

Organic Farmers & Growers Ltd.

OF&G was started in 1975 with the intention of providing those who wished to farm by biological principles, with an advice and marketing service comparable to those provided by government sponsored organisations, such as ADAS and the MMB, for the conventional farmer.

To do this has meant becoming involved in farming from A - Z. It has meant doing a great deal of research in order to be able to provide the kind of practical advice that farmers require if they are contemplating making a change.

It means providing proved methods by which the farmer can adopt organic techniques of pest control, cultivation, alternative sources of farm nutrients etc: without loss of profitability.

For information write to The Director, Organic Farmers & Growers Ltd., Martello House, Stowmarket, Suffolk.

Economic Growth — an allotments campaign guide by Peter Riley.

Over 120,000 people in Britain are waiting for land. Council waiting lists for allotments have grown by 16 per cent since 1970.

As a nation we spend £1.45 billion more on fruit and vegetables now than we did in 1970.

110,000 acres of land in England are derelict, 18,000 acres in Wales and 37,000 in Scotland. These are the 'official' figures. Unofficial counts make the acreage much much higher, and it is increasing all the time.

Friends of the Earth's new book is a campaign guide for those, whether groups or individuals, who want to get their local authorities to provide more land for people to save themselves **and** the nation money by growing their own fruit and vegetables.

The book that tells you the hows and whys and wherefores of bringing derelict land back into production is available — from FoE, 9 Poland Street, London W1 at $\pounds1.40$ plus 20p for post and packing.

Organisations offering advice and research in organic farming in the UK.

The Soil Association Walnut Tree Manor, Haughley, Stowmarket, Suffolk.

Henry Doubleday Research Association, Convent Lane, Bocking, Braintree, Essex.

International Federation of Organic Agriculture Movements Representative in the UK Mrs. Mary Langman, 43 Croftdown Road, London N.W.5.

Farm and Food Society, 4 Willifield Way, London NW11 7XT.

The Food and Agriculture Working Party of the Conservation Society (FAWP)

Is campaigning:

One: to change the Common Agricultural Policy (CAP).

Two: for British support of the European Environmental Bureau (EEB). The EEB is working within Europe to chang the CAP so that it embodies long term ecological objectives instead of short term economic ones that are dividing Europe. Common ecological aims could unite Europe.

Three: for a major research programme on the energy inputs and the yields achieved by traditional mixed farming compared to the specialised and high capital intensive farming of today. The nutritional values of crops grown under different systems must be included together with a cost benefit analysis. The Government must learn to take into account the savings on health services as a result of a healthier national diet. Four: TO CONSERVE AND EXTEND COUNTY COUNCIL SMALLHOLDINGS (see article p xx) Inquiries from interested readers are welcomed. To continue these campaigns requires your support.

> Robert Waller, 87 Oxford Road, Moseley, Birmingham 13.

The **New Ecologist**

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Looking for Common Ground

Everyone is stifled by the gigantism of modern bureaucracy; inside every conservative and socialist and liberal a little ecologist is struggling to get out. Everywhere we meet people carrying a torch for some cause that is essentially ecological in origin, whether they are anti-nuclear, anti-Concorde, anti-juggernaut, anti-pesticide or anti-factory farming, they are expressing (even if they don't recognise it) a desire for a more ecological society. The people who campaign to keep their local schools, save trees or prevent the tearing down of historic buildings; those who want allotments or better country bus services; those who hate supermarkets and fluoridation; those who drive out to the country to buy fresh farm food or seek out corners of unspoilt wilderness in which to refresh their jaded spirits, are all echoing the values enshrined in the Ecology Movement. Everywhere there are people who long for a more stable, more ethical society. People who deplore the loss of social responsibility that is the product of the welfare state, and the loss of human dignity represented by handouts from an anonymous establishment determined to hide from them the harsh truth that unless we change course disaster will engulf us all.

The dissatisfaction that is the inevitable product of lives without purpose, the talents wasted and turned to destructive activities, the aspirations unfulfilled all represent a well of human energy that could be rechannelled to support the eco movement. Here are people whose anger is directed against the society in which they cannot find a useful role. They are maimed by the very things that an ecological society would by its nature eliminate. They won't agree with everything in eco-philosophy, but it is our business to seek out and nurture the seeds of ecological instinct that are there.

Thousands of people express their views by joining local amenity groups, Friends of the Earth, the Conservation Society, the C.P.R.E., the World Wildlife Fund and similar organisations. Many more would welcome *real* measures to conserve energy and cut down government spending on fruitless projects and surveys and Commissions that never make a noticeable difference to their lives. In 1974 an American reporter covering the energy crisis expected to find the people of Britain grumbling at conditions and apprehensive about their material well-being in the face of threatened shortages. What he actually discovered, to his astonishment, was that the only grumbles were about the lack of any decisive measures and at the shillyshallying of those in authority. People were ready to accept petrol rationing or anything else that was necessary to get the country back on the rails; what they waited for in vain was an unequivocal commitment by the government to cut down fuel consumption and conserve energy through realistic home insulation grants.

The Ecology Party is going to put up fifty candidates at the coming election. They are going to campaign on policies that thousands of people will find partially, if not wholly sympathetic. They must go all out to promote those ideas that are instinctively supported by their listeners. When candidates are faced with implacable opposition to the more difficult policies, such as no-growth, they must not turn away in despair; they must search instead behind, beneath and beyond the prejudiced exterior until they find the ecologist lurking in the heart of the opposition, and then they must gently draw it out. The more controversial tenets of ecological philosophy will be easier to get across when the embryo is growing in an ecological ambience.

Of course the toughest battle will be to convince all these seedling ecologists that a vote for the Ecology Party is not what the big boys delight to call a 'wasted' vote. The tragedy of the present system, which bears no relation to Democracy, is that the majority of voters, if they are not voting for a TV personality, are more intent on defeating those they blame for current ills, than on voting positively for a party that represents ideals they can hardly believe in. This is why, in the long term, the strength of the Movement must be built up at the local level. Meanwhile in the coming campaign, candidates and party workers must seek out and woo those thousands whose instinctive values are those of the Ecology Movement. They must be persuaded that the non-materialist, decentralised, postindustrial society that offers so much that they want, cannot be realised without effort and without risk. All those reforms that they quite clearly see to be necessary cannot come about until those that govern give up the notion of perpetual growth and dramatically change direction. There is a deep well of native intelligence in ordinary British people; they know that you cannot preserve wildlife and build cities on the same plot of land; they know that self-reliance cannot be achieved when the country depends on imports it cannot afford; they know that a growth society cannot ever be an ecological society. A recurrent theme in this issue of The New Ecologist is that common cause must be found if eco-policies are to make a significant impact. Eco-politicians of course must not depart from their aims or deny their ideology to win votes but in the critical period before the next election it is the areas of common interest that must be discovered, the imagination that must be set alight and the seeds of ecological sympathy that must be watered and tenderly brought to maturity.

Ruth Lumley-Smith

The Promised Land: is it still so promising?

Peter Bunyard

Technology has become Israel's sacred cow. But already past successes are bringing problems that no amount of technical sophistication can solve. In many areas the limits to growth are rapidly being reached.

Israel is a land of paradox; a land of sentiment where archaeology and the disinterring of a distant past have to live beside the march of progress; where landmarks as famous as the River Jordan are sacrificed for the sake of agricultural productivity; where there is rivalry between fanatical adherence to the laws of an ancient religion and the pragmatic socialism of the first Zionists and the Kibbutz movement which followed them. In Israel development has proceeded apace, especially since the Second World War and the founding of the State of Israel three years later. New settlements, urban sprawl, multi-lane highways and the bustle of traffic, and all mod cons in the houses, these are the manifestations of progress as are the tanks manoeuvring in the desert, or the jets streaking supersonically in the sky.

Israel is a supreme example, of what happens when a country finds itself in the grip of industrialisation. Like many rapidly developing countries she has a mixed, and growing population made up of people from a wide range of different backgrounds and cultures; a vulnerable environment and an intense faith in technology. Indeed the Israeli attitude to the gigantic environmental problems looming ahead is that they can all be solved by technological means. Will this young state be able to continue its development and solve its problems? Will it be able to find the money and the continued financial support from outside for tackling grandiose schemes like the Med-Dead canal? Or shall we see in Israel the consequences of a headlong clash between industrial development and natural limitations to such development?

The Israeli approach to industrial development is not simply one of getting on the bandwagon of material progress; its people are convinced, and not without some justification, that their country's survival depends on it maintaining technological superiority over its neighbours. Israel too has a policy of keeping its doors open to any Jew, whether persecuted or not, who wishes to enter the country, and the need to provide jobs, homes and a reasonable standard of living for the influx, has meant that development has become not simply necessity, but a creed of existence. Furthermore Israel has developed the West Bank, not just for her own people, but for Arabs, whose standard of living has risen accordingly. Indeed Arab farmers have been provided with tractors and modern agricultural technology, while many have now found jobs in Israeli The New Ecologist No. 2 March/April 1979

towns where they can earn a good living as labourers and masons.

Apart from winning wars, and being involved in a political storm from the beginning of its fight for existence, Israel is probably best known for its agricultural settlements and their incredibly high productivity. Yields of grain up to four tons to the acre on irrigated land are commonplace and its dairy cows are among the highest producers in the world. Given that nearly all the farm land had to be won from sand dunes, malarial swamp, thorn bush and desert, the story of Israel's agriculture would seem to be one of unmitigated success. Yet it is agriculture that is stretching some of the country's resources right to the limit.

At the present time agriculture uses nearly eighty per cent of all Israel's water reserves each year, which leaves a very small margin for industry and the domestic sector. For the most part Israel depends for its water supply on groundwater reserves which lie some 70 metres deep in the sandy aquifer along the coastal plain and in naturally worn caverns deep in the limestone mountains around Jerusalem. Approximately one-third of the water required for irrigation purposes is taken from the River Jordan and the Sea of Galilee. Water use is governed by Tahal — the water planning authority — and by Mekorot which controls the amount of water used by agricultural settlements. Indeed a community found to have been wasteful of water is likely to be fined and have its future use restricted.

Although rainwater amounts to three or even four times the amount of water used annually by Israel. much of it runs off and evaporates before it can be tapped. The rest goes to recharging the aquifers: consequently Israel has no choice but to rely largely on the recycling of groundwater. A major problem is now developing: in recharging, the aquifers are slowly accumulating salts and in another generation or so the water may become too salty to drink. Excess nitrate from fertiliser use, particularly in the citrus fruit groves along the coastal plain, from sewage, industrial waste and from animal feedlots, has found its way into many aquifers, where it is accumulating at the rate of one part per million per year, and a great many wells are now considered too polluted with nitrogen to be safe as drinking water for babies. Chlorine and other salts are also increasing at the rate of 0.5 per cent per year in the coastal plain aquifers owing to the continual washing down of the soil.

A second major problem has arisen as a result of

using the River Jordan for irrigation. The river no longer flows on its way to the Dead Sea, it only trickles (Christians coming to Israel to get baptized have to do so close to the Sea of Galilee), consequently the Dead Sea is evaporating faster than it is filling, and is shrinking at the rate of half a metre a year.

Until five years ago sewage treatment was virtually non-existent in Israel. Thus Tel Aviv and the other coastal plain towns discharged their sewage untreated into the Mediterranean, while Jerusalem let its sewage run down the long twisting Wadi Soreq to Bet Shemesh some 40 kilometres away, by which time it had purified itself. Haifa now has conventional sewage treatment plants including activated sludge and filter bed systems, and alongside, an experimental high rate algal oxidation pond in which the dense growth of algae and bacteria is skimmed off and dried to make feed for poultry and fish. Jerusalem now has one activated sludge system built with World Bank funds which copes somewhat spasmodically with one sewage stream, while the other continues to run untreated down the mountainside. Tel Aviv and the Dan region around is also getting an activated sludge system, and there is a plan, once the project is completed, to pipe the activated sludge all the way south to the Negev where it can be used as liquid manure for crops. As for the cleansed water, it may have to be used for irrigation since the Israel Ministry of Health is against recharging the coastal plain aquifers with it. In the meantime water from the experimental solar pond sewage plant at Haifa has been used, once clear of biomass, for irrigating nearby cotton fields using a drip pipe system.

The problem therefore remains how to tackle the increasing salinity of the coastal plain aquifers and how to prevent the Dead Sea drying up altogether. Tahal, together with other research agencies, has come up with the audacious idea of building a canal all the way from the Mediterranean to the Dead Sea. Since the Dead Sea is already saline and dead, Tahal considers that it would not matter if salt water ran into it, meanwhile its level would rise, and furthermore, because it is 400 metres below sea level, hydroelectricity could be generated. Up to five routes have been studied so far, one of them passing in a 40 kilometre tunnel through the mountains to the West Bank town of Hebron. Tahal still has little idea whether the water might not vanish in fissures in the limestone and finish up contaminating underground fresh water aquifers, or whether earthquakes might not be triggered given that the rift valley, of which the entire Jordan valley is part, is a seismically sensitive region. The last brush stroke in such a daring vision is to have a string of nuclear power stations along the canal cooled by its water. There is a proposal to use the reactors for both electricity generation and desalination. The desalinated water would then be piped to the coastal plain and used to recharge the aquifers, consequently reducing their increased salinity. Such a proposition would kill lots of birds with one stone. It would enable electricity to be generated both from the hydro plant and from the nuclear power stations; it would raise the Dead Sea level and it would increase the quantities of fresh water available to Israel. But who will support such a venture given that it will require colossal sums of money and incredible engineering? Will it work? And what about the environment, will that suffer as a consequence?

According to one well-known ecologist, Professor Evenari of the Hebrew University, who has established dry desert farming techniques in the Negev, to push through such a scheme would be 'Meshuga la davar' crazy in the extreme — ranking in the same order of follies as the Aswan Dam in Egypt. Indeed his opinion of technocrats is not very high, since "the more spectacular, the more costly, the larger the enterprise, the greater is the disaster at the end of it all."

Despite warnings from such eminent scientists as Evenari, Israel will in all likelihood go ahead with its Med-Dead canal because it is all part of its development plan. As it is Israel is already turning away from agriculture and the new settlements proposed for Galilee and Negev are to be industry based. The competition for water and land has ensured that industry can only be developed at the expense of agriculture which is hardly a novel situation. Professor Evenari is pessimistic: "Why stress our weak side?" he asks. "We are no good in commerce, and we lack a professional public relations attitude, furthermore our factories are only fifty per cent as successful as those in similar fields in the United States. Industry suffers from strikes particularly when there is rampant inflation. Why we make good soldiers and lousy PRs, I don't know, especially as Jews are so good in Madison Avenue, but since our success lies primarily in agriculture, why don't we stress that?"

The Negev desert comprises fifty per cent of the land area of Israel. Although much of its soil is loess and, given water to wash away the salts, potentially fertile, the notion that it can be made to bloom — Ben-Gurion's dream — is hardly feasible given the potential shortage of water. Yet with the techniques of small plot run-off farming — Evenari's 'negarin' — a considerable area of the Negev could be brought into cultivation, particularly for growing drought-resistant trees such as pistachios and almonds, without any need for irrigation. Evenari and his colleagues at the Hebrew University have now extended their activities in the Negev, and beside the original re-developed Nabatean-Byzantine farms at Avdat and Shivta, have established



After heavy rain storms enormous torrential floods stream through the wadis. The photograph shows a flood in Wadi Mashash.

grazing grounds at Wadi Mashash, some twenty kilometres south of Beersheba, using the same techniques of run-off, terraces and dams to create pasture. At the same time they discovered old cisterns and wells which even after a lapse of centuries were useable. To complete the experiment a flock of over three thousand Awassi fat-tailed sheep were bought from a Bedouin, and kept throughout the year on the fifty hectare holding.

Despite all the problems the experiment has been extremely successful and as foreseen a great many more animals can be kept on a given area than by nomadic grazing; furthermore with far less damage to the environment. A nearby kibbutz, Ben-Gurion's Sde Boker, is sufficiently convinced by the Wadi Mashash experiment to have ventured on its own runoff pasture programme, probably for cattle as well as sheep. And what about the Sahel, the Australian desert, Kenya or Tanzania, where similar climatic and soil conditions prevail? Evenari reckons that the productivity of all those areas can be greatly increased without incurring great changes in the lifestyle of local nomads. As it is, run-off farming is practised by the Berbers in the semi-arid hills of Tunisia, who apparently learnt the technique from the Phoenicians. One of the most important aspects of run-off farming, is that it is basically drought resistant; one good flooding of the terraced fields being sufficient to last the whole year. Arid zones like the Sahel, with a recent history of droughts, could benefit enormously from such techniques.

But the Negev is threatened as never before. Because of its plans to move out of occupied Sinai, Israel is proposing as many as thirty new settlements, three large urban centres, new industrial complexes, four enormous airfields, and vast army exercise areas for the Negev. Not only will such proposals seriously affect the movements of the more than thirty-five *housand Bedouin in the area, but in Evenari's eyes, it may well be the end of the Negev itself. His concern is echoed by Professor Amos Richmond, director of the Desert Research Institute at Sde Boker. In an interview with the Jerusalem Post he pointed out that the Institute was started by the Government in order to advise on any settlement of the Negev. "Yet, until now we have not been contacted by the Defence Ministry to participate in its plans for the Negev.



Microcatchments in Wadi Mashash after a flood. The New Ecologist No. 2 March/April 1979

Over such a large area of wilderness the ecologist is almost bound to be at loggerheads with planning authorities whether civil or military, especially in Israel where security overrides all other questions. It is undoubtedly fortunate that Evenari and others have already performed sufficient research on the desert environment to show its potential for better uses than the building of cities, the development of industry, or for military exercises.

Because Israel is a new country, and largely made up of recent immigrants, it has a poorly developed environmental consciousness. The irony is that Jews from Arab countries like the Yemen, or from North Africa, often came from extremely primitive conditions where for two thousand years or more survival depended on sheer resourcefulness. Some Jewish communities from Tunisia and Libya were in fact cave-dwellers and it must have been a fearful cultural shock to them when in 1948 they were airlifted to a modern state which was already committed to the goal of material prosperity.

Despite their rich and beautiful cultures Yemenite and North African Jews have been unable to resist the dominant culture of Israel, that of the western-oriented Ashkenazis, and their sudden aculturalisation has been a traumatic experience in itself. Thus Jews who in their own communities had been superb craftsmen, jewellers or engravers, for example, had very often to find menial jobs because they could not adapt quickly enough to the demands of a modern state. Moreover, the younger generation has been sadly caught with no culture of its own, a lack of concern for the environment has been one consequence of that limbo.

Today environmentalism is being forced on Israel. Tar on the beaches, intense traffic noise in the cities, the water problem, the evident pollution from industry, combined with the demands of an increasingly affluent population, are ensuring that the environment is getting something of a hearing. That at least is a change from the early 1970s when the then Defence Minister, Pinches Sapir, called ecology 'bullshit'. In 1971 there was in fact a committee on the environment which vanished after achieving nothing, and before then in 1961 there was the Kanowitz law 'for the abatement of nuisance' which was to deal primarily with pollution and noise; it ended in farce because no-one was prepared to execute it. According to Reuben Yaron, Professor of Law at the Hebrew University, the Kanowitz law failed because it was resisted by the powerful transport co-operatives.

Undoubtedly Israel's environmental awareness took a turn for the better when Dr Uri Marinov was made director of a new environmental protection service in 1975. At first the EPS was part of the Prime Minister's Office where in view of other political priorities it hardly made any impact. Then after two and a half years, the EPS with Marinov still at its head, moved to the Ministry of the Interior where it has remained. Marinov almost achieved what he wanted when the Knesset voted in November 1977 for all environmental units including those of health to be brought under one Ministry of the Interior and Environment, but Sadat came to Jerusalem, and the move was never imp-



Arab terraces date back to Biblical times.

lemented. Nevertheless some ministries are co-operating: the Ministry of Transport is handing the management of marine pullution, for which it was originally responsible, on to the EPS, and there is hope that other environmental units will follow, including a branch concerned with legal aspects.

What is the EPS achieving, and will it have any bearing in the long run on Israel's growing environmental problems? After his time in the PM's office, Marinov has learnt one salient fact: that a staff agency is inadequate in an Israeli coalition type of government. "Everyone wants to co-ordinate," says Marinov, "not to be co-ordinated. And the Prime Minister is always busy with other priorities."

Agriculture is a major source of pollution in Israel. Oil, rich in sulphur, is used for heating greenhouses and the application of pesticides and herbicides is among the highest in the world; indeed thirty per cent of the cost of cotton production is spent on pesticides. The EPS has now completed proposals for major legislation on the use of pesticides which is to be put to the Knesset.

"At the present time anyone can apply Parathion and there is no regulation concerning its use. The law will regulate all stages of pesticide use from its production, transport and application through to residues and disposal. Certain kinds of pesticides will be forbidden and others will require permits before they can be applied.

"It's easier to enforce laws in open areas. We have for example a nature reserve authority, consisting of some hundred inspectors, and already they have improved the storing and disposal of pesticides by farmers. They are a dedicated lot and we shall turn them into a sort of Green Police force."

If one is looking for an ecological message from Marinov one would surely be disappointed. When asked whether the hills upon hills of abandoned terraces in Israel, could be reclaimed in any way, Marinov rejected the notion that Israeli farmers would go back to using marginal land. Instead he saw agriculture becoming a capital intensive industry in which closed system hot house techniques will be used for the production of food. "That way, we will reduce demands for water and fertilisers and improve yields by some ten to fifteen times."

In the meantime Arabs on the West Bank continue to 42

cultivate the ancient terraces (many of them date back to Solomon's time) and produce their crops of olives, grapes and vegetables. They succeed because they are prepared to work hard using beasts of burden and involving no-one but their own families. The landscape they are maintaining, which slopes away from their villages, looks clean, well-cared for and exceedingly productive even by the most modern criteria. That landscape is in sharp contrast with the barren hills around Jurusalem which no-one has time or inclination to cultivate. In fact more than fifty per cent of the Israeli part of the Judean mountains from south of Hebron to north of Ramallah, was terraced, many of the terraces being of ancient Israelite origin, and at the end of the British Mandate some sixty per cent of those terraces were being cultivated by Arabs.

The terraces are not just part of the ancient history of that land of Canaan and Israel, they also represent a timeless, ecological approach to existence. Professor Z. Ron of the department of Geography, Tel Aviv University, has made a thorough study of agricultural terraces in the Judean Mountains, and has shown that without them, erosion would have washed all the mountain soil away in a matter of years. Their importance was well appreciated by the Phoenicians (Canaanites) and the Israelites, who built them as soon as they had removed any natural erosion-preventing tree cover.

Furthermore, the terrace builders made all considerations of convenience secondary to those of finding the best site for cultivation. Thus whenever there were natural springs the water was stored in caverns carved out of the limestone and then channelled in a cascade down the terraces. The village meantime was built above the terraces, on marginal land, even though that meant an arduous haul of water uphill to the villagers' homes.

It may be that the terraced Judean Mountains in Israel will remain desolate and abandoned. It is conceivable that they will get covered in concrete and high rise apartment blocks on the hills surrounding the ancient city of Jerusalem. Undoubtedly their loss to Israel as a productive part of the natural environment is indicative of a modern mentality in which man believes he will better himself by supplanting the natural with his own man-made systems. Yet there is a twist: for in the dire necessity to keep the industrial enterprise going, Israel has made herself increasingly dependent on natural resources — on water and energy for example - and on increasingly violent technologies for gaining those resources.

In that respect Israel is hardly different from other developed and developing countries. Yet the problems are likely to be more acute rather sooner than in the rest of the world since the limits to expansion are dangerously close. Ironically the Israelis seem for once to have lost their sense of history. The solution for Israel, indeed the way out of the terrible impasse of water shortage, pollution and of the problems of ensuring cheap energy supplies, is more likely to be found in looking back to the ancient past, and seeing how their ancestors used their environment, than in charging on with ever more dangerous and vulnerable technologies.

growth of population in the north have stimulated a great expansion of agricultural production, in the

It has been pointed out that the main difference between temperate northern countries and the poorer countries in the tropics and subtropics is in climate and the soil resources which depend upon it. Whereas industry, urbanisation and

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south these same factors have increased the rate of degradation of

Competition in the World Food Market: the implications for the U.K.

Dr. T.L.V. Ulbricht

As populations increase and productive farmland decreases worldwide, food surpluses are becoming increasingly rare. In future Britain may not find herself able to compete in the world food market. The only way to avoid future shortage is to increase home production.

The world is producing and can continue to produce enough food to feed the world population — yet, hundreds of millions are starving. There is now general agreement that this paradoxical situation arises simply from the fact that many are too poor to be able to buy sufficient food!

Changes in the world grain trade (Table I) show increasingly large deficits not only in the less developed countries but also in Western Europe and the Iron curtain countries. In the latter two cases, the grain deficits are due to the highly inefficient conversion of grain to animal products¹, and to inefficiency respectively.

More recent figures indicate that trade in wheat will have reached a record level of about 70m tonnes in 1977-78. The world's biggest importer is China, (which has had a bad drought this year), with 8.5m tonnes. Imports by communist block countries are still rising, the EEC and Portugal are importing more, and so are the developing countries, because of lower yields in North Africa, Brazil, Mexico and parts of East Asia. There are only three significant exporters of wheat: the U.S., 31m tonnes in 1977-78, Canada 15m, and Australia 10m.

n the soil, and their food deficit has

had to be made good from the north.² Not long ago it was confidently said about the 'Green Revolution' that the increasing dependence on imported food grains of the denselysettled poor countries was being markedly reduced³. Apart from India — which has been favoured in recent years by a succession of good monsoons — this has not proved to be the case at all. What, then, are the prospects?

Population and land

Because, theoretically, enough food is being produced, it has been argued that population growth is not the problem. To support this, it is pointed out that food production during the last two decades increased by 2.8 per cent, population only by 2 per cent⁴ Unfortunately these figures are very misleading, and it is necessary to look at what is happening in those countries where food is most needed — the developing countries. The total increase in food production (from yield and acreage increases) in those countries in the 1960s was 2.8 per cent per year, but demand for food (from combined growth of population and income) rose by 3.5 per cent annually.⁵

It is suggested that a developing country will not be better off by reducing its population growth from, say, 3 to 2 per cent because large families will be better fed than smaller ones — when the children grow up there will be more to work in the fields or to earn. However, this argument about population will only be true if one of three conditions is

Table I. The World Grain Trade (million tonnes)

	1934 -	1948-	1960	1966	1973*
	1938	1952			
Developed regions					
Western Europe	-24	-22	-25	-27	-19
Iron curtain countries	+5		0	-4	-27
North America	+5	+23	+39	+59	+91
Australia/New Zealand	+3	+3	+6	+8	+6
Less developed regions					
Asia	+2	-6	-17	-34	-43
Africa	+1	0	-2	-7	-5
Latin America	+9	+1		+5	-3
	+ -	net expor net impor	ts ts		

Source: United States Department of Agriculture.

fulfilled:

- 1. that agricultural development leads to a more labour-intensive agriculture;
- 2. that additional land can readily be brought into cultivation;
- that non-agricultural employ-3. ment is expanding at least as fast as the population.

The first is not true. As regards the second, the National Academy of Sciences concluded that increased acreage was unlikely to account for more than one per cent of annual production increases in the future. and it could well be less.5 The recent U.N. desertification conference estimated that productive range and farm land is being destroyed at the rate of twenty thousand square miles a year. In the last fifty years, a land area equivalent to half of South America has been lost to agriculture as a consequence of man-made degradation of the soil. It is estimated that the area of cultivated land will fall by 25 per cent (300m hectares) by the year 2000⁶. Although much new land is expected to come into cultivation, twice that area will probably be lost to urban sprawl and land degradation. By 2000 the population is likely to be at least 6000m; if that is a correct estimate the amount of land to feed each world citizen would then be 0.15 hectare - half of what it is today. Also, as much land is lost each year through faulty irrigation schemes as is made cultivable through new ones⁶

There remains the third possibility - rapid expansion of nonagricultural employment. Here the situation varies very much from country to country. Those who dismiss the population problem see the answer in terms of massive growth and development of industry?

Looking again at the patterns of the world grain trade, we can see the importance of increasing production in the deficit areas. 'It is possible that improved agricultural practice would improve Russian grain production . . .'4 . But agricultural output declined in Russia by five per cent in 1977 when it had been expected to increase by ten per cent, and the grain crop was down by 30m tonnes. 'We may imagine (sic) co-operative inter-

national agreements which change the pattern of world trade . . .'4 . It depends on the colour of your spectacles. 'Third world countries may deliberately strive to increase domestic food production . . .'4 . They are striving, but what is the result? Almost two-thirds of all developing countries showed a fall in self-sufficiency in 1970-72 when compared with 1961-637 . If grain production increased by 2.5 per cent p.a. in the food-deficit LDCs (it grew by only 1.7 per cent p.a. in 1967-74) then by 1985 there will be a deficit of about 100m tonnes of grain in those countries⁸. At the seventh International Commodities Conference in Chicago in 1977 it was forecast that world grain production, despite expected gains in productivity, will be 102m tonnes in deficit by 1990 for the world as a whole.

We must not be misled by changes that occur within one year or in one particular country. Russia's bad harvest last year, India's currently high grain stocks and China's drought may have little or no longterm significance. The vagaries of the climate can produce local surpluses or crises, and since only a small percentage of the total food produced is traded, relatively small changes can produce severe fluctuations in price. What the figures undoubtedly show, however, is that with world population growing at the present level, there will have to be a larger annual increase in world food production than there has ever been before, if large-scale starvation is to be avoided. There is likely to be increased world competition for food, and prices will rise in real terms. It may be that the inefficient conversion of grain to animal products will not be sustained at present levels in the wealthier nations, because, as prices rise, the cost of animal products will become relatively more expensive.

Energy

A collaborative project, on global prospects, involving 75 energy experts from fifteen countries at MIT recently published its report⁹. It concludes that the supply of oil will fail to meet increasing demand before 2000, probably between 1985-1995, even if energy prices rise by fifty per cent in real terms.

Energy needs depend on a

country's Gross National Product, and about one barrel of oil (or equivalent) is needed for each one hundred dollar increase in GNP. When oil was two dollars a barrel, a country could satisfy its energy needs from about two per cent of GNP - now it requires ten per cent or more.

It is inescapable that energy will become scarce and expensive - it will still be available, but at a price. At twenty dollars a barrel (today's dollars) it would be economic to extract currently unprofitable oil wells, oils from shales and tar sands: to mine new and distant coal-fields, etc., but the prospect is that Europe will have to devote ten to fifteen per cent of its GNP to pay for energy.

Relevance to agriculture

Agriculture uses a relatively small proportion of national energy consumption in developed countries, but a larger amount is required for processing and distribution. In the U.K., about four per cent is used for primary production and eight per cent for processing and distribution. Copied on a global scale, such an energy use by the agriculture and food industries would require the use of 40 per cent of 1972 global commercial fuel consumption. In the U.S.A., three per cent of national energy consumption is used in agriculture, and ten per cent in processing and distribution together these equal the total energy consumption of India.

The conclusions are that world agricultural development and the doubling of food production necessary in the next twenty-five years to feed the increased population will be a significant factor in raising energy costs. Crop yields in the U.K. have doubled as a result of a sixty-fold increase in draught power and a twenty-fold increase in the use of nitrogen fertilisers¹⁰. To double the world rice yield (to 5.8 tonnes/hectare, which is far below experimental yields already achieved) would need additional inputs (especially nitrogen fertiliser) requiring a nine-fold increase in the use of fossil fuel energy¹¹. It is obvious that a world-wide indefinite development towards food production systems like those of the developed countries will be quite

impossible.

Energy efficiencies in food production in these countries are very low, mainly because of the high proportion of animal products in the diet and in farm outputs. The U.K. produces equal amounts of dietary energy in the form of animal products and of crops fed directly to man, yet while the latter are grown on million hectares, animal 1.55 production requires 10.25 million hectares of crops and grassland and 1.52 million hectares for imported feedstuffs. This ignores the 6.65 million hectares of rough grazing only suitable for animal production. The increased cost of energy will also be reflected in the relative cost of meat and will lead to a reduction in consumption.

In the long-term, a significant increase in the cost of energy relative to that of labour in the U.K. will probably take place. Therefore, while the current trend towards more capital- and energy-intensive agriculture and food processing, with further reduction in agricultural manpower, will probably continue in the short-term, this may be reversed later, particularly if high unemployment continues.

Unemployment

In a recent lecture, Professor Freeman has shown that the high level of unemployment that already exists in the U.K. and other developed countries is unlikely to decrease. In fact, the effects of automation which were dreaded long ago are finally beginning to materialise as a result of the microprocessor revolution This revolution. whose importance has been quite underestimated in the U.K. so far, will lead to a large decrease in employment not only in the manufacturing industries (especially electronics, which has been labour-intensive up to now) but also in the service industries. Perhaps new industries will arise and grow; perhaps there will be a shorter working-week; perhaps a few more people will wonder whether the ways our lives are changed by technology are necessarily beneficial and desirable.

Implications for the U.K.

In a paper on loss of farming land Alice Coleman has pointed out that

one of the most stable forecasts of the whole planning era has been the inexorable growth of world population and world hunger. It cannot be assumed that other countries will always be the ones to go hungry. Britain is in an exceedingly vulnerable position of dependence upon imports in a world where one import source after another has been flickering out, so that there are now only three net food exporting countries left. In a letter to The Times (27.1.78) about the Green Pound and the way that taxation is forcing farming into ever larger units. Mr D. Green wrote that our farming 'is utterly dependent on massive injections of energy in the form of fertilisers, pesticides and weed-killers as well as plant and machinery. It is very efficient measured against man hours, and relatively efficient measured against capital. But the smaller and more intensively worked farms of the continent can tell us a lot about yields per acre and unit of energy and this, in the future is what will matter. Food prices now that are sufficiently high to make smaller holdings as viable as they are in Europe, are the inevitable price of regearing our farming to meet conditions of rising oil and energy costs and eventual oil shortage.'

Both these writers are making the same point, that the world food problem will not be solved simply by calculating that there would be enough food to go round if only it were distributed more equally. Rich and poor will continue to exist, and the main increase in population will occur in the poorest countries. Theoretically, in terms of technological know-how, food production could keep pace, but the fact is that it has never yet increased at the rate necessary. Climatic vagaries will continue to produce unforeseen shortages and rocketing prices. The cost of food will in any case increase in real terms because of escalating energy costs. Unemployment is likely to increase. Membership of the EEC (which is self-sufficient in most foods) may help the U.K., but when North Sea oil runs out, will we be able to meet our food import bill?

The least that can be said is that we must keep as many options open as possible and give priority to

conserving renewable resources. That certainly means giving agriculture its right importance and recognising that without a sound home agriculture we shall be in a very dangerous situation. Personally, I would feel happier if we were aiming at a gradual increase in self-sufficiency, associated with changes in diet likely to be beneficial to health. Others may wonder whether the long-term trend towards an energy- and capital-intensive agriculture that employs fewer and fewer people and depends on nonrenewable resources really makes sense any more. Could there be a new agricultural revolution? What changes may come about from agricultural research? What is certain is that the U.K. needs to maintain a viable agriculture and, in the face of increasing unemployment from the microprocessor revolution. to encourage the survival of the small farmer, thereby keeping open the option of increasing U.K. self-sufficiency.

Acknowledgement

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Farming, Fuel and Horses

P.J. Riley D.S. Warren

A study of land use and comparative costs suggests that as oil becomes scarce the horse may well prove to be the most viable alternative source of power for the farm.

Motive power

What will provide the motive power for agriculture when oil becomes scarce? Can other forms of liquid fuel be substituted, or will draught animals once more find a place on our farms? Discussion of these questions has been clouded by romanticism on the part of some environmentalists and by an equally irrational reaction from the agricultural establishment. Even one of the more moderate establishment voices, Professor Kenneth Mellanby, writes dismissively of the views of those "who call themselves ecologists'':

"In 1939, we had about a million working horses on our farms but we would need at least double to harvest the vastly greater crops grown today . . . two million acres of our best land would be needed to support the horses, and so would be lost for the production of human food.""

In a more recent response to Barry Juniper's article 'Crops + Oil = Food . . . But is the Equation Right?'² which suggested that we might adopt some agricultural methods used by our ancestors, Professor Mellanby went further: "I believe this view . . . is misleading and that any changes in farming policy based on it would prove disastrous."³

He went on to argue that, in any energy crisis, agriculture would be given priority and that in any case only about three per cent of our total energy budget is used in farming.

If these statements represent the conventional wisdom on agriculture and energy, we must look at them carefully. Taking the last (and most dubious) point first: agriculture may indeed have first refusal on what oil is left, but this is no more than a temporary measure and does not solve the long-term problem of liquid fuel supply. Let us, therefore, pass on to the real alternatives sustainable sources of liquid fuel and the use of draught animals. Since Professor Mellanby's attacks have focussed on the possibility of reintroducing draught horses, we shall look first at this possibility.

Draught horses

Professor Mellanby's suggestion that the one million or so working horses of 1939 would need to be at least doubled today is wide of the mark on two counts. Firstly, because there were only 649,000 horses including mares kept for breeding on British farms in 1939.⁴ Secondly, because the number of horses required is determined almost solely by the amount of ploughing and seedbed preparation to be done. Virtually the only extra work occasioned by the higher modern yields would be in the carting of crops from the fields.

It is true that at the beginning of this century the agricultural horse population was indeed over one million. At this time, according to Leach,⁵ about 30 per cent of lowland Britain was devoted to feeding the horse population, of which agricultural horses were somewhat less than one-third. In other words, 2.9 million hectares — one-fifth of the lowland farms — was occupied or used for non-farming horses.

This last figure suggests that a significant amount of farmland may still be used to support non-working horses. Certainly this is the impression to be gained by anyone who uses bridle paths or looks out of train windows. Scrubby horse paddocks abound, especially near towns, where landowners can charge high rents to horse owners for relatively poor pasture. In addition, there must be a large number and semi-working of working horses: army and police horses, racehorses, etc. We set out to find the total number of horses in Great Britain at present. Surprisingly, this proved a very difficult task; one authority told us that no one knows the number of horses in the United Kingdom. Nevertheless, reliable figures were obtained on certain sectors, together with an informed estimate of the total population. (See Table 1.)

These figures do not by any means provide a complete picture and there is certainly some overlap among them. The final figure of half a million is based on a pilot census of Avon and Wiltshire carried out by the British Horse Society (BHS) in 1976 and is the best available estimate of our present horse population. A full census is planned for 1979 which will make possible a more accurate assessment of the land requirements of Britain's largely recreational horse population.

The conclusion to be drawn from these figures is that there are The New Ecologist No. 2 March/April 1979

TABLE 1 HORSES IN THE U.K. IN 1977

Туре	number	Source of information	
Police (England and Wales)	400	Home Office	
Army	544	Ministry of Defence	
Racing			
- Flat	5,153	Racing Information Bureau	
- Jumping	4,129		
- Both	1,646		
- Stud Mares (1976)	17,202		
 Colts and Fillies 	8,800		
- Stallions	1,400		
Agricultural (1975)	4,632	Ministry of Agriculture	
Other horses on farms over			
40 standard man-days (1975)	151,988		
Registered for competition with			
the British Horse Society	100,000	British Equine Vet. Assoc.	
All (based on 1976 pilot census)	500,000	British Horse Society	

between four and six hundred thousand horses in the U.K. at present and the majority of these are used only in recreation. If, as the BHS suggest, their annual growth rate is as high as ten per cent, we could have over a million horses in the U.K. by the mid-1980s. If this is so claims that Britain cannot afford to support a large working horse population will begin to look a little thin.

How do the land requirements of the present recreational horse population compare with the land

TABLE 2 DAILY RATIONS FOR FOUR TYPES OF HORSE (in lbs)

	Oats	Bran	Hay
Heavy Draught	15	4	18
Light Draught	12	8	12
Carriage Horse	10	3	10
Pony	8	2	10
Oats Bran Hay			

Source: Miller, W.C. and West, G.P. Black's Veterinary Dictionary 9th Ed., 1970. A. & C. Black, London). which would be needed to support a population of working horses? Table 2 shows the rations required for various types of horse. Assuming the average recreational horse to be roughly equivalent to a 'carriage horse', and taking into account the average yields shown in Table 3, the areas required to support the average carriage horse and heavy draught horse were found to be 1.05 hectares (2.6 acres) and 1.66 hectares (4.1 acres) respectively. The details of these calculations are shown in Table 3.

According to these figures, the half million horses in the U.K. make use of 525,000 hectares (1.3 million acres) of agricultural land. To this should be added the unknown area of horse paddocks which produce little keep, despite often being on good lowland soil. The area which at the moment supports largely recreational horses could alternatively provide feed for 317,000 heavy draught horses or 430,000 light draught horses still well short of the peak figure of

TABLE 3 LAND AREA REQUIRED TO SUPPORT EACH HORSE

Feed	Heav	y Draught	Horse	Ligh	t Draught	Horse	(Carriage H	orse
Oats	tonnes 2.48	hectares 0.78	acres (1.92)	tonnes 1.99	hectares 0.62	acres (1.54)	tonnes 1.66	hectares 0.52	acres (1.29)
Bran*	0.66	0.17	(0.42)	0.50	0.13	(0.32)	0.50	0.13	(0.32)
Hay	2.98	0.71	(1.75)	1.99	0.47	(1.17)	1.66	0.40	(0.98)
		1.66	(4.09)		1.22	(3.03)		1.05	(2.59)

(* Bran, being 20 per cent by weight of the wheat crop, has been assumed to need 20 per cent of the land needed to grow that crop.)

1,100,000 horses at the turn of the century, but enough to make a considerable impact on Britain's farmwork. And if we consider that by the mid-1980s the horse population is expected to be the equivalent of 317,000 heavy plus 430,000 light draught horses, the impact could be enormous. This figure would provide one draught horse for each forty acres of Britain's thirty million acres of crops and grass. As, according to Watson and More,⁶ each draught horse can work between thirty and fifty acres, it will be seen that the land supporting the projected one million recreational horses of the mid-1980s could equally well provide the motive power needed by all of Britain's farms.

Could the horses be used both for farming and for recreation? Watson and More⁶ give the annual workload of a draught horse as 160-240 days a year, depending on environment. There could, therefore, be several weeks per year in which an agricultural horse might be available for less serious activities. Figure 1 shows the fortnightly requirements for horse labour on forty acres consisting of equal areas of spring barley, winter wheat, sugar beet and maincrop potatoes.7 It is noticeable that the horse's workload is at its lowest in the summer months when demands for recreation would be highest.

The traditional heavy horses the Shires, Percherons, Clydesdales and Suffolk Punches — cannot seriously be considered suitable for recreation, however, an 'intermediate' or light draught horse could be used both for recreation and, in teams, for agriculture. This idea deserves more investigation and we hope to expand on it at a later date. Any comments and suggestions would be appreciated in the meantime.

Alternative liquid fuels

If, as Professor Mellanby suggests, we reject the possibility of using draught animals in agriculture, then we must look at the alternative liquid fuels. Are they sustainable? If so, how much land do they use? The possible range of fuels appears to be:

- i) Petrol, diesel, fuel oil and liquid petroleum gas.
- Synthetic 'petrol' from hydrogenation of coal.
- iii) Liquid hydrogen from electrolysis of water.
- iv) Methane from digestion of manures and sewage.
- v) Ethanol distilled after fermentation of sugar or starch.
- vi) 'Wood naphtha' from destructive distillation of wood.
- vii) Synthetic 'petrol' from hydro genation of wood tar.
- viii) Synthetic methanol from coal, coke or charcoal.

Of these, the first two are based on finite resources and can only be temporary stop-gaps. Liquid fuel from coal, produced either by hydrogenation or by conversion first to water-gas, then to methanol, may well become important for all modes of transport during the next few



decades, and will accelerate the exhaustion of coal reserves.

The remaining fuels listed are, in principle, sustainable, though the 'odd one out' — liquid hydrogen depends on a full Nuclear Fast Breeder programme followed in the forseeable future by controlled nuclear fusion as a source of effectively unlimited electric power. Since this option uses relatively little land it is, on the face of it, 'cheap' power: in practice, it is likely to be the most expensively paid-for power since Dr. Faustus' bargain. It may cost the earth.

Methane is likely to be available in relatively limited quantities and this, together with the problems of compressing the gas, means that it will almost certainly be used for low-pressure, direct burning applications, making little if any impression on agricultural motive power.⁵

The remaining sustainable sources of liquid fuel are summarised in Figures 2 and 3. The techniques for production of ethanol from field crops are well established. The rather more complicated pathways for producing a variety of liquid fuels from wood will require a combination of ancient and modern chemical technologies, but promise to be more productive in the long run. In both figures, rough estimates of the 'net yield' of some energyconsuming conversions have been made on the assumption that a proportion of the final product is burned to fuel the production process. The accuracy of these estimates will obviously affect the final figures and any more exact data of the 'net yields' would be welcomed.

Relative land areas used

A direct comparison of the various land uses can be made on the basis of their work output per hectare of land. A heavy draught horse requires 1.66 hectares of land, a light draught horse 1.22. A fair figure for the average farm horse might be 1.5 hectares. Each horse would work two hundred days per year, and is capable of ploughing 0.3 hectares per day⁶, so the work output per horse can be expressed as sixty hectares ploughing per year, or forty hectares ploughing per



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hectare of keep per year. Given that tractor ploughing consumes 22.5 litres per hectare⁸ one obtains the figures shown in Table 5.

The use of coppice as a source of liquid fuel is apparently more efficient than the other forms of land use, particularly as it can be based on land unsuitable for agricultural crops. However, one factor must be borne in mind which is not taken into account in Table 5. This is the relative simplicity and low capital/resource input of the draught horse system. After harvest, the only technologies required are separation of bran, rolling of oats and harnessing of the animals - none of which need consume large quantities of energy. The horses oblige by providing not only motive power but also their own replacements. In contrast, the technologies outlined in Figures 2 and 3 require relatively complex pressure vessels, fermentation tanks, fractionating stills, etc., as well as tractors, all of which will require large energy inputs, both for their original installation and periodic replacement. If a total

energy analysis were carried out, taking into account these indirect energy inputs, one suspects that the differences in efficiency of land use would be much smaller.

Conclusion

Looking into the near future, it is reasonable to suppose, as does Professor Mellanby, that agriculture will be given priority for use of oil and liquid petroleum gas as these become scarce. The number of recreational horses is likely to rise during this period and we can expect increased discussion of the issues touched on in this paper.

The second phase of development - after petrol and gas are effectively exhausted - will depend on the use of existing coal stocks, including their use as a raw material for producing liquid fuel. During this period, it will be necessary to build up the alternative sources of motive power. Some facilities for sustainable liquid fuel production will no doubt be set up and a long term programme be started either for breeding a sizeable population of suitable draught horses or for widespread building of nuclear power stations.

In the long run, the choice may well lie between a thriving recreational horse population, with a full-'plutonium economy' to scale provide the power on farms, or a labour-intensive system of agriculture with an increased population of working horses, and fewer purely recreational ones. When the effects of these two alternatives on everyday life, the environment and personal freedom are considered, one does not have to be a romantic to conclude that the working horse still has a future.

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THE CHANCE TO SURVIVE Rare Breeds in a Changing World Lawrence Alderson 'If noted in the right quarters this book could well assure us a better future.' Daily Telegraph (Jan 1979) 0 7153 7632 2 192pp 164 illus £7.50



The Role of County Council Smallholdings

The Government's shortsighted policy of increasing the size of farms has brought about a serious decrease in the number of statutory smallholdings. But these small tenant farms have a valuable contribution to make in the strugale for greater selfsufficiency in Britain.

To the official way of thinking the heyday of the small farm is past and with it the need for the County Council smallholding. With their roots in the 'three acres and a cow' tradition of the nineteenth century. these statutory smallholdings satisfied the farm workers who had aspirations towards independence. They reached their zenith following the Land Settlement Acts of 1919 and 1921, which provided smallholdings for ex-servicemen.* In the last few decades the number of such opportunities has dwindled and the traditional role of the smallholding has been subordinated to the official view that large capital-intensive farms are more efficient and therefore more to be desired. As a result the number of smallholdings has dropped from some fifteen thousand in 1966 and more than twice that figure half a century earlier, to nine and a half thousand in 1976. Significantly there were at this date over six thousand holdings which were under threat as County Councils conformed to the requirement of the 1970 Agriculture Act by which small

Paul Carnell

farms were to be amalgamated to form larger, supposedly more viable. units. In addition, there is a move away from the provision of parttime holdings, indicating the greater emphasis on commercial viability. By this Act also local authorities were released from their obligation to provide for those qualified by experience** to apply for a statutory smallholding. Since 1970 the authorities have been required only to manage their lands in the interests of profitable agriculture.

The number of smallholdings available is thus being systematically reduced and official policy is heavily weighted against the small farmer, a situation that is further aggravated by allowing local authorities to sell smallholding lands in dribs and drabs for development. To anyone able to see beyond the short term gain it is apparent that these trends in smallholding policy are disastrous. The crux of the issue lies in the use of labour on small and large farms. Small farms have 'too much' labour relative to their other resources, and they therefore cannot employ it 'productively' for all the time that is available. For example, using modern dairying techniques a single man can look after a herd of about seventy milking cows. By comparison the small farmer with fifty acres may be said to face a 'resource constraint'. He does not have enough land for seventy cows, so either he milks only thirtyfive cows using modern equipment, in which case (for the purpose of this illustration) he is only occupied for half his time and makes a poor return on capital, or he uses outmoded equipment which takes longer, but at the end of the day he still shows only half the return of the herdsman

with seventy cows. This sketch shows how labour on a small farm is 'underutilised' and therefore inefficient in the sense that enlarging the scale of the operation would result in increased material returns to labour.

But this 'underutilisation' makes it possible for the small farmer to adopt more labour-intensive methods, and herein lies his strength. Output per acre is generally higher on the small farm. (The statistics have to be used with care because they include factory farms and there is a tendency for the small farmer to make use of bought-in feedstuffs. which is effectively buying extra acreage.) Many smallholdings follow the lines of the traditional mixed farm, with rotation of crops and livestock building fertility and intensifying land use. Henderson, writing in 1944, reckoned that by moving poultry in fold units, over his land he tripled the amount of stock he could carry. And the small farmer can use his 'surplus' labour to recycle waste products between the different enterprises on his farm slurry from cowshed to field, straw from the cereal harvest to be used as bedding. He may grow roots to feed his cattle, with a higher energy and protein yield per acre, although with a lower output per man than, for example, cereals. The small farmer will be able to give the extra care and attention to his stock and crops to coax that extra bit out of them. In contrast, the larger farmer with his eye forever on the cost-effectiveness of his hired labour, will be unable to follow these practices. Yet it is the former whom officialdom regards with a jaundiced eye and grades as 'inefficient'.

Let us consider this question of inefficiency. We need to distinguish between economic and commercial

^{*} Many of the ex-servicemens' smallholdings were doomed to failure in the farming depression of the twenties and thirties and resulted in bitter disillusionment for those whose dream of country life ended in bankruptcy. Unstable prices, inadequate resources, no encouragement of co-operation between holders, insufficient training and lack of commitment amongst many who chose smallholding as the only alternative to unemployment, underlay this failure and provides a lesson for the present.

^{**} from those with at least five years experience in agriculture or agricultural education.

efficiency. Commercial efficiency is measured by profit, the difference between the costs and the returns enfranchised in the market. But clearly economic activity has repercussions which are not reflected in market prices, but which are just as real in that they affect people's wellbeing. Therefore, because it is only a partial measure of the costs and benefits of an activity, farming should not be judged only in terms of commercial efficiency. Economic efficiency must incorporate all the repercussions of economic activity. Thus a battery poultry unit may be commercially efficient because it shows large profits, but if these are exceeded by the external costs, such as pollution from noise, smell and effluent residues, potential health hazards from contaminated meat and the utter inhumanity of this type of husbandry, then it cannot be considered economically efficient. These non-market items should be taken into account in an assessment of smallholding efficiency.

What are the non-market benefits? They are linked to the greater labour-intensity associated with small farms. We are in an era of high unemployment which is not likely to change for the better in the foreseeable future. Any loss of jobs from agriculture which lengthens the dole queue is of very dubious economic benefit. Furthermore as rural communities lose their more vigorous members, who move to towns in search of jobs, they are replaced by commuters, twice-yearly holiday homers and retired people. As a result the village ceases to be a lively self-reliant community and becomes a mere appendage to the affluent suburbs. More jobs in agriculture would help to reverse this trend. Part-time holdings could supplement the incomes of those, such as the village post-master, the milk roundsman and the shopkeeper whose services may be endangered by the decreasing rural population, making them difficult to sustain as full-time occupations.

Uncertainty over future trends in agriculture and the rising costs of non-renewable resources make it wise not only to maintain a sizeable small farm sector, but to increase it. A rise in energy prices will encourage a shift back to more labourintensive methods and a sharp rise in the need for skilled people. The small farm sector will provide a reserve of skilled labour to meet this need. And the experience of the small farmer will be of more practical value than that of the large agribiz farmer whose horizon is occupied by vast tractors and the fertiliser bag.

Perhaps the dire effects that a rise in energy prices will have directly upon agriculture have been exaggerated. Farming accounts for only a small portion of our total energy use, and a large saving in energy use can be made without great changes in our farm structure; for example, by adopting organic husbandry which can be done without using more labour-intensive methods.* However, much more energy is used in processing and distributing food, and more expensive energy would mean that these would have to become more localised. This, of course, favours the small farm which grows a wide range of produce in sufficiently small quantities for it to be assimilated locally.

Even if we ignore these benefits it is still not clear what is meant by small units being 'inefficient' or 'unviable'. We have seen that smallholdings cannot be considered inefficient in use of land. It is sometimes argued that they are inefficient in use of capital equipment, but this overlooks several important factors. In the case of the combine harvester, for example, the small farmer tends to do one of two things. Either he owns a machine, almost certainly second-hand, and recoups his outlay through doing contract work for other small farmers, or not having the machine he hires the small contractor to do it for him. He cares for it himself and depreciates it over a longer period than would a larger farmer. Consequently the small farmers' capital costs are proportionately no higher than those of the large farmer. What about labour? The material rewards for farmers may be low, sometimes lower than the standard agricultural

wage, but people do not choose this way of life for its financial rewards. Research has shown that small farmers tend to value their independence above all else, and often it is the younger men and those with some experience outside farming who put the highest emphasis on the non-material factors. Despite low incomes there is little indication that small farms are a depressed sector, and thousands more qualified people would like to become farmers given the opportunity. In March 1964 there were seven thousand applicants for smallholdings on the waiting lists. Unhappily waiting lists are no longer kept, but MAFF recognises that demand far outstrips supply. In Cambridgeshire, for example, nine holdings advertised at Michaelmas 1977 attracted 147 applications. It is interesting that the same high demand is not apparent for the horticultural holdings provided by the Land Settlement Association whose tenants achieve very high incomes but only at the cost of independence; holdings are grouped together in tightly knit estates where all the ancillary services (from propagation to packing and marketing) are provided co-operatively, but compulsorily, by the LSA.

Small farms have an important part to play, and as statutory smallholdings account for some 15 per cent of rented agricultural holdings in England and Wales, they are clearly an important instrument for influencing our farm structure. I would suggest two elements for a change in smallholding policy.

1. A halt to the decline in the number of smallholdings availbale followed by a determined effort to increase the number of opportunities provided by local authorities. This would require a change in the reorganisation policy of the 1970 Act, plus measures to discourage the authorities from selling off any more of their smallholding land for commitment development. The previously placed on local authorities to satisfy the demand from those eligible for smallholdings, should be reimposed. This would increase the number of opportunities supplied through the government. Unfortunately the supply of tenancies in the private sector is likely to decrease

^{*} Lockeretz *et al* (1976) found that organic farms in the US cornbelt used well under half as much energy per unit of crops as a comparative sample of 'conventional' farms, but with only 12 per cent extra labour.

following the greater security of tenure given to farmers' sons, which has had the effect of decreasing the value of the holding to the landlord. This has added to the demand for statutory smallholdings as almost the only remaining route into independent farming for those without very substantial capital. And looking further ahead, with the decline in skill, autonomy and hours associated with many jobs in industry there is likely to be more interest in the non-material rewards of running a farm. This suggests a second policy element:

2. Increased provision of parttime holdings. This would be one way of satisfying the conflict of those who would like to be involved with the land, if only to achieve a degree of self-reliance, without necessarily wanting to accept the low income which full-time involvement entails. Perhaps such holdings could be founded on the considerable area of wasteland that surrounds every large city. If they were to be let to parttimers such holdings would need to be largely horticultural and could tie in with local authority allotment schemes. A second, and basically quite different part-time holding is that which is held by a man already living and employed in the country, who would be able to care for a small head of livestock.

There are two major obstacles to getting these policies adopted. One is the present Act that makes amalgamation of smallholdings and small farms incumbent on the local authority and the second is the temptation for local councils to raise funds by selling agricultural holdings for immediate cash benefits. We must persuade the powers that be that both policies are shortsighted and that the long term interests of the country will be best served by a radical reversal of these clauses in the 1970 Agriculture Act.

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Correction:

The following mistake appeared in the article 'Overexposed' in our last issue. On page 13 for 'levels as high as 120 volts per metre . . .' please read 'levels as high as 120,000 volts per metre.'



Patron: Her Majesty the Queen President: Lord Molson Chairman: Roland Wade Director: Christopher Hall Charity Reg No. 233179

CENTRAL GROUP EVENTS

Saturday 12th May: Visit to Epping Forest This will be a guided visit to look at the problems of wildlife conservation, forest management and recreation in the Forest. Four or five sites will be visited and the guide will be Mr. Bernard Ward, Verderer of Epping Forest. We meet at Loughton Station (London Transport Central Line) at 11.30 a.m. Please bring your own picnics. Bring a car if you can. For further information and for car sharing arrangements write to Robert Holden, 3 Merrick Square, London SE1 4JB or tel: 01-407 9209 (evenings).

Charge 25p.



Ruth Lumley-Smith



Despite their differences conventional and organic farmers share a common interest in healthy productive land and a strong rural community. Neither has a monopoly of wisdom, but the time has come for both parties to unite in the search for future alternatives.

The time has come when we should publish the banns of marriage between the two parties that make up the farming community of Britain today. To make the best use of land resources and equally important, of inherited farming wisdom, and to bring pressure to bear for changes in government attitudes to agriculture, we must seek a new understanding between the conventional and the organic lobbies; we must bring about an end to the sniping and point-scoring that destroy a proper exchange of useful ideas. We must recognise that the majority of farmers, even when they are not sympathetic to the ecological stance, are none the less as deeply concerned with the health of the land and the long term prospects for agriculture, as are those dedicated to organic farming and the ecological ideal of small, labour intensive mixed farms both supporting and being supported by, self-reliant rural

communities. We must look for areas of agreement and seek to reduce those that divide us.

Before the second World War there was no such division; few but the biggest farmers could afford to substitute machinery for labour, artificial fertilisers for farmyard manure or herbicides for the hoe. Whether they were successful or not, most farmers were still 'organic', working the land largely as their fathers and grandfathers had worked it, and holding to certain universally accepted natural laws expressed in such earthy truisms as "Where there's muck there's money". They pursued traditional patterns of mixed farming less because they were ideologically motivated than because it was the only way to keep their land in good heart and get from it the best living they could in an age increasingly unfavourable to them. Imports of cheap food and the growth of the food-processing industry meant that small farmers in particular, were increasingly hard pressed to get an adequate return on their investment or for their labour. Holdings were under capitalised, much land was neglected and farming was a depressed industry.

It is misleading to suppose that the National emergency suddenly changed an apathetic farming community into one burning with patriotic fervour, of course there was a spirit of defiance in 1940, and a will to succeed against odds, never the less most of the changes were brought about because farmers were required by law to produce more food than ever before, and to bring under the plough previously neglected or uncultivated land; they were given the financial backing they needed to achieve these ends, and for the most part they succeeded amazingly well, even though they had to make do with a very reduced skilled workforce and a large number of landgirls. The same breed are in farming today - what they did then they could no doubt do again.

The division

Faced with the urgent need to increase food production the government subsidised artificial fertilisers and by doing so virtually started the movement that burst out of control with the post-war cheap energy bonanza of the fifties. During the reign of the War Agricultural Committees farmers had to comply with orders, and even those most opposed to artificials were forced to use them. There were already those in the organic movement who warned against their too liberal use, but the agro-chemical industry never looked back. Indeed because of the colossal vested interests involved, it is solidly committed to oppose any threat to its dominance, and to use every available means of propaganda, advertising and free advisory services to ensure that its customers continue to believe that "Chemicals are essential inputs to British agriculture, without which we cannot secure the large yields necessary for profitable farming . . .'' as Dr. G. W. Cooke, Chief Scientific Officer of the Agricultural Research Council, put it to delegates at the recent Conference on the Developing Technology of Alternative Farm Systems held at Stoneleigh. If farmers accept this dictum it is because as things are now, there is a great deal of truth in it. On the other hand the harmfulness of the chemical industry's stranglehold on British farming was emphasised by David Stickland, Chairman of the International Institute of Biological Husbandry, when he suggested that farmers are now 'hooked' on chemical fertilisers; the analogy can be taken further, for it is also true that if all such inputs suddenly ceased to be available, corn growing areas that have been kept in production by ever-increasing applications of artificials would suffer from withdrawal symptoms just as certainly as the junkie bereft of his fix. The change to organic practices can only be effected in stages, by restoring humus and building up natural fertility. Sam Mayall the doyen of organic farmers, suggests bringing one field at a time into a four year rotation, sowing it with a deep-rooting herbal ley, and thereafter applying no further artificial fertiliser.



Reducing dependence on chemical inputs

Do conventional and organic farmers have a common interest in seeking alternatives to chemical inputs? Unquestionably they do. Many farmers are already reducing applications and no one in his right mind is going to spread expensive artificials on his land just for the hell of it. But farmers need to see evidence on the alternatives as well expressed and as convincing as that put out by the advisory services of the agribiz industry. The economic viability of decreasing, instead of increasing, artificials must be demonstrated. Inspite of Dr. Cooke's assumption that without chemicals farming cannot be profitable, there is mounting evidence to show that heavier applications of fertilisers do not show a corresponding increase in returns. But much more fieldwork needs to be done and funds must be made available specifically to study the best way to effect reductions without involving sudden drops in vields and profits. In this context yields are not the only criterion to use in making comparisons, because organic practices, even when they produce lower yields may cost so much less in terms of inputs, that the farmer's profit will be equal to that of the high-energy farmer.

If, as another speaker told the Conference (*Integrated Control of Pests and Diseases*. P. Carden) "thirty to fifty per cent of agricultural produce is lost from the activities of pests and diseases" very grave doubts about the economic sanity of herbicides and pesticides must assail their most ardent defenders. The ability of pests to produce species resistant to the chemical designed to kill them is too well documented to be denied. The alternatives being worked out in programmes of integrated pest control are still in a comparatively experimental stage, but this obviously offers a way out of the pesticide syndrome that makes both ecological and economic sense.

Diminishing returns from nitrogen application is also well documented and Graham Harvey writing in the New Scientist recently (15.2.79) showed that although nitrogen is now applied to grassland in the U.K. at twenty times the pre-war rate, the number of cattle and sheep supported has not increased in proportion. The reasons are complex, but one result has been the virtual disappearance of clover, which is smothered by nitrogen-dressed rye grasses; as a consequence it no longer appears in many herbal seed mixtures. In the traditional herbal leys, clover and other nitrogen fixing plants, were the most important components of the livestock growers pasture. Experiments going on outside Britain have shown that mixed swards including clover can produce grass equal in weight, and far better in feed value, to rye grass swards that have been dressed with 300kg nitrogen per hectare. This suggests that the economic



Mixed farming?

interests of conventional farmers and the ecological principles of organic farmers can both be satisfied through the adoption of similar systems of grass management.

Reducing vulnerability to industrial disruption

Do farmers share a common interest in reducing their dependence on forces beyond their control? Undoubtedly they do. As we saw during the lorry-drivers strike this winter, farmers - and in particular intensive livestock rearers - are as vulnerable to industrial unrest as any other sector of the community. During the strike new items about pigs and poultry threatened with imminent starvation, because feedstuffs were undelivered, were as common as news items about pickets. Cattle and sheep due to go to market could not be moved, fuel for machinery was not to be had. The centralisation of production and the means of distribution has resulted in the farmer being dragged down from his traditional independence into the unreliable arena of commerce. Likewise when bad weather interrupted the flow of traffic in January this year, chaos resulted. In our village the milk lorry was unable to get through to collect from the dairy-farm, and there was no delivery to the local milk roundsman. Happily we all trudged to the farm with our whisky bottles or jugs, and enjoyed the luxury of unpasteurised milk; while the roundsman, who in the face of new MMB regulations designed to force out the producer/retailer, recently gave up his own small milking herd, fretted at the loss of revenue. It must be in the interests of farmers to reduce their dependence on these vast distribution networks. One of the basic and most vital features of self-sufficient rural communities will be the rationalisation of production to increase the variety of local products and to decrease the acreage used for cash crops; in the long term this will promote the return of the traditional craftsmen who can provide many of the goods now mass-produced in factories. the cobbler, the baker, the seamstress, the potter and so forth. With them will come the demand for schools and shops and country buses that are the lifeblood of a resurgent country population.

One obvious route to greater self-reliance is to phase out the intensive livestock unit in favour of mixed farms where a large proportion of stockfeed is home 56

produced, as it was in wartime. This would have the added advantage of vastly reducing the huge, expensive and ethically dubious imports of cereals, oil seeds and other feed plants from the Third World. Furthermore mixed livestock and arable units will reduce the anomalies caused by surpluses of straw on the one hand and of slurry on the other. The arguments against the degraded practices of factory farming are well known and are constantly reinforced by new evidence of illhealth and poor productivity in the animals, and of severe risks to human health incurred by eating the produce. The catalogue of diseases and ailments to which pigs and poultry kept in these conditions are prone, is horrifying. Diseases such as cancer, pneumonia, liver malfunction, gangrenous dermatitis - the list goes on and on - are only partially controlled by massive doses of arsenicals, compounds, antibiotics and hormones. The cost in drugs is astronomical and rising. Even those who defend these practices on the grounds that the cost of land and labour prohibits any modification of the system, must pause to consider how much longer they can afford to support such a sick population. At worst only escalating costs of imported feed and drugs will bring the system down; more likely public health authorities and doctors, who are increasingly uneasy at the evidence of human ailments related to intensively raised meat, will join their voices to those of the Farm and Food Society and the many other bodies campaigning against this system. Perhaps the increasing wariness of the consumer will play its part; what is certain is that factory farming has no place in an ecological society. There is no common ground between the ecologist and the feed-lot operator; I doubt whether we should even dignify him with the title of farmer.

Attitudes to mixed farming

Can we find common ground about the future structure of farming? Given that stocks of fossil fuels are finite, alternatives to high-energy inputs cannot but concern those now engaged in monoculture. Although mixed farming is at present so out of fashion that the audience neither laughed nor looked surprised, when another speaker at the Stoneleigh conference referred to "an instance of sheep and cattle grazing together with benefit to the pasture" as though this were an original, not to say daring innovation, the same speaker made a number of very constructive contributions concerning the proven benefits of some good old-fashioned organic farm practices (although that is not how he described them). He proposed, for example, growing different species and varieties of plants together in mixed crops; ley/arable rotations and periodic use of organic matter to supply farm nutrients. He argued in favour of deep-rooting plants, and minimal upheaval through deep ploughing, so as to build up increased populations of earthworms. Good organic practices these, urged since the nineteen forties by Friend Sykes and others, and by all those in the organic movement today. In fact this paper on making the most of natural resources given by Dr. K.R. Gray of the Department of Chemical Engineering at Birmingham University, showed how much common ground there is between conventional and organic farmers, for it recognised

from the outset that modern methods need to be modified and assumed that the criterion for good farming must be ecological stability.

"As far as possible manures should be the major source of our plant nutrients. Although the estimated production in the UK is some 120 million tons/year, much of this is geographically mismatched with the consumption of nutrients by the arable crops. There is much manure in the North and West of the country separated by long transport hauls from the arable crops of the East and South. With the specialisation of recent decades the national farm has become unbalanced; it may be time for a rethink. Although we may not return to a stock and arable blend on every farm, rising transport costs and tighter anti-pollution legislation on manure usage/ disposal could well promote a district self-sufficiency in nutrients with stock and arable units separated by only short transport hauls.'

As we see the practices urged by Dr. Gray, which include a better balance of livestock and arable, are synonymous with those being proposed by ecologists for the long-term end of creating a sustainable rural economy for the post-industrial age.



Machines versus men

Can we find common ground on questions of labour? One of the commonest retorts of the conventional farmer to any suggestion of a return to mixed farming or more organic practices is that it uses far too much labour. The plea for labour intensive farming is too often resisted on the grounds that it is a call to abandon machinery and return to archaic back-breaking methods. Both sides tend to exaggerate. Although some of the jobs now done by machines are physically tough - potato picking and planting, for example, or cutting and carrying feed for livestock on an icy winter morning, far fewer pre-war agricultural workers suffered long-term physical injury from their labours than are now maimed for life by handling poisonous chemicals. There are in fact many compensations, well known to the small family farmer as they are to the gardener, in working close to the land, seeing the livestock grow in a healthy environment, producing quality goods for a known market. On the other hand it is folly to propose an immediate end to all mechanised farming; so long as there is fuel farmers will no doubt have priority claims on it, but as it gets scarcer and more expensive, commonsense will surely dictate that while some fieldwork may be done by tractors, much else could once more be taken on by men and horses.

Antagonism to the labour-intensive idea is not purely economic. Much of it derives from the breakdown of the traditional close relationship between farmer and farmhand and the consequent isolation of the worker from what had at best been a rich and socially fulfilling lifestyle. There can be little doubt that one of the undesirable features of modern highly mechanised farming has been the tendency to regard the labourer as a nine to five specialist, remote from the cares and responsibilities of his employer. The cash incentive alone will not attract the sort of dedicated people best able to contribute to the revival of a selfreliant stable rural economy; if a return to the squirearchical system with its free cottage and pig and other fringe benefits would smack too much of peasant



bondage, nevertheless a new sort of partnership or profit sharing needs to be worked out. Whether employer or employee, the people engaged in farming must not be bound by petty bureaucratic rules, but should be free to enter into whatever agreements best suit their individual needs. What is certain is that a return to a labour intensive agriculture can only be achieved through a degree of co-operation between all those involved. Labour costs are likely to compare less unfavourably with machinery costs as fossil fuels become scarcer and more expensive; but in the meantime, since there are more people trying to get back to the land than there are opportunities for them to do so, some incentive should be offered to farmers to take them on. Outside the farming community there are many who hope eventually to find and work their own smallholdings. Most of them are more willing than wise and more enthusiastic than able. An obvious way to harness this fund of goodwill is to introduce government sponsored apprenticeships, similar to the job creation schemes now in existence. This should make it worth the farmers' while to take on and train unskilled labour, (as they did with the landgirls) and would at the same time provide the army of enthusiasts with an invaluable chance to acquire skills that are much better learned from an experienced teacher than arrived at through trial and error.

Funds for research

Will conventional farmers be prepared to see funds currently used by the government in support of ADAS and ARC diverted to research into organic agriculture? Why should they not? All the research necessary to provide more pesticides and herbicides and fungicides and top dressings and seed dressings and the like, is provided by the agrobiz giants. What the conventional farmer and the organic farmer both need to know now, is what are the best alternatives? The organic movement suffers from a chronic lack of funds. Organic Farmers and Growers Ltd does its best to provide its members with all the advisory back-up and marketing services currently available to the conventional sector from government and commercial sources. The Soil Association, H.D.R.A. and others are engaged in valuable research, but the scale of the operation is too small to bring about the changes needed or to disseminate sufficient information, government support is therefore essential. The education of young farmers provides another area of obvious imbalance, but when the crunch comes and the country is forced to adopt energy-conserving practices men and women with experience of producing food crops without chemical inputs and raising livestock without drugs, will be in demand, therefore the setting up of a College of Biological Agriculture should be a priority.

Areas of disagreement

Are there insurmountable differences between conventional and organic farmers? The most fundamental, which is both ideological and economic, lies in the dependence of the former on chemical inputs, while to the latter such practices are regarded as symptomatic of a lack of ecological wisdom. The truth is that wherever farmers meet together to exchange ideas the divisions are seen to be much less sharply defined. A thriving independent farm sector is of equal importance to us all: the message that emerged from the Stoneleigh Conference was that change is imperative. What differences there were lay rather in appreciation of the urgency of the need and the direction the change should take. Conventional farmers are well aware of the dangers of continuing dependence of inputs derived from fossil-fuels and are seeking viable alternatives. The organic lobby doesn't have all the answers, but with the support of the farming community, its efforts could make a much greater contribution towards the eventual emergence of the industry from its thraldom to the agribiz empire.

Common ground

Whether the motivation is one of ideology or expedience, everyone shares a vested interest in a thriving rural economy, and the future of farming therefore concerns not only those engaged in agriculture but the whole community. We have a shared interest in getting things right, and this surely means that both sides must be willing to gain from the insight and wisdom of the other. Ecologists have to some extent only themselves to blame if they have a bad name in conventional farming circles. By referring too often to the idyllic life of hunter-gatherers, by making unfavourable comparisons between the conditions of twentieth century rural life and that of our ancestors, they have given the impression that they have never heard of the grinding poverty of many rural populations throughout history. Furthermore they have appeared to regard modern farmers as charlatans and knaves, and to seek the solutions to today's problems in recreating the past. Nothing could be further from the truth. What concerns us is the future of agriculture now, and in the long term; what we need to search out are the best methods of achieving thriving rural communities, not based on imitations of the past, but using what is best in our traditional heritage and most useful in modern soft technology. The extended village seems to us to offer the best, if not the only, hope for the postindustrial age that lies ahead.

We believe that some fundamental changes in the law are needed and that to achieve these it is necessary to persuade government to look at the industry with fresh eyes and to grapple realistically with the likely consequences of diminishing energy resources. We believe that more money must be spent on research into the alternatives; we believe that small independent family farmers should be valued and therefore supported for the contribution they can make; we want more young people trained in organic principles; we want the domination of the agribiz industry weakened. The decline in the rural population and particularly in numbers engaged in farming has greatly the diminished the influence of the farming vote. We cannot afford internal divisions if we are to persuade parliament to bring in the necessary reforms and spend considerable sums of money to ensure that British farmers are equipped to meet the challenge of the future. There are acres of common ground between conventional and organic farmers, let's plough them in double harness.

ECOpolitics

Ecology Party Manifesto

What practical steps must be taken to transform Britain into an Ecological society?

Agriculture

Our farms are unprepared for a time when we shall have to be self-sufficient. Many are dependent on cheap energy, fertilisers and chemicals, and their high productivity is too often based on imported animal feed or an inflexible system of monoculture. Every year, thousands of acres of agricultural land are given over to roads and urban industrial development. Erosion is already a serious problem and there are grim predictions of a long-term fall in soil fertility.

Eco-policies

* Reduce our dependence on chemicals, fertilisers, non-renewable sources of energy and imported animal feed.

* Encourage British farmers to grow as much as possible of our food requirements, with the eventual aim of becoming self-sufficient.

* Abandon the present policy of encouraging large-scale farms in favour of smaller farms. Farm ownership by business and overseas interests will be strongly discouraged.

* Put into agricultural use or forestry every possible acre of potentially productive land, and prevent further loss for development or road-building.
* Maintain high yields without

* Maintain high yields without reducing soil fertility, by reintroducing flexible mixed farming, learning to rely on labour-intensive methods, and encouraging the use of organic farming.

The fundamental belief behind these policies is that the land is an asset of inestimable value, not just another "resource" to be ruthlessly exploited.

But farming is also a business, and

farmers must obviously adopt those methods most likely to afford them a reasonable standard of living. So they must be given every financial incentive to do just that - in an ecological way.

Health

Standards of health fall far short of those to be expected in an affluent society. One person in five will become a victim of cancer. There has been a dramatic increase in deaths caused by heart disease, and a significant decline in standards of mental health. The N.H.S. shows a wasteful preference for high technology medicine, yet there are long waiting lists for simple treatment. The structure of the Health Service has created a bureaucracy so inefficient and expensive that basic standards of medical care are jeopardised.

Eco-policies

* Create an environment which minimises disease, removing the causes rather than alleviating the symptoms. A stable society will offer self-evident benefits to health, with better food, settled communities, more rewarding employment, reduced exposure to pollutants and less stress.

* Move away from the highly technical and expensive business of curative medicine, to a more costeffective policy of preventive medicine.

* Support small community hospitals and encourage the community to take up its responsibilities towards geriatric and handicapped patients.

personnel. The community will be encouraged to take up its responsibilities as regards geriatric and handicapped patients.



* Encourage different forms of "alternative medicine" (acupuncture, homeopathy) whenever this is justified).

* The production and use of all drugs will be much more carefully controlled. The anti-smoking campaign will be vigorously stepped up.

Family & Community

Social stability depends on a sense of community and on secure, caring families. Yet an industrialised economy tends to undermine both the family unit and community organisation. Families are increasingly isolated and parental influence reduced.

However much they pay lip service to the importance of the family, today's politicians can do nothing about its disintegration without calling into question the very basis of the industrial state.

Eco-Policies

* Emphasise the importance of the community in rebuilding our disintegrated society.

* Organise our lives to as to reduce the high level of geographical mobility.

* Emphasise the vital importance of responsible parenthood. Make it possible for both parents to spend more time with their children.

(1) The role of the State

The social services are obliged to take over an increasing number of responsibilities which properly belong to the family and the community.

* Reverse this trend by encouraging self-help organisations, emphasising the ability of individuals to take responsibility for themselves and for others.



* Encourage politicians to work with people rather than for people, developing a system of care and welfare based on the community.

* Bring old people back into the community, and learn again to value their knowledge and experience.

(2) Law and order

Rising crime rates are a symptom of the stresses on the individual and society. Should we then reform offenders by "hard-line" punishment or by gentler persuasion - or should we perhaps reform the system? For many offences are a reflection of the system itself.

* Again, we believe the emphasis must fall on the community. The alienation of the young, the selfishness of the persistent offender, and the indifference of those who stand by and let it happen, can only be resolved within a self-reliant, 'self-policing' community, in which people are fully involved, and feel a sense of pride and identity.

The Government

There is widespread cynicism and apathy about politics today. The live broadcasting of Parliament has focused attention on its inefficient procedures and the undignified behaviour of some MPs. Party interest apto override national pears interest, and as much time is spent making deals as taking decisions. There is endless juggling around with local government organisation, but invariably it is to suit whichever party is in power, rather than the people they claim to represent.

Power remains firmly fixed at the centre. The party machines serve as an impenetrable barrier to many people's interest involvement. and Central Government is ever more ready to intervene, and there is considerable unease at the extent

to which our lives are controlled by bureaucrats. The "experts' and "decision-makers" seem more and more remote.

Eco-policies (1) The electoral system

* Change the present system. The "first past the post" method of electing MPs encourages a negative attitude, replace this with confidence as a basis for voting. * Introduce Proportional Represent-

ation as a vital part of the reforms needed to regenerate our political structures. It will ensure fairer, more effective elections.

Rethink the whole business of participatory democracy, including the desirability of five year intervals between General Elections.

(2) Devolution

* Set up the Scottish and Welsh assemblies without further delay. They must have extensive economic powers, without which devolution is a meaningless gesture.

* Prepare now for regional assemblies throughout the United Kingdom, in such a way as to ensure that they do not become power-hungry mini-Westminsters, but are properly geared to play their part in the transition to a more stable society.

(3) Decentralisation

Work towards a fully decentralised society. Make it a priority for Central Government to set up legislative and administrative structures to facilitate all local initiatives in this direction. Central Government only to retain nationally vital functions, such as foreign policy, resource management and pollution control.

* Emphasise the dual priority of economic self-reliance and political self-determination, based on a network of small, independent communities.

Consistently apply the golden rule of decentralisation - "that nothing should be done at a higher level which can be done at a lower level''. Participation is the key to success in any democracy.

We believe that the greatest unfinished task of our democracy is to transfer responsibility away from Central Government back to the people of this country. It is only by doing this that we shall restore the balance between the individual, the community and the nation.

Work

The problem:

Unemployment is the most disturbing symptom of our economic crisis. Growth causes, rather than cures, unemployment. For growth today means investment in capital-intensive, highly-

automated industries. The micro-electronic revolution will accelerate this trend in both the manufacturing and the service industries. International trade is bound to decline and the industrial state. geared as it is to an importexport economy, just will not be able to provide the jobs.

Eco-policies

* Create jobs that need people, adapting technology to a more human scale. Provide new jobs with low capital investment, devel-oping the skills which will make sense when energy isn't cheap and materials are scarce. Encourage craft industries.

* Move towards greater self-sufficiency by creating the jobs in areas where we are most dependent on imports - agriculture and forestry, many manufacturing industries, clothing and building materials.

* Create jobs with an eye to future energy demands, in full-scale insulation and conservation programmes, developing solar panels and other renewable energy sources. Encourage employment in all maintenance and repair businesses.

Expand the "recycling" industry. Start cleaning up the mess created by our industrial society.

Arrange financial incentives so that industries become smaller, serving the needs of the local community.

Encourage co-ownership schemes and co-operatives, making workers responsible to themselves and to the community, involving them fully through consultation and participation in decision-making.

Provide every incentive for small businesses to flourish and become the mainstay of the economy.

* Make it easier for people to be self-employed, rather than subjecting them to bureaucracy.

Provide the skilled workers our economy needs, through flexible retraining and apprenticeship schemes.

Promote the reduced working week and job-sharing schemes so as to remove the damagingly sharp distinction between work and leisure.

Energy

The lessons of the 1973 energy crisis seem entirely forgotten. Non-renewable fossil fuels still account for more than 90 per cent of the world's total demand and this demand is increasing rapidly. So are energy costs. The wastage of energy is enormous. Yet we continue to build huge power stations at an ever greater cost.

Eco-policies

(1) North Sea oil

* Considerably reduce the present rate of extraction. Such an asset is primarily important for its use in derivative industries, rather than as fuel. It must not be squandered merely to conceal the chronic imbalance in our trading position.

(2) Nuclear energy

* No further nuclear power stations will be built. They are prohibitively expensive, unsafe and unnecessary. Development of the reprocessing plant at Windscale should be stopped immediately.

(3) Alternative energy sources

* Research into energy from sun, wind and waves must be dramatically stepped up. Choose technologies which encourage local autonomy and initiative, which are non-polluting and renewable, using the earth's "income" and not its "capital".

* Treat this as the best "energy source" of all. Industry could manage a 40 per cent reduction in its energy requirement without any loss of output. A national insulation programme would provide many jobs. We simply must achieve a steady decline in our overall consumption without causing discomfort or inconvenience.

Transport

Present transport systems depend on an abundance of fossil fuels. We use 20 per cent of all our energy on transport alone. Such an abundance cannot last much longer. Transport in a modern industrial society imposes a catastrophic burden of noise and pollution on the environment. It makes unacceptable demands on land for road-building and on resources for vehicles that are not built to last. Because the present system encourages private transport, it erodes the services provided by the community for all its members.

Eco-policies

* Design our environment so as to minimise dependence on all forms of transport, breaking industry down into smaller units, where possible producing goods for local use only, encouraging people to live closer to their work.

* Develop those forms of transport which use fuel most efficiently railways, buses and canals. Move long-distance and bulk freight by rail and water. Build no more major roads.

* Arrange petrol taxes to discriminate in favour of low-consumption vehicles. An efficient, comprehensive system of cheap public transport, in country areas as much as in the towns, must be treated as an absolute priority.

* Design streets so that getting round on foot and by bicycle is pleasant and practical.

* Prepare to use the skills and resources of the declining car industry to build vehicles for the traffic system outlined above (including runabout electric cars suited to the town environment), and to make other socially useful equipment.

The Common Market

There is much that is wrong with the Common Market, and its Agricultural Policy is one of the finest examples of "How Not To Do It"! But even allowing for its growth-oriented policies and its bureaucratic structure, there is no fundamental reason why the EEC should be slower to adopt ecological principles than any national government. Indeed, current directives on pollution control require some governments to do more than they would if left to their own devices.

Eco-policies

* The development of the EEC should best be seen in terms of a federation of regions.

Our affairs will continue to be closely related to those of our EEC partners, and it should be possible to establish coherent European policies on energy, raw materials and the environment, co-operating with them to establish a stable Europe, based on and working through its regions.

The Third World

Over the next twenty years, world population will increase from four billion to six billion. Two out of three people live in poor Third World countries. Yet the gulf between the rich and the poor countries is still widening — they are simply not catching up. The developed countries consume 90 per cent of the world's oil, 80 per cent of its minerals and fertilisers, 75 per cent of its entire fish catch. There is a growing demand for a "New International Economic Order", a demand for justice rather than an appeal for charity. Many predict that we are locked on a collision course.

Eco-policies

* Recognise that our present way of life is only attainable by exploiting the resources and poverty of others. We must reduce our dependence on their cheap materials and agricultural produce — one third of the cereals grown in the world go into fattening up the livestock of the richer countries.

* Only by setting an example ourselves will we be able to discourage them from pursuing full-scale industrial development and growth. They themselves must recognise that such a policy can only cause increased poverty and food shortages.

* Give aid to initiate self-help schemes, to reduce the dependence of Third World countries on overseas trade, and to help re-establish their ecological "capital" through reafforestation schemes and suitable agricultural assistance. We should provide appropriate technological help for specific small-scale local projects with the emphasis on decentralised, labour-intensive methods. We must give every assistance to voluntary schemes to control population growth.

* Recognise above all that we have no immunity from the problems of these countries. The satisfaction of basic needs for the whole of mankind is an essential condition for longterm global stability. For this reason alone we must change our expectations, so that all countries move as rapidly as possible towards stable, essentially self-reliant economies.

CONSERVATION BOOKS **Recycled Stationery:** Domestic and Commercial Papers and Envelopes Personal Letterhead service Envelope Re-use Labels Posters Over 650 Environmental Books stocked Any Books supplied Filmstrips and Cassettes For details of any of the above, please send a large SAE Conservation Books, (E), 228 London Road, Earley, Reading, Berkshire, RG6 1AH. Tel: Reading 663281 (STD code 0734). 61

The New Ecologist Interviews Jonathan Tyler CHAIRMAN OF THE ECOLOGY PARTY

N.E. What do you say to those who feel that a vote for the Ecology Party is a wasted vote?

J.T. The main parties are plainly not facing the realities of the present situation, economically, socially or internationally. It cannot possibly be a wasted vote to vote for a party which is expressing the real issues: the issues which must come to the centre of the stage in the future. Even if we do not achieve a significant vote in numerical terms this time, if we attract a higher proportion of the vote than minority parties usually do, and if we gain significant numbers of new members - and the signs are that we shall - then we shall be poised for take-off in the next election. Therefore a wasted vote this time will not necessarily be wasted in the long run.

N.E. Quite rightly the Ecology Party is chiefly concerned with the longterm. But inevitably, the electorate will want to know its position on topical, short-term issues. What is the Ecology Party's policy on, say, the Unions?

J.T. I think frankly that the question cannot be answered directly. First of all we are not going to be in any position to deal with the very immediate issues. And secondly, quite a number of the problems, in fact the great majority, are ones which we believe are the product of our present crumbling social and economic system. As a consequence they are inherently insoluble within they are innerently insoluble within that system, and this is a primary factor behind our belief that the deficiencies of the present system can be tackled only by something radically different. The closed shop for example, is not a black and white issue. There are some quite valid arguments in its favour although, plainly, it also represents an in-fringement of liberties. It is a product of "Them" and "Us" confrontation in industry — and it is that attitude that ecological policies will overcome. Similarly strikers in recent months have been behaving,

on occasions, in an irresponsible manner. But we would not criticise them directly because they are reacting in one of the few ways open to them in a situation where they are faced with unequal power and unequal wealth. Perhaps also they are reacting to problems whose long-term implications are hidden from them by the government, the opposition and the media. We are concerned to raise the level of debate so that the *underlying* causes of these disputes are brought into the open.



N.E. Many Liberals feel that the Ecology Party is making a grave mistake by contesting marginal Liberal seats — and hence in most cases, ensuring that Conservative candidates who are totally unsympathetic to ecological causes will get in. Is it the Ecology Party's strategy to "take over" from the Liberals?

J.T. I would not put it quite like that. First of all, we accept that this strategy could lead to unsympathetic Conservatives winning seats. This, we feel, is acceptable in terms of our long-term strategy. The Liberals are clearly playing two tunes at the moment: the growthist tune, the environmental tune – and, perhaps among some members, the ecological tune. Our strategy must therefore be to make sure that the Liberals choose which tune they are going to play in future. We certainly admit that some Liberals are concerned with ecological issues and this inevitably makes them our most immediate partners in the eco-logical cause. The way in which events might develop after a General Election, in which we had severely knocked the Liberal vote, will depend on what happens to the Liberal vote generally. Clearly if the Liberals are completely demolished across the country, there will be an inquest of fairly dramatic proportions, and there are two possibilities. Either the more ecologically minded members, of whom there are

quite a lot, will finally despair and come to us, in which case we could very well emerge as the Third party — especially if there are similar misgivings among the more environmentally aware in the Labour and Conservative parties. But I think it is equally likely, especially if the Liberal result is poor but not catastrophic, that they may very well adopt a far more ecological policy than they have so far done and that would leave us in a distinctly fourth place from which we might not move.

N.E. Would that worry you?

J.T. I personally would not be worried if the ecological perspective was clearly being taken seriously and if the Liberals then stood a chance of wielding some power. The worst result would be if the Liberals had no influence in the next Parliament, and we had not done sufficiently well to be making an impact.

N.E. What do you think the Ecology Party can gain from standing at the European Elections.

J.T. The concensus which has emerged within the party is that we are Europeans. We see a future in some sort of *Federation of the Regions of Europe* — with the emphasis, of course, being on the type of federal structure where the power comes up from below, rather than being imposed from above. In all fairness, I must say that there is a minority in the party who wish to cut off altogether from Europe. But we, the majority, do not see selfreliance in the regions of Britain as inconsistent with the concept of a European Federation of Regions which, in its ideal form, would be wider than the present community of the nine.

We also have a tactical interest in fighting the European Elections. Firstly because it will help to add credibility to our status as a party effective on the national stage, and secondly because the structure of the election — the way in which the media will treat it, the way in which people will approach it in their voting decisions — is so different from our ordinary elections that we believe there will be greater flexibility and hence greater scope for a new party to make an impact.

We have, however, discovered that the money which Brussels has voted for the running of the elections has been distributed entirely to the parties who are currently represented in the European Parliament. We regard this as a monstrous denial of opportunity to fresh parties, particularly at a time when new thinking is critical to the whole future of the socio-economic system in Europe.

The European Elections

Even if Mr Callaghan manages to stave off a General Election until the Autumn, ecologists will still have the opportunity to go to the hustings before the summer is out. No amount of political manoeuvring can postpone the European Elections on June 7th, and the National executive of the Ecology Party has made it clear that it intends to contest four seats.

It should be said, however, that some within the party are unhappy with the decision. Active opponents of the EEC, they maintain that if ecologists are true to the ideals of decentralisation, they should not sully themselves by participating in elections for a parliament which owes its very existence to an alliance based on economic growth and which, once fully established, can only lead to further centralisation and increased bureaucracy. They believe that instead of participating in the European elections, ecologists should publicly abstain from voting.

Such negative action would, claims Jonathan Tyler, Chairman of the Party (see interview), mean losing a valuable opportunity for making a real contribution to the present debate on Europe at a time when many Europeans are dissatisfied with the existing structure and aims of the EEC, and are actively seeking new directions. 'Ecologists should enlarge the debate', he says in the Party's newsletter, 'by stressing the international dimension of many environmental prob-lems and the attractions of a successful all-Europe, but decentralised ''Federation of the Regions''. An elected European Parliament could be, for all the reservations about the EEC, the first brave step. Continental ecologists are taking it. It is inconceivable that the Ecology Party in Britain should falter.

Ecoropa, the Group for European Ecological Action (see *The New Ecologist*, March/April 1978), also believes that it is essential that the voice of the environmental movement be heard at the elections and that the ecological perspective be made central to the arguments put forward. The group is planning a series of whole page advertisements presenting their *Declaration for a Green Europe* in all the leading newspapers of Western Europe, to be published on the same day provisionally scheduled for May 9th. The declaration calls for selfreliance, smaller communities, decentralisation and regionalisation, conservation of energy, the banning of dangerous technologies, and an immediate halt to the nuclear power programme.

Unless the new European Parliament includes at least a sizeable minority of ecologically-minded candidates, the views of millions of Europeans will go without representation. Should this happen, we can be certain that the matters debated by the Parliament will simply be matters of degree: whether we should build one hundred nuclear power stations or only fifty: whether the modernisation of agriculture will drive four million farmers from their land or only two million . . . The vital issues of conservation, regionalisation. self-reliance, freedom from bureaucratic domination and disarmament will be ignored.

Ecoropa itself does not aim to put up candidates, however. Instead it urges electors to vote for candidates who subscribe to the principles of the Declaration, and to put pressure on those who do not modify their position. At a minimum, candidates who wish to win Ecoropa's support must agree to campaign for revocation of Article 2 of the Treaty of Rome which calls for economic growth as the fundamental aim of the community.

A similar campaign is being run by the Green Alliance, launched in March to a flurry of publicity over its latest recruit, Lord Croxham, former head of the Civil Service. It has issued a "Challenge to Candidates", aimed at discovering where they stand on ecological matters. Among other questions, it asks whether (once elected) a candidate would vote for: measures to promote increased access by individuals, small farmers and community groups to land upon which to grow food; allocation of public funds to a new labour-intensive programme of environmental and energy conservation; and a programme of urban renewal based on the encourage-ment of small enterprises and the development of a humane urban environment.

According to their replies, the Green Alliance will place candidates on a Green or Groan list. They have already selected Sir Brandon Rhys Williams — the Conservative MP who told his constituents that 'People will become immune to radiation' — as Groan of the Year.

In France, the electoral strategy of ecologists is still unclear. Europe-Ecologie, an umbrella group formed in November, has stated that it may put up candidates, but as yet has made no firm commitment. It appears that many in the group feel that the elections are a waste of time, whilst others would prefer to campaign on a single issue, rather than on the whole range of ecological principles. To this end, three leading anti-nuclear groups from the Paris area have set up an organisation Le Convergence Anti-nucleaire (CAN), to put up a list of anti-nuclear candidates.

The efforts of both CAN and Europe-Ecologie are being seriously hampered by French electoral laws which seem designed to permit only those candidates from the gang of four (the major parties) to run. The laws oblige all parties who wish to put up a list of candidates to furnish a deposit of three million francs (£300,000). That money, claims the Government, will be needed to pay for the posting of electoral addresses on a national scale. Europe-Ecologie is campaigning to change the law so that the signatures of 50,000 favourable electors will entitle a party, however large or small, to free postage. If that campaign fails, Europe-Ecologie threatens to boycott the elections - if not to disrupt them.

Whether the French ecologists will be able to settle their differences and tighten up their electoral strategy before the elections remains to be seen. If they don't, it is certain they will miss a tremendous opportunity to further the ecological cause. According to a recent poll in L'Express, four per cent of the electorate say that they intend to vote for an ecological list at the election — and if the ecologists achieve five per cent of the national vote, they will automatically receive four seats in the Assembly. Such a prize would be lost if the ecological vote is split, for, as Laurent Samuel asks in Le Sauvage, who is going to vote for a movement which seems unable to settle its own internal differences?

Nicholas Hildyard

REPORTS

Food from Waste

"That slope", Derek Owen said, pointing to a long green hillside in the foreground of Cornwall's china clay landscape, "used to be a series of waste tips. But people in this village often tell me that we have done no reclamation in their area. They have already forgotten what it looked like two years ago." This is understandably exasperating, but in truth there could be no more significant comment on the success of the innovative methods now being used. The forgetfulness of the villagers means that Derek Owen's landscaping and reseeding are having precisely the effect he wants. If those erstwhile clay pyramids had been dusted with a shifting coat of imported topsoil and were growing more weeds than grass there would be no chance of forgetting their origins, for that was the old way of greening the white sand tips, and more often than not the topsoils slid down the steep sides and the weeds grew in furrows and patches among the still visible wastes.

The old way is not good enough for Derek Owen, English China Clay's landscaping surveyor. His purpose is to bring the waste tips back into cultivation with a cover of vegetation which will not only blend with the landscape, but will at the same time be agriculturally productive. Much of the reseeding is done by the use of hydromatic techniques whereby a mixture of seeds, fertiliser and mulch are sprayed by high pressure pumps, directly onto the stepped sides of the tips. Different mixtures are used for different areas, and as can be seen in the seed trial plots, these are being carefully selected to return each area to the most suitable type of vegetation. In moorland areas, for example, the mixture used consists of topsoil taken from the adjacent land which contains the seeds of

indigenous plants so that the reclaimed area is all but indistinguishable from the natural moor that surrounds it.

At Maggie Pie, a disused storage lagoon, horticultural trials have been carried out under the direction of Professor Bradshaw and a research team from the Botany Department of Liverpool University. In what has for long been regarded as sterile waste, crops of cabbages, new potatoes, peas, beans, radishes and some soft fruits have been successfully grown. Close by are trial plots of different legumes and other nitrogen fixing plants that have a significance far beyond the immediate needs of reclamation in this area. At Carthew there are over eight thousand sapling trees and more than ten thousand shrubs waiting for transplantation to permanent sites as windbreaks and soil stabilisers. The majority of the trees are indigenous hardwoods.

established sheep and cattle graze on the reclaimed slopes, among them a small, but increasing flock of the once endangered breed of Soay sheep, an attractive goatlike creature that is particularly hardy and needs little shepherding, sheds its own fleece and produces a large lean carcass.

No one pretends that the twentysix acres of ECC's mining operations are about to disappear under a coat of verdant pasture, but this type of reclamation can be put into operation as soon as a specific area of waste goes out of production. The new techniques being developed by Derek Owen and his team ensure that food is now being produced in areas that generations of farmers and conservationists have regarded as totally unproductive. In a country constantly threatened by loss of farmland for roads and urban development it is heartening to learn of some acres travelling in the reverse direction.

Ruth Lumley-Smith

As the vegetation becomes



Indian Energy Seminar

The sharp rise in world oil prices, especially when combined with booms, followed by sharp declines, in prices paid for commodity exports has hit the Third World hard. For example the Philippines, India and Tanzania - with a combined population of around seven hundred and fifty million, spend between seven and thirty per cent of their relatively meagre per capita GNPs on oil imports. The recent official OPEC price rise, plus the unofficial, but nevertheless real, extra increase due to the shutdown of Iran as an oil exporter, promises to make 1979 a bad year. As a result a number of international and regional energy meetings have been set up by Third World and international organisations, specifically to air the energy crises of the Less Developed countries. The first of these meetings, organised by India's Administrative Staff College, was held in Hyderabad from 3 to 8 January 1979.

For the seventy per cent of the Third World who still live in rural areas without electricity one of the Seminar's major themes - nuclear power - would have been stunningly incomprehensible. India, however, has poured massive funds into purchasing CANDU reactors and cobbling together a nuclear fuel cycle, and India's AEA is part and parcel of the 'free world' nuclear power system - especially insofar as it sees itself as representing the Third World in the halls of the big nuclear (energy) nations. But the obscene irrelevance of one of the world's poorest nations going nuclear - and especially because the possession of nuclear weapon capability was more than incidentally important - has triggered a shock wave of rejection in a small, but fast growing, number of Indian academics and civil servants. Their rejection is well rationalised and enumerated.

Professor D. Bose of the Indian Statistical Institute, giving one of several anti nuclear papers, made the statement that India's vast spending to get 640MW of nuclear capacity was absurd when there were at least 40,000MW of undeveloped hydropower at large scale sites, and perhaps 75,000MW available at sites where micro-hydro plant (below 200kW per site) could be used. Other speakers compared India's nuclear fuel import dependence, and its escalating cost (due to cartelisation far more vicious than OPEC's) with its oil import dependence. But India's AEA had a welloiled presence at the meeting, which even extended to there being. apparently by chance, an area electricity board chief in the audience who leaped to his feet to expound the virtues of nuclear capacity - which he didn't have and to intone the litany of 'cheap, clean, reliable, secure, etc.'. The very large number of delegates who were able to both refute and ridicule the points of obvious misinformation for example that breeder reactors are 'an economic success', that 'no people have died from nuclear power plant accident' - ensured that this was one more conference where the nuclear lobby did not achieve a propaganda coup.

Much more encouraging was to hear at first hand, of the rising interest and investment in solar energy being made by the OAPEC countries. The representative of OAPEC's Economics Department reinforced his brief review of their careful study and support of new energy projects by sharply castigating the approach of the OECD nations. As Mr. Al Saadi put it: 'How much effort has the West put in to developing and selling solar furnaces, and how much effort have they made to sell arms. in the Middle East?'. His comments were amply reinforced by Dr. Ali Shams, an Iranian now exiled to Kuwait, and working for Kuwait's Institute of Scientific Research. He made the point that the International Energy Agency (which was represented by an urbane Eurocrat) was set up by Kissinger in 1973 in an

attempt to break OPEC through bilateral oil deals after OPEC had shrugged off the more obvious threats of armed intervention. Now the IEA was talking about OPEC's "duty" to help the Third World pay for oil and to develop solar energy - when the EEC nations barely scrape more than 0.35 per cent of GNP as their aid contributions, while the OPEC nations give about 2.5 per cent. Both Dr. Shams and Mr. Al Saadi pointed to the deteriorating crisis in Iran as a bloody example of the Western governments' preference to simply sell arms in unlimited quantities as a superficially cheap and quick way to recycle petrodollars. In private conversation Dr. Shams said how much he had 'enjoyed' the Paul Erdman book Crash of 79, a nearprophetic vision of the Shah's megalomania bringing about first a collapse of oil production in the Middle East, and then the inevitable worldwide economic collapse this would cause.

Interestingly, this theme - of the West's rush to destruction being signposted 'Third World Arms Sales' - was taken up very vigorously by Prof. Georgescu-Roegen. In an uncharacteristically explicit and direct way he pointed out that \$400 billion per year spent on arms was not an omen for any kind of future, and that economists who attempt to rationalise the arms trade are indulging in dangerous, evil rubbish. After these high points the meeting separated into several different groups, considering a vast number of mainly technical and economic papers. These ranged from subjects such as biogas-electrification through the use of fuel cells (a very promising technology), to low-cost solar cookers, and improving work animal energy use. The economic papers ranged from those concerning the price of different biomass and mineral fuels in the underdeveloped nations, through to microeconomic studies of demand elasticities in the commercial fuel sector of India, the last example being the theme of Dr. R.K. Pachauri's paper, and being the area of interest that originally prompted him to start organising this highly successful meeting

Andrew MacKillop

Nuclear power fizzling out

'One by one, the lights are going out for the US nuclear power industry. Reactor orders have plummeted from a high of forty-one in 1973 to zero this year. Nuclear power stations are taking longer to build, and the delays are tacking hundreds of millions of dollars onto their costs. Waste disposal, which is supposed to be solved by now, is not. The export market is already glutted and shrinking fast. And the cumulative effect of these and other troubles has been a severe erosion of both public and political support for nuclear power.'

That is the view of the prestigious American magazine, Business Weekly, which has published a damning report on the economics of nuclear power. Indeed the report, Nuclear Dilemma: The Atom's fizzle in an energy short world, goes so far as to predict that the nuclear industry is likely to collapse altogether in the next ten years.

'Domestic utilities are facing such shrunken growth projections for electricity demand that even if the nuclear industry's political, social, economic and regulatory difficulties could be solved, there may not be an adequate market demand left for their product.' Says a senior, non-nuclear executive at General Electric: 'The existing nuclear industry can't survive. Period.'

Business Weekly, 25.12.78 Not Man Apart, February 1979

Roads to nowhere

For seven years the people of New Britain, Connecticut, have allowed homes and businesses to be pulled down and traffic to be disrupted so that a sunken four-lane road could be constructed to connect with a proposed interstate highway at the edge of town.

Now the connecting road is completed, but there is still no interstate highway — nor is there ever likely to be one. So New Britain now has a road that goes nowhere.

Nor is it the only city that has been ravaged in recent years by road schemes that have never come to fruition. Places as big as New York City and as small as Lincoln, Illinois, are also saddled with remnants of ambitious highway or subway works that stand unfinished. More than two hundred miles of interstate highway have been officially withdrawn — often after buildings have been bought and demolished.

U.S. News and World Report, 19.2.79

Aerial disasters

Widespread crop spraying in Columbia has created what government ecologists are calling an environmental disaster. A pilot study by the government wildlife service (INDERNA) blames uncontrolled aerial crop spraying for the deaths of thousands of animals, widespread sickness in the local population, and the forced migration of many peasant farmers. Although the government has outlawed the use of DDT and aldrin, both are still widely used in crop spraying, as are other insecticides. The INDERNA study found that at least thirty per cent of the population in the banana, cotton and rice growing area in North Columbia have illnesses related to crop dusting, including rashes, vomiting, headaches, anaemia, liver damage and male sterility. Along the Sevilla River, aerial spraying has destroyed the rain forests, with a consequent loss of habitat for alligators, monkeys, manatees, turtles and other animals. Local fishermen have been forced to migrate because their oyster lagoons have been destroyed. If the government does not control aerial spraying, claims the National Federation of Cotton Growers, the coastal plantations may be wiped out by plagues of insects which are already becoming immune to insecticides.

Environment, November 1978

More cover-up means less protection

A scientist for the U.S. Centre for Disease Control (CDC) has accused federal health officials of trying to cover-up a congressional investigation into radiation-induced cancer deaths at naval shipyards. 'We are clearly in the middle of a serious cover-up', Erwin Boss told the Associated Press. Boss is one of nine scientists who have been studying the incidence of leukaemia at eight military and civilian shipyards.

The project was prompted by research conducted by Boston haematologist, Dr. Thomas Najarian, which indicated that workers at Portsmouth naval shipyard (which services atomic submarines) were dying of cancer at six times the rate of non-nuclear workers.

'The investigation has been stalled at every turn and the team of nongovernmental experts that Congress ordered to watchdog the study has been stacked with pro-government people,' says Boss. 'CDC and the National Institute of Occupational Safety and Health have been lying . . . to Congress, to shipyard union leaders, to everyone.'

Further evidence of a cover-up comes from a report in *Critical Mass Journal*, who have obtained a classified report compiled by Naval Sea Command. The report cites 'numerous deficiencies' in radiological work which 'have contributed to the shipyard exceeding its 1977 radiation exposure goal by over 170 manrems.' More than eighty specific radiological deficiencies were reported by Portsmouth authority that year due to poor radiation protection procedure at the shipyard. There were nineteen accidents involving nuclear material at the shipyards during 1977.

The report was signed by Admiral Hyman Rickover, deputy commander of the Navy's nuclear programme, on December 30th 1977 two months before he told a congressional committee that 'To the best of our knowledge, ability and to the best scientific evidence we have, we do not have a problem at the shipyard.'

Hearts of oak

Oak trees are being threatened by a fungus similar to the one that caused Dutch Elm Disease, Mr. Michael Harley warned at the Timber Growers' Organisation annual meeting in February.

'It has recently been shown that the fungus which causes Oak Wilt, a killer disease of the oak on the Mississippi and in Eastern North America, can live and be carried about in the sapwood of sawn oak timber,' he said. 'Our French friends, who have

'Our French friends, who have important oak forests, are proposing to ban the import of all oak wood from North America. We are urging the Forest Authority to take the same drastic steps here.'

The Daily Telegraph, 2.2.79

India's eco-consumerism

The Indian government is actively pursuing its Gandhian great leap backwards to promote labour-intensive industries tailored to the needs of its rural millions. The government has frozen the existing capacity for mill-made cloth, leaving future expansion of output to handlooms. Khadi (hand-spun yarn) is going to be given a boost by exempting polyester-khadi blended yarn from the stiff duty imposed on the mill-made variety. The Indian subsidiaries of Lever Brothers and Swedish Match have been asked to phase out production of soap and

matches, so that these can be produced by village industries. And railway trains and stations are to help the village potter by storing drinking water in earthenware pots and serving passengers in throwaway clay cups, instead of washable ceramic ones. Steps in the right direction — but will eco-consumerism make the throw-away society any better?

Economist, 24.2.79

Whose fault?

A Sussex dairy farmer, Mr. David Houseman, has been convicted of starving his cattle and fined the maximum £20 plus costs. The veterinary and RSPCA evidence was damning, and Mr. Houseman admits that the beasts were gravely undernourished. But he is adamant that the guilt lies not with him but with an organophosphorus compound called azinphox.

So far as he is concerned, the story began about six years ago when a plane sprayed his neighbour's peas with an insecticide marketed under the trade name of 'Gusathion'. This is a German product in which azinphox is the active ingredient. The spray drifted onto Mr. Houseman's cows. It also killed colonies of bees belonging to his neighbour. Mr. Houseman did not worry at the time, but then his cattle began to die.

Over the next six years, he lost 145 of his pedigree Guernseys and all treatment proved to be of no avail. Mr. Houseman says that a pattern of symptoms began to develop — infertility, diarrhoea, loss of appetite, arched back and heightened temperature. In acute cases, collapse, paralysis of the hind quarters and death followed. Calves tended to be born with abnormalities, including growths on the side of the head, crooked leg, blindness and even a case with no tail. Azinphox is understood to be stored in the body fat and to break down slowly.

Compensation was paid on the bees, but none has been forthcoming for Mr. Houseman. The manufacturers of Gusathion, Bayer, have looked into the case — and deny responsibility. Inevitably they claim that the symptoms could not have been caused by Gusathion.

Veterinary Practice, Vol. 11, No. 1

Playing politics

Environmentalists are fighting tenaciously to prevent the use of an untested and allegedly carcinogenic pesticide. They say that the Environmental Protection Agency approved the pesticide for political reasons and against the advice of its own scientists.

Three times last year, the EPA agreed to requests by the State of

Mississippi to use Ferriamicide, a new organochlorine insecticide, as an emergency weapon against fire ants. But according to a recent report by Dr. David Villeneuve, head of the Environmental Contaminants Section of Health and Welfare Canada, one of Ferriamicide's main breakdown products is photo-Mirex, which is even more toxic than Mirex, the active ingredient of Ferriamicide. Pure Mirex was the chief insecticide used against fire ants until the EPA banned it in 1976 after studies indicated that it causes cancer and birth defects in mammals.

The Environmental Defense Fund says that the Canadian study was widely known before the EPA's most recent approval of Ferriamicide. According to the EDF, the agency's whole attitude to Ferriamicide has been influenced by the desire of senior EPA administrators to appease the powerful southern politicians who had been pressing very hard for its approval. Almost every southern senator and congressman, as well as state and local politicians, joined the campaign to win EPA approval for Ferriamicide.

EPA files which the Environmental Defence Fund obtained show that the agency was highly sensitive to this political pressure, though EPA officials insist that the decision to political pressure. Barbara Blum, EPA deputy administrator, wrote on one internal memo: 'If it's a political decision we want to make the most of it.' She was apparently referring to the opportunity to win more favourable treatment for the EPA and for the Administration's pesticide legislation in Congress.

Nature, 1.3.79

A-bombs and leukaemia

Research workers at the University of Utah claim to have discovered a 2¹/₂-fold increase in the leukaemia death-rate among children exposed to fall-out from atomic bomb tests carried out in the Nevada desert in the 1950s. Residents of Southern Utah have suspected for years that an apparently abnormal level in the number of cancers in the area was linked to fall-out from A-bomb tests. The two towns of Parowan and Paragonah, for example, experienced three times the expected rate of leukaemia.

It was also learned that a study carried out in 1965 by a scientist with the U.S. Public Health Service, which claimed to have documented an excessive level of leukaemia among residents of two Utah counties exposed to fall-out, was ignored and subsequently forgotten. In the early 1950s, the Atomic Energy Commission told Utah residents that the fall-out was 'far from hazardous' and presented 'no danger'.

Nature, 8.2.79

Ban on 2,4,5-T

The U.S. Environmental Protection Agency has taken emergency action to ban the use of the herbicide 2,4,5-T, following its being linked to increased incidence of miscarriages in Oregon. 'Studies show a high miscarriage rate immediately following the spraying of 2,4,5-T in the forests around Alsea, Oregon,' explained an EPA spokesman. 'This alarming correlation comes at a time when seven million pounds of 2,4,5-T are about to be used to control weeds on power line rights-of-way and in pastures, and to manage forests across the nation.'

These uses will be stopped immediately by 'emergency suspension' — the most drastic action that EPA can take against a herbicide or pesticide, and the first time it has ever been invoked. The closely related Silvex, which is used primarily to kill weeds on suburban lawns, is also covered by the order. But the remaining uses of 2,4,5-T, on open ranges and rice fields, are not included and may continue because, according to the EPA, 'they appear at this time not to involve human exposure comparable to the suspended uses'.

The Environmental Defense Fund has rejected this argument and is petitioning the EPA for a total ban on all uses.

Nature, 8.3.79

The great insect invasion

Worldwide use of pesticides exceeded four billion pounds in 1978 — one pound for every person on earth - but their effect seems to have been minimal. In the U.S., the 'insect problem' is more severe than at any time since the dustbowl days of the 1930s. Last year Western rangelands were attacked by the largest grasshopper swarms in years. The tobacco budworm, increasingly resistant to even the strongest pesticides, is threatening crops throughout California. And in the Rio Grande Valley in Texas, the budworm has become so resistant that some farmers spray their fields as many as fifty times during the growing season - and still lose half their crops.

In the corn belt, researchers report that the western corn worm, once a minor pest, is marching across Midwestern cornfields at the rate of 150 square miles a year. Surprisingly, the National Academy of Sciences seems to have been taken off guard by this infestation: 'This advancing front represents a primary and unanticipated problem.' Have they been reading too many pesticide adverts?

U.S. News and World Report, 19.2.79



Cracks in nuclear mythology

NUCLEAR OR NOT? Choices for Our Energy Future, edited by Gerald Foley and Ariane van Buren. Heinemann Educational Books, £5.90. THE POLITICS OF NUCLEAR POWER, by Dave Elliott (with Pat Coyne, Mike George, and Roy Lewis), Pluto Press, £1.95.

Nuclear or Not? presents the edited transcripts of a Royal Institution Forum held in October, 1977. Over the course of two days, an invited audience heard, and was able to discuss, the views of opposing speakers on such topics as alternative energy sources, the technological demands of nuclear power, and the international proliferation of nuclear weapons.

The case for nuclear was put mainly by employees of UKAEA, the Nuclear Power Company, Shell, and the SSEB, while the not case was rehearsed by Gerald Leach and Brian Johnson of the International Institute for Environment and Development, Walt Patterson of FoE, Peter Chapman of the Open University, and others. Tony Benn, the Energy Secretary, and Dr. John Cunning-Parliamentary Underham, his secretary. also addressed the meeting.

Broadly, the delegates of the nuclear industry argued that the UK faces an 'energy gap' in 30-40 years' time, as coal and oil become increasingly uneconomic, and that, in the face of this 'energy crisis', it would be irresponsible not to press ahead with all of the available options and, in particular, with nuclear, the alternatives being relatively unproven; to delay might result in a crash programme at a later stage and the risk of sacrificing safety to speed. In the long term, to ensure continuity of fuel supply, the fast breeder should be developed.

To this, the not contingent replied that predictions of an energy gap rest not only on misleading aggregated energy totals but on an atypical historical period (1950-1975) in which the real price of fuel was declining, whereas the future is more likely to resemble the period 1900-1940, when increasing efficiency in the use of fuels permitted an increase in the standard of living with more or less constant fuel consumption; that the nuclear side significantly underestimates the contribution of simple conservation measures; that investment in the nuclear programme has starved alternative energy sources of funding, and much retarded their development; that nuclear can only supply electrical energy, whereas a rational policy would deploy energy resources more efficiently by matching the type of energy supplied to the intended use, utilising combined heat and power generating stations, for example; and that to defer binding commitment to any energy policy for a few years would allow the potential hazards of nuclear and the feasibility of the alternatives to be more thoroughly appraised.

Strictly speaking, the not side went unrepresented in the prepared papers, all of which were explicit in envisaging a small nuclear component; absolute opposition was only to be heard from the audience. In their introduction to the book. Foley and van Buren remark on the surprising agreement between the two sides, and confess that they were 'slightly disappointed by the lack of fireworks.' On the whole, the most forthright statements came from the nuclear side. 'I don't accept for a moment,' Sir Francis Tombs declared. 'the proposition that advanced society should opt for a simpler way of life involving a lower standard of living.' No-one was asking him to. Peter Chapman, for example, having pointed out that the unspoken priorities of Whitehall must reduce any purported energy policy to an energy-supply policy, went on to develop a scenario consistent with these priorities, assuming unchanged lifestyles and continued economic growth at $2\frac{1}{2}$ per cent p.a.

As the Windscale inquiry showed, the anti-nuclear movement can now command advocates with a formidable mastery of the issues involved, who are taken seriously by their opponents: this position has been secured at the price of accepting, to an extent, the definition of the debate imposed by the other side. While it would be asinine to deplore the emergence of such expertise opposing nuclear among those power, it is at least as important that the movement should rest on a broad popular base.

The Royal Institution Forum raises the question of the best means of broadening the debate on nuclear power and, more to the point, of mobilising support for the antinuclear cause. The Forum itself seems less than ideal: those present were already actively involved in the nuclear debate, on one side or the other, and it would be surprising if the published transcripts were to reach a much wider audience. (The same is not true, of course, of the one-hour television documentary based on the Forum.)

The Politics of Nuclear Power suggests that the trade unions could provide political muscle for the antinuclear movement. In the past, as the authors admit, the trade-union attitude has been largely unsympathetic: the majority view, as put by the TUC to the Windscale inquiry, is that economic growth is necessary for full employment and a rising standard of living, and that economic growth depends on nuclear power. At the 1977 Labour Party Conference, Frank Chapple of the Electrical and Electronic and Plumbing Trade Union reminded those who had tabled an anti-nuclear motion that a global energy shortage would mean 'death through cold, starvation, and wars of conquest'; Mr. Chapple and another EEPTU man also make their distinctive contribution to Nuclear or Not?

The Politics of Nuclear Power is directed specifically at trade unionists, as a first step in exposing the limitations of this orthodox view. Increased energy consumption, it is argued, is as likely to mean the introduction of labour-saving technology as increased employment.

The nuclear industry itself is shown to be among the most expensive ways of providing new jobs: at an estimated cost of six hundred million pounds, the proposed Windscale expansion will employ one man per six hundred thousand invested. for example.

Lucid and concise chapters deal with health risks in the industry; with the restriction of trade-union rights entailed by security measures at nuclear establishments and, more generally, the civil-liberties implications of the plutonium economy; and with the singular and tragicomic history of the UK nuclear industry, in which the expansion programme has been decided not by the CEGB but by the UKAEA, acting 'as judge and jury in its own case'. (About the basis of UKAEA decision-making, the Chairman of CEGB in 1963 said, 'I think that their activities are guided by what they think our requirements ought to be.')

Turning to the future, the authors outline a strategy based on the development of alternative energy sources and labour-intensive conservation policies, socially useful work, community and workers' control, and decentralisation of production.

The literature on nuclear power is now quite extensive, and any new book on the subject runs the risk of appearing otiose and banal; neither of these falls into that category. Vacillating purchasers might be helped to a decision by noting that Nuclear or Not? cannot be recommended to those whose powers of concentration are seriously impaired by proofreading errors, nor The Politics of Nuclear Power to those with a violent aversion to socialism.

To end with a crumb of comfort: 'Nuclear power in the UK,' if Pat Coyne is to be believed, 'has been developed and kept alive by a combination of political will and institutional inertia . . . It is now being deserted by its few friends with any grasp of commercial reality, and the consensus of political interests which previously sustained it show signs of cracking.

Bernard Gilbert

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Integrated pest control

THE LEAST IS BEST PESTICIDE STRATEGY, edited by Jerome Goldstein. \$6.95 or £5.00. Paperback. Obtainable from the JG Press, Box 351, Emmaus, Pennsylvania 18049, USA.

Ever since *Silent Spring* came close to starting a war among people who had not read it, the word "pesticide" has been one of those emotional trigger words that send everyone into paroxysms of rage. The inevitable casualty has been rational discussion, since both sides tend to base what passes for argument on wild exaggeration.

The fact is that pesticides have conferred advantages, that in most cases they work as they are meant to work, but that problems result from the general inefficiency with which they are used. A farmer who drenches his crop at fortnightly intervals to control a pest that may pose no real threat and that, in any case, may be vulnerable to poisoning for only a day or two in its whole life cycle, is using potent chemicals wastefully. It is expensive and it can be unreliable because by spraving on the wrong day he may miss the pest at the one time when he could kill it. The chemicals he uses may well cause environmental side effects.

The solution, then, is to reduce pesticide use in the interest of greater efficiency, and the techniques that have been developed to achieve this are grouped together — or integrated — as what Americans now call "integrated pest management", or IPM. Mr. Goldstein's book describes the progress that has been made with IPM in the USA, which is where most of the work on the subject has been done.

IPM amounts to a great increase in the subtlety with which pest, weed and crop disease problems are approached. Rather than simply whistling up the latest wonder spray and sloshing it everywhere with touching optimism, the farmer who uses IPM calls a consultant. The consultant monitors the insect population and advises an appropriate strategy. This may well involve spraying with a pesticide, but at a level that is much reduced because the chemical can be applied much more precisely. The chemical approach is not the first option to be considered, though. Would a modification in farming methods solve the problem, at any rate for next season? Is the pest susceptible to a virus disease? Can the weed be controlled by an insect or other animal? Can the weed be infected with a parasitic fungus to which the crop is not susceptible? Might biological control work?

Of course, biological control, usually based on the introduction of a predator or on the release of sterilized males of an insect pest species. is the most obvious non-chemical choice. Unfortunately, it is also the one that has been over-sold. There have been notable successes in the closed and artificial environments of glasshouses, and the technique may work where a new crop has been introduced from another part of the world along with its pests but without the predators of those pests. Even then it is uncertain and at other times it brings dangers of its own. Will the predator multiply fast enough to be effective? If it does, will it continue to multiply and so become a pest itself? If chemicals used to sterilize male insects escape into the environment, what will happen? (These chemicals are likely to be more hazardous to non-target species than the pesticides they are meant to replace.)

The book contains many anecdotes as farmers recount their own experiences, and this anecdotal approach becomes somewhat repetitive in a kind of "overkill" way. If I am told that a particular technique works I will accept that. I do not need to be beaten about the head. This is a minor criticism, though, for the book's inclusion of a USDA paper on IPM techniques, its full list of training and research programmes and, at least for American readers, its list of consultants and suppliers, make it valuable.

IPM has the official, though in practice probably muted, support of President Carter and the USDA. No doubt it would be spreading more rapidly were it not for the embarrassing fact that it has no commodity to market. The agrochemical industry, after all, can finance its information and advisory services from the sales of its products that such services promote. On the other hand, IPM is beginning to offer employment, which must be good news for those who would like to earn their living doing something both useful and environmentally benign.

Obviously, the book is intended as propaganda, the detailed successes of some being used pour encourager les autres, and remembering the size of advertising budgets in the chemical industry, why not? As propaganda, though, it makes it all sound too easy. The many failures are not listed. After all, there are about ten thousand known species of insect pests and IPM has been found to work on only a few hundred. It would be sad if people were fired with enthusiasm that waned as they began to experience difficulties. IPM will advance, but we should not fall into the trap of assuming that we can make pest control more subtle and more environmentally sensitive, but also simpler. The simplest course of action will always be to drench everything with the chemical the salesman recommends.

Michael Allaby

Teething troubles

FLUORIDATION — THE GREAT DILEMMA by George L. Waldbott in collaboration with Albert W. Burgstahler and H. Lewis McKinney. Coronado Press Inc. Hardcover \$14.95, paperback \$7.50.

The great dilemma arises because a little extra fluoride in drinking water is claimed to give partial protection against dental caries, while more than the so-called optimum amount can cause not only serious dental fluorosis but also a long list of other unpleasant symptoms. benefit of small Actually the amounts is in serious doubt and the disadvantages well documented. For reasons that are rather obscure the public health authorities in the U.S. formulated a policy for the fluoridation of water supplies in the early 1950s before any proper tests had been done and have found it necessary to suppress as much contrary evidence as possible since then.

The claim that fluoride reduces dental caries has not been properly

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tested or researched so that the Royal College of Physicians (RCP) in 1976 reported over thirty years after the effect was first suggested that the mechanism by which fluoride works was not known. One suspects that research has actually been suppressed because if it were known to be going on the public might have doubts about the certainty of the claims made for fluoride. On the other hand many cases of fluoride

poisoning from water with the recommended concentration of 1 ppm have been authenticated. The usual claim (e.g. by the RCP) is that there are no proven cases; which means that they are demanding more rigour in demonstrating the harm done than in proving the benefit. This is surely the wrong way round. Anyway many patients have experienced the switching on and off of seriously debilitating symptoms when they have reverted to a normal diet and/or fluoridated water or to a diet omitting known food sources of fluorine and/or low fluoride water respectively.

Most of this evidence is deliberately and consistently ignored in official publications. I know of one paper rejected by a prestigious British journal on the grounds that it would cause public alarm if published — it raised the issue of a possible relationship between fluoride and cancer mortality.

Waldbott is an allergist of long standing, and the usual tactic has been ridicule, refusal to discuss his cases, or even to deny their existence. (The RCP knew of "no evidence" of the kind he had described). Unfortunately we are not free from this kind of suppression of free discussion of an important public health issue in Britain, and again it originates from the public commitment of a government department dating back two decades. However, the situation is much worse in the USA because researchers are much more dependent for their livelihood upon grants from government or industry that can easily be withdrawn, and many bodies, such as the EPA allow themselves to be enticed into declaring a policy in favour of fluoridation which is outside their brief (and competence).

Oddly enough Waldbott is not a strong opponent of fluoridation on ethical other or non-technical grounds. The abuse of science upsets him, but he makes no attempt to articulate the basic objection that many environmentalists have to being managed. manipulated. interfered with or whatever you like to call it, especially when they know that the authorities which try to impose fluoridation are not attempting to change the dietary habits which are well known to be the real cause of dental caries.

This book is very well referenced, and is recommended if you want examples of how public commitment and money can affect the pronouncements and behaviour of people upon whose technological advice the system tries to make us depend more every day.

R.S. Scorer

Cultural liquidation

TRACT No. 26. Cultural Imperialism and the Prohibited Nations of Europe, by Keith Buchanan, The Gryphon Press, 38 Prince Edward's Road, Lewes, Sussex. £1.00.

MISSILE VILLAGE. A Strong Words Portrait of Gilsland, Strong Words, Erdesdun Publications, 10 Greenhaugh Road, South Wellfield, Whitley Bay, Tyne and Wear, NE25. 50p.

It is Keith Buchanan's thesis that. in the long term, imperial powers conquer as much through the pages of a dictionary as through the barrel of a gun. In the nineteenth century, the point was made by Sir Charles Trevelyan, a civil servant of the Rai: 'The only means at our disposal for preventing revolution is to set the natives on a process of European improvement. They will then cease to desire and aim at independence on the old Indian footing. The national activity will be fully and harmlessly employed in acquiring and diffusing European knowledge.' A more modern account comes from Martin Carnoy: 'Western formal education came to most countries as part of imperialist domination. It was consistent with the goals of imperialism: the economic and political control of the people in one country by the dominant class in another.'

The same process of cultural liquidation, it is argued, has been applied within the countries of Western Europe, in controlling the 'internal colonies' such as Ireland. Scotland, Wales, Brittany, the Basque regions, Occitania, and Catalania - these are the 'prohibited nations' of Keith Buchanan's title. The case of the Scottish Highlands seems particularly woeful: the substitution of the landlord-tenant relationship for the traditional clan system, the introduction of Englishlanguage schools, and the suppression of bardic schools was followed by

the Clearances, the forced migration of virtually the whole Highland population, which left the new landlords free to introduce colonial-style practices based on extensive sheeprearing, while at the same time providing an influx of cheap labour for the towns to the south. Keith Buchanan argues that the conflict between the needs of the rapidly developing industrial society in England and the non-materialistic, more communal basis of the Gaelic cultures in Scotland and Wales was a strong inducement to culturebreaking.

Today, the process of cultural liquidation — accompanied by what has been termed *glottophagy*, the smothering of local languages and dialects, whether through attrition or bald proscription — is promoted by the relatively insidious agencies of television and mass tourism. The result is a world of growing blandness and uniformity or, as a French commentator has put it, 'one fundamental boredom extending from Paris to San Francisco and from San Francisco to Calcutta.' Throughout Europe, however, there are groups who oppose this homogenisation, and Keith Buchanan suggests, echoing Patricia Elton Mayo, that this is the real political battle that will shape our future.

In Missile Village, some of the victims of cultural erosion speak for themselves. The villagers of Gilsland are suffering the consequences of decisions and forces over which they have little control. Straddling the border between Cumbria and Northumberland - this administrative division has itself caused problems over the years and has impaired the development of a cohesive community spirit Gilsland was a popular spa in the nineteenth century but, with the growth of package holidays to Europe since the War, this source of income has steadily declined; in 1967, the railway service was discontinued. The single most disruptive development has been the

building and abrupt closure of the Blue Streak missile research establishment at nearby Spadeadam, which provided brief prosperity at the cost of disrupting local employment patterns.

Missile Village collects together reminiscences and reflections of Gilsland men and women that highlight the changes which have affected the village and form a picture of the long-established local culture. It is the latest in a series of booklets produced by Strong Words, a publishing collective in the north east of England which specialises in recording the experiences of working people in their own words. On the evidence here presented, it appears that some at least of the villagers would endorse the sentiments of a couplet dating from 1903: 'We know Switzerland well, but we know Gilsland better, and of the two give us the latter.'

Bernard Gilbert

Living on a Little Land PATRICK RIVERS

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are a lot of pitfalls. If you want an honest, practical guide to the self-reliant life which sticks to the realities and deals in hard facts and economics, you need look no further than Patrick Rivers' excellent *Living on a Little Land*. It contains a wealth of sensible information and advice and a great deal of real guidance for anyone seriously interested." Oldham Evening Chronicle

Illustrated by Sally Seymour, paperback £1.95; hardcover £3.95

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Practical Books For Thinking People

Oxford University Press

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P. J. Salter and J. K. A. Bleasdale

No, you do *not* need green fingers to produce good vegetable crops. What you do need is a professional approach, and that can be learned from this book. The authors are on the staff of the National Vegetable Research Station in Warwickshire: their simple instructions and practical advice are based on modern scientific research and will work in everyone's garden. The book deals with spacing, sowing (including the novel method of fluid sowing) and planting, feeding and watering different vegetable crops, and also how the vegetables can be protected from pests and diseases. It will be invaluable to both the beginner and the experienced grower. Illustrated £3.95 Oxford Paperbacks £1.95

A Victorian Poacher

James Hawker's Journal Edited by Garth Christian

'For the real home-made wine commend me to A Victorian Poacher, by James Hawker, a Bradlaugh socialist of bitter passions and a considerable field naturalist who exacted respect from squire and keeper and poached incorrigibly on into old age for the sheer hell of it.' Christopher Wordsworth in The Guardian. £1.50 Oxford Paperbacks

The Gamekeeper at Home and The Amateur Poacher

Richard Jefferies

'In *The Gamekeeper at Home* the naturalist and the sociologist combine a painstaking, loving, scrupulously weighed account of the wild life in and out of the keeper's domain that tends to make most modern books on the subject look superficial. *The Amateur Poacher* is a boy's eye view of England as a glorious natural hunting ground, a place to track and snare and shoot but inevitably also to observe.' *The Times*. £1.95 *Oxford Paperbacks*

Reconciling Man with the Environment

Lord Ashby

'Lord Ashby's cogently argued and well-documented analyses of democracy at work make fascinating reading.... The book is full of little gems of judgement over the whole range of specialist fields involved. You will not agree with them all, but you cannot fail to be stimulated. *The Times Higher Education Supplement.* £4.25

OTHER BOOKS RECEIVED

Wilderness, Anthony Smith. Allen and Unwin £7.50.

The author made a journey round about the earth visiting the wild, ferocious, comfortless emptiness of the wildernesses he describes in this absorbing and thought-provoking book. The outstanding feature common to all his chosen wastelands, whether tundra or desert, mountain, swamp or dense tropical forest is that they are beyond the reach of man. Who will not rejoice to learn that three-quarters of the surface of our world is still unsullied by human pollution? Beautifully illustrated with the author's own photographs.

Challenge to Survival: A Philosophy of Evolution. Leonard Williams (revised edition). Allison and Busby £5.95.

Leonard Williams challenges many popular concepts about the human condition and traces the evolution of our moral conscience from pre-history. Through philosophy and dialectic, illustrated by reference to the behaviour of his breeding colony of Lagothrix monkeys, he argues that the social organization of man and the higher primates, developed from instinctual good and the ethic of mutual aid. Modern man, in his dedication to the consumer society and the ideology of perpetual growth, has strayed from his natural heritage to the detriment of himself, his environment and all natural life with which he shares our threatened planet.

Energy, Economic and Ecological Relationships for Gotland, Sweden — A Regional Systems Study. Ecological Bulletins No. 28. A-M Jansson & J. Zuchetto. Swedish Natural Research Council (NFR) Sw Cr 70 (about £8.00) from Editorial Service/NFR, Box 23136, 5-104 35 Stockholm.

The dull title hides a very interesting little book. Taking as an example the island of Gotland, it attempts to describe a region in terms of energy flows between and within the various systems of which it is composed. It seeks to integrate ecological, economic and social factors in such a way as to provide a sounder basis for regional planning. As with any other model, the conclusions reached are only as good as the information and priorities fed in; the complexity and sophistication of the model may obscure this simple fact, but cannot change it. Inspite of its limitations such an analysis remains a fascinating and promising possibility as a means of introducing ecological sanity into practical policy-making.

Seeds for Change: creatively confronting the energy crisis. Conservation of Urban Energy Group (Conservation Council of Victoria), Patchwork Press, 118 Errol Street, North Melbourne 3051, Australia.

Although primarily written to stimulate discussion about the energy future of the City of Melbourne, this comprehensive analysis of the present situation, alternative energy choices and practical possibilities, also provides a comprehensive general assessment of the problems and choices likely to face any major city. Since energy is the cornerstone of all our lives this book is also about people and lifestyles; government and decision-making, officialdom and bureaucracy and much else.

DAVID FLEMING chips in..

A letter to the Editor

Moonshine and ecology. I sometimes reflect about how much they have in common, and articles like your editorial on microelectronics (November/December 1978) force me to admit that they share all too much. I particularly enjoy the moonlit romance of the idea that we should persuade our international competitors not to invest in microelectronic technology. Micro Electronics Limitation Talks, the world's longest-running musical romance, sponsored by The Ecologist in the hope that chips, unemployment, poverty and other horrid things will simply M.E.L.T. away.

Here are some grim realities:

1. All the nations involved in any way in international trade will develop microprocessors as fast as they can, and no finger-wagging is going to stop them. Per unit of output, microtechnologies require less capital, less energy, less material resources than any technology yet developed; they demand less operator training, allow more standardisation, can be established more quickly. Any economy which does not develop its own industry to the microtechnological limit will simply be jerked out of the world market, like a grape pip between greasy fingers. This is not a good thing or a bad thing; it is simply a phenomenon. (Shake not your fist at the rain, Mrs. Vicar, just hold the fete indoors.)

2. We in Britain depend at present on very substantial imports of protein and raw materials. If our earning power were cut off suddenly, there would be the social and economic collapse which, I think, it is the whole purpose of the ecology movement to avoid.

3. Therefore, Britain, which needs to maintain her ability to compete overseas for a considerable time ahead, must keep abreast of the technology being used by her competitors.

4. However (and here, please, may I ask you not to take one of these points in isolation; hold your 74

breath, it's meant to be a sequence), whatever happens, with or without microelectronics, unequivocally, Britain's earning power is certain to decline very seriously within the near future. If we don't develop micro-technology, our earning power will decline because we can't compete; if we do, it will decline because there is a world glut of the things we and our competitors export, and instead of earning £'s, we will be earning pence. Microtechnology, in other words, will introduce a massive recession from which the world will not recover for centuries. (Why then, you will ask, don't we set up the M.E.L.T. talks straight away? Answer: because even if the developed nations could agree to a period of technological restraint of this kind, the developing countries won't; microtechnology offers the developing countries the one and only chance they will ever get of catching up with the material success of the West. The benefits of this won't last long, but they do set an immediate objective for their governments, and, by God, what a way to go!)

5. Since we're all going to be stuck in recession soon in any case, and since this means that Britain is not going to be able to pay for the imports she now relies on, this means we must establish a selfreliant, ecologically-based society as fast as we possibly can.

6. But this task is going to take time and money. It will be astonishingly difficult. In order to get the time and money we need, we must preserve Britain's ability to compete for as long as possible. That means keeping up with developments in technology. It also means accepting that there are bound to be some elements of duality within the transitional economy: the conventional industrial economy buys the time we need; the ecologically-based economy establishes the framework of self-sufficiency with all possible speed. And we have to recognise that, no matter how fast we move, we shall not be able to move fast enough. We're in the shadow of recession now; whether it's months or years away makes little difference to the fact that we are going to get caught. We shall all be wishing (a) that our earning power were a little better than it is and (b) that the

task of developing the ecologicallybased society were a little bit more advanced than it is.

Of course, the ecologically-based economy would certainly elbow out of the way some manifestations of the formal economy of the present day. The Farming Recovery Programme will transform the whole agribusiness business as a matter of top priority, and very rapidly indeed. And the opportunity — or need — to dismantle certain sections of the economy which had become obsolete to our need would certainly occur.

Nevertheless, our crying need for the earning power of the conventional sector would remain through the transition period, yet, when it comes to it, this conventional sector will contract at a rate which will arouse, even in the mind of the fully paid-up Luddite, feelings of shocked concern. It's a process, as Mr. Wedgwood Benn has it, of deindustrialisation. And it will happen without anyone, ecologist or otherwise, lifting a finger.

As many people are admitting, this decline will bring very high levels of unemployment. And as practically no one is admitting, it will mean that average earnings, whether in the form of weekly wages or unemployment benefits, will decline to totally unacceptable levels. And the pace of this development will be somewhat less devastating if Britain does maintain her ability to compete for as long as she possibly can. It must be the first object of anyone who recognises the coming dangers, to reduce the speed and extent of this economic collapse. To turn, like a shy virgin, from microtechnology - and thus to hasten the collapse on its way would not only be grotesquely irresponsible; it would also make the humane establishment of the sustainable society a great deal more difficult.

Come on, don't let's argue. Let's get on with the task that we know about — establishing a sustainable society to bale out a decaying civilisation. No civilisation has succeeded in doing this before: the reformers have always failed to agree among themselves...

Yours faithfully, David Fleming.



The one remedy

Dear Sir,

I have been reading with interest various articles that have appeared in the magazine 'Himalaya'. It is heartening to see how one and all strongly emphasize the need to put a stop to erosion, but the surprising thing is that none of the writers of these articles mention the Banj (Himalayan Oak), which is the one tree which can do this. There are suggestions for broad-leaved species being mixed with the pines and firs, but that is of insignificant value compared with Nature's method which is to protect the belt on which the heaviest rains fall with a solid covering of Banj.

Time and again I have pointed out the difference between Banj and Chirpine the Banj with its deep, strong roots and its thick foliage of broad leaves nourishing the ground where they fall, and the Chirpine with its shallow roots and thin canopy of pine-needles making a dry, polished covering to the ground where they fall; the Banj with its capacity to absorb the monsoon rains in its rich undergrowth of scrub, letting them out gradually in springs and streams, and the Chirpines with no undergrowth at all letting the rainwater rush down the mountainside carrying off the top soil and, on steep slopes, now and then the shallow-rooted pine trees themselves. Yet the noble Oak has almost vanished while the Chirpine is multiplying like a weed because the timber and resin which it yields are the pivot round which the Forest Department's Himalayan planning revolves.

To reinstate the Himalayan Oak would be, I know, a tough undertaking in organisation, time and money, but in comparison with the colossal disaster which it could circumvent it would be an extremely moderate price to pay.

Let us seriously consider for a moment what this colossal disaster means. In its beginnings it is already with us. Year by year the floods are increasing and last year they exceeded anything ever known before — more deaths, more damage to crops, mcre destruction of property, more silting up of dams and water channels. If this yearly havoc is not tackled at its source, it will inevitably lead to all-round collapse — collapse of agriculture, collapse of power installations, collapse of government itself.

And now let us consider in comparison with this what the resuscitation of the Himalayan Oak would amount to. It would mean:

1. The systematic and complete removal of the Chirpine above 4,000 feet.

2. The development of the Himalayan Oak in its habitat together with its normal undergrowth of small trees, bushes and grass.

3. Inside this zone prohibition of the lopping of trees for fodder, severe restrictions on grazing and no increase of fields.

4. Compensation to the villagers in this area both with money and the revival of crafts along with introduction of new occupations that could be suitably carried on.

What is the cost of this undertaking compared with the ever increasing cost of yearly flood havoc?

Nature must be enabled to come to the rescue if the situation is to be saved, If only the Leaders at the head of affairs would go to the Himalayas with open eyes and open minds they could see for themselves what I mean. The

What we are up to

Dear Sir,

I read with interest Johnny Johnston's critical response to Hildvard's article on food taboos, and would like to offer some support for Hildyard's essay. Though Johnston may have found this article 'atrocious'' he offers no arguments, academic or otherwise, to refute what Hildyard had to say, but merely suggests that what we need is ''esoteric percep-tion'', an awareness of some ''higher knowledge" that will reveal to us the "true reality" - such as religious mystics have advanced through the ages. But the latter mode of understanding is not ecology, and perhaps Johnston would be well advised (to maintain his tranquillity of mind) to read other journals - those devoted to religion and esoteric lore. But I doubt if he will find in such journals any illumination on the symbolic significance of food. I would indeed be interested to learn - and perhaps Johnston could provide us with an article to enlighten us? what Rudolf Steiner had to say on the rationale behind food taboos. Why for instance the Hadza think the rock hyrax a delicacy whereas the Hebrews thought it a dreadful abomination. Anthropological studies, which Johnston seems to deplore, have at least attempted to describe, and without belittlement, the cultural significance of specific food taboos. But naturally such studies have been reluctant to accept folk explanations. That the hyrax was not eaten because it was considered polluting (in terms of early Hebrew religious concepts) is hardly an adequate interpretation.

But Johnston clearly misunderstands what anthropologists (and ecologists) are up to when he disparagingly suggests that they are ''very materialistic''. In fact the work of Mary Douglas — from whom Hildyard drew many of his ideas — is a sustained attempt to go beyond crude materialist explanations. Indeed, she



Oak tree holds the secret of Nature's wisdom and will impart if to the Leader if, in silent reverence for Creation, he will listen.

Mirabehn Tunbridge Wells, Kent

offers convincing arguments against the materialism of a member of the esoteric fraternity, namely Moses Maimonides.

In recent years in combating the managainst nature ethos of positivism and Bourgeois thought there has been a lamentable tendency to go completely overboard, and to equate ecology with religious mysticism. But the musings and intellectual attitudes of a Kung Bushman in a trance state, Black Elk, Smohalla, Gautama the Buddha, Mahavira - or even Rudolf Steiner — have nothing to do with ecology, or at least with that tradition of thought that emphasizes the mutual inter-dependence of living things and the earth they inhabit, and which stems from the scientific rationalism of such writers as Darwin, Marsh, Grinnell, Seton, Murie, Elton and their like. And it is no good pretending it has. I hope Nicholas Hildyard will not be put off by Johnston's acid remarks.

Yours faithfully, Brian Morris, Lewes, Sussex.

The goal's the same

Dear Sir.

I greatly enjoyed Mr. Jonathan Porritt's virile, aggressive, chest-thumping diatribe on behalf of the Ecology Party in your last issue. I can understand why he finds it difficult to trust his fellow ecologists within the main political parties and that he should regard us as either fools or knaves. Although I found some of his remarks provocative I do not intend to use this letter to try to refute his points, for I believe that eco-politicians should retrain from the sort of witless trench warfare which has characterised conventional politics for far too long.

We in the Conservative Ecology Group do not pretend that we alone have the magic solution to the problems that confront our society. I suggest that no such monopoly of wisdom exists. If our society is to survive it will only do so if men of goodwill from all political parties cooperate and combine against the 'seventh enemy'. Ecologists believe that in diversity there is strength, a point which has often been underlined by The Ecologist magazine. If this applies to eco-systems, may not the same principle also be valid for eco-politics? I suggest that it does and that the separate contributions to be made by the Ecology Party, S.E.R.A., and the Liberal and Conservative Ecology Groups should be seen as contributing to a saner outlook which is essential if grey politics is to give way to green.

I realize of course that there are many practical limits to pluralistic sunshine, sweetness and light but I think we might at least try to accept that while our methods may differ, our ultimate goal, in essence, is the same.

Yours faithfully, Richard Williams, Secretary, Conservative Ecology Group, Portsmouth.

An appeal . . .

Dear Sir,

We have been subscribers to The Ecologist for several years and would like to tell you how much we appreciate the splendid work you are doing in publishing such a worthwhile journal.

My wife has been very ill for several years with herbicide poisoning. We have suffered aerial drift from helicopter spraying of neighbouring properties to control noxious weeds with Tordon 520 on three major occasions during the past ten years and every year to a lesser extent. Tordon 520 is 245T and Picloram. We have never used any of these toxic substances ourselves, being organic gardeners. Her



body has become so sensitive to any trace of poison that it is very difficult for her to find any uncontaminated food or drink. We have searched for water that is pure but have not found any without herbicide. She cannot wear woollen clothing that has been mothproofed or materials that have been treated for fire resistance. All woollen products in New Zealand, carpets, clothing and knitting wool are mothproofed with Dieldrin.

We are protesting against these practices in every way we can and have appealed to our Local County Council for protection against aerial spraying. It has agreed to do all it can to keep us free of drift this season. Mothproofing seems an entirely unnecessary process. Uncontaminated wool is a very wonderful material. We are looking for references dealing with the health hazards involved in this practice, to workers in the woollen trade, to people who wear woollen clothes or use woollen products in their homes. Any information you may be able to give us will be most welcome.

Yours faithfully, R.W. Balch, Yulan, East Taieri, Mosgiel RD 2, Otago, New Zealand.



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