatened to break the backs of landowners and farmers. At the last annual general meeting of the Farmers' National Union, a resolution was passed expressing grave concern that current and proposed capital taxation would make it impossible to preserve con tinuity in the ownership and occupation of farming units. The most damaging tax so far is the Capital Transfer Tax (CTT) which prevents a farmer from passing on his capital assets, before death, to his heirs. The proposed tax is the wealth tax, an annual tax that would have to be paid on assets, not income. Such a taxation policy, the NFU declares, would bring about the disintegration of our proven agricultural system, which has operated for the benefit of the economy and the people. If this system were damaged, they allege, it would lead to a reduction of investment and jeopardise future food supplies. The disintegration of the structure of our farming would be the result of farmers having to sell land in order to pay taxes The larger and more efficient farms would be gradually broken up.

Clearly the Chancellor has been impressed by these pleas, and his recent budget proposals, so far as farmers are concerned, would appear to leave the situation roughly unchanged. The relief of 50 per cent for the valuation of a full-time farmer's land for CTT is not calculated on the old-time 'notional rental' basis, but on vacant possession value agreed by the District Valuer and then reduced by 50 per cent. At present this method results in more or less the same figure as the old one, but changes in the ratio between rents and site values could result in considerable differences between the old taxes and the new. For example, if land values rise and rents remain static or fall, much of the value of the new concession would be cancelled out, Farmers would be shouting for more relief. The

In this article I am going to argue that any attempt by the Chancellor to solve the problem of reconciling farm ownership and farm profits with social justice by means of taxation cannot prevent undesirable effects. For example, if taxes are raised, the structure of farming will be broken up without being redesigned to suit good husbandry and individual enterprise. If taxes are lowered, then the financial institutions and big business will see farm land as a good investment and still more of our land will be farmed to suit the accountant. We are only fiddling and tinkering with the real problems because urban governments do not understand agriculture. Consequently, they cannot anticipate the results of their taxation measures.

The concentration of land and capital in the hands of the few is a universal-curse, and so far as the socialists aim to prevent this, I support them; but they are caught in a contradiction since they also believe that large farms are the most efficient, and accept the arguments of the NFU and the CLA that it would be disastrous to break up our farm structure. This explains why their policy is one of feeble compromises. Is it true that if our farm structure were changed it would result in lower food production and higher prices?

How essential is our farm structure?

Our 'proven agricultural system' – as the NFU calls it – rests upon our farm structure, which in their opinion is the best in the world, excluding the United States; it is a better structure than that of the rest of Europe, on account of our farms being considerably larger than theirs. Size favours efficiency as we now interpret that word. That is why farmers try to increase their holdings and believe this ambition to be a great virtue. When farmers talk of productivity, it generally turns out that they mean output per man, the maximum produced for the lowest cost.

Admittedly, this kind of efficiency has been the farmers' inevitable response to the government's economic squeezes in its efforts to keep down the price of food to the nation. Industrial mass production methods must be applied to agriculture where a cheap food policy is traditional. I shall assume that readers of The Ecologist know such measures why do not encourage good husbandry, an agreeable landscape and an independent character. I will just recall the reasons why the efficiency of the large mechanised farm is temporary phenomenon. If we reckon efficiency in terms of energy expended, the most economically efficient farm becomes the least efficient in terms of its use of resources. The primary energy source is human labour; if you can't afford the electricity for the washing machine, you must wash the clothes by hand. This would also be true if you could afford it but no fuel was available to make the electricity. You must also take into account the energy required to make the washing machine. In terms of input and output of energy, washing the clothes by hand is more efficient than washing them with the washing machine. However, you may not feel this is very significant when you feel too exhausted to do the rest of the housework! If the family is a large one, then everything can be done in the most efficient way by sharing out the labour. If there is only the one housewife, or worker, then she employs the washing machine and the energy it requires as her servant. But the servant is not free; it demands its energy and materials as its wages. The same is roughly true of the energy aspect of farming; large farms with few men have to employ machines as servants, and these machines demand energy (and the materials needed to construct them) as their wages. The wages will rise as the energy becomes scarce; prices will rise as materials become scarce. In terms of input

and output of energy, human labour is the more efficient. But once you are trapped in the routine of the high-energy structure - in this case the large farm with few farm workers - it is difficult to reverse the farming methods. The energy inefficiency of high-technology farming is increased by chemical methods of cultivation, by the use of artificial fertilisers and all the other . processes that require imported energy and materials. These are all substitutes for human labour. In these terms, a Chinese peasant has been calculated to be several thousand per cent more efficient than a Western hightechnology farmer.

Although bicycles are more efficient than cars, less polluting and more healthy, it is unlikely that we will abandon the motor car; it is, however, common sense to impose restraints on the use of the motor car, and restructure society so that the least efficient forms of transport do not dominate the others, and indeed drive them out. The end of that process would be national bankruptcy. We should never be able to afford the wages demanded by our machine slaves.

If fuel and resources increase in price, the high-technology low workforce system will no longer produce the cheapest food. This will deal a far more destructive blow to our present farm structure than any taxation system. A larger farm labour force is likely to be welcomed to mop up the urban unemployment that will accompany the decline in the over-production of mass-produced goods when materials and energy become scarcer.

It is changes in husbandry that will ultimately mould our farm structure

If these predictions are correct, the NFU's warnings are only relevant to the existing farm structure, and take no account of its probable transformation in the future, though how long this will take is not easy to prophesy. But we may be sure that cost-efficiency, as at present reckoned, will become less and less a coefficient of size and high technology as it is now: it will become more dependent on

good husbandry. The machines have been our energy slaves; they have done more and cost less than human labour. Now their wages in energy and raw materials for their construction are becoming more difficult to pay. In some cases they are now higher than human labour. People have been considered one of the highest costs on the farm since farming was industrialised. The policy of substituting machines for men has been far more damaging to our environment, natural and social, than has been acknowledged; it has changed our husbandry, not entirely for the better, certainly not in terms of nutrition and fertility. But it has been so successful economically that it has been irresistible. This high-yielding modern husbandry has not been designed to nature's requirements; it is a mechanical construct not an organic development; consequently it is extravagant in energy as we have seen, and since it does not feed back to nature what it takes from it, as plants growing under natural conditions will do, it cannot develop indefinitely. On both economic and ecological grounds, therefore, traditional husbandry, based on mixed farms and rotation, must once again infiltrate our farm planning, since it has stood the test of time better. Our farm structure will have to adapt to these changes far more than to any pressure from taxation. Although good husbandry can be practised on a farm of any size, provided there is sufficient man power to pay attention to soil and animals, it is the middle-sized and smaller farm that is likely to thrive best.

Farmers have seldom anticipated change; they are conservative by nature. Few of them anticipated the revolutionary changes brought about by the tractor, artificial fertilisers and chemical sprays. Only scientists and a few pioneers foresaw what was likely to happen. Large numbers of traditional farmers were swept aside by a new breed. This breed is now the establishment and they cling to their way of life as tenaciously as the older farmers clung to theirs. The NFU might note that the results are likely to be the same.

But what effects will immediate trends have on the farm structure?

Having outlined the paradoxical situation in which we find ourselves today, let us try and make out how the immediate future is likely to develop and how far it harmonises with the changes we have described above.

We have seen how efficient farms are accustomed to reduce the costs of production by intensive capitalisation. In fact these farms are now more heavily capitalised per man employed than is the case in any other industry, including even the chemical industry. Despite that, farm workers receive almost the lowest wages, since the return on farm capital is so low. The source of farm capital is usually the farmer himself; it is personal not corporate capital; death duties, which are meant to be a personal tax, in this case fall on the business.

According to an analysis done by the Agricultural Mortgage Corporation - Farm Finance and Fiscal Policy, written by their managing director, Mr. F. Clive de Paula only 9 per cent of British farms belong to institutions (though we are not told the acreage). Mr. de Paula says that the proposed wealth tax, which will be steeply graded, would, if it were introduced, fall more heavily on farms of roughly 200 acres and over than on any other equivalent industrial unit employing the same number of men. It is unlikely that many farmers, he says, will be able to pay such taxes from sources other than their own farm income; so the tax will fall heavily on their assets, which will have to be sold to pay the tax. The profits of the efficient farmers are usually little more than sufficient to cover the costs of the expenditure essential to maintain and renew their property and machines in preparation for the next year's work. Renewal and maintenance costs are rising faster than revenue. This means the farmers would have to sell their land to pay an annual tax, as they now have to sell land to pay death duties. They will be caught in a trap. If they sell land they will need to intensify their operations to produce more on their remaining land, until they reach a point of

diminishing marginal returns which makes further intensification by techno-chemical means unprofitable. As we have seen, the cost of energy imported to do this (including the energy used to make fertilisers and sprays) is increasing. What will happen then? Many of these harassed farmers will not be able to sell their land in any case, since the buyers would be neighbouring farmers who would themselves need to sell land or would not want to expand and become more vulnerable to taxation themselves. If small parcels of land were sold annually in scattered lots, it would create such an irrational fragmentation in most rural areas, especially the remote ones, that it would suit nobody. If he could not raise capital by any means, the large farmer would have to fall back on a lower-cost loweryield husbandry.

In the long run, then, rising costs and capital taxation would lead to the gradual dismemberment (or decay) of the 10 per cent of farms some 28,000 - that cultivate some 40 per cent of our land. These are the larger units of over 300 acres each on which some half a dozen or so people are employed. They have gross assets of a quarter to a half a million pounds or more each, and they produce more than half the total output of the industry. Below them there are another 10 per cent of farms (also 28,000) between 150 and 300 acres on which two to four people are engaged, with gross assets of between £100,000 and £200,000 each. These farms may also find it difficult to survive unchanged. Of course these are very general figures and they conceal a great variety of different kinds of farm; nevertheless 20 per cent of our farms produce more than half our food from more than half our land. These are the farms threatened by high taxation, or most of them. A high percentage are farmed by the tough men who learned to adapt to the economic squeezes of the sixties with standardised industrial methods, including standardised poultry and pigs bred to live in confined artificial environments. These men are sometimes not farmers at all but

businessmen like Arthur astute Eastwood. Beneath these 56,000 farms that predominate in the industry are another 220,000, of less than 150 acres, many of them worked part-time, some of them hobby farms. Without being capitalised to anything like the extent of the large farms, and only using the same total aggregate of land, or less, they produce among them roughly the same amount of food. Of course to do this, as we have seen, many small farmers have to work very long hours for less than the farm worker's wage. Nevertheless, the moral is that the production of food per acre does not depend on intensive capitalisation, but primarily on devoted human labour.

However, looking at the statistics in cost and efficiency terms only, the agricultural economists and the Agricultural Mortgage Corporation regard it as catastrophic if the larger farms should be threatened. They see the present tendencies as moving in the wrong direction, from efficiency to inefficiency, from high production to low production. They see the price of food being still further forced up It takes a different sort of vision to point out that in the long run they must be wrong, for ecological, social and amenity reasons.

Under the changed circumstances brought about by the rising costs of fuel fertilisers and imported feeding stuffs, together with the higher and higher taxes, the means to efficiency will need to be reconsidered Already we have evidence, both in America (even in the corn belt) and in England, that some organic farms can now produce food as cheaply as their orthodox neighbours. American statistics show that their yields per acre and per animal are often slightly lower, but costs are commensurately lower still. Why should lower yields matter, if they are economically efficient, when the problem of Western agriculture is to control surpluses created by technology? Many will say that the quality of the product, the conservation of the fertility of the soil, the health and freedom of animals, more than compensate for lower

yields and are more economically rewarding, in the long run, than factory-farming methods.

The Agricultural Mortgage Corporation, studying the effects of the Capital Transfer Tax and the proposed Wealth Tax, conclude that they will progressively make the size of farms smaller, to keep them below the level of punitive taxation. They also add that lending to small farms is especially expensive and requires higher interest rates to allow for risk and the expense of detailed investigation of the farmer's credit worthiness. It is scarcely surprising that they are alarmed, for lending to their best customers, the 'efficient' farms, may soon become as unrewarding as lending to small farms. Like the NFU, they draw attention to the dangers of the future of agriculture and the food supply from socialist legislation - which is nothing less than the piecemeal destruction of our 'better' farm structure.

Yet even in terms of the statistics they quote themselves, this conviction is not proved, at least in terms of the quantity of food produced. The smaller farms provide more employment, more individual liberty, even if the work is harder; they provide more diversity and a richer village life; and to judge by what I see in Norfolk, they do less damage to the landscape. It is possible, therefore, to draw a conclusion that is the opposite of that of the economists, the NFU and the money-lenders. The break-up of the 'efficient' farms could be a positive gain, provided there was a national farm policy that controlled the process.

Such a statement will sound like unmitigated Bolshevism to those who have never given a thought to the relationship between land and liberty, ownership and justice, husbandry and sustained fertility. It is course the of opposite of Bolshevism, for the Russians have concentrated agricultural land ownership in the state. One wonders if these worthy speakers at the NFU are hand in glove with the socialists, for by increasing the concentration of agricultural land, they make it easier for the state to take over when the time is ripe.

There are dangers in what is happening though, some of which have been rightly pointed out by the farming establishment. A great opportunity for the reconstruction of rural life may be lost instead of gained, for the socialists do not aim to improve the structure of British farms; they have certainly not grasped that in agriculture today a new structure is required to match a changing husbandry Their concern is to prevent the concentration of capital in too few hands in all industries. It is an accident that their idea of taxation finds the large farms so vulnerable. It is most unfortunate that, in relation to farming and land ownership, they do not know what they are doing. Mr. Peart, the Minister for Agriculture, has declared himself in favour of the farm amalgamation scheme and says he is fully aware of the dangers of taxation to investment. He must then be in favour of preserving the present structure which his colleagues would dismember by their policy. In the socialist ranks, all is confusion; Mr. Healey's concessions show that they have lost their nerve. The National Union of Agricultural Workers are in favour of large units and land nationalisation; large units are more vulnerable to strike tactics, and if land is nationalised, farms will be collectivised. Certainly the interests of farm workers do need defending, but we do not want the workers proletarianised. It is up to the nation to support a policy that provides farmers with sufficient profit to pay their workers competitive wages. The present policy of the N.U.A.W. would still further decrease farm labour. Its policy should be to reduce the present heavy capital investment in farms and increase the number of people working on them. It should aim to restore the farm ladder so that more farm workers have the opportunity to own or rent their own land. We need to involve people in development.

The contradiction in the policy of the Labour government is now clear, while it favours the large efficient farmers as producers of cheap food, it would at the same time like to ruin them as capitalists, so that they join the lame-duck category. What would happen then? Does the government propose to nationalise their land and turn it into state farms? If that happens, or if the large farmers respond by turning to a survival husbandry, the predictions of the orthodox economists and the fears of the farmers will be fulfilled and output will drop severely, as the experience of the Pussians shows. British individualism would not tolerate the successful Chinese model or that of Israel. Obviously, the upshot of all this is that the government hovers between its desires and its fears.

The government, therefore, must make a straightforward statement of its aims: that it intends to prevent the concentration of agricultural land in too few hands. One must admit that to state this so boldly would cause an uproar and the Tories would take political advantage of it. Today's conservatives understand the fundamentals agriculture as little as the of socialists; they too are an urbanminded party, and the farmers' vote does not win elections. They would accuse the socialists of a petty attack on wealth, yet they should welcome an extension of the virtues of owner occupation in agriculture. In this article I have tried to draw attention to the nature of the problem and to show that there is no justification for treating the present farming structure as sacrosanct; that the government, any government, should aim to find a means of preventing the excessive concentration of capital and land in a few hands, including the hands of the state itself. Our farm structure is being determined by technology and economics and not by the real needs of the land or farming people. I am personally persuaded that, so far as land ownership is concerned, nobody should own the land, as is the case in primitive communities; the sophisticated method of achieving this in advanced communities is surely that advocated by Henry George: the nationalisation of ground rents. However, it would require another article to show the relationship between this and a

sound agricultural structure.

If the Labour Party were explicitly to relate their legislation to the prevention of the concentration of farm ownership and to argue the injustice and disadvantages of 40 per cent of our farm land being farmed by 10 per cent of our farmers in terms of economic costs, and under-employment of labour, they would be able to justify legislation that assured that the farming land sold to pay higher taxes on large and highly capitalised farms was not lost to food production. But breaking up the farm structure surreptitiously without any plans for redesigning it is as great a danger as the nationalisation of land. Nor should the pressure on farmers to sell land to pay taxes be exploited by local authorities as a means of capturing the land under The Community Land Act, unless the land purchased is used for food production. The Act provides an opportunity for the development of allotments, smallholdings, parks and open spaces on the fringes of urban areas.

To sum up: Agriculture is about to experience radical changes as a consequence of general trends in inflation, rising costs of energy and other imports onto the farm and, perhaps, to an increasingly popular aversion to the monopolisation of land by a few. These factors, together with the pressure to distribute wealth more fairly by means of taxation, whether reasonable or not, together with the need to find new sources of employment, will bring constant pressure on the structure of farming.

To be clear in our minds on these issues may make the difference between a depressed agriculture and a revitalised and prosperous one, feeding the nation from its own resources and enriching the personal life of the community. It is a question of responding to what at present seems to be adversity by a policy based on understanding the real needs of the land and humanity alike. What may seem disastrous to the NFU and the CLA should, rather, offer opportunities for living. better in a less affluent society.

The Role of Culture in the Control of Infectious Diseases by George J. Armelagos & Alan McArdle

The Pacific Islanders once lived in natural national parks, now they must create them to protect what remains of nature against the depredations of the industrial way of life which they are adopting. In this talk at a conference in the South Pacific, Ray Dansmann warns them that national parks can only survive if, outside them, the excesses of industrialism are avoided.

The study of infectious disease in human populations has traditionally focused on biological factors: the virulence of the pathogen and the immunity of the host. This bias is quite understandable, since the primary interest has been to develop treatments for specific diseases, which necessarily involves the definition of symptons, differential diagnosis, and the isolation of the pathogen. There has been some consideration of the role of population parameters in the incidence of disease, but social and cultural factors have been largely neglected. One of the best attempts to examine the interaction between disease and population from the point of view of adaptation is that of Alland (1).

In this paper we review studies which demonstrate the importance of culture in the transmission of infectious diseases and, from this perspective, we consider the effect of infectious diseases on small populations.

Culture and Disease

Culture is an adaptive mechanism (49), facilitating the survival of the group in its environment. Its three subsystems — technology, social organisation, and ideology — act as a buffer to environmental forces (6).

Cultural practices may hinder the transmission of a disease; examples include vaccination (26), quarantine, and the eradication of pathogens (47). More generally, there is abundant evidence to suggest that cultural practices can influence where and when, in a human population, infectious disease will occur. May ((35), p.29) notes:

Cultural traits either bring stimulus and host together, creating the chance for disease, or keep them separate, thus preventing the disease. Thus, at any place considered, there is a disease potential which is replaced by actual disease if and when the cultural trait separating stimulus and host breaks down or disappears. It is on this threecornered basis — stimulus, host, and culture — that the science of the ecology of disease is established.

The ecological approach requires a definition of disease which incorporates environmental factors. A satisfactory approach (5, 36, 42) is to define disease in terms of the potential of the population to react to chemical, physical, infectious, psychological, and social insults. May ((35), p.28) states that disease would include any change which

jeopardises the survival of a population in an environment. Infectious disease, then, is measured by the interaction between the pathogen, the host (the human population), and the environment, where the human environment includes culture as an important part. We may consider briefly the influence of the three subsystems of culture — technology, social organisation, and ideology upon the transmission of infectious disease.

Technology: The technological aspect of culture is the primary means by which a population extracts energy from the environment. The role of technological innovations such as agriculture in increasing the possibility of disease transmission is demonstrated in the classic study of malaria in West Africa (33,50). The increase in malaria can be related to a number of factors. The clearing of vast expanses of land for cultivation forced the mosquitoes which are the vectors for the malaria parasite to change hosts. The parimary hosts in most instances were non-human primates, which were driven away by the land clearing. With the large influx of settled human populations, and the proliferation of mosquito breeding sites in the population areas, man became an ideal host for the mosquitoes.

May (34) has discussed the way in which house construction in Vietnam reduces the potential for malarial infection. In the hill areas, houses are built on stilts eight or nine feet above the ground, animals being stabled under the house. In this situation, the animals, being kept within a confined space, provide a convenient food source for the malaria-bearing mosquitoes; moreover, the flight ceiling of the mosquitoes is eight or nine feet so that very few can enter the house. and those which do enter will tend to be repelled by the smoke from the cooking fires.

In the delta area of Vietnam, on the other hand, the malaria vector does not occur, and houses are built on the ground, the animals being stabled at the side. Food is cooked outside the house and is brought inside to be eaten in the smoke-free living space. When, under pressure of overpopulation, delta people are forced to move to the hill areas, they fail to adopt the culture of the hill people, but instead continue to build their houses on the ground. As a consequence, the malaria-bearing mosquitoes feed on the humans in preference to the animals and malaria becomes a serious problem among the new immigrants. According to May, the people of the delta have become unwilling to move to the hills, feeling that the evil spirits there do not like them.

There is evidence that large-scale technological development can increase the potential for interaction with disease. At a recent international symposium devoted to the impact of technology upon ecology (17), several papers on this subject were heard (28, 29); reports from Rhodesia and Egypt indicated that as a result of dam construction the range of snails carrying the liver fluke (schistosomes) has been seriously increased (43, 46).

Social Organisation: The social system determines the pattern of interaction between individuals, and hence has a fundamental influence upon the transmission of disease within a population. In a contro-versial study (27), Hudson has claimed that changes in social conditions are responsible for transforming syphilis from a relatively mild non-venereal form to a more serious venereal disease. Apparently both forms of the disease are caused by the same spirochaete. Hudson believes that increasing sexual promiscuity has encouraged the change to sexual transmission of the disease and suggests that, because improved hygiene practices have virtually eliminated the previously endemic mild form, the population has been deprived of its natural immunity to the disease.

Idealogy: The interation between disease and ideological factors is clearly seen in the case of Kuru, a degenerative neurological disease found among the Fore of New Guinea. An individual suffering from Kuru becomes confused, shakes uncontrollably, and has difficulty in keeping his balance (20, 21). As deterioration of neural tissue progresses, loss of co-ordination in the facial muscles makes it appear that the individual is laughing. Late stages of the disease are marked by increasing immobility, and death normally occurs within a year of the first appearance of the symptoms.

The frequency of Kuru among the Fore is quite high (0.37%), and a disproportionate number of females and children are affected. The cause of the disease was unknown for many years. The most frequent explanations focused on genetic causes, and, since women were often struck by the disease, it was assumed to be sex-linked. One researcher was led to argue that it must be a dominant trait in females and a recessive trait in males.

The cultural response of the Fore to the disease took several courses. Their funeral rites required that the body of the Kuru victim be eaten. However, since the males believed that this would deprive them of their vitality, only the women and children ate the remains of the deceased. In addition, the Fore, assuming the Kuru to have resulted from sorcery by neighbouring tribes, began a selfquarantine to reduce imposed contact with the neighbours. Recent work by Gajdusek has shown that Kuru is in fact a slow virus with an incubation period of 14 to 39 months. It now seems likely (22, 23) that the mode of transmission of the disease is cannibalism. This conclusion is based on three observations:

- 1. The close relationship between the pattern of Kuru victims and the individuals who consumed the victims.
- 2. The pattern of consumption, in which there was little cooking of the deceased.
- 3. The decline in the incidence of Kuru following the prohibition of cannibalism among the Fore.

Small, isolated populations are incapable of the continuous transmission of disease; outbreaks of endemic disease, where they do occur, are likely to be periodic or sporadic.

The ideological system of the Fore influenced the pattern of infection both through the practice of cannibalism and, most significantly, in the belief that Kuru was the result of sorcery. Initially, the Fore thought that Kuru was an infectious disease and, accordingly, they refrained from eating Kuru victims. Only with the acceptance of sorcery as the explanation did the practice of cannibalism increase. The belief in supernatural causes is very common in native accounts of disease ((1), p.138). It is interesting to note that, because their self-imposed guarantine coincided with the prohibition of cannibalism by the government officials, the Fore came to believe that the ensuing reduction in Kuru was to be attributed to the guarantine (that is, to the reduced contact

with sorcerers in other tribes) rather than to the cessation of cannibalism.

The participation of culture in the disease process is probably not a recent development; cultural practices may have played an active role in the biological evolution of the early hominids. However, evolutionary studies of the disease ecology (2, 3, 12-14, 18, 25, 41) generally agree that, for 99.9 per cent of human history, changes in technology and social organisation were relatively slow, and that the dramatic development came as little as 10,000 years ago, with the emerg-ence of agriculture. The accompanying shifts in population size, population density, and settlement pattern (15) and the associated alternations in the environment, includextensive ing land clearance. brought about considerable changes in the disease ecology of human populations. Not the least significant among these changes was an increased potential for infectious disease.

Diseases Affecting Small Tribal Populations

Until the Neolithic era, man was a hunter-gatherer; he lived in small bands of no more than a few hundred people. The disease ecology of such a group is quite different from that of a population of half a million, and cannot be described by models (7, 8) developed on the basis of disease behaviour in such large groups.

Small, isolated populations are incapable of the continuous transmission of disease, and outbreaks of endemic infectious disease, where they do occur, are like to be periodic or sporadic. This is a consequence of the lack of potential hosts in a small population. If the disease pathogen cannot survive until it comes into contact with a new host, the disease will not be maintained in the population. Many infectious diseases, amongst them measles and influenza. require an interacting population of 500,000 individuals in order to be maintained. The diseases that affect small human populations are those in which the host remains infective for a long period of time, and those which have animal populations as their hosts (12).

Diseases which have a reservoir host outside the human population (usually called zoonoses, or zoonotic diseases) have played an important part in the disease ecology of human populations (10, 19, 34). Serious outbreaks of these diseases were probably an occasional but major risk in prehistoric hunter-gatherer populations.

Hunter-gatherers are likely to come into contact with a great number of animal species which may be the hosts for these diseases. There is little buffering between hunter-gatherers and their environment and, because they are intimately connected with the other parts of the ecosystem, they will be very sensitive to fluctuations in the system, such as cycles of disease occurrence. It has been suggested that the complexity of the ecosystem will significantly affect the disease ecology of a hunter-gatherer population (16): the more complex the ecosystem, the larger the number of species with which the group is in contact, and the greater the risk of infection from an animal host (9).

In the course of hunting, man would have been exposed to diseases such as plague and encephalomyelitis (which may have had primarily rabbit or squirrel hosts), trichinosis, sleeping sickness, schistosomiasis, and trematode infection. One characteristic of these zoonotic diseases is that, whereas the natural host population is able to develop immunological responses to the disease, the human population does not have the same opportunity, having but spasmodic contact with their normal hosts and, as a result, mortality and morbidity are very high. This has been found to be so in the cases of scrub typhus (4), Japanese encephalitis, tick-borne encephalitis, Rocky Mountain spotted fever, and tularaemia (42).

As well as suffering from diseases that had animal hosts, Palaeolithic hunter-gatherer populations would themselves have served as hosts for those pathogens which had been present since the origin of the hominids. It is thought that parasites such as head and body lice. pinworms, yaws, and malaria would have been carried over in our revolution from other primates (41) and also that most of the internal parasites found in modern man and certain bacteria (Salmonella typhi, staphylococci) were also already present (13); against these diseases one can assume that resistance had developed.

It is unlikely, however, that many of the contagious diseases characteristic of large populations would occur in small hunter-gatherer populations, unless transmitted from urban populations (11). Examples include measles, influenza, smallpox and mumps. It is probable, in fact, that if hunter-gatherers were not exposed to these diseases, they would have had little opportunity to develop immunity to them. According to Haldane (25) and Motulsky (37 38), immunity to infectious disease would have begun to develop only after the Neolithic period. Earlier selection would have favoured genetic factors that afforded no protection against disease. However, Lederberg (31) argues that, as a result of continued exposure to animal reservoirs of infectious diseases, slow selection for immunity may have taken place through the cumulative effects of small differentials in selection which have occurred over a long period of time.

Disease Responses in Small Populations

As we have seen, the diseases affecting hunter-gatherer groups are predominantly those which have a reservoir host outside the human population. The hunter-gatherer group is very responsive to fluctuations within the ecosystem of which it is a part, and the regulation of its population by these diseases plays an important role in maintaining the stability of the ecosystem. Because the group is only in irregular contact with these diseases, little or no resistance to them will develop, and cultural responses will be as important as genetic ones.

The social organisation of huntergatherers is very fluid (45, 52). They are grouped into bands of a few families, each of which operates as an independent subsistence unit. Mobility is high, both spatially and between groups: fission and fusion of bands is frequent (48, 51).

It is usual to consider the effect of disease upon a group in terms of the associated variations in population levels. Infectious disease as a disruptive factor in the equilibrium of a population has a 'point effect': for a particular interval of time, the mortality of some or all portions of a group is raised above its normal level. Thereafter, the population will tend to return to the previous higher levels. In a hunter-gatherer group, there are limits to the rate at which this recovery can occur. This is because of the high mobility of the band and its subsistence basis, which means that each child represents a significant energy cost to the group (32). As a result the band can support only a fixed number of children at any one time.

When a hunter-gatherer population is affected by a disease to which it has not previously been exposed, the effect of increased mortality on the social system of the group may be less serious than that of the accompanying morbidity

Ball blankets prevent air pollution



A cheap and simple way of preventing the emanation of smells and corrosive fumes from effluent pits and processing solutions is to cover their surface with a close-packed layer of Allplas balls.

Independent tests have shown that such ball blankets reduce air pollution by no less than 98.2%. Practical proof of the efficiency of this method of pollution control now comes from the Canvey Island sewage treatment works where odour from partly treated sewage in outdoor sludge tanks drew serious complaints from residents on nearby housing estates. As can be seen in the picture, Allplas balls were simply emptied straight from cartons into each sludge pit where they immediately spread out into a smothering blanket. The blankets provided a complete solution to a difficult problem: there are no further complaints from residents.

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Full details, prices, independent test reports and technical advice on pollution problems are available from Capricorn Industrial Services Ltd, 49 St James's Street, London, SW1A 1JY (Tel: 01-493 8847). (30, 40) for, as a result of the disease, large numbers of individuals will fall ill and will become incapable of performing their normal functions within the group. Morbidity, unless it results in reduced fertility, will have little effect on biological adaptation but may have quite disruptive, and not easily calculable, effects on the cultural system.

If we search the anthropological literature for information on the effects of specific diseases on the structure of populations, we find that it is surprisingly sparse. There is a need for reasonably precise data on the diseases likely to affect the populations of interest to anthropologists. A closer examination of the medical and epidemiological literature may provide information on the effects of disease on prehistoric populations, while historical demography is a possible source of data on diseaseinduced modifications of population size and structure.

Although it is common to consider disease in terms of the decline and recovery of population levels, other approaches also seem promising. One such considers the effect of disease on the energy flow in a cultural system (24, 44). The effect of disease in various ecological settings is traced in terms of changes in energy capture.

It has been our intention in this article to stimulate interest in the ecological approach to the study of disease. As Montgomery notes ((36), p.35):

Anthropologists have become more attuned to expectations and assumptions concerning behavioural variations often radically different from those they ordinarily use. Effective research in this broad area must almost be interdisciplinary team research, and if anthropologists can see their way clear to integrate the results into an ecological and general anthropology, a growing number of important contributions can be anticipated.

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The Mizos, like other tribal people have evolved a way of life that beautifully satisfies the needs of the individual, and of the society he belongs to. The Indian Central Government, however, in its efforts to create a monolithic state is threatening serious disruption to that society.

by S. Barkataki

The Mizos, till recently known as Lushais, were in the news not only all over India but also outside on account of the uprising in the Mizo hills in 1966. They have recently come back into the news with a further uprising in 1974 which has not yet been totally quelled. The Mizo hills district, recently formed into a Union Territory, i.e. a separate state, with an area of eight thousand square miles, forms the southern extremity of the State of Assam. It is inhabited by a simple, affable, entimedia to the news with a and come back into the news with a and come back into the news with a and come back into the news with a and succent the news with a and succent the news with a succent the news with a

little is known in the outside world. Till their subjugation by the British in the nineties of the last century, the Lushais were ruled by Chiefs of the Sailo clan (mostly) and they frequently raided the neighbouring plains district of Cachar to the north and carried away booty. Unlike the Nagas and the Garos, however, they are not known to have at any time practised head-hunting in these raids. In one of these depredations they kidnapped an eleven year old English girl named Mary Webster from a tea estate in Cachar, which led to an expedition and annexation of the Lushai hills to British India.

hardworking people, about whom

The term Lushai is a corruption of Lusei, one of the sub-tribes of the Kuki-Chin-Lusei group of tribes, comprising many sub-tribes and clans with varying dialects, customs and habits. Till recently these people were nomads and the nomadic urge is not fully spent yet. This state arose largely out of their agricultural practices. They follow a method of cultivation called jhumming. An extensive area covered by valuable forests is chosen every year for an entire village; the trees are felled and after allowing some time for the timber to dry, the entire area is destroyed by fire. After having manured(!) the area with ash in this fashion, seeds are sown. The same treatment is given to another area the following year. As land in the possession of a particular village is limited in area, the villagers have to go back to the same plot of land after a certain number of years (the jhumming cycle) and destroy once again the trees which in the meantime had grown. Due to growth of population, the *jhumming* cycle is growing shorter and shorter from ten to twelve years to five or even three years. The soil erosion caused by this method of cultivation is enormous.

The MIZOS

Unless the devastation of virgin forests can be stopped by replacing the present methods of cultivation by more permanent ones such as terracing, as practised by the Angami Nagas, most of the hills of this region will turn, in the not too distant future, into deserts unfit for human habitation.

When there is a shortage of land or when it becomes unproductive, the people, who depend for their livelihood solely on agriculture and hunting, migrate in search of more fertile lands.

In this manner the Lushais came to their present habitat from the Chin hills in Burma. According to their legends, the Chins and the Kukis and related tribes like the Lushais originally belonged to a place called Sinlung in south-China. Some natural western calamity forced them to migrate to the Shan country to the north-east of Assam, from where the Ahoms also came to rule over Assam for six centuries. After they had lived happily for generations in that country, a great famine compelled them to go down the Chindwin valley to the Chin hills in Burma in search of new land. An old folk-song runs thus:

> My Chin land of yore, My grandfather's land of

Himelei;

My grandfather's ways were good,

Sinlung's* ways were good.

They called their new habitat in Burma Chinlung after the original Sinlung. It is a common practice with the Chin-Kuki-Lushai tribes to call their new settlements by the name of the settlement they have just left, with the result that we find villages with the same name in different parts of the country and also in far away North Cachar hills, which are separated by several thousand square miles of the plains of the Cachar District.

Although the terms Mizo and Lushai are used synonymously, the Lushais — or more correctly, the Luseis — are only one of the Mizo tribes. They were apparently more vigorous than the other tribes and provided all the tribes with the leaders in their march from Burma to Assam. These leaders, belonging to the Sailo and Thangnur clans, became the Chiefs in their new habitat. In the process of settlement they drove away to the north the Kuki tribes who had migrated from the same source earlier.

* Lung = Rock.

The Mizos live in thatch and bamboo huts in isolated villages perched on hill-tops between three and five thousand feet high, a simple, hard, austere life but they are renowned for their cheerfulness and hospitality. Each village, separated from others by several miles, was till very recently a more or less autonomous state, ruled over by the Chief, advised by the elderly upas (counsellors), appointed by the Chief generally on the hereditary principle. Their government was a gerontocracy. The pattern of society was perfectly socialistic. In society none was high or low in estate. The Chief was, in social life, as much a commoner as the humblest of his subjects. There was no individual ownership of land. Though in theory all land was owned by the Chief, in actual practice it was the property of the village community. Villages vary widely in size and population. There are hamlets with no more than thirty houses, while large villages contain over five hundred.

A Chief and his officials were entitled to certain customary dues from the Chief's subjects. Each household was required to contribute to him annually six tins (about a quintail) of paddy (buchun) and the right foreleg of every animal killed (sachhiah). Villagers had to build and carry out annual repairs to the Chief's house (usually larger than a commoner's) without remuneration. In return, the Chief gave them a feast. There were also other minor dues such as ngawichhiah (fishtax), khuaichhiah (honey-tax) and porterage when the Chief free travelled. His counsellors [upas] were entitled to priority in the choice of land for *jhumming* and were exempt from forced labour (porterage), to which the hill tribes were subject during British rule and which was, in the prevailing conditions, unavoidable. (As there were no roads till a few years ago, all travelling by officials had to be done on foot or horseback, and porters had to be impressed under compulsion to carry luggage.) Other village officials, viz the tlangau (villagecrier), the thirdeng (blacksmith), puithiam the (priest), the khawchhiar (village writer-cumaccountant), the zirtirtu (school teacher) received paddy contributions from each household at varying rates from one to three khos (basket). The Chief had also the right to banish from his domain any person who incurred his displeasure or whom he considered undesirable. A villager had also the corresponding right to migrate from one Chief's

ram (demesne) to another's, if the latter agreed. In actual practice, a strong, good Chief who administered according to customary law could get away with almost anything, while a weak Chief indulging in petty tyranny was likely soon to find himself a King without subjects.

Mizo habits and customs differ widely from those of the other tribes inhabiting the north-eastern frontier of India. The men have, by and large, adopted Western dress but the women have generally stuck to their native costume. A beautifully designed cloth called puanchei, woven on primitive hand looms tied round the waist, covers the lower part of the body. On the upper part is worn an open-necked blouse called kawrchei with artistically designed borders. Mizo puancheis and kawrcheis are very much in demand especially amongst outsiders, Europeans and Americans. The earlobes of both boys and girls are pierced in childhood, and the hole, in the case of the girls, is gradually enlarged by mechanical means till an ivory disc about an inch in diameter can go in and remain fixed. The most valuable ornaments are amber necklaces and cornelian beads. Long hair in women is greatly admired. It is dressed with pig's fat. Men, women and children alike are inveterate smokers. The men use a pipe made of bamboo and the women a complicated contraption resembling the Indian hookah. They do not have the Khasi and Assamese habit of chewing areca nuts with betel leaves. As regards their food habits, the Mizos are fond of pork, fowl and beef; smoked elephant's flesh is a delicacy. Many of them eat dogs, but not cats, snakes and bats, which are eaten with relish by other hill tribes of the region. Whitebellied rats are much sought after. They drink home-brewed zu, a beer made out of rice. Before conversion to Christianity, zu played an important part in the Mizos' life, it being indispensable for religious ceremonies and social functions.

Marriages are hardly ever arranged and take place through courtship. Indulgence in sex by teenagers is not disapproved of and pre-marital offspring are well taken care of. In order to obtain a bride, the bridegroom's parents or relations are required to pay a marriage price, varying in amount from a couple of hundred of rupees to a number of *mithuns* (gayals: a kind of semiwild cattle), according to the financial position of the parties. The marriage price is intended to give security to the bride and is shared amongst the parents and near relations of the bride. It consolidates family ties and obliges the relations to look after the woman, if she is divorced, widowed or deserted. Divorce is simple and easy. The man has simply to pronounce the words, "I divorce you" and divorce is effected. As an old saying goes, "A wife and a bad fence can be changed at any time." When the divorce takes place at the initiation of the husband, which is usually the case, he has to forego the marriage price. If it is the other way about, the price has to be refunded to the husband by the woman's parents and relations.

Property is inherited by the youngest son. If a person has more wives than one, the first wife's sons take priority. A concubine's son takes priority over an illegitimate son. The principle behind the youngest son inheriting is that he is considered to be the fittest person to look after the parents in their old age, when the older boys would already be able to stand on their own feet. A Chief, however, was succeeded by his eldest son, as he was expected to be more mature in judgement and, therefore, more competent to administer his father's subjects.

The Mizos believe in a Supreme Being, whom they call Pathian, the creator of everything in the universe, and a benevolent being. But this being has little to do with human affairs. What concern human beings more are the huais, i.e. spirits, good and evil, living in trees, mountains, rocks, streams and caves. The evil ones cause harm to mankind. Whenever someone is visited by sickness or misfortune, these evil spirits have to be propitiated with sacrifices of pigs, fowls and other domestic birds or animals, as prescribed by the *puithiam* (priest) according to the nature and magnitude of the trouble. Women are believed to be often possessed by an evil spirit called Khawhring. When so possessed, a woman speaks in unknown tongues and divulges unsavoury secrets. Such women never get married and in the past were sometimes killed. They have belief in Heaven and Hell also, Pialral and Mithikhua respectively. When a person dies, his spirit is supposed to leave the body through the crown of the head and proceed towards the Rih lake in the Chin hills. Thence he is sent by a mystical being called Pawla, to either of the abodes of the dead, according to his deserts. Thangchhuahs, i.e. persons who have given five prescribed major feasts and have killed in the chase an elephant, a bear, wild boar, wild mithun

(gayal) or a king cobra et., go straight to *Pialral* as a matter of right.

Many of the beliefs have undergone change with conversion to Christianity, which the Mizos embraced more readily than the other tribes of the region. The majority, except for the south-eastern corner of the District, are now Christians -Presbyterians and with a sprinkling Baptists of Catholics. Even so, as old beliefs die hard, Christians too sometimes go to the puithiam when they are in distress.

Of all the Mizo codes of conduct, the most admirable is tlawnghmania, which is difficult to define. It is an elaborate code of chivalry. If you are invited to a feast, you are expected to partake of as little food as possible, so that others may not be deprived. If a young man meets an old person carrying a heavy load, the former is expected immediately to relieve the latter of it. When a traveller or foreigner falls sick in a village and needs shifting to a hospital, which may be situated several days' march away, the village youths will carry him on a stretcher all the way. To accept a reward or remuneration of any kind for such services is infradig

Tlawnghmania was instilled into the youths in the zawlbuks i.e. bachelors' sleeping houses. As soon as a boy attained puberty, he was not allowed to sleep in his parents' house. Colonel Shakespear, in his 'Lusei-Kuki-Clans' opines that this institution originated as a safeguard against incest, which is quite likely, seeing that in most houses there is only one large room for all the members of a family. Be that as it may, the zawlbuks served a useful purpose. Boys were disciplined there and infused with a spirit of service to the community. In the olden days it provided the village with homeguards in fights between the Chief and neighbouring Chiefs.

I have attempted so far to draw a picture, in as few words as possible, of Mizoram (ram = country) as it presented itself to an outsider till a few decades ago. It was a land of smiles, wine, music, dancing, songs and joy. In spite of the hard work the people had to put in to wrest a living from the unkind, rugged, mountainous terrain, they were a happy band with their simple joys and pleasures, living their pastoral, idyllic life, completely cut off from the rest of the world.

Look at that picture and consider what followed: the British, after the land of the Lushais was annexed to

their empire, were wise enough to let them lead their own life with as little interference as possible. The Chiefs were allowed to continue to rule, although some of their arbitrary powers were curtailed. But the object of this wise policy was frustrated by the induction of Christian missionaries in the wake of British occupation. Their activities completely changed the pattern of Lushai life. The attitude of the missionaries towards the primitive tribes was one of superior beings, come from distant lands at great personal sacrifice to civilise savages by leading them out of the darkness of heathendom into the light of Christian civilisation. The fact that these simple people had also a culture and a way of life of their own, which might have been dissimilar but not inferior to any other, and that deculturalisation does not mean civilisation but deracination, was lost sight of. The first lesson the people received from their mentors was to look with contempt upon almost everything they had cherished for generations. Zu, i.e. harmless rice-beer, which was part of their food, was prohibited as an un-Christian beverage. Along with zu, community dancing and singing also became taboo, lest these pleasures tempted the flock to tribal feasting and a reversal to other tribal ways. Indigenous songs were replaced by hymns with imported tunes. As a result, the people were gripped by a kind of religious psychosis. A gay, cheerful outlook on life gave way to sombre seriousness; broad open-hearted smiles were replaced by scowls and frowns expressive of fear and suspicion. The basic character of the people was altered.

Along with suppression of the zawlbuks, which were frowned upon by the missionaries as dens of vice, other pastimes such as zu-drinking, singing, dancing, merrymaking and ribaldry, tlawnghmania, went by the board. The peoples' habits and manners also changed. Men discarded their colourful tribal costumes and started flaunting a slovenly suit of coat and pants, day in and day out, unmindful of the dirt it gathered in the process. The missionary efforts to create a tribe of imitation, artificial westernised Christians, it must be appreciated, involved a terrific amount of suppression of inherent tribal urges. The consequence of the suppression was revolt. As soon as the hand of British authority was withdrawn, the Mizos, for no plausible reason, broke out in rebellion in 1948, ostensibly against the Chiefs, but in reality

against established authority, and there was widespread violence. The rebellion was quelled without much difficulty, but this fire remained smouldering to burst out with redoubled fury again in 1966.

After Indian independence in 1947, sweeping and far-reaching changes were introduced in the form of administration. They were, no doubt, progressive reforms but whether they led to progress and contributed to the peoples' happiness is another matter. The sudden and summary liquidation of the ageold institution of the Chiefs suddenly removed the pillars on which social structure rested, and disrupted village life. But the worst effect of the new dispensations was the demoralisation caused to the character of the people about which I had occasion to write in The Ecologist of November, 1971. These people had always been self-reliant. They made and maintained village paths, constructed school, hospital and church buildings, wells, water-tanks, and playgrounds and did other works of public utility without remuneration. These were community development projects in the true sense of the terms. The liberal doling out of grants, loans and subsidies indiscriminately in the name of community development completely changed the attitude of the people, and the erstwhile spirit of self-help and selfreliance evaporated to such an extent that they stopped giving proper attention even to their paddy fields.

The enlightened amongst us have to realise that our kind of enlightenment is not the only kind worthy of emulation, and it may not be suitable for small ethnic groups whose traditional background is totally different from ours. The only way to make such people happy is to let them alone, as far as is practicable, to develop according to their own genius, offering a helping hand when asked for, without adopting a superior, patronising attitude. To foist on them alien religions, political and administrative institutions, just because they may have thrived on other soils, is wrong. I have intimate friends among the Mizos and it is clear to me that at present they are an unhappy people - a people deprived of tradition, of their beliefs. and of that confidence in their own future that a society requires to be healthy and sustainable.

Notebook

Better the Witch-Doctor You Know ...

Selling useless medicines at high prices to the poor and ignorant has provided a comfortable income for hucksters and quacks down the ages. Today it is a multi-million-pound business operated by international companies. A recent report by the Haslemere Group, Who Needs the Drug Companies?, reveals the massive proportions of the confidence trick played by Western drug manufacturers on the Third World. Poor countries are in some instances being charged ten times as much as industrial nations pay for identical drugs. The nearmagical reputation of Western medicines encourages their use for complaints where they are useless or positively harmful - aspirin for malaria, or antidiarrhoea drugs for dysentery and other infections in which diarrhoea is part of the body's natural defence mechanism.

In any case, opinion in Western countries is increasingly in revolt against our drug-based, curative rather than preventive style of medicine. It might be in the best interests of the Third World to refuse our drugs as a gift, let alone at inflated prices. A few basic preventive and hygienic measures, combined, as in China, with the encouragement of such traditional healing techniques as survive, are likely to give far better value for money.

Scapes and Fringes

Alice Coleman, Director of the Second Land Utilization Survey of Britain, is a firm believer in our need to plan for self-sufficiency in food. Alarmed by the rate of loss of agricultural land revealed by the Survey (if it continued we would have no farmland at all by 2175), she suggests it is time the planners started taking the problem seriously. She therefore proposes a new classification of environment into five types — townscape, farmscape and wildscape, which should be conserved, and urban fringe and marginal fringe, which should be converted into one of the "scapes". The Survey has developed a precise technique for defining and recognising the five basic classes.

The idea is obviously not a panacea. What, after all, happens when all the "fringe" is converted — scape eats scape, presumably? But its medium-term implications, for example that new urban development should be confined to the 250,000 acres of waste land and scrub in and around our towns and cities, certainly seem to make sense.

Preparing For Yesterday's Problems

The Government's recent Consultative Document on Transport Policy is a disappointment — at least if one actually expected anything worthwhile from it. A document of this kind, which in no way commits the Government to specific action, but is primarily a basis for discussions on future policy, is the obvious place to give a hearing to ideas still new enough to be provocative: what we have here, by contrast, carries no hint that transport policies might need to be radically rethought either now or in the foreseeable future.

The hand of the road-transport lobby lies heavy on the whole report. Occasionally this influence is explicit: an admission that it would be desirable to abolish excise duty on cars and increase petrol tax - thus

encouraging people to buy smaller cars and drive less is immediately overruled by the thought that this could "add to the difficulties" of British car manufacturers, since it is their smaller models which are especially vulnerable to foreign competition. An industry which is already in receipt of massive handouts of taxpayers' money hardly seems to merit such consideration. Again, the document recognises that every increase in car ownership means a decline in the quality of life for the carless, and states the problem succinctly: "Mobility becomes ever more necessary, but command over it for the minority becomes less. This does not, however, deter it from asserting that private car ownership not merely will, but should, "personal mobility is what people want, increase and those who already have it should not try to pull the ladder up behind them." The moral pose is unconvincing, for the fact is that at least one-third of the population could not in any conceivable circumstances get a foot on that ladder. To judge by this report, they must count themselves lucky if they still have buses to use, since if they have not already given up trains they will shortly be compelled to do so, leaving a truncated railway network as the prerogative of middle-class commuters and businessmen on expense accounts.

This, of course, is assuming there are still any cars, trains or buses around. It is not very clear how far into the future the document is intended to look: but it appears to be unaware of the fact that all major forms of transport are based on a dwindling resource. Such an example of the official mind's inability to adapt to changing circumstances recalls the old jibe against the War Office that it spent its time preparing to fight the last war but one.

Another Threat To Ozone

Recent research suggests that nitrogenous fertilizers may endanger the atmosphere's protective ozone layer, according to Dr. Mostafa Tolba, Executive Director of the United Nations Environment Programme. Both the manufacture and the use of such fertilizers increase the amounts of nitrous oxides entering the atmosphere; and these oxides are known to act as catalysts which convert ozone to oxygen. In view of the enormous scale of the fertilizer industry, this could well be the most serious of the various possible threats to the ozone layer. How serious it is impossible to say: we simply do not yet know how stable or delicate the balance of the oxygen-ozone cycle is. But the likely consequences of a major reduction of ozone are so horrific that even a one in a thousand risk would, in a rational world, be too much to take.

Inexhaustible Raw Materials?

A recent exchange in the House of Lords revealed alarming ignorance in the Department of the Environment. Lord Dunleath had asked the Government what they suggested he should do with his collection of over 600 empty non-returnable bottles. Lady Stedman, for the Department, replied, in effect, that he should put them in his dustbin and forget about them. When Lord Dunleath drew attention to the waste of world resources represented by such bottles, Lady Stedman replied that the main raw materials of the glass industry — sand, limestone and soda ash — are "indigenous, virtually inexhaustible, and comparatively cheap". What she omitted to add was that the countryside which frequently lies on top of all this sand etc. is very far from inexhaustible; and that the energy needed to turn the stuff into glass — at about 200 gallons of oil, or equivalent, per ton of glass — is very far from cheap.

ICI and Others v. the Peak

The Peak District currently seems to be bearing the brunt of the never-ending attack on the National Parks. At the time of writing, an inquiry is in progress into an appeal by ICI against the refusal of the Peak Park Planning Board to allow quarrying for limestone from about 200 acres of the Park. Counsel for ICI has drawn attention to the company's "continuous effort to reduce the environmental impact of large-scale industrial activity" (well, they're *paying* him, aren't they?); but he does not say how they propose to reduce the impact of a hole 300 feet deep and a mile wide on a piece of previously unspoilt moorland. (Since the quarry would be worked until "well into the next century", they'd have plenty of time to find an answer to that one).

Meanwhile Mr. Shore, the Environment Secretary, has overruled the Planning Board by allowing Laport Industries, another big chemical company, to go ahead with plans for a lagoon for wastes at Blakedon Hollow in the Park, involving an 80-foot dam across a wooded

COMING EVENTS

COMMUNITY ACTION IN EUROPE

a symposium organised by the land use planning working group of the

International Youth Federation for Environmental Studies and Conservation under sponsorship of the

International Union for Conservation of Nature and Natural Resources

at:

the S.F.U. Centre, SOLLENTUNAHOLM Sweden, 15-21 August 1976.

If interested in active participation, please complete the enclosed application form and return to: Xaver Monbailliu c/o PAYSA, Land Use Consultants 30 rue Sadi Carnot 92 VANES, Paris, France.

SOIL ASSOCIATION ORGANIC HUSBANDRY COURSE

Ewell Technical College, Surrey. July 12th -16th.

The sixth one-week course organised by the Soil Association and entitled "A BIOLOGICAL APPROACH TO SOIL HUSBANDRY" will be held at Ewell Technical College, Reigate Road, Ewell, Surrey on the above dates. Lecturers will again include Lady Eve Balfour, Dr. E.F. Schumacher, Dr. V. Stewart, Mr. Sam Mayall, Dr. A. Deavin and Mrs. Dinah Williams. Visits will be made to an organic farm or an organic market garden. Programmes and booking forms from Dr. A. Deavin at Ewell Technical College or Mrs. Joy Griffith-Jones, The Soil Association, Walnut Tree Manor, Haughley, Stowmarket, Suffolk IP14 3RS. Tel. Haughley 235/6.

ALTERNATIVE SOCIETY **NEW CONNONITISS** EXCHANGE June 18-20 Celni, Tywyn, Merioneth. For those interested in homeproduction or new community experiments. **CRAFT CAMPS** July 19-30 August 16-28 Lower Shaw Farmhouse, Swindon. Skills exchange holidays. Families welcome. MINI UNIVERSITY August 2-14 Lower Shaw Farmhouse, Swindon. 12 days of guided study-Energy, Health, Housing, the Arts. For information write: 9 Morton Avenue. Midlington, Oxford.

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limestone valley. And there is a proposal afoot for a motorway through the Park: this would cut the journeytime between Manchester and Sheffield by some ten or fifteen minutes, a benefit of such obvious and overwhelming national importance that Mr. Shore's enthusiastic support for the scheme may be taken as certain.

Lies About Laying

A draft law on cruelty to animals, to be introduced later this year in the Swiss parliament, proposes to ban battery poultry farms. The poultry industry is fighting back with various economic arguments, among them the one that battery birds produce 250 eggs a year compared with a maximum of 150 in other conditions. Since the same argument is repeatedly publicized by the Kommandants of our own hen-Belsens, it can hardly be pointed out too often that it is a lie. The freerangers at the bottom of my own garden, who are in no way exceptional, average over 250 a year: moreover they show very little slackening-off in the winter despite the absence of the artificial lighting which the 'experts'' say is essential. I suspect that the undeniable rise in productivity per bird in the post-war poultry industry is due to the introduction of the new hybrid strains, and has very little to do with changes in housing and management. Perhaps there is an experienced poultryman among our readers who could comment on this?

Nicholas Gould

WHERE DO WE GO FROM HERE?

Alternative Society Working Papers

Alternative Society will publish during 1976 a series of working Papers. The topics covered by these papers will be Housing, Energy, Education, Government, Industry and Employment, Land, Money, Agriculture and Transport. The purpose of these Working Papers will be to outline a strategy for change which will be politically coherent, and will take account of the underlying problems facing our society.

The papers will be exploratory They will provide a basis for debate, and will be revised after a period of time has lapsed for criticisms and comments to be absorbed.

The Working Papers on education and Housing will be available at the beginning of May. Land and Agriculture will be available at the beginning of June. The other papers (10 in all) will appear monthly. They will be about 7,000 words in length and will be printed and illustrated.

Alternative Society, 9 Morton Avenue, Kidlington, Oxford.



In this study of a ten mile section of the lower Dyfi Valley in Mid-Wales John Parry shows the social implications of the Government's post-war agricultural policy for a traditional farming community.

Changes in climate, mechanisation, science and tenure have all played a part in re-defining the pattern of farming in the lower Dyfi valley since 1949, but one of the most significant changes has been the amalgamation of farms into economically viable units — a movement encouraged by Westminster from the 1950's onwards.

The move to larger farm units affected both labour supply and crop production. Figure 1 shows the change of employment structure in the lower Dyfi valley since 1949. According to the 1955 Mid-Wales Investigation Report the number of people employed in agriculture (as opposed to those linked to agriculture on a part-time basis) was expected to fall for several years. In the Mid-Wales area as a whole between 1950 and 1960 the number of full time agricultural workers fell from 10,484 to 8,049 - a decrease of 23.2%

In 1964 the inability of agriculture to maintain population on the land was highlighted in a National Farmers' Union Report, which stated that the contributions of agriculture to depopulation were more recent in their incidence and were more directly attributable to the increasing absorption of small farms into larger units. In 1957 the Mid-Wales Industrial Development Association was organised to ease and eventually halt the depopulation movement. The aim of the Association was the promotion of rural activities other than agriculture such as the construction of reservoirs and power stations whose effect was to further attract people from farming. W. D. Jones has noted that as a result of

the construction of a power station and reservoir at Trawsfynedd between 1950 and 1955, Merionethshire lost no fewer than 300 of its fulltime regular farm workers (both family and hired), and that another 275 workers left between 1955 and 1960.¹

By 1955, one striking change in the social reorganisation of labour was making itself evident. In the past, most of the farm workers 'lived-in', but this practice rapidly disappeared as farmers' wives and workers alike found it irksome under the improving conditions. A cottage with modern services became essential and if the farm cottage was unattractive and isolated the family preferred to have a house in or near a village from which they could travel to the farm every day by car, motor-cycle or bicycle. Many of the workers who did live on the farm in the late 1940's had their own

then blasted roads and put in power and water supplies where needed. Ironically, this is all the shepherds ever required, but it was too late – the land was sold and the trees planted, and the few farmhouses that remained became forestry workers' homes.

The expected advantages of an afforestation programme in an area such as the Dyfi valley were stated in the conclusions of the Mid-Wales Investigation Report (1955). "The development of afforestation, properly integrated with agriculture. will strengthen the social and economic fabric of the countryside and assist materially in the rehabilitation of the upland areas."² This would be derived from the release of forest workers wherever possible to help farmers during the summer months on adjoining farms; they were to be housed in villages, "To strengthen and diversify the present community



parcel of land and in several cases owned livestock themselves. They were full participants in the farm at all hours of the day and would eat meals with the farmer and his family. Each was respected for his own worth and expertise — which was witnessed by the success of each individual's crop or livestock. Today the farm worker is more likely to have a council house with no land, and certainly will not have an opportunity to look after stock of his own. In a sense he is a step removed from the land.

The changing mood of the farm workers (and their wives) in the early fifties saw a demand for higher living standards which led to a movement down from the remote hills into the villages and council estates. This often gave rise to the selling of the resulting uninhabited grazing areas to the Forestry Commission who life."³ In return, farmers were to be encouraged to look out for forest fires and keep horses for casual haulage work.

By 1964 the National Farmers' Union Report recognised that such harmony between the farmers and the Forestry Commission hardly "Much of the hostility existed. referred to has arisen from the policy and effect of so-called block afforestation, which changes the colour and character of the landscape as effectively as it upsets the delicate ecological and economic balance between farming and forestry."⁴ Ten years later, Plaid Cymru, the Welsh Nationalist Party, was attacking the Forestry Commission on all fronts, "The activity of the Forestry Commission is another matter of concern in our rural area, the Commission being more often the farmer's adversary than his friend. Its justifi-



Figure 1.: Changes in the agricultural employment structure of the lower Dyfi valley since 1949.

cation for destroying our pastoral society over huge tracts of land has been that it would provide more employment, but in that it has failed dismally. Little employment is provided in the forests of Wales, and none at all in the timber-processing industries."5 It seems that the whole psychology and mentality of a farmer to land is utterly different to that of a forester and never the twain shall meet, and it is noteworthy that in 1956 the Government thought that co-operation would blossom and that afforestation would "strengthen the social fabric of the countryside."

The movement of people away from the land also affected crop production which had become very important in the war years, when it was economically possible to produce food under difficult circumstances, but in the early 'fifties conditions began to change. It no longer made economic sense to produce cereal crops in competition with large arable farms in the lowlands where expensive and sophisticated machinery was replacing the labour force.

The effect of this national trend on the Dyfi valley resulted in a drop of the acreage under crops from 2523 acres to 713 acres between 1949 and 1972. See the table below:

	Acreage in the Dyfi	Acreage in the lower Dyfi valley	
	1949	1972	
Wheat	109	0	
Barley	84	29	
Oats	1192	243	
Mixed Corn	191	15	
Potatoes	185	10	
Mangolds	22	0	
Rape	740	416	
TOTAL	2523	713	
	Source: Parish Re	turns	

The implications for the survival of traditional family farms were



TYWYLLNODWYDD, has been reduced from approximately 250 acres of pasture land to 30 acres since trees were first planted there.

recognised in 1955 by the Mid-Wales Investigation Report which stated,

"Our inquiry has been concerned with a rural economy which is changing rapidly under the influence of powerful social and economic forces, the effects of which have not yet run their full course. Although our investigation has been economic in its approach we would not be human if we did not appreciate the concern which is felt by many responsible Welshmen at the possibility of the disintegration of a way of life which has nurtured a democratic outlook and an appreciation of true values which are of lasting worth."⁶

This change of emphasis was epitomised in the Zuckerman Report "Scale of Enterprise in Farming," 1961, which stated that the basic cause of the lower economic efficiency of the average small farm was that overhead costs, and in particular family labour, were too high in relation to the output obtained. It was the reduction of family labour that forced farms to become more competitive and efficient and which contributed to rural depopulation in the Dyfi valley, which in turn led to changes in the farming and social pattern. Today the amalgamation of small farms is still offical policy, but its consequences are under scrutiny; the dependence of large industrialised farms on expensive and decreasing world energy resources, causes concern and must eventually lead to a reappraisal of the value of the family farm.

In conclusion it is the systems of farming in the lower Dyfi valley that have changed enormously in the last 25 years — systems that have led to considerable social changes. This article has attempted to outline some of the implications of just one movement — namely that of amalgamation, based more on cost efficiency and science rather than maximum productivity from the land.

There can be little doubt that the next few years are likely to see more changes — changes which *must* surely not only incorporate the "science" of the day but must also take account of the old "husbandry" of yesterday.

John Parry

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JAMAICA AN ENVIRONMENT AT RISK

Jamaica, independent for fifteen years, has rapidly growing environmental and ecological problems of frightening magnitude.

In many respects Jamaica has become a sacrifice on the joint altars of politics and commercialism. Uncontrolled and unplanned industrialisation has polluted and destroyed. Politicians, with their own axes to grind, have exacerbated rather than improved the situation and have brought about their own peculiar environmental hazards.

In a recent interview published in The Ecologist (November, 1975), Jamaica's Minister of Mining and Natural Resources, the Hon Allan Isaacs, indicated his awareness of these problems but admitted that it was necessary "on occasions (to) make trade-offs between immediate economic gain and long-term social and ecological well-being". Unfortunatcly, Jamaica's present "trade-offs" look like adding up to an intolerable legacy for the future. Smog now hangs over Kingston during morning rush hours. Badly adjusted diesel engines account for much atmospheric pollution, with the Government-owned omnibus services among the worst offenders.

The oil-burning power station at Hunts Bay has long been a polluter par excellence. In a television interview, the Minister responsible admitted that the Government's policy was to generate power regardless — pollution control could come later, much later.

The cement factory situated on the edge of Kingston Harbour pumps out — so it is said — eight tons of cement dust every week which it spews into the atmosphere. The Government says that it would be too costly to force the owners to fit electrostatic precipitators to the chimneys.

Bauxite and alumina are important to Jamaica's economy. The Government's levy on bauxite brought in \$151,500,000 in 1974.



At one site alone, near Ewarton, an enormous red caustic mud lake is forming, damned up in a mountain valley. It contains many millions of gallons of waste products of the manufacture of alumina, pumped there from a nearby factory. The Minister of Health and Environmental Control has publicly admitted that the lake constitutes a serious threat to the entire underground water basin of much of the southern part of Jamaica. But nothing is done, and the lake continues to grow.

Kingston Harbour is one of the finest natural harbours in the world. In recent years, indiscriminate discharge of sewage, industrial wastes and the dumping of garbage has foully polluted the harbour. It has already become almost a dead area. Again, little attempt is being made to improve the situation.

Across the harbour at Port Henderson, large areas of mangrove swamps, the home of many unique species, have been destroyed by the same process of indiscriminate garbage dumping.

Minister Isaacs mentioned other areas of concern such as bad housing, malnutrition, unemployment, degradation of family life, but significantly, did not discuss his country's overpopulation problem. Jamaica has a population in excess of 2,000,000 and the annual rate of natural increase is between 2.0 and 2.5 per cent. Jamaica has a large and costly National Family Planning Board, but family planning is being played down by the Government, and the National Family Planning Board contents itself with placing erudite and wordy advertisements

in the local newspapers discussing the mode of action of the oral contraceptive when the target audience is 90 per cent illiterate.

Sex and family-life education has not yet been introduced in Jamaica's schools – although an advisory committee on the matter, set up by the Government, has been sitting on and off since 1956. Meanwhile, 25 per cent of all the country's births are to teenage girls, mostly with no permanent relationship with their children's fathers.

In 1973/74, the school-age population between 6 and 11+ was estimated as 364,191. Over 100,000 of these either attend school irregularly or not at all. In Kingston, gangs of children roam the streets, begging and stealing – tomorrow's criminals. Programmes to assist children are extremely limited. Last year a request to the Government for \$2,000, to improve a children's home was turned down for "lack of funds" while, at the same time, the Government could find in excess of \$7,000,000 to finance the Commonwealth Heads of Government Conference, in Jamaica.

Jamaica is a parliamentary democracy with two major political parties. Unfortunately, rivalry between the parties has assumed all the worst aspects of "tribal" partisanship. Armed gangs, operating outside the law and claiming allegiance to one or other of the Parties, are responsible for much of the current crime wave. Political victimisation, always a disturbing feature of Jamaican life, has become rampant. Even more disturbing is a recent trend to incite violence against minority groups within the society. This is particularly sad when it is remembered that Jamaica has come a long way along the path towards a radically integrated society.

Jamaica's only real hope is that her rulers will forget political expediency and make a real attempt to protect her environment and ecology, at the same time making a sensible use of her resources, both human and natural. Judging from present trends, such an approach is still far off in the future.

H. G. Forsythe



This beautifull mountain lake is in fact a vast resevoir of caustic red bauxite waste in the Mount Diablo.



Tomorrow's Dinner?

NITROGEN AND PHOSPHORUS; FOOD PRODUCTION, WASTE AND THE ENVIRONMENT, edited by Keith S. Porter. Ann Arbor Science, £11.00. FOOD FROM WASTE, edited by G.G. Birch, K.J. Parker and J.T. Worgan. Applied Science Publishers (no price marked). THE FOOD IN YOUR FUTURE; STEPS TO ABUNDANCE by Keith C. Barrons. Van Nosterand Reinhold Co., £4.00.

Where has all the nitrate gone? Into the field drains, of course, or at least a significant proportion of it has. Most phosphate contamination of surface waters is caused by sewage from towns: when New Jersev banned the use of phosphates in detergents, phosphate pollution of water fell by half. Much of the nitrate, on the other hand, comes from fertilisers and manure used by farmers. It is a vicious circle that will persist until changes in the economics of fertiliser use impose constraints. Nitrates are highly soluble in water, so the farmer knows a proportion of the fertiliser he applies will be lost. So he applies extra, to allow for this loss, and then a bit more to allow for the possibility of unusually wet weather in the early part of the growing season. So water is polluted because farmers fear they will lose nitrogen into water.

Nitrogen and Phosphorus, Food Production, Waste and the Environment is the report of a detailed study of the movement of these two elements in the central part of New York State, the region of the Finger Lakes, a group of thirteen narrow lakes that lie from south to north pointing at Lake Ontario, and in ground water on Long Island. The region is devoted to mixed farming, with the emphasis heavily on dairying, to supply milk and other dairy produce to New York. The aim was not merely to determine whether a

problem exists, but to go further and propose remedies that are feasible within existing farming patterns, The team represented a range of disciplines: agricultural economics, agricultural engineering, agronomy, limnology, sociology, and systems analysis, all from Cornell University. They concluded that, although nitrogen contamination of water is not serious generally, there are local areas where it causes concern, and so some changes in the timing and rate of nitrogen fertiliser application may be indicated, as well as a limitation on population densities in areas from which water is abstracted. The cheapest way to reduce phosphate contamination, after its use in detergents has ceased, is to install tertiary treatment plant for urban sewage.

The report is intended for laymen as well as for planners and scientists, but although it avoids technicalities so far as it can, it remains heavy going and, at £11.00, expensive heavy going at that. For anyone concerned directly with the quality of water and its relationship to agricultural practices and sewage treatment, however, it is very valuable indeed, for it demonstrates a practicable interdisciplinary approach to management that can be translated to any watershed.

The study recognises, of course, that nitrogen and phosphorus are not simply pollutants, nuisances to be disposed of, but valuable resources. So, too, but in a very different way, do the food scientists who took part in the symposium, whose proceedings are published as Food from Waste. They considered how organic wastes of all kinds can be recovered and used as raw materials for food production. Crop residues, molasses, waste paper, abbatoir and dairy wastes, and sewage all came in for consideration, as well as the now more conventional leaf protein and single-cell protein grown on hydrocarbon substrates using microfungi. The wide range of papers ensured that a broad picture emerged of the state of the technology at a particular time, which is especially useful since it permits the student, anxious to know what he will be expected to eat in a few years' time, to measure the progress of one process against that of another.

The aim of reclaiming food wastes is, first and foremost, to reduce pollution of surface waters. Everyone believes that in the next few years restrictions on the discharge of noxious effluents will become very strict indeed, as the EEC strives to improve the quality of the Rhine with blanket measures that apply equally to all rivers, great and small. So it is sensible to return these substances to use, both to prevent their loss from the food system and to provide means for financing the processes required to extract and dispose of them.

Yet I worry about the ideology that is beginning to underlie the technology. Scientists are growing euphoric about the contribution they are making to world food supplies, and it is but the tiniest step from this deep conviction of the ethical value of what they are doing to an insistence that all opposition to them, every last shred of doubt, be swept aside lest we all starve. Should that happen and it is less improbable than it may sound - there could be a demand that the whole of crop plants, not just the part harvested conventionally, be processed into food. Practised on any scale, this could reduce the amount of bulky organic matter returned to the soil sufficiently to disrupt many existing farming systems. At the same time it could present consumers with toxicity hazards that have not been, and probably cannot be, evaluated properly. As a means for reducing water pollution, novel food production offers an expedient approach. It is not a solution. The solution would be to disperse processing plants to such a degree that their by-products could be absorbed safely and conveniently by nearby farmers in an unprocessed state. It is difficult to see how it can contribute anything to world food supplies.

Professor Barrons would agree. He tries to keep an open mind, but he cannot see novel proteins feeding the hungry people of the world. If they are to be fed, it will be by farmers. He attempts a popular overview of the present state of agriculture and food supply, dedicating it innocently to "my fellow agricultural scientists and technologists". The tone is set by the title of the first chapter: 'You arenever farther away from agriculture than your next meal, so he proceeds with a homely philosophy based firmly on his belief that what is good for Dow Chemical Corporation is good for the world, and occasional slogans and passages that should be, but are not, printed in capitals, as warnings to those who would err from the path of chemical righteousness. His vitriol is saved for those he calls the "hunger mongers", a delightful epithet he attaches to those who refuse to accept the need for population limitation, those who

allow farm land to be swallowed up by urban expansion, but also to those who seek to preserve and expand national parks, wilderness areas, and to anyone who would restrain that natural exuberance that leads farmers to use any quantity of any Dow chemical that they can lay their hands on. If his strictures against all advocates of organic farming sound archaic to everyone except Earl Butz, the US Secretary of Agriculture, his concern about management policies for public lands is less shrill than it seems. No one in Britain would suggest that livestock be banned from areas of national parks that have been farmed for centuries, but this is being proposed in the US.

So, if you can stomach the prose and don't mind being insulted from time to time, this book provides a simple summary of the present world food situation, interesting because it is viewed from a very American standpoint.

Michael Allaby

Future Imperfect

NUCLEAR POWER by Walter C. Patterson, Penguin 1976, 80p.

Many governments are now well that alternative aware energy sources will soon be required to take over from fossil fuels in our industrialised society. At present the only potentially abundant source of power which offers anything like the concentration of energy necessary for sustaining such a society into the future, appears to be nuclear power. Indeed projections of its growth indicate a doubling period of no more than four years. At such a pace projected world demand for energy would in theory be met almost wholly by nuclear power early in the next century.

Unfortunately most of us accept such a proliferation of nuclear power without any attempt to determine what it will mean either for us or for our descendants. We thus dumbly acquiesce in the selfrighteous decision-making of our leaders and think, like them, that they are benefitting our society when they license the importing of thousands of tonnes of another country's nuclear waste.

In fact if we wish to have any say in the future we must learn as far as we can the technical ins and outs of nuclear power. It is also our duty to recognise the ethical problems associated with such power. On that score Walt Patterson's book is a welcome addition to the spate of books on the subject. First and foremost it is informative and clears up distinctions between the different types of reactor in current use; hence we come to see why Britain, after much dilly-dallying, chose the SGHWR rather than the LWRs of the United States, and why the Breeder Reactor is the key to the future of fission reactors — if they should have one. Patterson also has the knack of bringing his account vividly to life and making it read as easily as an exciting novel.

The irony is that Patterson does not have to prejudice his account with his own bias against nuclear power. It is all there for the taking. Not one nation, that has set out to create a nuclear industry of its own, has escaped a major accident in a reactor or reactors, and that dismal record is from a total of little more than 200 reactors. The near-misses and the anguished decisions, often the wrong ones, made by operators when faced with a reactor crisis, would be science fiction if they were not so palpably true. Luckily for the industry no power reactor has yet breached its containment structure, although large quantities of radioactive substances have been ejected into the environment.

Nor is any assessment of risk really adequate. Technology itself may not be at fault, but human beings remain fallible and unpredictable — like the operator who set fire to part of the Brown's Ferry nuclear station in Alabama, with a candle.

Now that the expansion of nuclear power is about to commence, more serious questions are being raised about the possibility of plutonium thefts either by terrorists or even by governments themselves. India's recent bomb test was from plutonium gained from a reactor built, with Canadian co-operation, for peaceful purposes only. In addition the long-term care of highly radioactive waste remains an unsolved and possibly unsolvable problem since it may require the willing or more likely unwilling co-operation of unborn generations hundreds of years hence.

Patterson makes no attempt to cover all the issues raised by nuclear power. He hardly touches the ethical issues of a power source which is fit only for highly industrialised soieties and therefore will be of little benefit to the developing countries. Nor does he metnion the problems of derelict power stations which will begin littering the skyline after a generation of nuclear power production. Yet he does see fit to discuss nuclear explosions, since he, like so many of us, cannot dissociate nuclear power from its sinister beginnings as a weapon of wholesale destruction. With plutonium at large, and aggression by no means diminished in the world, it is surely naive in the extreme to overlook the connection.

Over all Patterson's book is a reminder that mankind must decide now on the ethics of nuclear power. Should we have the courage and farmindedness to opt out of this power source? Such a step would challenge the entire basis of our western industrial society. Hence the rebuttal of nuclear power is but an affirmation that we are seeking a different kind of society in which highly concentrated energy sources play a less and less significant part and man learns again to live with the plentiful diffuse energy sources that have sustained him for the great majority of his time on earth.

Peter Bunyard

Is the Answer a Tree?

FOREST FARMING by Sholto Douglas and Robert A. de J. Hart. Preface by E.F. Schumacher. Watkins, £3.85.

When Richard St. Barbe Baker in his eighties goes off to foreign parts to start a tree-planting operation, which is going to last a decade or two, one realises that in forests lie immortality. Once we get involved with trees, age is as nothing. Forests replace themselves: with them, we need fear not soil erosion, drought nor famine, heat nor cold. They offer fertility, moisture, food, clothing, fuel, shelter.

As Dr. Schumacher says in his introduction to *Forest Farming* by J. Sholto Douglas and Robert de J. Hart, "the answer was there all the time." Moreover it is still available to us. All over the world Schumacher has seen agriculture wreaking disaster in mountainous, rocky and arid regions, where silviculture would mean salvation.

How is it that we have run into such trouble when the solution seems to have been so obvious? Possibly because the time-span of political planning is rarely more than five years. Not till 1973 did we hear about planting trees — until then it had been more expedient to chop them down, and the work of the Forestry Commission had been, like other aspects of agriculture, directed to quick profits rather than long-term advantage.

The authors of this fascinating book refer us to the teaching of Buddha: that every Indian should plant and care for one tree every five years. This, it is claimed, would result, in a five-year period, in 2,000 million established trees, yielding an economic value greater than any of India's five-year plans. Properly diversified, they could produce almost everything man really needs, while preserving wildlife, decreasing pollution and enhancing the beauty of the landscape. Tropical America can even boast a native cow-tree yielding copious amounts of a latex resembling cow's milk. Others produce edible fruits, seeds, beans, flowers and leaves, oils and fats. Forests, unlike annual crops, are largely independent of the vagaries of weather; they provide their own fertility and water and yield more food per acre. In temperate regions, livestock produce 2 cwt. of meat per acre; cereals 11/2 tons of grain; apple trees 7 tons of fruit; while in tropical areas, leguminous beans yield 15-20 tons of cereal equivalent. Multiple cropping from interplanting with vines, vegetables and cereals makes further production possible. Olives and carobs can be planted on rocky mountain sides where their roots can penetrate deep down to



answer to the environmental crisis by Alan Hayward

A Marshall Morgan & Scott paperback. Published 1975 at 50p.

From your bookseller, or 60p post free from Bible Books, 177 Ledard Rd., Glasgow G42 9RE. buried sustenance and tap underground water sources. Trees can store water for long periods and some can survive extended droughts that kill all other forms of vegetable life.

The authors tell us that "the exuberant productivity of the tropical forest clearly indicates that cooperation is a far more potent force in Nature than competition." The forest offers unlimited opportunities for research into "the complex biochemical mechanisms by which different plants stimulate each other's growth and neutralise each other's diseases and other antagonistic factors." The fact that in recent decades some birds and insects, formerly considered innocuous, have become serious agricultural pests, is considered to be due to the wholesale destruction of natural plant life characteristic of modern western agricultural practice. Their onslaught on crops, orchards, etc., has been due to the destruction of hedgerows, the source of their natural food.

Peasants all over the world have always used the products of the forest for many purposes. In this country there are ancient rights for people living within forest confines, to graze their animals and gather wood. Food has always been there for the taking, even if some game laws have restricted the variety to which commoners could help themselves.

Everywhere now these priceless forests and jungles are being eroded.

They are the habitat, not only of innumerable wild creatures, but of so-called primitive tribes, whose deep understanding and knowledge of the natural world within which they live in harmony are being exterminated with them. Once lost, this knowledge may never be regained. As trees exhale oxygen, wholesale destruction such as is perpetrated in the Amazon basin may lead, as we are told, to a reduction of atmospheric nitrogen below the essential needs of the world's human and animal population.

St. Barbe Baker, founder of The Men of the Trees, holds that at least 30 per cent of a country's land surface should be under trees. In Great Britain this area is only 6½ per cent: we have far to go, and with an increasing unemployment problem, together with growing needs for fuel, food and the other produce of the forest, the answer surely is to get planting.

As long ago as 1929, J. Russell Smith, Emeritus Professor of Economic Geography at Columbia University, published a book called *Tree* Crops - a Permanent Agriculture. If proper notice had been taken of his work, much ecological disaster might have been avoided. It is to be hoped that Forest Farming will have a better fate and find its way into every agricultural college, not only in this country, but in the Third World, where its message, and much valuable practical advice, is so urgently needed.

Joanne Bower

This Month's Authors

Maurice D. Arnold M.A. is Regional Director of the U.S. Bureau of Outdoor Recreation in Philadelphia, Pennsylvania.

Professor R. F. Dasmann is Senior Ecologist at IUCN in Morges, Switzerland He previously held many posts including Director of Environmental Studies at the Conservation Foundation, Washington. He has published over a hundred articles on wildlife and conservation and has written many books on the same subject, among them: Planet in Peril, Ecological Principles for Economic Development, The Conservation Alternative, and four editions of Environmental Conservation from 1959 to 1976. George Armelagos is Associate Professor of Anthropology at the University of Massachusetts. He is engaged, with his colleagues, in research into environmental disease.

Robert Waller is an Associate Editor of *The Ecologist*. He is also a poet, novelist, biographer and a well-known writer and broadcaster on agriculture.

S. Barkataki, who lives in Assam, India is a known authority on tribal peoples, and has contributed in the past to The *Ecologist:* 'The Hill Tribes of Assam' Vol. 1, No. 17. He is the author of:*Tribes* of Assam and Assam.



Supersonic Aerosols?

Dear Sir.

Sarcastic and far fetched talk about Concorde and aerosol sprays is simply not good enough. They must be treated as an extravagance of a society which is depleting irreplaceable resources and not as a special danger to the environment. If we do not do this we shall let many much more undesirable activities continue unchecked.

Thus I was disappointed in your "Notebook" (Feb. 1976, p.67) inventing fictions about what Mr. Benn would say in a quite impossible situation. We know (don't we?), that, even if no more deliberate steps are taken in the materially advanced countries, the cut back from growth has already begun and there can never possibly be enough Concordes (and Tupolev equivalents) to produce any detectable effect on the atmosphere.

'Notebook'' refers to "W.M.O. Scientists". There are none engaged in research and few in other aspects of the science. All their experts are nationals employed for specific jobs, and I, like many other meteorologists have done my stint. But W.M.O. does not make pronouncements that are more valid than a Met. Office or any other national meteorological service or university pronouncement.

In the case of the chlorofluoromethanes there is certainly no agreement about their effect on the atmosphere. This is not, as many people imagine, primarily because different scientists are paid to say different things but because they are making different guesses from a state of very considerable ignorance about what is going on in the stratosphere and how it works.

I think it is fair to say that meteorologists are much less ready to predict that any measurable effect will ever occur due to chlorofluorothan other scientists methanes because they have a much longer practical experience of the complexities of the atmosphere and know that this complexity militates against abnormal external influences having much effect. They do not trust the quite naive and simple models of the atmosphere used in the predictions. Perhaps the most important reson other than the habit the chemistry has of throwing up complicated surprises when people start making more detailed measurements, is the very serious misrepresentation of reality in the diffusion model used to model the mechanisms which transport the chemical substances vertically and the effect chemical composition has on the motion.

Thus the best theory is definitely a seriously wrong one at the present, and there is no prospect of having a proper model within a decade if only because we are unlikely to have the kind of measurements which would validate the model. I would guess that we are unlikely to have them in this century, and this guess is based on the slow progress made since 1945 in modelling the troposphere where the measurements are very much easier to make.

I have no reason for defending aerosol sprays, nor for attacking them in particular. I would like to see all such extravagancies very much more highly priced, and this includes all air conditioning and refrigeration units which are as important a source of chlorofluoromethanes as aerosol sprays.

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

Professor Scorer confirms what has been our thesis all along: if we are ignorant, as he admits we are, about the effect of pollutants on the self-regulating mechanisms of the biosphere, upon which life depends, there is clearly no justification for generating them. It is quite obvious that pollutants must be regarded as guilty until they are proved otherwise; not the other way way round as he implies.

A Country Life

Dear Sir.

M. J. Huntington (Farmer) wishes to know what qualifies me to write on agricultural matters. Well I will tell him. I started working seriously on farms during all my school holidays when I was fourteen. When I was sixteen I spent a year as a pupil on the farm of Mr. Catt, at Feering, Essex; after that three years at the South Eastern Agricultural College, Wye; then a year as a pupil-assistant on the farm of Mr. A.T. Garne, Aldsworthy, Gloucestershire; then three months on the Tarka Training Farm, Craddock, Cape Province, South Africa; then a year 'riding camps' on the very large and distinguished merino and cattle farm of J. Oscar Southey, Middleburg, Cape Province; then three years managing the seven-thousandhectare farm of Edwardsfelde, Outjo, South West Africa; then three years working as a Livestock Officer for the Veterinary Department of Northern Rhodesia, most of the time spent controlling the anti-pleuropneumonia campaign of a district rather larger than Mr. Huntington's county of Cornwall (we were completely successful in eradicating this disease which looked like killing off the entire cattle population of Barotseland); then I had six and a half years serving in the infantry, which I admit was not really an agricultural pursuit; then I returned to England and spent three years as District Labour Officer for Samford and Gipping Districts for the War Agricultural Executive Committee. during which I was responsible for contracting with farmers for the labour of five thousand prisoners of war, and responsible for seeing that the work was done properly - and at a profit. Since then I have been engaged in running a five-acre smallholding in Suffolk (for eight years) and this 62-ac farm in Pembrokeshire (for twelve years) both very successful'y.

I was brought up in the country, and except for a couple of years when my family did live in London, have never, as far as I can remember, spent more than two months in a town in my life.

Editor Yours faithfully, John Seymour (Farmer), Trefdraeth, Sir Benfro, Cymru.

Political Alternatives

Dear Sir,

I am glad Cllr. Robinson (*The Ecologist*, March/April 1976) regards our argument as friendly. That makes it easier for me to involve an innocent bystander: in general my criticisms apply equally to the Socialist Resources and Environment Association.

Cllr. Robinson said nothing which answered the nub of my original argument: that the Liberal Party, despite appearances, is not the natural vehicle for the ecological movement because (inter alia), if it, or any other party, were to adopt such a radically different philosophical basis, and focus attention on it, they would become temporarily unpopular, and would permanently lose many key figures and party workers. Until this proposition has been tested. I see no reason to make life comfortable for either the ecoliberals or SERA.

For example, John Pardoe and Denis Healey have, among many others, revealed themselves as unshakably growthist. (It is impossible to establish this concisely, apart from Healey's 'high wage, high output' speech.) Neither has so far felt obliged to make any comment on the ecological factions in their respective parties, which must, from their point of view, be talking dangerous rubbish. The highest aspirations of these eco-groups will be to pull their punches as mightily as the Tribune Group was forced to, when it came to the crunch.

Cllr. Robinson's claim of experience, on strategy and communication etc., begs the question. I welcome his expertise just as soon as he joins the Ecology Party. Over the past 3 years the EP has issued a stream of statements highlighting the inconsistencies in orthodox policy, and the existence of our alternatives. These have of course all been ignored. Either the Liberals have fared no better, or they have signally failed to use the advantages Cllr. Robinson claims. As I write (Easter) the young Libs have just wound up their confrence with a declaration on civil rights. Meanwhile that 1974 no-growth commitment remains an abandoned toy, there for those who want to remember it, but non-existent for those to whom it would be a divisive embarrassment. SERA must be given credit for a courageous exception to this need for diplomacy: their statement on Concorde.

The expertise, indeed the sheer manpower, now hamstrung elsewhere could be freed from these constraints. As members of the Ecology Party, our tasks are to produce an ecological manifesto (in fact to update it); to publicise it, and its implications for people's daily lives; and utlimately to achieve a mandate to put it into effect. I have never said, as Cllr. Robinson implies, that these tasks will be easy. On the contrary, it is the hijack of an established party which, if feasible, would be the soft option.

I regret however that this debate cannot be friendly: I am not sure how urgent Cllr. Robinson regards the problems, but I see them as akin to those of a family whose house is on fire, and who are arguing about their possessions, and possibly their lives. One of us is wrong, Cllr. Robinson, criminally wrong. Yours faithfully, C. R. Lord,

National Secretary, Ecology Party.

THE ECOLOGY PARTY

In the Local Government Elections in May members of The Ecology Party contested a variety of seats.

John Luck, an architect from Rye, came third in his ward polling 721 seats (the top candidate gained 832), to win a seat on Rotherham District Council.

John Davenport, Campaign Secretary for the party, came 10th out of 20 candidates, polling 372 votes to gain a place on the Kempsey, Worcestershire Parish Council.

Keith Rushworth, standing for the Leeds Metropolitan District Council achieved 3.7 per cent of the votes in a stiff contest against the three major parties.

James Gollins collected 90 votes in his contest in North Shropshire, only 42 votes behind the winner.

Olive Bridges gained 49 votes standing for Suffolk Coastal District Council, Leiston Ward, and 118 votes in the Leicester-cum-Sizewell Parish Council.



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