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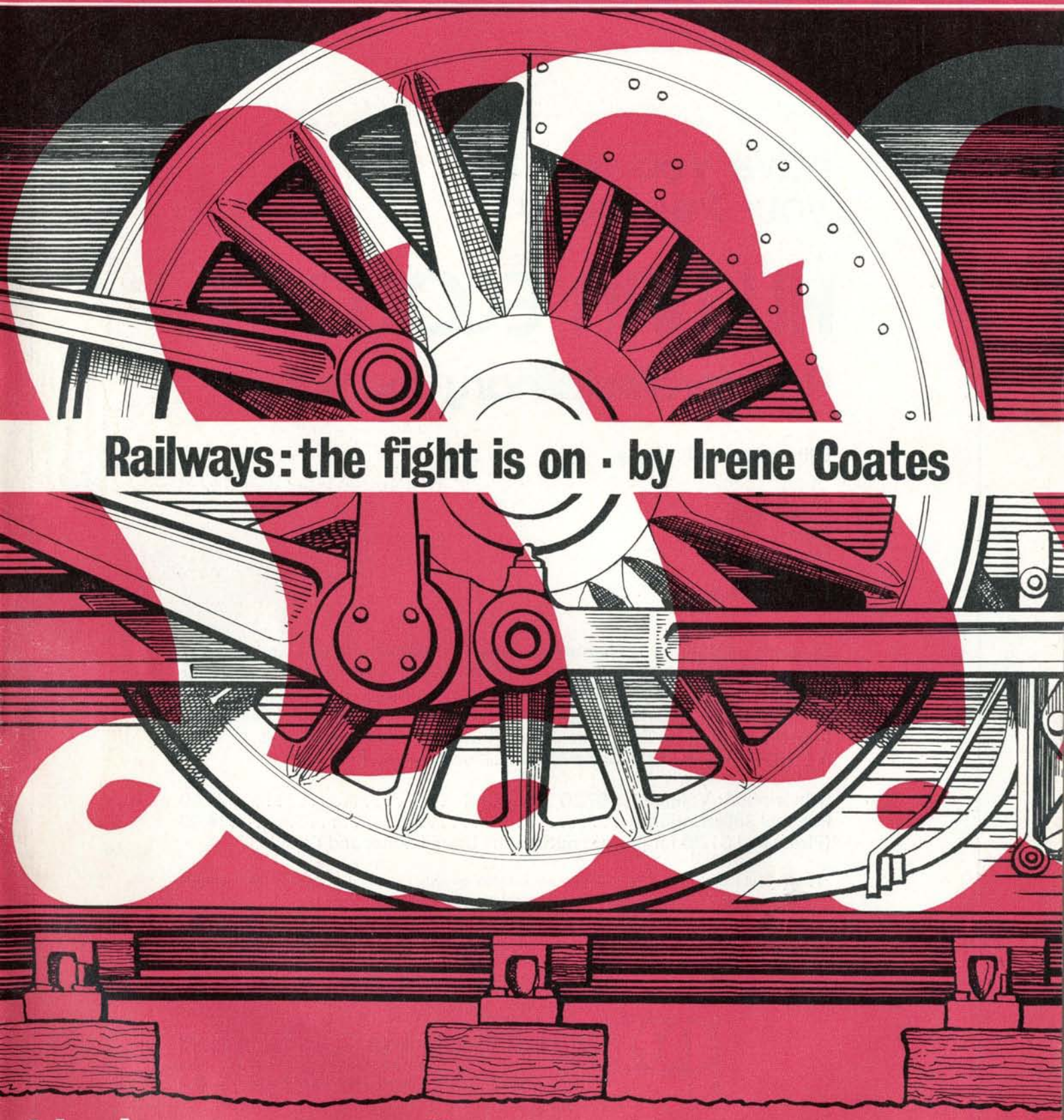

Railways: the fight is on · by Irene Coates

I had a vasectomy · How to stabilise the economy
Digging up S.Wales · A rural community rescued

ecologist

Vol. 3 No. 3 March 1973

CELTIC OIL: WHO GETS THE SPOILS AND WHO GETS SPOILED?

There is oil under the Celtic Sea, or at least the oil companies think so. They have bought production licences covering 11,423 sqkm of the area between southern Ireland, Pembroke, north Cornwall and the Scillies.

They have yet to find anything but no doubt they will. When they do, who will get the muck and who the brass?

For muck there will be. So far there have been six oil rig accidents in the southern North Sea alone—including one blow-out (fortunately gas not oil) and two complete sinkings. Since the Celtic sea is both rougher and deeper, blow-outs and other accidents are almost bound to occur. Pipeline breaks and other transportation spills are also likely. Then the oil, instead of bridging Britain's energy gap, will wash ashore to clog the beaches of Cornwall, Devon, and Somerset, Glamorgan, Carmarthen, and Pembroke.

There will be jobs of course, jobs that are badly needed. Both Cornwall and South Wales are development areas, and to make matters worse South Wales is to lose 12,500 jobs from the "rationalisation" of the steel industry—an estimated 8,000 in three years with the closure of Cardiff's East Moors steel-making plant, and a further 4,500 by 1980 at Ebbw Vale.

However, nobody knows how much oil is under the Celtic Sea, so its job providing potential cannot be assessed. For the time being, the Department of Trade and Industry are excluding it from their development plans for South Wales, and the companies themselves aren't making any promises.

There will be no jobs to speak of until the field (if it exists) starts producing, and that cannot be for at least three and probably six years after oil has been found in commercial quantities. Of the five major licence holders —Shell (3,142 sqkm), a consortium headed by Premier Consolidated Oilfields (2,085 sqkm), another headed by the Gas Council (780 sqkm), BP (778 sqkm), and Texaco (767 sqkm)—only Shell will probably start test drilling this year.

Clearly, jobs from the Celtic Sea will not come in time to rescue South Wales from the steel disaster. And when they do come, those directly concerned with oil will be very few, and those derived from servicing the industry depend on a big gamble now.

South Wales has already learned the hard way that oil is a capital intensive industry. When BP and Esso first announced their plans to build terminals and a refinery at Milford Haven, local people were led to believe that the development would bring a great many jobs, a claim which the oil companies

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NZ's blueprint party

A new political party has been formed in New Zealand and has already attracted a surprising amount of support. Surprising because its platform is almost item for item the proposals of *A Blueprint for Survival*—even its manifesto is called *Blueprint for New Zealand*.

The three established political parties in New Zealand are the National Party, which has been in power for 20 of the last 23 years; the Labour Party, which won last year's general election; and the Social Credit Party, rather reactionary and too small to win any seats, polling about 6 per cent in recent elections.

Now they have been joined by a fourth, the Values Party. Formed in May 1972, leaving only a few months before the election, it contested about half the constituencies. Yet although its platform would be regarded by many as idealistic and impractical, it overtook the Social Credit Party in almost all cases and in Wellington and Christchurch left it a long way behind. The Value Party's prospects seem bright.

The comparative success of the Values Party in so short a time shows that ideas like those of the *Blueprint* are accepted much more readily than most politicians would think. The lesson for Europe is clear. Radical alternative parties could be successful and should be formed. Not the least encouraging aspect of the Values Party is there is no "professional politician" within its ranks.

Robert Allen

In this issue

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Celtic oil, *continued from page 81*

encouraged. In 1956, Esso announced their £20m refinery, and stated that its construction would employ 5,000 men for two and a half years. At the public enquiry in 1957, this figure fell to 4,000, but they said that 1,000 would be given permanent jobs. By 1960, however, construction was providing 3,500 jobs, and the number of permanent jobs promised had dropped to 325. When the refinery opened, this number again went down—to 280 in 1965, although it is now rising with expansion. Similarly, BP promised in 1960 that their terminal would employ over 50 people, but today it employs 39. Indeed, unemployment in Pembrokeshire has risen—from 705 (3.2 per cent of the total labour force) in 1956 to 1,370 (5.3 per cent) in 1972—as a direct result of the oil industry's importation into the area of temporary labour.

Gamble now or save for later?

If there is a Celtic oil boom, the jobs will come from ancillary activities like supplying and servicing the rigs. For example, it is estimated that in 1970 natural gas brought Great Yarmouth almost 2,000 extra jobs. Who gets the benefits will depend largely on where the oil companies are based. BP and Texaco with terminals in Pembrokeshire already, will obviously stay there. Where will Shell, Premier, and the Gas Council go? Besides Pembroke, Barry in Glamorgan and Falmouth in Cornwall are possibilities.

Biggest bonanza would go to the dock that could repair and even build rigs. There is a world-wide shortage of rigs, and at the moment Southampton is the dock nearest to the Celtic Sea with cranes large enough for full repair work. A dock with the courage to risk capital could generate a lot of employment, and Falmouth for one is considering doing just that. Is this wise?

A county whose money-spinning beaches are to be spoiled by still greater quantities of oil might reasonably seek some compensation through a costly gamble for jobs. Or it might no less reasonably demand a delay in production so that the risks of pollution can be minimised and the benefits of oil conserved for the next generation.

Robert Allen

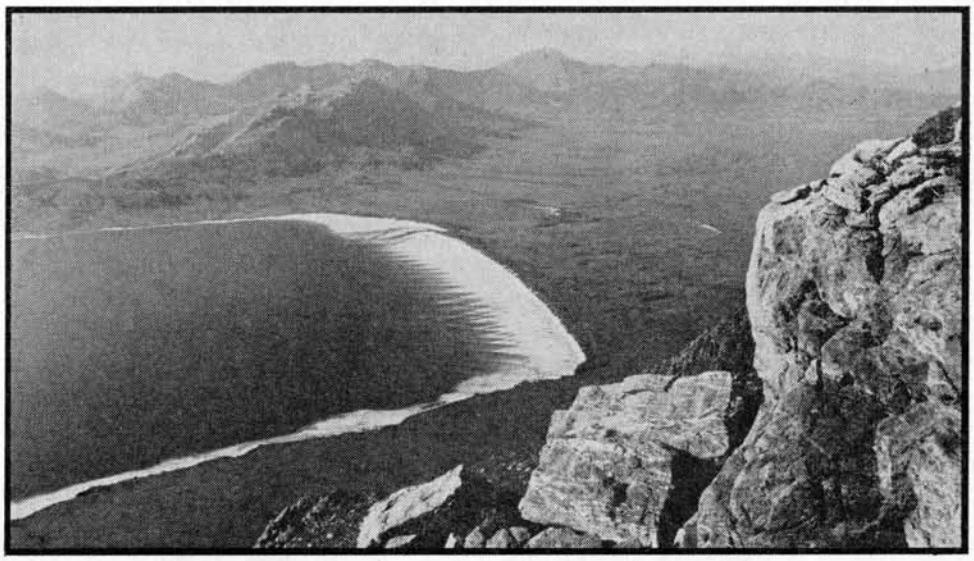
Will unique Tasmanian lake be saved?

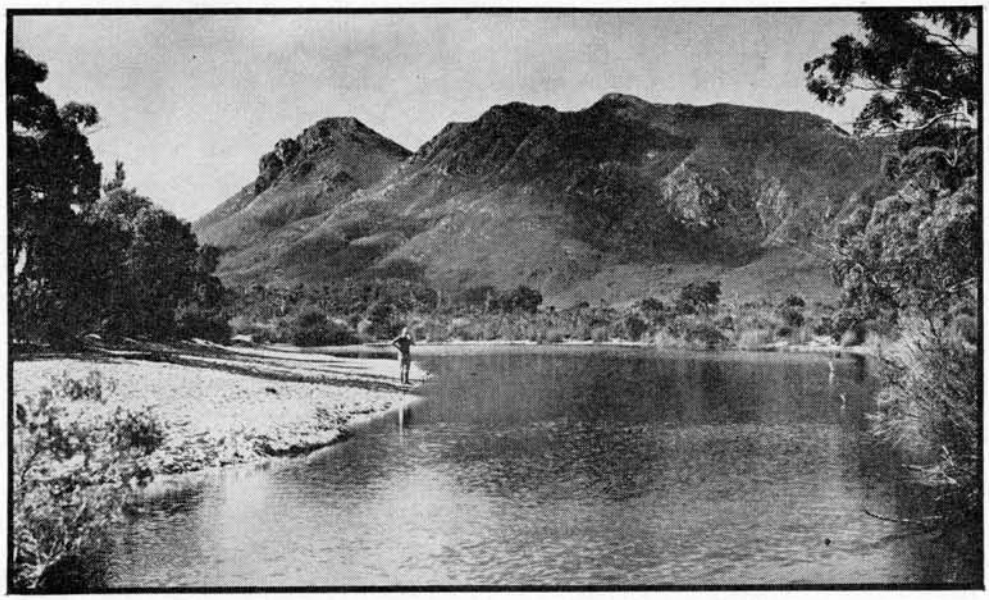
Pedder's last impediment

A dramatic last minute attempt to save a unique Tasmanian lake has been made by Australia's Minister for the Environment, Dr Cass. He has urged the Federal Government to go ahead with a Commission of Enquiry into alternatives to flooding Lake Pedder, whether the Tasmanian State government likes it or not.

Part of Tasmania's South-West National Park, Lake Pedder is of international scientific importance. Its impending destruction has been described by the International Biological Programme as "the greatest ecological tragedy since European settlement of Tasmania".

The lake's importance lies in its structure: there are extensive beaches of quartzitic sand and gravel, which are seasonally flooded (in winter) and exposed (in summer). Because of the beaches' gentle slope, the effect of these fluctuations is dramatic: as the waters fall a rich variety of flowers come into bloom, many of them endemic or rare.





Two views of Lake Pedder

Although the lake has been studied only recently and partially, 17 species of animal and plant absolutely unique to it have been discovered already. In addition, there are three very rare species, of which Lake Pedder is one of their most important habitats. Among the unique species of plants, is a new species of lily (genus *Milligania*) and two new species of the genus *Centrolepis*. Among the animal species unique to the lake are two species of a very ancient group of crustacea. Many of the other animal species have been newly discovered at Lake Pedder. Almost certainly if there were time for more research, further new and unique species would be discovered.

This fascinating variety of little known life depends on the seasonal rise and fall of the lake through the beaches in which it exists. This cycle has now ended with the construction of a hydro-electric scheme which will put the whole of Lake Pedder permanently under water.

The scheme consists of a main dam with power station on the Gordon River which is ponded back to form the Gordon River Storage; a second dam on the Serpentine which flows north-west out of Lake Pedder; and a third on the Huon which flows east from the hills on its eastward side. Two large lakes have thus been created, joined by a canal sliced through the range between them.

Only the top two feet of Serpentine/Huon water will be drawn off into the Gordon River Storage so the scheme is a bit like using a sledge-hammer to crack a nut. Its opponents have proposed instead that the Huon be allowed to run free and a much smaller lake be formed by the Serpentine Dam: large enough to provide sufficient water via a pumping station to top up the Gordon, but not so large as to affect Pedder.

If the waters were to start falling in the next month, then most of the threatened species would recover. Last year, the Federal Prime Minister, Mr Gough Whitlam, appealed to Tasmania's Premier, Mr Reece, to help set up a joint Federal-State Commission to study alternatives to the death of Lake Pedder. Mr Reece refused. It is Mr Reece's intransigence that led to Dr Cass' appeal to his own government to step in regardless, before it is too late —before Australia confirms itself as a land of big feet and no brains.

Robert Allen

Organic research centre in business

The Pye Research Centre has opened its doors at last. Formed more than a year ago to take over from the Soil Association the comparison of different farming systems, it has been examining its research material—the farms themselves—and sifting through mountains of records, some of them going back to the end of World War I. In January it announced its objectives and outlined the projects which form the start of its research programme.

The Centre aims to study any correlation that may exist between farming systems and the nutritional quality of produce and the effect of the produce on the health of consumers; to define "nutritional quality", which is a vague concept at present and to devise farming systems that will produce food of a predetermined quality at an acceptable market price; to compare farming methods from the points of view of crop quality, long-term environmental effect and sustainability; to study the effects of farming on ecosystems; and to conduct "such additional research into any aspect of nutrition, agronomy, medicine, environmental pollution or ecology that might contribute valuably to mankind's understanding of his relationship with his total environment and thereby enable him to use the resources available to him to the best possible effect".

The aim is ambitious and while it is built on the foundations laid by the Soil Association it goes far beyond the original concept.

The programme has begun with 48 separate projects, most of them conducted by and all funded by the Centre itself. There is collaboration with Durham University to monitor nutrient leaching and to examine nitrogen balances, with Manchester University to study the levels of caesium-137, with NERC on the biological control of cabbage root fly, with the Ministry of Agriculture to measure levels of fertility and to test manurial practices, with the London Hospital Medical School to study the effects of sodium fluoride on soils and on pregnant females and embryos, and with Leicester City Council to examine the value of municipal compost and possible dangers from its pollution by heavy metals.

In a sense, these projects are peripheral to the immediate work of the Centre, which is to bring the farms to a high state of fertility, while maintaining the integrity of the section that receives only organically based materials, to improve the dairy herd so that by 1979 the Centre has a first-class pedigree Guernsey herd, and all the time to monitor the nutritional value of its output through the observation of small mammals in a controlled environment as well as rabbits and farm livestock, out of doors. It will also take a critical look at what many farmers regard as the worst of modern practices, such as the monocultural growing of wheat and the burning of straw, to find out what effect they do have and to compare the results they give with those available to the more moderate farmer.

Very properly, the Centre avoids placing any emphasis on organic farming. It does not prejudge its results and the comparisons it makes are genuinely impartial, as they must be if they are to have any meaning. Nevertheless, it is still the only research centre in Britain to take the views, attitudes and methods of organic farmers seriously and the information it produces will be of immediate interest and value to them.

Michael Allaby

I had a vasectomy

My name is Harold Rurlander—my wife's name is Jean, and we are both 25. We have a son, Rickie, who is three and a half, and there is a baby on the way. We have been living in Austria for nearly two years, where I teach English at a hotel school.

At the beginning of June this year I had a vasectomy operation, and I'd like to tell you about it, what led up to it, and how we feel about it afterwards. After Rickie was born, Jean and I searched around for a contraceptive method which would suit us. We knew the pill was almost 100 per cent effective, and so that is what we used for two years. Jean went through the usual changing of brands to find one that suited her, but we were still very disturbed by the reports and counter-reports of the long-term safety—or danger—of the pill. And the thought that she was tampering chemically with the natural workings of her body upset Jean very much. We could see that this wasn't the answer and were appalled by the prospect of her having to take the pill for the next 20 years or so.

We had already become interested in the problems of environment and overpopulation and began to read more about these subjects. About this time we realised that you either give up in despair at not being able to do anything about these problems as an individual—which means you lose respect for your own role in life when you feel that you have no influence on anything—or you respect your own and other people's individuality, and realise that you and they, together, can make a contribution to the solution of these problems. We chose the latter course, joined several groups of like-minded people, such as Friends of the Earth, the Conservation Society, the Birth Control Campaign and Population Stabilisation, and decided to try and live up to these principles in our own life, with regard to environment and overpopulation. We then thought that we would have no more children of our own, but adopt any more that we wanted. On enquiry, we

found that according to Austrian law we couldn't adopt till I was 30, which was too long to wait. This is why we are having a second baby after all. But then we thought about what would happen afterwards. We wanted to stop at two children at all costs, because of our commitment of doing something about achieving a stable population at an average of two children per family. The pill was out, and we had no faith at all in other forms of contraception on a long term basis, nor a desire to use any of them. So we needed an alternative.

About three years ago we first heard about vasectomy and got some information about it through two very helpful organisations: the Association for Voluntary Sterilisation in New York, and the Simon Population Trust, now the Crediton Project, at Crediton, Devon. We also made enquiries about it through our GP before we left for Austria. After that we read more and more about it, and became more and more convinced that it was the perfect solution to our problem.

The operation

As for the operation itself, I can only tell you about my own experience, but I've no reason to believe it's not typical. The Crediton Project has a list of responsible and experienced surgeons throughout the country who carry out the operation on a private basis, and I was told it would cost £20 to £30. (In fact, it cost only £20). The Project put me in touch with a surgeon in South London, whom they recommended very highly. A referral is made in the normal way by the Project's doctor. I was given an appointment almost immediately—there was no waiting list. This wasn't because only a few vasectomies were done—just the opposite, in fact—but because the way they were done was particularly efficient.

At the clinic, there were other men and their wives, who were there for the same reason as us. The only formality is the signing of a consent form by husband and wife. Each surgeon decides on the merits of a case whether he will accept it or not. If he felt that both husband and wife were fully in favour of the operation, he would probably not refuse to do it.

The doctors and reception staff put us all at our ease, and the man who had his operation before me assured me there was nothing to worry about. The operation itself lasted no longer than 20 minutes and was carried out by two surgeons with no woman present. The intravenous sedation took effect immediately and then I felt pleasantly drowsy. This feeling lasted for some time after the operation.

Not being the queasy type and having watched the birth of our son, I was able to sit up a little and watch most of the operation, which was painless and only slightly uncomfortable once or twice. Afterwards there was a lie down and a cup of tea, and it struck me at this point that the whole proceedings weren't much more complicated or uncomfortable than when you donate a pint of blood!

Afterwards, I was given detailed printed instructions on what to do after the operation, especially as far as the dressings and sperm counts were concerned. Again, after the operation there was no pain at all, only some discomfort occasionally. The dressings and support have to be worn till the incisions have healed.

There are two sperm counts. The first at about 12 weeks after the operation, and the second at about 15 weeks. Until both *negative* counts have been taken, you still have to use other contraceptive methods, but the operation is very rarely unsuccessful. You have to assume that it is irreversible, although some doctors in the USA have a 50–80 per cent success rate in the cases where they've tried to reverse it. (The first vasectomies in the States were done in the 1920s, and it's estimated that over two million have been done there since then, so this method is by no means new and untried).

No adverse effect

There are no adverse physical or psychological side-effects of the operation at all. I certainly feel no different than before, except that Jean and I are delighted at the prospect of not having to use any contraceptives literally for the rest of our lives, and the release from tension and worry about becoming pregnant again is something any couple will understand. A survey of over 1,000 vasectomised men carried out by the Crediton Project showed that not only were their marital relations happier and more relaxed, but that the number of times they had intercourse in a month increased in almost every case.

More and more couples are realising that vasectomy is the answer for them, as is shown by the figures for vasectomies carried out in recent years. The UK total for 1968 was about 10,000. In 1969 it doubled to 20,000, and in 1970 it doubled again to about 40,000, with over 100,000 in the USA. I am convinced this is the answer for so many people throughout the country and the world, and hope that it will become more and more popular now that local authorities are empowered to run vasectomy clinics under the National Health Service.

Since I've had the operation, I've spoken to many people about it—spreading the word, so to speak, and I shall go on doing so because I believe it's the answer to many of our problems as individuals, as families, as nations and ultimately as a world community threatened by the dreadful scourge of overpopulation, the root of so many other evils.

Harold Rurlander

Notes

1. Men in the UK interested in having a vasectomy should go first to their own doctors, who will probably be able to refer them to a suitable surgeon; but if they have any difficulty, or need further information about the operation, they should then contact the Crediton Project, or the Family Planning Association.

2. The sperm counts can of course be done later (even much later) than 12 and 15 weeks after the operation. This is sometimes all to the good, as a small percentage of men take much longer than three months to clear seminal vesicles. This is why some men have more than two sperm counts before two consecutive negative counts are taken. (Other precautions must be taken, of course, between the operation and the two negative counts).

3. Local Authorities are now empowered to run vasectomy clinics under the National Health Service. To date 22 local authorities are considering offering free vasectomies, and Hackney and Islington have already agreed to do so. The Family Planning Association has 30 vasectomy clinics across the country with waiting lists no longer than two weeks.

4. Some men are worried about the possibility of the tubes growing together again, as has happened in very rare cases. This would normally happen within a month or so of the operation, so the sperm counts would register the fact that the operation was unsuccessful. On the other hand, a growing together of the tubes is considered impossible with the "umbrella handle" method, which is being used increasingly. This consists of cutting a segment from each vas (tube). Each cut end is tied twice, and doubled back on itself, and tied again. The cut ends do *not* face one another, and one surgeon, who does vasectomies regularly, has reported *no* failures at all over a period of three years.

"I'm sorry, Bert, but I'm the only one well enough to go on strike."

Comment

Britain has no strike problem

Britain has no strike problem. The statement must sound extreme, not to say extraordinary, in a country whose newspapers, television and radio news programmes report new industrial disputes daily. We have convinced ourselves, and the government, not only that strikes are undesirable, but that the incidence of them has risen to such a degree that national calamity must be imminent. So it may be, but not as a result of strikes.

In 1967 the United Kingdom lost three million working days as a result of industrial disputes and in subsequent years the figure has been even higher, partly as a result of protests against government action to prohibit strikes. Yet, according to an article in the December 1972 issue of *WHO Chronicle*, in 1967 Britain also lost 23 million working days as a result of compensated industrial injury or disease. Beside this, the number of days lost through strikes dwindles into insignificance. As though the figures alone were not bad enough, illness costs more than strikes, for not only is production lost and compensation paid to dependents, but medical treatment must be paid for as well. Nor is that the end, for to this figure of 23 million days may be added a proportion of the days lost through strikes whose true cause was frustration at working in boring, bad or even dangerous conditions. By 1971 the number of working days lost through strikes had risen to 13.6 million, those lost through illness rose to about 240 million and through injury to 25 million. (*Social Trends 1972*, HMSO). Our preoccupation with strikes is quite out of proportion. We are ignoring the graver problems.

The figures for the incidence of industrial or occupation-related injury and disease are probably conservative. They do not take full account of neurotic symptoms, digestive disorders, peptic ulcer and cardiovascular conditions to which industrial workers are particularly prone and which are clearly related to the environment in which they spend a large part of their time. Nor do they take account of those illnesses which are distressing rather than incapacitating. Hearing loss is common in certain industries, yet it causes no loss in working hours. Vibration, heat and changes in atmospheric pressure may affect the health of workers and infections may be transmitted more rapidly in the environment of a factory. Dust and toxic gases may produce symptoms only after years of exposure. A proportion of accidents is due to disease, physical or psychological, at a sub-acute level.

Trades unions work constantly to improve working conditions but their efforts seldom attract public attention. In discussions about the environment, particularly in those which centre on industrial pollution, unionists are quick to point out that what is an inconvenience to the community at large is a day-to-day hazard for their members.

We should break our obsession with strikes and pay far more attention to improving the environment inside as well as outside factories, with unionists and ecologists working together. They should work together; they are fighting on the same side.

Michael Allaby

The settlement of Stockholm

The tumult and the shouting have died, the captains and kings have—at least temporarily—departed. The dust raised at Stockholm has again settled to conceal the slow slide by nations toward global industrial crisis.

Was Stockholm worth it all? The trouble is that even the crudest cost and benefit review is virtually impossible. Many of the costs, e.g. the preparation of documentation by national governments and non-governmental bodies, were also benefits, in that they were intergovernmental and educational exercises. Education was indeed, probably the main benefit of the whole conference.

But if it is impossible to quantify what we mean by this statement, it is at least possible now to discern the shape of the new UN machinery for environmental action conceived at Stockholm.

The January *Ecologist* described the emerging outline of the General Assembly's settlement. The picture is not yet complete, but the general pattern of who in the UN will do what and where is now reasonably clear.

What is also clear is the degree of resistance within the UN System itself to these changes. Maurice Strong, now confirmed as the First Executive-Director of the new Environment Programme (UNEP), had to fight for his present stature and degree of budgetary freedom, right down to the last dotted i and crossed t. In fact, the battle of the fine print is not quite over yet. But what has emerged is that Strong, the 41-year-old ex-cabinet minister, has proved himself a match for the UN's finest Italian hands with the stiletto. Not surprisingly, Strong met his toughest opposition over the issue of control of the new Environment Programme's operating budget of $2,000,000. According to a report leaked from high places to the *New York Times*, Strong marched into Waldheim's office, a letter of withdrawal from his candidacy for the new post in hand. Strong won Waldheim's backing, his tough line gaining him new respect in the endless in-fight of the UN's bureaucracy.

How is Strong now disposing his extremely modest battalions? The shape of the new work programme, recently revealed, shows a re-grouping of the six subject areas of Stockholm into three new subject areas. Area I will now deal with pollutants, climate, natural disasters, information exchange, and fisheries. Fisheries have been transferred to this subject area from the old subject area II (natural resource management). The move may be significant in that it appears that the Environment Programme intends to concentrate initially on the issue of contamination of fisheries by pollution, and to avoid the politically fraught question of conserving catches. They can, after all, argue, in defence of this arrangement, that the conservation aspect of fisheries is in effect *sub judice* as it is intimately involved in the issue of territorial seas and nations "patrimonial rights" over sea and seabed resources. However, Strong's approach is that the Programme should concern itself with the total management of fish resources.

The new Subject Area II (resource management) includes management of genetic resources; "integrated resource planning"; land and water manage-

ment; energy; and a compendium category now called "parks, wildlife and protected areas".

Newstyle Subject Area III replaces old style Subject Areas I, IV and V. It will include human settlements; "environment and development", population, as it affects the environment (an advance on Stockholm apparently induced by the prospect of World Population Year and a World Population Conference in 1974) and another compendium category, entitled "education and social, cultural and public information activities".

For the time being the 30-odd professional grade officers responsible for these three subject areas will remain in the *Palais des Nations* at Geneva. But in the Autumn (October is the target date) the Executive-Director's office, plus the administrative staff and management of the new Environment Fund (about 20 professionals) will move to Nairobi. They will be followed by other professionals now being recruited, for Subject Areas II and III.

Geneva will become a "regional office" of UNEP for Europe, but most of the UN Secretariat's work on pollutants, climate, fisheries (contamination of) and natural disasters will remain—for the time being—located in the *Palais*. It will be presided over by an Assistant Executive-Director, Robert Frosch, new to the UN, and formerly one of the US Navy's chief science and technology advisors. The new Environmental Information Referral Service will be divided between the *Palais* and the offices of the International Computing Centre, housed in the glittery chrome glass and white marble headquarters of WHO just up the hill from the *Palais*.

Initial operations in each of these Subject Areas are going to be very seriously hampered by budget constraints. The Secretariat's total operating budget of under $2 million will be stretched drum-tight by air fares to and from Nairobi and by giant telephone bills that are inevitable in an organisation straddling Nairobi, Geneva and New York, where an essential liaison office must be maintained. Nor does it seem that the Environment Fund is going to get its target figure of $20 million in its first year of operations. The German Government is the only one that has so far (at mid-January) actually paid up. The Japanese have announced that they will stump up 10 per cent of the target. The UK having promised £400,000 a year (4.7 per cent of the total target) is now shamed by France who has surprised many with an offer of 6.7 per cent. A maximum of $15 million is expected to be contributed to the fund in its first year.

How will these early commitments to the Fund be spent? A programme of operations is being prepared for June 11th when the new UN Environment Council will begin its first 10-day meeting. Requests for help received so far from developing countries have asked for environmental studies of human settlements problems and regional seminars to clarify possible targets for action. The Environment Secretariat is also negotiating with the UN Development Programme and the UN's Advisory Committee on Science and Technology, whose own Action Plan, published in 1971, lists a number of areas where "intermediate" or "more appropriate" technology could, and should, be developed to solve some of the Third World's common environmental and developmental problems.

So the Stockholm ship of inter-state is launched. As governments start to clamber aboard, the next months will indicate whether the majority come equipped with charts and provisions or with saws and gimlets. But with Maurice Strong now striding the quarterdeck at least it can be predicted that the new vessel will not remain tied up in dock.

Brian Johnson

"It's never too late to be a coalman" [1]

Coalminers will have found the Government's hand-out very welcome. For a number of years their's has been an industry in decline and until their last-minute reprieve they were facing a 50 per cent drop in annual coal production to 80 million tons and a 75 per cent reduction in their total work force to 65,000 by 1980. A staggering rundown when one takes into account that in 1967 395,000 men worked the mines.

Not that the Tories are giving £720 million together with a £475 million write-off of the Coal Board's debts out of the goodness of their hearts. Otherwise they would hardly be injecting capital into the steel industry in the face of the British Steel Corporation's intention to lay off thousands of steelworkers. The real reason for the Government's intervention to salvage the coal industry is undoubtedly a dawning realisation that coal will be a vital ingredient of the British industrial scene in 20 to 30 years' time when the oil and natural gas of the North Sea and also of the Celtic Sea will be becoming little more than memories.

It seems that coal will be the only source of primary energy on which Britain will be able to rely with any degree of certainty by the turn of the century. Despite expectations that 90 per cent of Britain's electricity and 50 per cent of its primary energy would be delivered by nuclear power by 2000 the nuclear industry appears to be in chaos, with no clear idea which line of reactors to pursue. Moreover to construct the requisite number of reactors to meet Britain's energy demands in the future looks like being totally beyond the capabilities of the nuclear industry as it now stands.

The simple truth is that Britain, like the United States, is facing an energy crisis in which energy resources can no longer be extracted and utilised fast enough to meet demand. By 1985, for example, the United States could find itself in the impossible position of paying more for its imports of primary energy than it could then gain from the total sales of its exports.

In view of such a crisis it would be a foolhardy government that turned its back on coal, as previous British Governments have done. Nevertheless the Government's generosity towards the coal industry loses some of its lustre when compared with the mammoth capital investments of the oil industry. Exploration alone can cost up to £2 million per bore hole and the total cost of exploration, production and running costs over the next 10 years in the North Sea are likely to run to a minimum of £2,500 million. The 25,000 new jobs anticipated by the North East of Scotland Development Association will need an investment of £100,000 each.

The coalminers are used to carrying the industrial society on their backs, and it looks as if they will go on doing so for some time to come.

Peter Bunyard

1. Milligan, Spike, 1972. *The Last Goon Show.*

Gremlin

Look out, some Shell's about !

December 1972's *Ecologist* carried a letter from one of Shell's executives, taking Friends of the Earth to task for saying rude things about Vapona.

"The insecticidally active part of Vapona strips", he wrote, "is the well known chemical dichlorvos, probably one of the most safe and well documented insecticides in current use".

December 15th 1972's *Nature* carried a letter from three scientists at the University of Victoria, British Columbia, who had tested 17 pesticides for mutagenicity. They found that only two of them were mutagenic to bacteria—captan and dichlorvos.

Mutagenicity to bacteria is a danger signal that the substance could be mutagenic or teratogenic to mammals. The scientists found that "Dichlorvos increases the mutant yield by a factor of about three", and sometimes as high as six, and they added that "these values are underestimates". They concluded that their results "indicate clearly the mutagenic action of this widely used and much discussed pesticide".

The man from Shell wrote in the *Ecologist*: "As you would expect, Shell companies are at all times conscious of their proper responsibilities in connection with the environmental effects of their products".

Like withdrawing Vapona?

And if dichlorvos is their safest and best documented insecticide, what are they going to do about the others?

Save transport, plant a tree

True to the spirit of Plant a Tree Year, the Forestry Commission has launched ambitious tree planting schemes in practically every county in Britain. Especially lucky is Sussex: at Charlton an entire *clump* of trees is to be planted —as a partial screen to a sawmill.

Litter Britain Tidy

Litter louts will be glad to know that they can dispose of their disposable cups with a clear conscience. Thanks to DRG Cups, specially coated paper cups are now available adorned with rousing anti-litter slogans. This enterprise is the fruit of cooperation between DRG and the Keep Britain Tidy campaign, an organisation renowned for its environmental extremism.

According to the manufacturers, "DRG specially coated paper cups are completely disposable, a characteristic that the cross-channel ferries, along with many other users, have welcomed in their attempts to reduce beach and sea pollution".

It's a relief to hear that. There have been a lot of complaints lately about the other kind of paper cups, the one's without the anti-litter slogans. Apparently when tossed over the side they are simply disposed of by the sea back onto the beach.

Still, even they aren't as bad as china cups. China is a real menace. Thank God for Keep Britain Tidy. Without them our beaches would be knee-deep in crockery.

Fur crying out loud

There was plenty of fur flying in the *Times* a few weeks back what with Hugh Shire, button-boy for the notorious British Fur Trade Association, weighing into Friends of the Earth for all he was worth—which, in financial terms at least, is probably a fair sum. FOE doesn't care about animals, didn't get involved in the animal import debate until the banning of the three cat-skins was already agreed, and since FOE tries to raise money in order to pursue interests it doesn't really hold it's also committing fraud on the public at large. Quite a mouthful. Quite a mouth.

Now Friends of the Earth are entirely capable of looking after themselves, and when it comes to a punch-up it's universally acknowledged that gremlins don't have a lot of weight to throw around. But this particular Gremlin is a thorough little chap and happens to have documentary evidence (as has the BFTA) which shows Shire's criticisms to be no more than a series of total—and defamatory—fabrications. And if Gremlin can prove that, then so can FOE. It would be an ironic touch if the Fur Traders themselves were skinned—in the courts.

Correspondence

Sir,

Your comment under the heading "Eco-nuts" in your January number calls for an explanation. It has always been CPRE policy to aim at preventing the loss of a single acre unnecessarily through greed, indifference or bad planning. This, you say, is an extreme point of view. Why? Are we to understand that the odd acre here or there does not matter at a time when we are losing some 60,000 every year, or that greed, indifference or bad planning are not to be combatted?

Yours faithfully,

John Yeoman,
Assistant Secretary,
Council for the Protection of Rural England.

Dear Mr Yeoman,

I join you in your fight against greed, indifference and bad planning. What pains me is the extreme rigidity of your attitude to change. Of course it is inevitable, of course it should be for the better. But *whenever possible*? Tush.

Yours sincerely,
Gremlin.

Dear *Ecologist* Editors,

I have just received a letter from the Council for the Preservation of Rural England. It appears to be a hoax. Life is difficult enough without this sort of thing. Kindly see that it does not happen again.

Yours sincerely,
Gremlin.

And now, live from Cornwall . . .

Andrew MacKillop, our wizard demotechnologist, has a crossbow which boasts a telescopic sight, an aluminium alloy crosspiece, and other signs that it is a high technology article. Taxed on this, MacKillop protested that it had a lower environmental impact than a gun. Any day now, we expect him to arrive at the office in a helicopter, on the grounds that it has a lower impact than Concorde.

Talking of impact, the car shared by Goldsmith and his fellow gentleman farmer (cross out which does not apply), Jeremy Faull, has the highest environmental impact of any vehicle in the South-West, judging by the frequency with which they drive it into the hedge. "It's good being close to nature", said Goldsmith to Allen one day. Muttered Allen: "Not that close".

How to stabilise the economy

Herman E. Daly

A Blueprint for Survival suggested four principal conditions of the stable society: a stable population, minimum consumption of raw materials and energy, minimum ecological disruption, and a community structure which would make the first three conditions acceptable. Since then argument has centred on how these conditions might be achieved.

Here, Herman Daly, one of the few economists to have addressed himself to these problems, proposes three institutions, or methods—the first to maintain a stable population, the second to minimise both resource depletion and pollution, and the third to ensure the harmonious distribution of wealth (without which no society is likely to remain stable).

"Only when, in addition to just institutions, the increase of mankind shall be under the deliberate guidance of judicious foresight, can the conquests made from the powers of nature by the intellect and energy of scientific discoverers become the common property of the species, and the means of improving and elevating the universal lot."—John Stuart Mill.

The steady-state economy is a *physical* concept. It is defined by constant stocks of people and physical wealth (artifacts), maintained at some desirable chosen levels by a "low" rate of throughput. Benefits come from the services rendered by the stocks or funds of physical wealth and people. This service is the satisfaction of certain human wants. Although unmeasurable, want satisfaction or psychic income is clearly a function of the existing stock, not the flow of throughput. The flow of physical production serves to maintain the stock in the face of the ravages of wear and tear and depreciation, and is a necessary cost. In sum, the immediate benefit of the stock is the service it renders, the immediate cost of the stock is the maintenance throughput it requires.[1] The ultimate benefit yielded by the stocks is life itself and the enjoyment thereof; the ultimate cost imposed by the maintenance flow (throughput) is the continual degradation of low-entropy, useful matter-energy into high entropy, waste matter-energy.[2] The size of the stock and its associated throughput is limited by the mass of the earth, the rate of heat radiation to outer space, and far more stringently by the tangled web of ecological interrelations which too large a throughput will rip to shreds. Social limits are less recognisable than the physical, but probably more likely to be the effective limit. The biophysical limits imply the necessity of a steady-state economy. The more stringent, but less recognisable, social limits probably imply the desirability of a steady-state economy long before it becomes physically necessary.

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Steady-state vs. no-growth

But once we attain a steady-state economy we are not forever frozen at that particular level of population and wealth. As values and technologies evolve, we may decide that a different level is both possible *and* desirable. But the growth (or decline) necessary to reach the new level is a temporary adjustment process—a transition from one steady-state to another, not a return to growth as the norm. Technologists can discover how to get more service out of the same mass of stock. This kind of growth is non-physical and is limited only by human inventiveness and appetites. Technologists can also discover ways to maintain the same mass of stock with a lower throughput, which may permit the choice of a larger stock maintained by the same throughput. This kind of growth is limited by the second law of thermodynamics.

In light of these considerations, the terms "no-growth" or "zero-growth" economy are unfortunate in that they can be interpreted to mean that no growth of any kind is possible either in welfare or in occasional temporary adjustment to a different level of stock. To avoid this confusion I advocate the term "steady-state economy" as here defined in physical terms. But while the critics have enjoyed knocking down the "no-growth" straw man it should be clear that the steady-state position remains unscathed. Futhermore most of the radical social implications of no-growth which aroused their righteously rigorous analytical anger in the first place, are equally present in the steady-state view, and not so easy to escape. To see this we need only ask what kind of institutions are necessary for the attainment of a steady-state economy. They follow from the definition: an institution for maintaining a constant population; an institution for maintaining a constant stock of physical wealth; and less obviously, but most important, an institution for limiting the degree of inequality in the distribution of the constant stock among the constant population.

Persuading the realists

In what follows, the necessity and desirability of a steady-state economy are taken for granted.[3] The question considered is: what kind of institutions will best do the job? The institutions suggested are radical and will never come to be without a moral and political renewal. But lest I be charged with being unrealistic it should be emphasised that the present economy, addicted to exponential growth of physical quantities,[4] is patently unrealistic. As Paul Ehrlich says, "It must be one of the greatest ironies of

the human species that the only salvation for the practical men now lies in what they think of as the dreams of idealists. The question now is: can the realists be persuaded to face reality in time?"[5]

Part of the task of persuasion is to outline how a steady-state alternative could function. All critics of the status quo must face the perennial question: "What will you put in its place?" Though the question must be squarely faced, failure to answer it exhaustively does not justify the status quo. As G. K. Chesterton observed:

"If we give man an emetic after he has taken a poison, it is not because we think he can live on emetics any more than he can live on poisons. It is because we think that after he has first recovered from the poison, and then from the emetic, there will come a time when he himself will think he would like a little ordinary food. In other words, the very first principle upon which all such reforms rest, is that there is some tendency to recovery in every living thing if we can remove the pressure of immediate peril or pain."[6]

The immediate peril is the pressure of exponential physical growth, driven by greed and excessive inequality. The first two institutions aim at stopping physical accumulation and are like an emetic. The third, governing distribution, is necessary both to keep the emetic from acting too harshly on the poor (a palliative), and to keep growth pressures of inequality from recurring in the future (a prophylactic). Major faith, however, must be placed in the basic regenerative powers of life, rather than in our ability to consciously plan a specific future according to some detailed rational blueprint. Any prescription beyond emetics, palliatives, and prophylactics is likely to be both unnecessary and overpriced.

Social institutions

The guiding design principle for the three social institutions is to provide the necessary control with a minimum sacrifice of personal freedom, to provide macro-stability while allowing for micro-variability, to combine the macro-static with the micro-dynamic. To do otherwise, to aim for micro-stability and control is likely to be self-defeating and result in macro-instability, as the capacity for spontaneous co-ordination, adjustment, and evolution (which always occurs on the micro level) is stifled by centralised planning.

Licensing parenthood

For maintaining a constant population an ingenious institution has been proposed by Kenneth Boulding. Unfortunately it has been treated more as a joke than as a serious proposal. The idea is to issue directly to individuals licences to have children. Each person receives certificates in an amount permitting 1·1 children, or each couple at marriage receives certificates permitting 2·2 children, or whatever number corresponds to replacement fertility. The licences can be bought and sold on a free market. Thus macro-stability is attained, micro-variability is permitted. Furthermore, those having more than two children must pay for an extra licence, and those who have fewer than two children receive payment for their unused licence certificates. The right to have children is distributed equally. Market supply and demand then redistributes these rights. People who do not or cannot have children are rewarded financially. People who wish to have more than two are penalised financially. And the subsidies and penalties are handled by the market, with no bureaucracy.

A slight amendment to the plan might be to grant 1·0 certificates to each individual and have these refer not to births but to "survivals." If someone dies before he has a child, then his certificate becomes a part of his estate and is willed to someone else, for example, his parents, who either use it to have another child, or sell it to someone else. The advantage of this modification is that it offsets existing class differentials in infant and child mortality. Without the modification, a poor family desiring two children could end up with two infant deaths and no certificates. The best plan of course is to eliminate class differences in mortality, but in the meantime this modification may make the plan initially easier to accept. Indeed, even in the absence of class differentials the modification has the advantage of building in a "guarantee."

Two other subsidiary advantages might be claimed. First, the genetic burden of infertility is rather arbitrarily and "unjustly" distributed among couples. The Boulding plan offers at least some compensation to those who drew a fertility blank in the genetic lottery. It partially compensates for a natural inequity. Also it allows celibates to exercise some influence on the quality of the next generation by exercising discretion concerning to whom they sell or give their certificates. They could sell or donate their certificates only to those whom they felt would make good parents.

Objections and presuppositions

Let us dispose of two common objections to the plan. First, it is argued that it is unjust because the rich have an advantage. Of course the rich always have an advantage, but is their advantage increased or decreased in Boulding's plan? Clearly it is decreased. The effect of the plan on income distribution is equalising because (1) the marketable asset is distributed equally; and (2) as the rich have more children their family *per capita* incomes are lowered while as the poor have fewer children their family *per capita* incomes increase. Also, from the point of view of the children there is something to be said for increasing the probability that they will be born rich rather than poor. Whatever injustice there is in the plan stems from the existence of rich and poor, not from the plan itself, which actually reduces the degree of injustice. Furthermore, income and wealth distribution are to be controlled by a separate institution, discussed below, so that in the overall system this objection is more fully met.

A more reasonable objection raises the problem of enforcement, that is, what to do with law-breaking parents and their illegal children? What do we do with illegal children today? One possibility is to put the children up for adoption and encourage adoption by paying the adopting parents the market value, plus subsidy if need be, for their licence, thus retiring a licence from circulation to compensate for the child born with a licence. Like any other law-breakers the offending parents are subject to punishment. They may have the choice of a fine, a jail sentence, or sterilisation. Of course if everyone breaks a law no law can be enforced. The plan presuppposes the acceptance of the morality and necessity of the law by a large segment of the public. It also presupposes widespread knowledge of contraceptive practices. But

these presuppositions would apply to any institution of population control.

Objective constraint vs. manipulation

Choice may be influenced in two ways: by acting on or "rigging" the objective conditions of choice (prices and incomes in a broad sense), or by manipulating the subjective conditions of choice (preferences). Boulding's plan imposes straightforward objective constraints and does not presumptuously attempt to manipulate peoples' preferences. Preference changes due to individual example and moral conversion are in no way ruled out. If preferences should change so that, on the average, the population desired replacement fertility, the price of a certificate would approach zero and the objective constraint would automatically vanish. The moral basis of the plan is that everyone is treated equally, yet there is no insistence upon conformity of preferences, the latter being the great drawback of "voluntary" plans which rely on official moral suasion. Some people, God bless them, will never be persuaded, and their individual non-conformity wrecks the moral basis (equal treatment) of "voluntary" programmes.

Depletion quotas

The guiding principle is the same as in the case of population: to combine macro-stability with micro-variability, or macro-statics with micro-dynamics. The strategic point at which to impose macro-control seems to me to be the rate of depletion of material resources. If we control aggregate depletion, then by the law of conservation of matter and energy, we will also control aggregate pollution.

Let there be quotas, both renewable and non-renewable, set on new depletion of each of the basic resources, during a given time period. Let legal rights to deplete up to the amount of the quota for each resource be auctioned off by the government, at the beginning of each time period, in conveniently divisible units, to private firms, individuals, and public enterprises. After purchase from the government the quota rights are freely transferable by sale or gift. As population growth and economic growth press against resources the prices of the depletion quotas will be driven higher and higher. Reduction of quotas to lower levels in the interest of conservation of non-renewables and optimal exploitation of renewables would drive the price of the quotas still higher. The increasing windfall rents resulting from increasing pressure of demand on fixed supply would be captured by the government through the auctioning of the depletion rights. The government spends the revenues, let us say, by paying a social dividend. Even though the monetary flow is therefore undiminished, the real flow has been physically limited by the resource quotas. All prices of resources and of goods increase, with the prices of resource-intensive goods increasing relatively more. Total resource consumption (depletion) is reduced. Moreover, by the law of conservation of matter-energy, if ultimate inputs are reduced, so must ultimate outputs (pollution) be reduced. The aggregate throughput is reduced and with it the stress it puts on the ecosystem.

Profitable effects

With depletion now more expensive and with higher prices on final goods. recyling becomes more profitable. As recycling increases, effluents are reduced even more. Also, higher prices make consumers more interested in durability and careful maintenance of wealth. Most important, there is now a strong price incentive to develop new resource-saving technologies and patterns of consumption. If there is any static efficiency loss in setting the rate of depletion outside the market (a debatable point), it seems to be more than offset by the dynamic benefits of greater inducements to resource-saving technological progress.

The adjustment of depletion and pollution flows (throughput) to long-run ecologically sustainable levels can be effected gradually. In the first year depletion quotas could be set at the previous year's levels, and if necessary gradually reduced by, say, 2 per cent per year, until we reach an equilibrium level of stocks of wealth requiring "optimal" throughput for maintenance. Thereafter the constant stock will be maintained by the constant throughput. As we gradually exhaust non-renewable resources their quotas will approach zero and recycling will become the only source of inputs. By this time presumably, the ever-rising price of the resource would have induced a recycling technology. Without quotas this resource exhaustion need not be gradual. Also, without quotas, there is less incentive to develop the new technology, since one must face the uncertainty that some newly discovered reserves will lower resource price and make the technology temporarily uneconomical. When the rate of depletion becomes a social parameter it can be taken as known, and uncertainty will be less. Discoveries of new reserves will increase the length of time until exhaustion, rather than lowering the price.

Social decision as economic policy

With depletion quotas the aggregate rate of depletion becomes a social decision. This can be regarded as the correction of a market failure. For renewable resources quotas can be set at a calculated optimum sustainable yield or maximum rent, thus correcting the market failure of over-exploitation. The quota on renewables must be such as to avoid "eating into our capital." For privately owned and well managed renewable resources the quotas would be redundant, and could be dispensed with. Since with non-renewables mankind is always eating his capital, the rate of depletion should be a collective decision based largely on value judgments—once we are below ecological disaster thresholds. But two considerations argue for lower rates of depletion and higher prices than now prevail: first, the conservationists' moral concern about future generations, and second, the idea that resource-saving technology can be induced by high resource prices. The rate of depletion of the stock of terrestrial-low entropy is fundamentally a moral decision and should be decided on grounds of ethical desirability (stewardship), not technological possibility or present value calculations of profitability. By fixing the rate of depletion we force technology to focus more on the flow sources of solar energy and renewable resources. The solar flux cannot be increased in the present at the expense of the future.[7] Thus let technology devote itself to learning how to live off our solar income, rather than our terrestrial capital. Such advances will benefit all generations, not just the present.

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A further effect of the quota scheme is that relative factor prices would change, with labour becoming cheaper relative to land and capital. This effect by itself would tend to increase employment, which in itself is not a benefit, but is necessary as long as we maintain an income-through jobs system of distribution. However, reduced aggregate consumption would tend to reduce employment. In this case, a job-sharing reduction in the work week might be needed, or increased reliance on unearned income, such as a social dividend financed out of receipts from the auction of resource quotas.

Actualising the process

The actual mechanics of quota auction markets for three or four hundred basic resources would present no great problems. The whole process could be computerised since the function of an auctioneer is purely mechanical. It could be vastly simpler, faster, more decentralised, and less subject to fraud and manipulation than today's stock market. Also, qualitative variation among resources within each category, though ignored at the auction level, will be taken into account in price differentials paid to resource owners.

The scheme could and probably must be designed to include imported resources. The same depletion quota right could be required for importation of resources, and thus the market would determine the proportions in which our standard of living is sustained by depletion of national and foreign resources. Imported final goods would not be cheaper relative to national goods, assuming foreign nations do not limit their depletion. Our export goods would not be more expensive relative to the domestic goods of foreign countries. We would tend to a balance of payments deficit. But with a fluctuating exchange rate a rise in the price of foreign currencies relative to the dollar would restore equilibrium.[8] It might be argued that limiting our imports of resources will work a hardship on the many underdeveloped countries which export raw materials. This is not clear, because such a policy will also force those countries to transform their own resources domestically rather than through international trade. Finished goods would not be subject to quotas. In any case it is clear that in the long run we are not doing the underdeveloped countries any favour by using up their resource endowment. Sooner or later they will begin to drive a hard bargain for their non-renewable resources, and we had best not be too dependent on them.

An alternative to effluent taxes

The basic difference between depletion quotas and effluent taxes (the usual "solution to pollution" offered by economists) is that the former places macro-physical constraints beyond which the market economy may not go, and then leaves the price system alone, whereas the latter sets no physical constraints, but seeks by micro-intervention to rig all prices in such a way that the market economy automatically counts the costs of all ecological effects of growth and automatically stays within proper ecological bounds. The campaign slogan for effluent taxes is "internalisation of externalities," which means *calculating the full social cost* of production and including it in *the money* price of the product, for *each* commodity.

Unfortunately the problem of setting the correct effluent tax so as to truly "internalise externalities" is impossible. Many externalities are unmeasurable *in principle* (they involve interpersonal comparisons of well-being), and most are unmeasurable in practice. Indeed, the reason for such costs being left out of account by the market in the first place is often the impossibility of measuring them. Even when external cost (and benefits) can be measured, they are often the result of more than one polluting activity, and the allocation of the joint cost to each activity is arbitrary. Also, by permitting quantities to vary without limit, the effluent tax scheme assumes that external costs increase continuously and gradually, that there are no ecological thresholds or trigger relations. Unfortunately this is often not the case. In addition, as a tool of micro-intervention, effluent taxes require very detailed information, besides monitoring every chimney, dustbin, and drainpipe in the country.

Taxes do not limit growth

But even assuming away all the above difficulties and assuming the perfectly correct internalisation of all external costs, we find that effluent taxes do not limit growth of the throughput (GNP). They keep the throughput at its lowest cost mix for any given level of total throughput, but the level itself can continue upwards as population growth and economic growth continue. The reason is simple. Every time we "internalise an externality" we not only increase costs, but also incomes. Aggregate expenditure always equals aggregate income. The economy is always "rich" enough to buy as much as it can produce regardless of price.[9] If the government ran a surplus (did not spend the effluent tax it collected), then growth would be halted. But growth-oriented orthodox economists will urge government spending, probably even a deficit, in the name of full employment. From the orthodox viewpoint the inability of effluent taxes to limit the GNP throughput will be counted an advantage. But from the steady-state perspective the best that effluent taxes could do would be to reduce the resource-intensive component of GNP to some minimal percentage level, and hold it there, while the absolute level continues to rise. Internalisation of externalities via effluent taxes will not keep us from growing beyond ecological bounds.

Quotas: advantageous and workable

While depletion quotas lack the seductive theoretical nicety of effluent taxes, they nevertheless offer many advantages, as is evident from the previous discussion, and more important, are workable in practice. In purely physical terms there are obvious advantages to intervening at the input end of the throughput pipeline (depletion) rather than at its lowest entropy at the depletion end and at its highest entropy at the pollution end. Control is easiest at the point of lowest entropy. Depletion quotas are analagous to counting and inspecting your sheep as they pass through the corral gate into the feed pen. Pollution taxes are like trying to count and inspect your sheep by counting and analysing the contents of all the piles of sheep dung spread all over the pasture, and determining which piles of dung belong to each sheep.

The setting of depletion quotas is no more arbitrary in practice than the setting of effluent taxes. The quota scheme does not assume continuous gradual behaviour of external costs. It limits depletion as well as population. It requires no impossible feats of

measurement, and a much smaller army of monitors. There are fewer mines, wells, and ports than smokestacks, garbage cans, and drainpipes.

But precisely because depletion quotas do not require detailed information the ability to function as an instrument of fine-tuning is very limited. Pollution is reduced in a gross, quantitative, across-the-board fashion. Qualitative differential control over pollutants is limited, as is control over location of pollution. It is clear that two processes using the same inputs can have qualitatively different effluents, depending on the nature of the process. At this stage we can no longer influence pollution indirectly via depletion controls, but must control the effluent directly, either by pollution taxes or quotas levied on the specific micro-units involved. Thus effluent taxes are appropriate as a fine-tuning supplement to the basic instrument of depletion quotas.

Orthodox economic thought

The focusing on effluent taxes and internalisation of externalities is indicative of a peculiar tunnel vision which afflicts economic thought. In an article entitled "The Economist's Approach to Pollution and its Control" (*Science*, August 6, 1971), Professor Robert Solow observes that, "as economic development proceeds many [previously free] resources become scarce. This [is] . . . because growing population and increasing production of commodities put more pressure on the limited supply provided by nature. Eventually, as an economy grows, even air and water become scarce." The problem he sees is that externalities arising from the uncharged-for use of these newly scarce resources play havoc with the efficient allocation of resources. The remedy suggested is "internalisation of externalities" so that we each pay the full cost of our consumption.

At a theoretical level this is hard to argue with. Professor Solow recognizes operational difficulties, and suggests moving the tax from the pollution end back towards the input end. It is a sensible and cogent article. Yet nowhere is there any suggestion that we need not (and cannot) forever continue to turn free resources into scarce resources. It is all very interesting to know that prices can be rigged so as to allocate newly scarce resources "optimally". But that does not mean that we should continue to allow economic growth and population growth to increase the scarcity of clean air and water, silence, non-congested areas, unhurried moments, and so forth. We do have the alternative (and long-run imperative) of stopping growth in both the population of human organisms and the population of extensions of human organisms (physical wealth). This latter alternative is the approach of the depletion quota scheme which is a kind of birth control imposed on the population of artifacts.

"Growthmania"

The orthodox view seems to be that as long as we attain the lowest cost mix of the throughput we need not worry about absolute size. Growth is still king. Or perhaps it is assumed that once *all* external costs are *fully* and *accurately* accounted in prices, so that marginal *private* cost and benefit coincide with marginal *social* cost and benefit, then individuals will automatically stop increasing production, consumption, and population at the point where marginal social cost equals marginal social benefit.

It is hard to imagine a better example of the fallacy of misplaced concreteness. Theoretically this is seductive, but operationally it is empty. In an economy in which the labour-leisure choice were available on a small margin to all individuals, all of whom were relieved from the absolute work pressure of insecurity by some minimal holdings of personal wealth, it is possible to imagine everyone opting for leisure after a certain real income had been achieved. But effluent taxes have little to do with such a limit, and a growth-oriented capitalistic economy allows very little labour-leisure tradeoff and very little personal security for most people. Furthermore ecological limits might occur before the shift from goods to leisure becomes important. Nevertheless, assume we reached such an optimum state—could our present economy remain there? No, for without growth and net investment, aggregate demand would fall short of capacity, and unemployment would appear. Distribution problems would be greatly intensified. Our system is hooked on growth *per se*. Growth is *not* seen as a temporary *means* of attaining some optimum level, but as an *end* in itself. Why? Perhaps because, as Henry C. Wallich so bluntly put it in defending growth, "Growth is a substitute for equality of income. So long as there is growth there is hope, and that makes large income differentials tolerable." (*Newsweek*, January 24, 1972). We are addicted to growth because we are addicted to large inequalities in income and wealth. Let the poor eat growth. Better yet, let them hope to eat growth in the future.

The basic malady is addiction to unlimited growth, "growthmania." Effluent taxes are band-aids. Depletion quotas strike at the real trouble, and are radical in the literal sense of getting at the root of things.

Control of distribution

Distribution is the rock upon which most ships of state, including the stationary state, are very likely to run aground. Currently we seek to improve distribution by establishing a minimum standard of living guaranteed by a negative income tax. In the growthmania paridigm there is no upper limit to the standard of living. In the stationary-state paradigm there is an upper limit. Furthermore, the higher the lower limit below which no one is allowed to fall, the lower must be the upper limit above which no one is allowed to rise. The lower limit has considerable political acceptance; the upper limit has not. But in the stationary state the upper limit is a logical necessity. It implies confiscation and redistribution of wealth above a certain limit per person or per family. What does one say to the cries of "destruction of incentive"? Remember—we are no longer anxious to grow in the first place. Also, one recalls Jonathan Swift's observation:

"In all well-instituted commonwealths, care has been taken to limit men's possessions; which is done for many reasons, and, among the rest, for one which, perhaps, is not often considered. that when bounds are set to men's desires, after they have acquired as much as the laws will permit them, their private interest is at an end, and they have nothing to do but to take care of the public."

The basic institution for controlling distribution is very simple: maximum and minimum limits set on wealth and income, the limits on wealth being the more important. Such a proposal is in

no way an attack on private property. Indeed, as John Stuart Mill argues, it is really a defence of private property.

"Private property, in every defence made of it, is supposed to mean the guarantee to individuals of the fruits of their own labour and abstinence of others, transmitted to them without any merit or exertion of their own, is not of the essence of the institution, but a mere incidental consequence which, when it reaches a certain height, does not promote, but conflicts with, the ends which render private property legitimate." (*Principles of Political Economy*, Book II, Chapter I, "Of Property.")

According to Mill, private property is legitimated as a bastion against exploitation. But this is true only if everyone owns some minimum amount. Otherwise private property, when some own a great deal of it and others have very little, becomes the very *instrument* of exploitation, rather than a guarantee against it. It is implicit in this view that private property is legitimate only if there is some distributist institution (like, for example, the Jubilee year of the Old Testament) which keeps inequality of wealth within some tolerable limits. Such an institution is now lacking. The proposed institution of maximum and minimum wealth and income limits would remedy this severe defect and make private property legitimate again. Also it would go a long way toward legitimising the free market, since most of our blundering interference with the price system has as its goal an equalising alteration in the distribution of income and wealth. Thus such a distributist policy is based on impeccably respectable premises: private property, the free market, opposition to welfare bureaucracies and centralised control. It also heeds the radicals' call of "power to the people" since it puts the source of power, namely property, in the hands of the many people, rather than in the hands of the few capitalist plutocrats and socialist bureaucrats.

But what are the "proper" limits to wealth inequality? Where does one draw the line? Just because one cannot specify exactly where to draw a line does not mean that there is no line to be drawn, or that it could be drawn anywhere. Most creative thought is dedicated precisely to the task of drawing imprecise lines. Plato felt that the richest citizens should be four times as wealthy as the poorest. For the sake of political consensus let us propose that the richest be allowed to have, say, ten or twenty times as much as the poorest. Within such limits distribution is governed by market forces. After experiencing that state of affairs for a while we could then intelligently decide how to modify it. The twenty-to-one (or some other) limits would also be applied to income, with progressive taxation levied within the limits. Below the lower limit the tax rate becomes negative. Above the upper limit the tax rate becomes 100 per cent: "private interest is at an end and they have nothing to do but to take care of the public"—or tend their own gardens.

Maximum income and wealth would remove many of the incentives to monopoly. Why conspire to corner markets, fix prices, and the like, if you cannot keep the loot? As for labour, the minimum property and income would enable the outlawing of strikes, which are rapidly becoming intolerable. Unions would not be needed as a means of confronting the power of concentrated wealth, since wealth would no longer be concentrated. Indeed, the workers would have a share of it and thus would not be at the mercy of an employer. Also, a limit on corporate size would be needed.

Life in a steady-state

How would such a distributist state look in its specific details? Three acres and a cow for every sturdy yeoman? Certainly it would be more complicated than this agrarian vision with which the idea is often associated. One problem is that wealth can be consumed. What about the individual who consumes his minimum wealth and then wants it restored each year? He could continue to receive the minimum income, but could hardly have his wealth restored annually. The minimum wealth would have to be granted once to each individual—a social inheritance received, say, at age twenty-one. If the individual squanders it, that is his problem. The problems of detail and accounting would be great, but no greater than those faced today by the Internal Revenue Service. What is lacking is not technical capability, but the will and the moral commitment. Indeed, the last statement holds for each of the three institutions outlined.

Do we have the moral resources for such changes? Can the crackpot "realists" be persuaded to face reality, including the reality of the normative dimension of man's existence? If not, then the institutions advocated in this paper are mere daydreams. But then survival under institutions which do not depend on moral resources is a nightmare.

Notes

1. K. E. Boulding, "Income or Welfare," *Review of Economic Studies*, 1949–50. also "Economics of the Coming Spaceship Earth," in Henry Jarrett, ed., *Environmental Quality in a Growing Economy* (Baltimore, Johns Hopkins Press, 1966.)

2. Nicholas Georgescu-Roegen, *The Entropy Law and the Economic Process* (Cambridge, Mass., Harvard University Press, 1971).

3. For discussion of these issues see *Toward a Steady-State Economy*, Herman E. Daly, ed., (San Francisco, W H. Freeman, 1972).

4. While not itself a physical quantity, GNP is nevertheless a value *index* that measures *quantitative* change in the flow of goods and services produced. Prices and quantities are the basis of GNP. Prices (exchange values) bear no necessary relation to total use value or welfare, and in any event both absolute and relative prices are held constant in calculating real GNP and its growth over time. Quantity probably has borne a direct relation to welfare in the past, but whether it still does in affluent countries is highly doubtful. In sum, real GNP is overwhelmingly an index of quantitative physical change. Even the service component has an irreducible physical dimension. Although the coupling here is rather loose, it is always some *thing* which yields a service—for example, a machine or a person. The recent increase in the service component of GNP reflects more people and things in the service sector, and not much in the way of increased service per thing.

5. *Population Resources, Environment* (San Francisco, W. H. Freeman, 1972), p. 444.

6. G. K. Chesterton, *The Outline of Sanity* (London, Methuen and Co., Ltd., 1926), p. 38.

7. For a brilliant discussion of these long-run issues, see Nicholas Georgescu-Roegen, *The Entropy Law and the Economic Process* (Cambridge, Mass., Harvard University Press, 1971), pp. 20, 21.

8. The whole of this paragraph refers specifically to the US.

9. An effluent tax levied on a *single* good could greatly reduce the consumption and throughput of that good. But it does not follow that a general effluent tax levied on *all* goods (or most goods) will significantly reduce aggregate throughput. What is true for the part is not necessarily true for the whole (fallacy of composition).

Railways: the fight is on

by Irene Coates

photographs by Tim Clarke

At the very time when ecologists and environmentalists have woken up to the virtues of the railways, the Government is once more flexing its muscles and telling us that they are too expensive to run. The Department of the Environment's prematurely revealed Blue Report[1] actually only spelled out in detail what was generally being discussed by those who had their ears close to the ground on railway matters. Nevertheless, the *Sunday Times* performed an admirable service in publishing their contents: it alerted the general public to the existence of a powerful body of official opinion prejudiced against railways. This prejudice is most obvious in the way our transport options are costed. Both the social costs of roads and the benefit of rail are seriously underestimated. A rational transport policy is urgently needed and if one were drawn up a very strong case could be made for an enlarged railway network.

For the first time for ages, the railways are a political hot potato. The public, which has been shown to be 82 per cent in favour of maintaining or extending the present rail network, with only 5 per cent in favour of cuts,[2] will make sure that it is a hot potato which is neither dropped nor permitted to cool. All over the country the clans are gathering, as local groups get ready to defend their services as best they can under the bad old rules of the 1952 Act which limit objections to closures to grounds of personal "hardship" only. The *SOS Campaign* has received massive support from these groups for their resolution calling upon the Government to renew the grants on which these immediately threatened services depend. Meanwhile a powerful new body called *Transport 2000* has established itself in London, its membership being composed of delegates from all the major environmental organisations and the rail unions, its main aim being to defend and promote rail transport within an integrated transport policy.

The next move is due from the Department of the Environment. Mr Peyton, Minister for Transport Industries, has announced that a statement is to be made early this year. The reason for all this solemnity is ostensibly that, whereas British Rail is statutorily obliged to break even "taking one year with another", there is predicted to be a loss of some £40 million for last year in addition to grants amounting to £63 million in 1971 and a deficit which was covered by an additional grant of £27 million over two years. The Blue Report estimates a possible £100 million deficiency by 1976.

This is still the lowest grant support of comparable railway systems in Europe. West Germany pays about £700 million per annum to keep her railways going, and France about £500 million, while the "break even" remit demanded of British Rail assumed a 3½ per cent increase in the Gross National Product, whereas the reality was 0.9 per cent, which cannot be laid at the door of British Rail. So what is all the fuss about? If other countries in Europe find it worth their while to run State-aided railway networks, why cannot Britain?

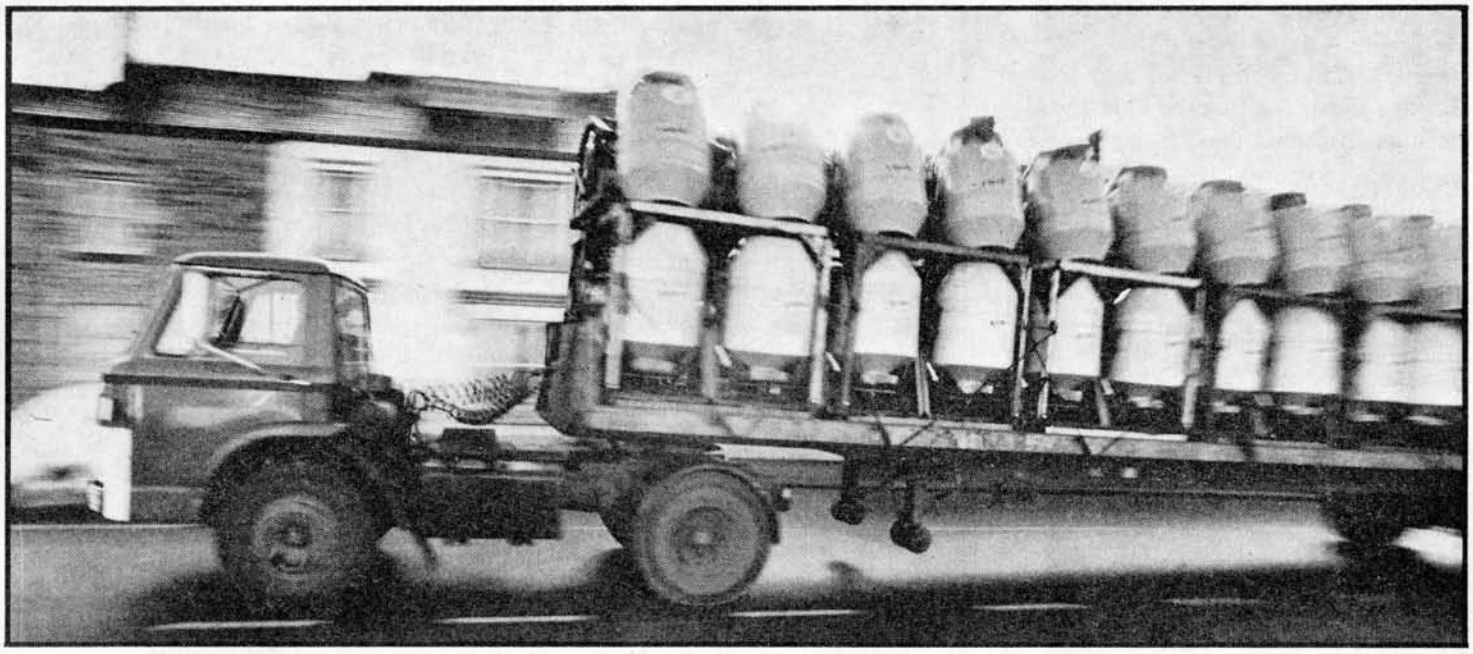
In the event of the Government succeeding in shutting down about 40 per cent of our present 11,600 miles of railways, as is suggested in the Blue Report, what would be the full costs of providing sufficient road space for the displaced passengers, freight and Post Office parcels and mails? Since our present rail network is generally underused, costs of increasing passengers and freight carried is marginal; but to increase traffic flows, even marginally, on our overcrowded roads means that the full cost of new road space has to be met, with all the associated costs of extra use of scarce resources, environmental damage and pollution. And this extra traffic would be likely to "generate" on a more than mile-for-mile basis, thus further adding to the costs of building the most expensive and inefficient method of surface transportation that human beings have yet devised.

As *Sinews for Survival*[3] puts it:

> "In every respect uncontrolled road transport systems are less efficient than controlled track systems in their consumption of natural resources and as these become scarcer and their value increases, this cost becomes greater . . . The Government must urgently re-examine its transport philosophy as the availability of the resources we have examined becomes the ultimate constraint."

In an article entitled "The Future of European Inter-city Transport" in the *OECD Observer*[4], the BTU requirements for passengers and freight are quantified for three transport modes (Table 1). Broadly, road transport requires three times the energy used for rail. The main burden of the article is that rail transport is progressively going to have greater advantages over road and air as part of an expanded and integrated transport policy for Europe. In particular:

> "For the intermediate distances of 100-600km . . . the railroad has the *potential* to out-perform the motor vehicle and the aircraft on almost



every ground: door-to-door travel time, comfort, convenience, reliability and efficiency."

The United Kingdom is among nine OECD members taking part in a programme to plan future improvements in inter-city transport service on a co-ordinated, European-wide basis, and the hope is for a "balanced and integrated transport system for Europe as a whole".

Why was the Blue Report written?

This of course is all very fine. Inter-city trains are likely to be much faster, smoother, more comfortable, and if the Channel Tunnel is built, we shall be linked with the rest of the European network. But that is in the future. What about now? Supposing the grants aren't renewed and the services begin to close? What about the lamentable condition of freight? Why was the Blue Report written?

Although any plan to reduce the size of the rail network is likely to be presented to the public as an essential economy to avoid ever increasing and appalling financial losses, it is extremely doubtful whether that will be the real reason for the cuts. One hears the authentic anti-railway prejudices in this paragraph of the Blue Report:

> "Finding an acceptable solution along commercial lines will not be easy. But the alternative appears to be to accept that, for social, economic, environmental or political reasons, major changes in the present railway are unthinkable. This would mean that large and ever increasing revenue subsidies to the railways would be inevitable. We do not see how the acceptance of this position could be justified."

This paragraph, with its rigidity of approach and tacit dismissal of alternatives, reads like veiled propaganda, which argues towards a predetermined conclusion. There is no recognition that the railway's main problems are caused by the present road policies. It was left to an editorial in *The Daily Telegraph*[5] to spell out this relationship, and to ask (with others) for a comprehensive review of transport as a whole.

> "Many railway lines run at a loss because potential customers prefer to go by road. One wonders, however, whether this would be the case to anything like the extent that it is if road users had to pay a charge . . . As in the case of other "free" or subsidised services, demand is artificially inflated. If the consumer, faced with the choice of going by rail or by road, had to pay a realistic price in either case, there could well be a general shift back to the railways".

Railway accounting

As is well known, road and rail are financed by different and non-comparable methods. The accounting system for rail results in high perceived costs per mile to go by train, while the perceived costs of driving a car include only the price of petrol and parking. The advantages of travelling by car are further increased when more than one member of a family is travelling. Thus, although the total cost of buying, running and maintaining a car comes to, on average, £550 a year,[6] this does not act as a restraint on any one journey; indeed, it produces the attitude: "Now I have a car, I had better use it as much as possible." For many drivers even this annual cost is cushioned by the prevalence of company cars, and the tax relief obtained by owners of cars used for business purposes. The full range of relevant figures on the numbers of company cars at present on the roads, their total mileage and the precise influence of this form of tax relief on trends of increasing the traffic flows is not available. But some estimate can be gained from the knowledge that in 1962, 53 per cent of all new cars and 18 per cent of second-hand cars were sold as company cars.[7] The proportion of new cars is now likely to be nearer 60 per cent.

The existence of this type of car has a stimulating effect on the total car market which is considerable even in proportion to their large numbers. They remain as company cars only for a year or two, so that maintenance and repair is carried out under guarantee. They are then thrown on to the second-hand car market thus artificially increasing its size. Since the life of a company car is so short, manufacturers who compete against each other to capture the "fleet car" market can only make cars of competitive price by building short-life vehicles and concentrating on such items of "company appeal" as speed, sleek looks, driver comfort, and reliability for up to two

years. Again, during its brief life as a company car, it may clock up to 25–50,000 miles per year against an average of 8,000 miles. (This average itself is increased by the inclusion of the large company cars, and the figure may be nearer 70 per cent, whereas expense account train tickets form only a very small proportion of all revenue from fares.)

Now it is understandable that market pressures are forcing manufacturers to produce the maximum number of short-life vehicles, but this is ecologically ruinous. Therefore in any "balanced" transport policy the incidence and influence of company cars must be taken into account. It will first be necessary for accurate figures on company cars to be obtained and published.

The need for these figures becomes even more acute when we turn to the *EEC Secondary Regulations on Transport*.[8] The existence of this document is not generally known, yet these Regulations will apply to Britain within a year of accession. The basis of Common Market thinking on transport is to lay down rules and procedures whereby three modes of transport—rail, road, and inland waterway—will engage in economic competition with each other for the available markets of carrying passengers and goods. To this end:

> "One of the objectives of the common transport policy is to eliminate disparities liable to cause substantial distortion in the conditions of competition".[9]

So far, these rules and procedures have been laid down in much greater detail for railways than for the other two modes. This is largely because their method of accounting is easier to control. The railways are run as a business with an annual balance sheet. Before we look more closely at the effects these Regulations are likely to have on our railways, it is as well to notice what is missing at the moment (they are continually being added to) and to question, in particular, whether transport should be treated as a market open to be captured by the most efficient operators. This is at total variance with those who wish transport to be supplied as a free or nearly free social service available to all, and it may well lead to the exacerbation of the economic rat-race and squandering of scarce recources which has just been noted with regard to company cars.

There are no regulations restricting transport modes which cause disproportionate damage to the environment; none encouraging more environmentally, ecologically or socially preferable modes. Cycleways and pavements are expressly excluded, while cars are not even mentioned. Road transport is limited to lorries and buses. There is an urgent need for these Regulations to be examined extremely closely and critically. Their main purpose appears precisely to *abolish* the "civilising" factors which environmentalists are striving so hard to include in the transport debate. One of the chief factors which is held to "distort" the economic competition between modes is all forms of public service grant or "obligation", as it is called. The present grants are only applied to passenger services, not to freight and not to the infrastructure (track etc.) These passenger service grants are likely to be changed anyhow. British Rail wants these services to be handed over to the new regional authorities, which will be told to find the cash to pay the grant if there is sufficient local pressure to provide the necessary money on rates, and if this is not done then the service will close. Under this Regulation (*Article 14*), only "essential" services would be aided "in order to ensure the provision of adequate transport services". But (*Article 3*) "the competent authorities shall select the way least costly to the community". Which sounds all too like the new Poor Law for Transport, and on the face of it is likely to lead to buses rather than trains.

TABLE 1. ENERGY REQUIREMENTS FOR INTER-CITY PASSENGER AND FREIGHT TRANSPORT

	BTU's per passenger km (1)	*BTU's per ton-km (1)*
Rail	1,000	420
Auto/Truck	2,800	1,400
Aircraft	6,000	23,000

(1) BTU: British Thermal Unit (1 BTU = approximately 0.25 kcal).

Source: *Adapted from Eric Hirst, "Energy Consumption for Transportation in the United States", Oak Ridge National Laboratory, Report ORNL-NSF-EP-15, March 1972.*

Declining freight revenue

Another factor which discriminates against trains in the short term is the rapidly declining revenue from freight. Under the 1968 Transport Act, freight has to be run as a business, and British Rail prefers to carry regular consignments of long distance bulk freight. Indeed, they have reduced the number of their wagons to the point where individual loads may not be accommodated.[10] As Table 2 shows, freight receipts £ for £ are less than in 1967, whereas passenger receipts have risen more steeply than the cost of living. Since British Rail does not separate costs of different users, and indeed claims that this is impossible since so many costs are shared, we can only infer that passengers are bearing a larger and larger proportion of the shared costs. But if this is so, then the grants represent a subsidy to freight as well as to passengers, and removing the passenger services would leave freight in an even worse position than estimated. This would also mean that if local ratepayers are told they must pay the grants in order to keep their services, they too will be subsidising freight. When the "rail policy review" does finally see the light of day, it is likely that its recommendations will be based on the present unfair accounting system, and that all its alternatives will be unacceptable. Above all, the *benefits* which are to be expected from the normalisation procedures set out in the EEC Regulations will not be included in this premature assessment of the railways' future.

The normalisation procedures eventually seek to standardise the accounting systems of the three modes: rail, road and inland waterway. Since the railways are further advanced in this (as previously noted), it is recognised that there is a need for "compensation" to the railways until the other modes are normalised. It is also recognised that:

> "the financial burdens borne by the railways are usually greater than the benefits they enjoy".[11]

There are fifteen Classes under which British Rail would receive substantial benefits. And the Regulations give the railway undertakings the initiative in working out exactly how much compensation they would be entitled to. In particular, it seems that the interest charges of some £45 million would no longer be payable, and the National

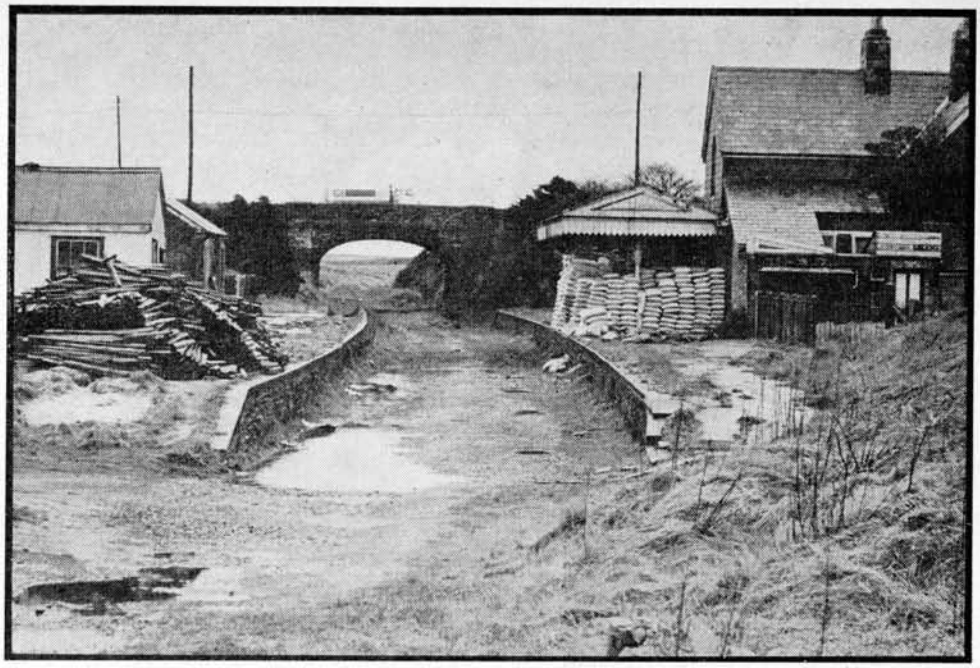
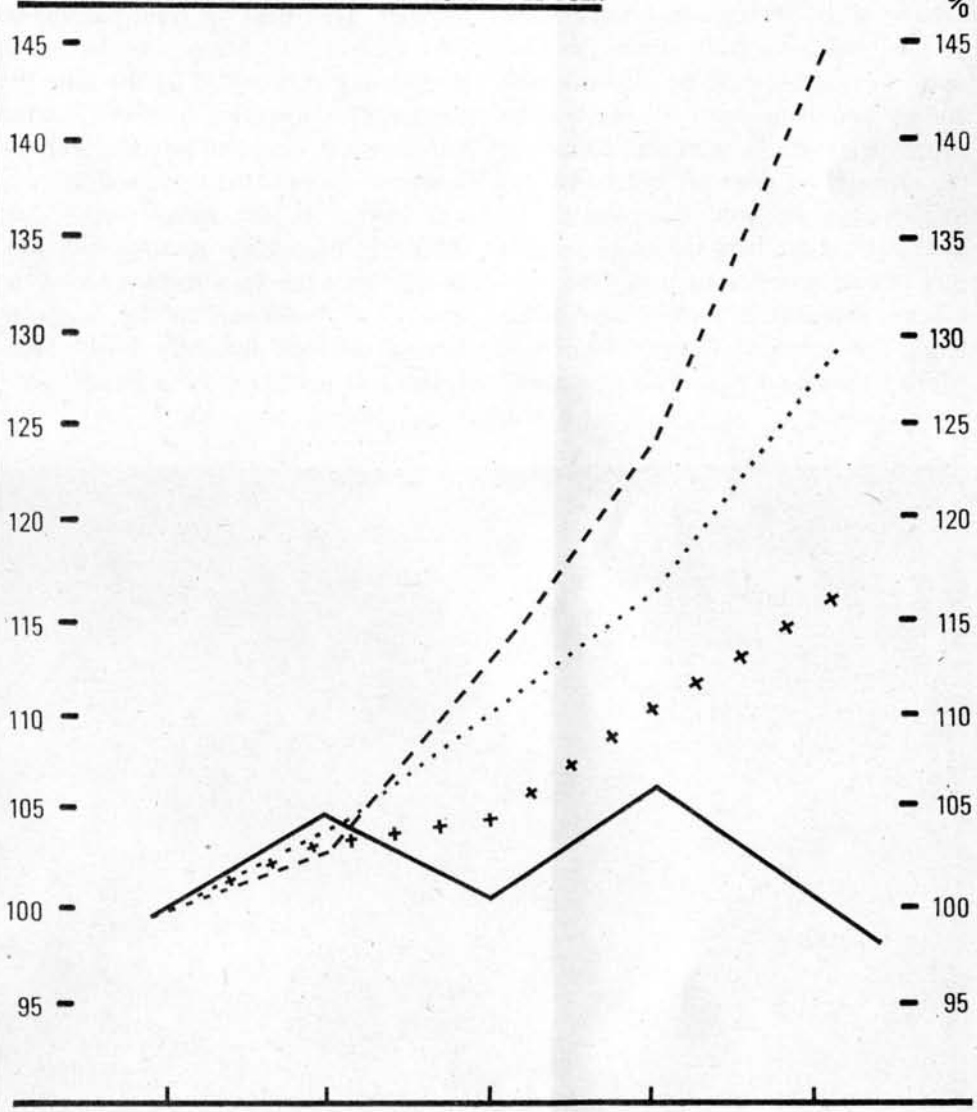


TABLE 2 : ANNUAL RECEIPTS FROM TYPES OF RAIL USER



KEY

- - - - Passenger fares & charges

——— Freight

+ + + + Parcels & P.O. mails

· · · · · · Cost of Living

Receipts shown as percentages, seen in relation to Cost of Living (Retail prices). 1967 = 100

Figures derived from British Railways Board Annual Report & Accounts 1971 Table 6-A and Monthy Digest of Statistics

Debt would need to be written off by the Government, as has recently been done for the Coal Board.

Now it is obvious that until these calculations have been made, *no* passenger services should be discontinued, and *no* lines shut down. It may well be tempting for the Government to reduce the size of the network before having to pay compensation; increased public awareness is the best safeguard against that being allowed to happen. One must assume that British Rail is busy calculating the amount of compensation to which they are entitled. This figure, and the accounts on which it is based, should be published. *Article 11* states:

> "Decisions of the competent authorities of the Member States taken in pursuance of the provisions of this Regulation shall state the reasons on which they are based, and shall receive official publication."

The Government can choose whether to "normalise" or not. If it does so then it must be in terms of these Regulations. The Regulations will apply to Britain within a year of accession. Why have we not heard more about them before now? All transport is a cost. It is of vital importance that this fact is recognised. If we indulge in economic competition between modes we waste our investment both by under-using one infrastructure and by over-using another. To cream off train passengers and freight into buses and lorries is doubly expensive. And by the time the economic competition has been started between rail, road and inland waterway it seems obvious that there will be only one runner in the race: roads, thus defeating even this questionable aim. Is this what the Government wishes to ensure? A walkover for the favourite having nobbled the only likely challenger? It may well be a Pyrrhic victory, ending with more and more vehicles chasing less and less oil and less and less space. However tempting it is to sit back and say "I told you so" when it happens, we need to take a more responsible course and fight for our railways for the sake of this small and vulnerable island.

References

1. Blue Report, the prematurely "leaked" DOE document whose contents were published in the *Sunday Times* of 8 October 1972.

2. *Sunday Times* Opinion Poll, 29 October 1972.

3. *Sinews For Survival*, Stockholm Conference 1972 HMSO, page 55.

4. By C. Kenneth Orski, Head of OECD's Division of Urban Affairs, OECD Observer No. 60, October 1972.

5. *Daily Telegraph* Editorial 10 October 1972.

6. Automobile Association figure.

7. Information supplied by GLC to author in Letter 12 January 1972.

8. *EEC Secondary Regulations* (Part 13) Transport HMSO £4.50.

9. Op. cit. Regulation No. 1191/69.

10. N.U.R. claims freight business turned away. *Evening Standard*, 11 December 1972.

11. Regulation Number 1192/69.

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THE ECOLOGIST, "Catesby", Molesworth Street, Wadebridge, Cornwall

A rural community rescued

by Michael Allaby

The parish of Glencolumbkille lies in the south-western tip of County Donegal. In 1947 it welcomed a new priest. Still a young man, he had spent the first ten years since his ordination in London, where many of his parishioners had been Irish country people compelled by poverty to seek work in a strange land. He determined that if and when he should be recalled to his native Donegal he would try to arrest this sad drift of population. He did return to Ireland and to a large extent his hopes have been realised. A declining, depressed community has been transformed into a viable, happy one.

In the process the priest, Father J. McDyer, has become something of a living legend, although his popularity is not universal. He has been denounced as a materialist, as a communist and he has been accused of seeking publicity in order to inflate his own ego.

In fact, his motives were simpler:

"As a priest, I could have carried out the normal and traditional duties of an Irish priest in a rural parish and few would expect me to do more. However, I felt that I could not carry out my spiritual ministry and ignore the social and economic plight of my people. To be indifferent to this would run contrary to the virtues of justice and charity which I preached and tried to practise and would also conflict with the intense nationalism which had always welled within me".

What he found in Glencolumbkille was a people among whom emigration was a way of life. For centuries they had suffered famine after famine, culminating in the Great Famine of 1847, which began the drift of population, first to America and more recently to England. His parishioners numbered some 1,800, living in an area of about 130 square miles, much of it mountainous. The parish is remote, its natural resources few and its people were impoverished. The dole was a major source of income and as he tried to persuade them to join in the enterprises he initiated he sometimes found them reluctant to abandon the only enonomic security they knew.

It is not only the size of a population that is reduced by emigration. If the drift continues for generation after generation, the quality of the society that remains is reduced as well. It is the young who leave and it is the ablest and most enterprising who leave first.

It is the lack of a satisfactory social life that drives away the young as much as shortage of work and Fr. McDyer decided that the first thing he had to do was to create a sense of community. The people built a community hall. It was constructed entirely by voluntary labour and it was finished in twelve weeks. It was important that an end product appear before apathy set in and absenteeism eroded his work force. The hall was designed to provide facilities for drama, films, badminton, card games, debates, lectures, physical culture, dances and lessons in old-time, modern and ceílí dancing.

The community hall began to show a profit and this was used to buy a community park for outdoor sports. In the future profits from it will finance other social amenities.

The next task was to provide some of the services most town dwellers regard as essential—electric light, water, roads, a clinic and an adequate church and school, in that order. The authorities with which he negotiated were helpful, but the people themselves sometimes resisted the innovations, particularly over the installation of electricity and water. In the end the water scheme succeeded because of the help of voluntary student labour. Young people from seven different countries spent four successive summers locating springs, constructing small reservoirs and piping the water to the houses below.

How to farm a mountain

Still there was no sound economic base. Traditionally this was an agricultural community, yet the land was poor. The average size of a holding was eight acres, of which only one was tillable. Farming methods were unnecessarily time-consuming and inefficient. It was unlikely that the people would ever again support themselves by farming alone, but, such as it was, the farming had to become as efficient and profitable as possible.

Fr. McDyer secured contracts for the growing of vegetables and he aims to improve the sheep farming through the Glencolumbkille Hill Farming Experiment. Pigs were introduced to the area and today there are ten or eleven modern piggeries.

It was not easy. Farmers are the most conservative of people and poverty-stricken farmers are likely to be the most conservative of farmers.

"People often ask if all the farmers made use of these opportunities and the answer is that the majority of them did not. I suppose there are several reasons. First there was the fear of many that if they increased the profitability of their holding they might lose the dole. Secondly there were many whose family had long emigrated and they only looked on themselves as ageing caretakers rather than farmers. Thirdly, there were bachelor farmers who quite logically did not wish to be disturbed from their traditional methods of farming; and fourthly, there were undoubtedly some who could not for very long sustain a vegetable crop because of rotational difficulties, but who through lack of confidence in themselves or for other reasons were not prepared to embark on hill farming or pig farming".

Yet many did co-operate and they have prospered. As the years go by the true farmers are being sifted from those who might never have suceeeded.

It was not always the farmers who proved the obstacle. There were times when the government was less than helpful. The pig units had been planned to work in conjunction with glass-houses and with a poultry unit. The Minister of Agriculture refused a grant, or even a loan, to establish either of enterprises. Fr. McDyer was offered a contract to sell a few thousand tons of turf a year, but not a single farmer would accept it, for fear of losing the dole.

Most of the farm units were too small and many of the farmers too old; 112 of them were persuaded to communise for an experimental period of ten years. It would have ensured them perpetual security and ownership for themselves and for their heirs, employment for life and the maximum productivity that could be achieved from their combined 18,000 acres of mountain and 1,200 acres of lowland. This scheme failed for lack of initial capital.

Exploiting natural resources

Fr. McDyer's aim was to exploit to the full the natural resources of the locality. It made no sense to import raw materials from far away in order to manufacture products for distant markets. The economy had to be based on farming, small industries derived from farming or from local traditional skills, home crafts, tourism and fishing. It was vital, too, that the people should own the enterprises so far as possible. This was the only way they could raise capital. A co-operative would be formed and shares sold to local people and to well-wishers elsewhere. No one person was asked to risk a large sum. It is true that the first factory to arrive, which produces Donegal tweed, is not owned by the people, but they do own the vegetable processing plant, the machine knitting factory and the jewellery factory. Now there is, in addition, a folk museum and a home crafts co-operative with about eighty members and a craft shop.

The folk museum proved a popular attraction to tourists and it was felt that the time had come to offer visitors a place to stay in Glencolumbkille. Ireland is full of hotels and rather than build yet another they have built a holiday village. Twenty thatched cottages, with a small supermarket, are scattered over a five acre site and are rented, fully furnished. The people hold a few parties for the holiday-makers but that is the full extent of the entertainment that is provided for people who have come primarily for peace and relaxation.

Ironically, perhaps, the tourist village is not a co-operative enterprises. It was financed by a bank loan—now being repaid rapidly—advanced to a company formed by Fr. McDyer and a few associates. He would have preferred that it be owned by the people but he was unable to convince a sufficiently large number of them that the region had any attraction for visitors. To them the parish was not especially beautiful —it was simply where they lived. Fr. McDyer saw its beauty and he has described it:

"In the south-west the mountain of Slieve Liag rises like a mighty fortress to hurl defiance against the onslaughts of the Atlantic Ocean. At the crest of the mountain is the spine-chilling One-Man's-Pass and here the mountain drops a sheer one thousand feet into the sea. To the east is the spectacular Glengesh Pass where cataclysmic events of a primeval age have gouged out one of Ireland's finest mountain passes. To the west, the glens glide gently to the silver strands of the sea".

Halting the drift

People have lived in Glencolumbkille for 5,000 years at least. The early settlers were replaced by the Celts. Christianity was brought by St. Columba, no less. It is only within the last few centuries that it has fallen on hard times.

As Europe industrialised, the drift of population to the cities accelerated. Today there are many who deplore the adverse effects, on both urban and rural life, of over-urbanisation. They are too obvious to be ignored. Yet the political centralisation that has accompanied the centralisation of economic power inhibits the thinking of many of those who would seek solutions. They tend to imagine schemes for rural development devised and implemented by governments—from the cities. At best such plans are likely to be clumsy and half-hearted. There is an air of inevitability about the decline of the countryside. After all, who is to say that a person may not live in a city if he chooses to do so? Fr. McDyer accepts this. His aim is only to ensure that the decision to live in a town is based on a choice that is truly free.

Of course, there are obstacles. Fr. McDyer must have encountered most of them. Some he has surmounted, some he has not, but on balance Glencolumbkille must be counted a success; a step, perhaps, towards a more stable, more rational society.

Digging up South Wales

by Harford Williams

Llantrisant, with Talbot Green in the left background (photo: Peter Moss Vernon)

In 1851 Wales was represented at the Great Exhibition in London by a few lumps of coal and some pit gear but at that time two-thirds of its people lived in the countryside. About fifty years later South East Wales had become one of the world's biggest coal exporting areas—and was thoroughly raped in the process. Although Prince Charles, on St. David's Day 1971, promised his support for Welsh demonstrations highlighting the dangers of further pollution of our countryside we still read of potential disaster areas in the Principality. For instance, in June 1971, Volume 1 No. 12 of the *Ecologist* referred to gases from an aluminium smelter in Anglesey causing great distress to local people, of mining plans threatening two of our national parks and society courting "ecological catastrophe" if 50,000,000 tons of oil a year are allowed to be discharged at Amlwch in Anglesey. Will the rape of entire Wales be finalised in the next decade or so? The situation is serious. In terms of danger from pollution Snowdonia was recently classified as one of the world's two potential disaster areas. The other was in remote Alaska.

In this context, the National Coal Board's proposal for opencast mining of less than 100 acres of Llantrisant Common in Glamorganshire may at first glance seem insignificant. At a public meeting in Llantrisant on November 8th, 1971, officials of the Coal Board revealed their provisional plans to extract 400,000 tons of coking coal from this small area at a rate of 100,000 tons per year. Thereafter the land would be reclaimed by the Ministry of Agriculture, Fisheries and Food over a further period of three to four years. In other words a very large number of ratepayers are to be subjected to considerable inconvenience for up to seven years whilst the Coal Board gains the equivalent of only a 10-week supply of coal for the South Wales steel industry. Furthermore, it was admitted that 100,000 tons is less than 1 per cent of the total annual opencast output of British coalfields. The coal will be transported from the site to Llanharan via Talbot Green—a densely populated town—at a rate of 2,000 tons a week, i.e. a 12-ton lorry operating every 20 minutes over a 10-hour day for five and a half days a week. A resident pointed out that Talbot Green already has a traffic load of 9,000 vehicles a week and in such circumstances the Coal Board "would do well to get one loaded lorry through the town on a Saturday morning". Additionally, casual reference was made to various "other activities" on the site throughout a 24-hour day —stripping topsoil, draining, digging lagoons, drilling, blasting and using 30-40 ton dump trucks for constructing a massive temporary spoil heap. An astonished member of the audience asked if the National Coal Board had seriously considered the location of his home, only about 75 yards from the proposed operation and if this in its opinion was a comfortable distance. "Yes" was the reply but it was qualified by the remark, "of course we shall not be within 75 yards of your home throughout the four-year period". In the light of this reply we must remind ourselves that the entire area involved is only about 100 acres and is very close to a large number of homes and a large new school. Hence the reason for complaint from a local teacher.

In view of the public's strong reaction against the proposal, The National Coal Board's Opencast Executive will now undoubtedly publish reasons for their plan to mine within a proposed conservation area. Rio Tinto Zinc gave at least eight reasons for copper mining in Snowdonia, but there were as many and equally good counter arguments. Let us hope that the Coal Board, in responding to the next public and reasonable request for a full and better explanation, will constantly bear in mind at least two of Bertrand Russell's ten commandments:

(i) Do not think it worth while to proceed by concealing evidence, for the evidence is sure to come to light.

(ii) When you meet with opposition endeavour to overcome it by argument and not by authority, for a victory dependent upon authority is unreal and illusory.

It is in this same spirit I am publishing the biological argument put forward at the meeting against coal-

mining Llantrisant Common. My tentative views were of necessity based on casual observation or discussion of the common within the critically short period of time available for preliminary enquiry. If archaeological, historical, economic and other reasons against the plans are equally strong and abundant—and I suspect they are —then let them be heard now. The days of the passive conservationist are over. In fact, the Board was seriously asked about the possible archaeological significance of the site and an official answered with a smile that no resident archaeologist would be employed. Similarly, its replies to biological arguments were unsatisfactory.

Amenity and research values neglected

Llantrisant Common is a small area of constant colour change and outstanding natural beauty. It is freely and easily accessible to schools, university colleges, industry and the public. Furthermore it is close to a proposed new town development and its inhabitants will obviously require interesting natural amenities. Surprisingly, the amenity and research value of the common's very rich plant and animal life have been almost totally neglected by professional biologists and town planners. The Nature Conservancy, one university college and a local school have already expressed a keen interest in the common as a research or an educational study area. The Nature Conservancy has already stated that the Board's proposal's threaten features of considerable scientific interest and a feature of recreational/educational interest which is unique within the context of the New Town development. The Conservancy's initiative and progress must be encouraged because a thorough knowledge of the common in its present form is urgently required in order to understand the degree to which further industrialisation and urbanisation are likely to pollute our atmosphere. Urbanisation alone is already recognised as having far-reaching and potentially disastrous effects on plant and animal life. In addition to the immediate benefit of applied research to our society a study of the common's wildlife may offer additional bonuses from an examination of more fundamental biological problems, for instance population control relative to the available resources of food. It is advisable therefore, to elaborate on these comments and suggest specific examples of the common's plant and animal life which are worthy of further research. The examples may be appropriate and useful to the Coal Board's plans for minimising further pollution of the area and determining the extent to which the Board and other industries are already responsible for polluting our countryside. The residents of the nearby town of Beddau overlook Llantrisant Common and have bitterly complained of existing pollution from Cwm Colliery. They may now have reasons for renewed anxiety.

Lichens and mosses as foul air indicators

The sensitivity of a lichen—a naturally growing mixture of an alga and a fungus—has since about 1960 provided us with a quick and cheap way of estimating air pollution. The association between the alga and the fungus is readily disturbed if changes occur in the composition of the atmosphere. This is why lichens disappear from trees and rocks of urban areas when the air is polluted. Recently two British scientists have used some 50 species of lichens in drawing up a scale of pollution. The scale ranges from pure air in which all the species will thrive to heavily polluted air in which none can grow. Are we to assume that Llantrisant Common has no lichen flora which could be used for such purposes?

Likewise mosses may be invaluable. They take up toxic metals from the atmosphere which can be measured in the laboratory by an absorption spectrometer. It is reasonable, therefore, to ask for accurate records of the mosses on the common and, if already poisoned, their present level of metals relative to that of the air around them.

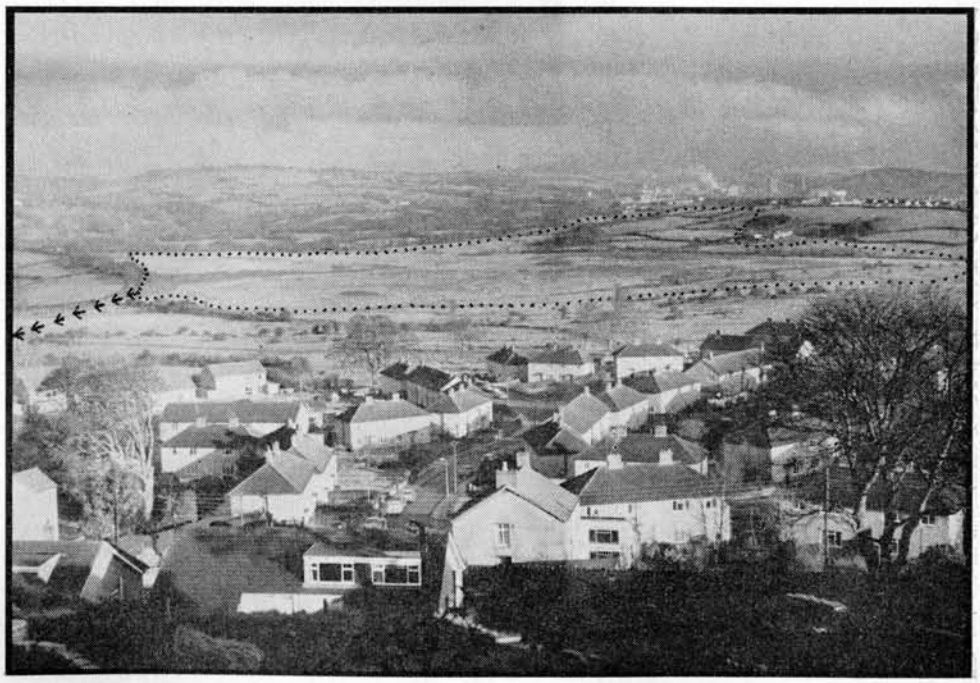
Bird life in danger

Nesting kestrels, a curlew, jay, linnet, wren, owls and a sparrow hawk have been seen on one afternoon's casual observation on the common. The presense of a sparrow hawk, easily distinguished from the kestrel by its rounded wings, is very significant because it is among a dozen or so British birds said to be on the decline in a recent official survey by the World Wildlife Fund.

Owls, mice, and voles

If brown owls are regular permanent residents of the Common would we not expect to find their two main species of prey, mice and voles? Elsewhere in Britain it has been found that owls, when their prey is scarce, almost all fail to breed. This new and fundamental discovery shows that owls have achieved a remarkable mechanism for controlling their own numbers relative to the availability of food in the environment, thus enhancing their own chances of survival.

Llantrisant Common, showing approximate boundary (dotted line) of NCB site and proposed exit road (arrows) (photo: Harford Williams)



Foxes and rodents

The disappearance of foxes, according to an authoritative view, leads to an enormous increase in the number of destructive rodents. Blasting for coal at depths from 30-130 ft. and further activities for a 24-hour day will surely frighten away foxes and other carnivores. Are we then to cope with a possible increase in rodent pests?

Threat to angling

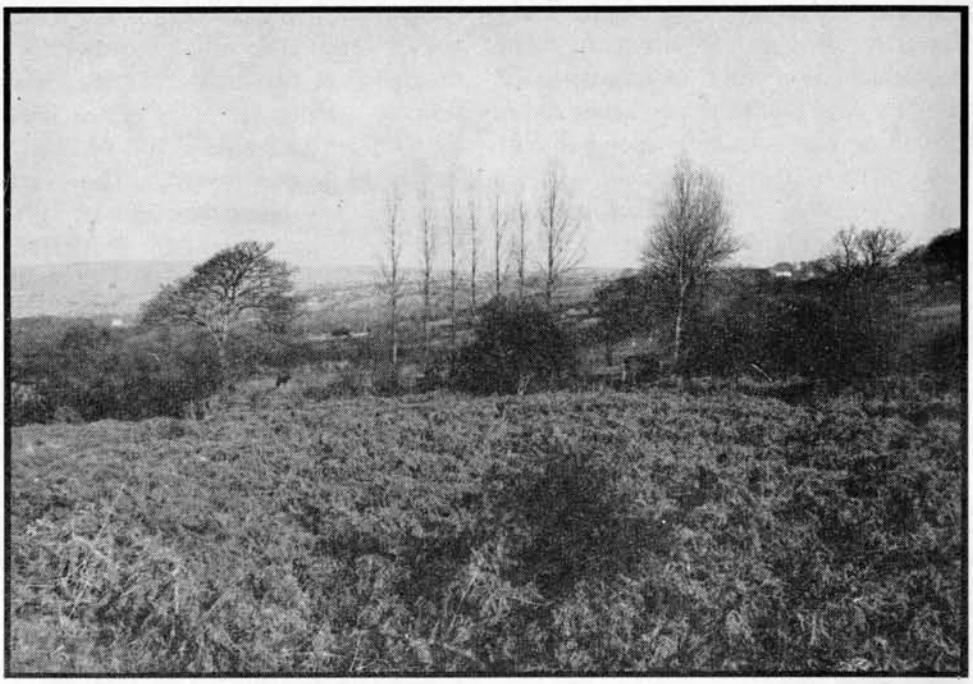
Over three million people are participant anglers throughout the British Isles. In other words more people fish than watch Association Football. Little is being done for this important amenity in Britain. The present cleanliness of the well-stocked Mychydd stream which runs close to Llantrisant Common is a tribute to the efforts of the Llantrisant and Talbot Green Angling Club. The stream abounds with brown trout. Can we be assured that natural drainage, following mining and other activities on or near the Common, will not seriously affect some reaches of the river? A Coal Board official referred to the possibility of "little solid suspension, mineral content, and a pH range of 5-9".

Lead poisoning

Coal extraction from the Common will admittedly mean more traffic. One tentative and presumably minimal estimate is available—about 60 large lorries operating daily between Llantrisant and Llanharan—one every ten minutes. This kind of increase in traffic must be seen in the light of a recent suggestion that no pollutant has accumulated in the general population so close to the threshold of clinical poisoning as lead. We must, therefore, seriously note another new discovery, about half the lead liberated in exhaust fumes falls within 30 yards of the roadside. Our very meagre evidence suggests that this may cause stunting of plants and be more harmful to animals, including man. There is an apparent lack of information to show whether children are more sensitive than adults. Leading British scientists have recently spoken of possible brain damage to children due to lead poisoning.

Noise and stress in humans

I have mentioned an increase in heavy lorry traffic. Such vehicles may cause noise levels of 100 decibels but reference was made by the Coal Board to the proposed use of silencers. It is said that irreversible changes occur in the human body if noise levels are greater than 90 decibels. 100 decibels is therefore excessive and excess noise does impair hearing and cause deafness. Levels of 50-55 decibels may interfere with sleep and produce a feeling of fatigue on awakening. Persistent noise may be a factor in some stress related diseases in man. It must be conceded that an additional heavy lorry for every ten minutes of the day is bound to result in persistent noise. And the Coal Board has not yet announced details of noise level due to other activities, including a proposal to blast with opencast gelignite at depths ranging from 30-150 ft.



Close-up of vegetation (photo: Harford Williams)

Conservation versus reclamation

Derelict land and disused coal, gravel, iron, clay and other mineral workings can and have been beautifully reclaimed. For instance the National Coal Board and Stoke City Council's award winning scheme at Central Forest Park—a 128-acre site containing the long standing dereliction of huge, unsightly colliery spoil heaps and pottery marl-holes. The judges criticised the National Coal Board for charging a high price for the land it sold Stoke city and not giving favourable consideration to the enormous advantages to a community of the reclamation and improvement of land already ravaged by mining operations.

But Llantrisant Common is not derelict. It is an area of unspoiled natural beauty, a colourful, varied, fragile and very small piece of land. Hence the proposal for conservation. Mining for coal, if permitted in this area, would be an irreversible ecological disaster. Before coal mining is allowed within a declared conservation area it must surely be proven that the coal is absolutely necessary in the public interest. Furthermore it must be clear, beyond all possible doubt, that there is no alternative source of supply in this country, or for that matter in Europe. It has been admitted that Llantrisant Common holds only a very small percentage of the total British annual supply and four years is necessary to obtain this small amount. This seems to confirm a recent authoritative statement that the coal and lignite resources of the whole world will last for 2,000 years at the present rate of extraction. If in the light of these facts there is no alternative source of supply, then permission to mine the common must be subject to immediate and perfect restoration. This cannot be achieved because the biological changes that result from coal mining are known to be largely ireversible. The conclusion is obvious, this priceless piece of natural beauty must not be sold for a dubious and short-term reward. It must be conserved.

How much growth is possible?

by Peter Bunyard

Economic growth, defined in its clumsiest form as growth of gross national product (GNP), still has many proponents, as is clearly demonstrated by a new book* on energy and growth written by a number of eminent economists and other specialists. Yet a number of demonstrably limiting factors on growth, such as our inability to provide enough power plants to sustain it, are ignored—as Peter Bunyard, currently writing a book on energy for Penguin, shows in this review article.

It's easy enough to jump on the environmental bandwagon, but there is a staggeringly broad gulf between those environmentalists who pronounce their concern for the human environment and yet who wholeheartedly advocate progress—whatever that might be—and those environmentalists with more than a sneaking suspicion that modern industrial society is sliding at a rapidly accelerating pace down the slippery road to disaster.

The first group contains the technocrats, for they see all environmental problems as having a technical solution, whether it be through gadgetry to contain industrial effluents or through economic measures and the imposition of anti-pollutant taxes; or more likely through both methods working together. The second group sees the way far less clearly and is downright sceptical that environmental problems are simply amenable to the "expert" approach. Such a group believes that if man's final and precipitous fall is to be halted there must be some profound changes in modern society, involving every aspect of life from the distribution of population to the relationship between man and his work.

If the reader is looking for any radical thinking in *Energy, Economic Growth and the Environment* he is likely to be disappointed, for most of the contributors, although expressing some fine sentiments about the future of humanity, are firmly committed to technical solutions to man's problems —and technical solutions need lots and lots of energy in terms of hydrocarbon and uranium fuels for their fulfilment. This growth, measured as always by the ubiquitous GNP, is what man must have, and the contributors, most of whom have had their feet sometime on those tempting top rungs of their professions, have the weight of establishment thinking firmly behind them. Nevertheless, there are two exceptions out of the nine contributors. Professor Barry Commoner has produced an impeccably argued piece indicating how modern post second world war industry is much to blame for bringing about widescale environmental degradation and Professor Kenneth Boulding, an economist, voices his doubts that the growth ethic is taking spaceship earth quite where its proponents would like it.

The way one feels about most of the book will depend very much on how one reacts to the kind of world proposed by Glenn Seaborg, recently retired from his position of chairman of the United States Atomic Energy Commission. "Ideally", he says "we want the beneficial social effects of economic growth with none of the environmental consequences. We want a just society with well-fed, well-housed people who are educated and enlightened enough to move easily between productivity and leisure. We want a modern civilisation—a highly human one—that approaches a physical equilibrium but is creatively dynamic. In short this is our new version of Utopia."

Which way to Utopia ?

Just how is this Utopia going to be attained? The economist's job is to manipulate the resources available so that every one comes out well, from the producer of the essential raw materials to the manufacturer of the glossy final product. His job is now expanding; he has also to work out ways and means by which industry can continue production but without the concomitant environmental damage. It is his task to work out the subtle positive and negative pressures that will give the manufacturer the incentive to go on producing but the disincentives to go on polluting.

Professor Walter W. Heller is an economist of some note in the United States. He is cautious and humble enough not to damn anti-growth econuts to Kingdom come, but after some careful juggling with the issues at stake he comes out fervently on the side of the established economic thinking about GNP. Between 1959 and 1969, he tells us, the number of persons below the poverty line in the United States fell from 39 million to 24 million, from 22.4 per cent to 12.2 per cent of a rising population. The reason for this success story is economic growth derived basically from a 3 per cent average increase in productivity per year.

"Change, innovation and risk thrive in an atmosphere of growth", he says. "It fosters a social mobility and opens up options that no stationary state can provide".

Like Wilfred Beckerman, the British economist, Heller is for imposing taxes rather than regulations to control effluent discharge. Within the present framework of industry there is a lot to

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**Energy, Economic Growth and the Environment* published for Resources of the Future Inc. by the Johns Hopkins University Press. £4.50.

be said for taxing industry at a rising rate as its effluent discharge goes up. Moreover, such a tax system could, if properly imposed, act as a restraint when certain unethical industries are able to get away with environmental malpractices, Heller himself cites the example of battery farms which produce vast quantities of manurial waste that are dumped into urban sewage systems or surrounding land and water. Make the polluter pay, and perhaps such methods of farming would fail in competition with more traditional methods which allow the animals to graze.

Not that such a tax system would always work. Could one tax the motorist, for example, who discharges lead and other noxious substances into the atmosphere, or the farmer who sprays his land with pesticides and herbicides when these are products made to be sprayed around? It is obvious that the economist can only offer a partial solution to the problem of environmental degradation through economic incentives and the market system.

Growth for whom ?

It is easy enough to pick holes in any generalisation about modern society, or any society for that matter, but against Heller's or indeed Seaborg's idea of the benefits derived from a growth-oriented society one can equally well argue that a stationary state society concerned with equality and the proper distribution of life's necessities could be just as conducive to human creativity and so-called social mobility as a society with a fixation on profit and productivity and a rigidly hierarchical structure to maintain it. While some may think it good to have reached the top of the pyramid and to have access through wealth to much of what they want, is it really so good to be condemned to the shop-floor and a life of drudging routine?

The fallacy is to imagine the jump in one single step from a growth-committed society to a stationary state society. It would be total chaos. But to plunge deeper into the jungle of competitiveness and ruthless exploitation—part and parcel of a modern industrial consumer society—may be just as good a recipe for chaos. All the contributors are aware that goods are going to cost more, a lot more in the near future, both as resources become dearer through the rising costs of exploitation and as industry begins to feel the cost of combating pollution within its four walls.

Philip Sporn, a former president of the American Electric Power Company, has made some fascinating projections as to how much electricity is likely to cost the United States by the year 2000. Not that he is against growth, far from it, he is wise enough to see that the projections that are being put forward by a number of experts are way out. Joel Darmstadter, of Resources of the Future for example, suggests in the appendix that the demand for primary energy in the United States is likely to leap from 68,000 trillion Btu (British thermal units) in 1970 to some 190,014 trillion Btu in 2000, with installed electricity generation rising astronomically from 340,000 megawatts (MW) in 1970 to 2,228,400 MW in 2000.

On the assumption that 96,000 MW of the 114,000 MW of conventional steam capacity in service in 1960 will be out of action in 2000, then to produce sufficient generating capacity to meet Darmstadter's projection an average annual addition of 64,900 MW will have to be made each year from now until 2000. Philip Sporn points out that only 15,600 MW were added annually over the past ten years.

Nonsense from the AEA

One can make a similar nonsense of the United Kingdom Atomic Energy Authority projection that Britain will have 150,000 MW generating capacity, 90 per cent of it nuclear by the year 2000. The installation rate to meet demand will have to be around 6,100 MW a year; a rate which must be compared with the present rate of 2,400 MW for all types of plant including oil-, coal-fired and nuclear. With problems now arising over the siting of power plants and the seven years or so before a nuclear plant has reached full load, can one really see Britain, or indeed the United States achieving a 250 per cent to 300 per cent yearly increase in its ability to provide electrical power?

How much the electricity will cost by the turn of the century depends very much on the technology being used. Dry cooling towers, for example, cost more than wet cooling towers, which themselves cost more than abstracting cooling water from a river or lake. Then again rising costs of coal, oil and natural gas may make the breeder reactor more competitive, and Sporn, like Seaborg, has no fears about nuclear power and the use of the breeder reactor to generate large quantities of plutonium fuel. Taking all in all Sporn estimates that electricity will be costing the consumer around 3.00 mills per kilowatt-hour in 2000 compared with some 2.00 mills per kilowatt-hour in 1970. Not such a staggering increase. The crunch comes with the total cost to the United States which Sporn reckons will be spending $32 billion more annually on providing electricity in the year 2000 than it was in 1970, and the total electricity bill in 1970 only came to $20 billion.

The cost of desulphurisation

As Richard J. Gonzalez, formerly director of Humble Oil, points out, a shortage of petroleum or natural gas is not likely to be felt for some time to come as new reserves are discovered and exploited. Nevertheless the cost is bound to go up considerably as measures are taken to prevent environmental pollution at all stages during production and use. Removing sulphur, for example, adds to the cost of coal and oil. Gonzalez refers to some prices recently set by Venezuela whereby fuel oil with 2 per cent sulphur or more will cost $2.41, with 1 per cent sulphur will cost $3.23, and with 0.3 per cent sulphur will cost $3.52 per unit of oil.

Whether the growth protagonists like it or not the rising demand for primary energy and all its derivative industrial goods are leading to some sharp price increases, some of which are just beginning to make themselves felt. Add to that the cost of cleaning up industry and then keeping it that way and one can see Seaborg's Utopic dream receding ever farther from a multi-million multitude of eager hands, all vainly trying to snatch their piece of a comfort-laden, easy-living world that exists only in the minds of the ad-men.

As emphatically as they condemn the stationary state society without really coming to grips with its aims, the defendants of the modern industrial society will turn a myopic eye to its faults and a keen, bright gaze at its triumphs, whether they be kidney

machines, satellite communication or a swifter means of transport from one corner of the globe to the other. But Professor Commoner's contribution should be compulsory reading for anyone who fondly imagines that new technologies are necessarily better and more efficient than the traditional time-honoured methods that they have replaced, in many instances only recently. Progress measured by Commoner's index of "environmental impact" turns out truly to be a myth.

Rising inefficiency

Take the case of inorganic nitrogen fertiliser which has so bumped yields up in the post-war years. In just under 20 years, from 1949 to 1968, its use in the United States increased nearly $6\frac{1}{2}$-fold. Over that period crop production per capita of population increased by a small margin from 5.43×10^{-7} units to 6×10^{-7} units. The significant change was in the quantities of nitrogen fertiliser needed for the growing of one unit of crop. In 1949, 11,284 tons of fertiliser were used per crop unit and in 1968 more than 57,000 tons were used, "This means", says Commoner, "that the efficiency with which fertiliser nitrogen contributed to crop yield has declined five-fold. Obviously an appreciable part of the added nitrogen does not enter the crop and must appear elsewhere in the ecosystem."

Commoner relates the same kind of story for pesticides which show a $2\frac{1}{2}$-fold increase in use per crop unit between 1950 and 1967; for phosphorus-containing detergents which by 1968 were being released at 20 times their 1946 rate; and for mercury which until recent legislation was being released at a rate of 0.2 to 0.5 pounds into the environment for every ton of chlorine manufactured in mercury electrolytic cells, and by the mid-sixties some 13 million tons of chlorine were being manufactured annually in the United States.

The point that Commoner makes is that these releases of environmentally-damaging substances have all taken place because a new product—and not *ipso facto* a better one—has replaced a more traditional one. Inorganic fertilisers which are easy to apply have ousted manures and sewage which are now nuisances dumped for want of a better solution in lakes, rivers and the sea; pesticides have come in because many farmers have broken away from traditional crop rotation systems to monoculture cropping; phosphorus detergents have replaced soaps made from saponified fats; and chlorine production has increased phenomenally to keep pace with the chemical industries which need chlorine for many of their products including synthetic fibres for clothing.

The new products have gained popularity primarily because of their price; the fact of the matter is that they are cheaper either initially or because their use is labour-saving. In terms of the total energy used in their production and application, however, the modern products are more expensive. Cotton or wool, both grown using free solar energy and both complicated organic compounds which are biodegradable, require far less energy—indeed orders of magnitude less—to finish up as articles of clothing compared with nylon or PCBs or any other synthetic product.

Barry Commoner tells us that the really bad damage to the environment, from pesticides, fertilisers, from mercury and from non-biodegradable plastics, has taken place post second world war. One does not have to look far for the motivating force—oil, billions of barrels of cheap, easy flowing energy. It is curious that not one of the contributors has alluded to the mighty impact that oil has had on the world, nor has asked himself what will happen to modern industrial societies when they have squeezed the last economical drop of this miraculous substance from the earth. It is a good thing that, apart from the appendix, Kenneth Boulding has the last word. Not that *Energy, Economic Growth and the Environment* is a bad book; far from it, for it is full of useful, well-documented information and is remarkably readable throughout. Just that Boulding does see the other side of the coin a lot clearer than most men; and that is not saying very much. His few thoughts about the stationary state do not take us very far, but inevitably they linger just a little on what he terms "romantic socialism of the Mao-Castro variety" in which as he puts it euphoria has been substituted for commodities. His conclusion is perhaps as good as any though it harks right back to John Stuart Mill. "The ultimate question of whether a stationary state would be bearable, or even stable", he says, "depends a great deal on the human capacity for social invention . . . we could regard the stationary state as a kind of maturity in which physical growth is no longer necessary and in which, therefore, human energies can be devoted to qualitative growth—knowledge, spirit, art and love."

One cannot help but ask, how in a capitalistic materialistically oriented society like ours would the establishment sell that (the idea of qualitative growth) to its electorate.

Coming events

3–4 April—Clean Air Spring Seminar. The Internal Combustion Engine and Pollution. National Society for Clean Air, 134/136 North Street, Brighton, BN1 1RG.

6–8 April—"Outdoor Education in Conflict?" The fourth annual conference of the National Association for Outdoor Education to be held at Alsager College of Education, Stoke-on-Trent. Details from J. H. Burton, Senior Lecturer in Environmental Studies, Alsager College of Education, Alsager, Stoke-on-Trent ST7 2HL.

26–29 June—MILJØ '73 is likely to be Scandinavia's largest and most comprehensive exhibition of products and services for environment protection and ecology. Trondheim, Norway. Further information from, Fagutstillingen MILJØ '73, Nedre Vollgate 8, Oslo 1, Norway.

26–29 November—Fuel and the environment 1973. Conference organised by The Institute of Fuel. Further information from the Conference Secretary, 18 Devonshire Street, London W1N 2AU.

British wildlife still threatened by pesticides

Tissue from a wide variety of birds, including blackbirds, finches, kestrels, moorhens, owls, and song thrushes, has been found to contain unusually high levels of dieldrin, in a study led by Dr Robert Hider of Essex University. Residues of DDT and PCB have also been found. Dr Hider has expressed surprise at these levels, which demonstrate that the voluntary ban on organochlorine pesticides has not been particularly successful. The distribution of organochlorine residues appears to be quite widespread: the most recent casualty from one of the Essex estuaries was a red-throated diver, a migratory species that breeds in Scotland and Scandinavia.

Times, 8.12.72.

Conservation Society

Simulation games

Economic growth and population growth are not the most important problems which conservationists should be facing today. In my view the vital problem is to educate the 99 per cent of people who are not convinced that these two growths constitute a serious if not fatal assault on the quality of life of the near future. *Education is the problem.*

I find that simulation is an effective educational strategy for developing attitudes towards conservation problems because, while it leaves people free to express their own opinions, it forces them to face up to problems and to make decisions—albeit only paper ones.

Making 16 decisions on environmental problems in 100 minutes is a tough assignment, but the thirty groups who to date have worked through the simulation, "European Environment 1975–2000", have been enthusiastic about it. Groups of about eight people form Advisory Councils of the Commission for the Environment of the West European Union—the name adopted for the European Community in 1974. Each Council chooses a chairman to ensure that quick decisions are made, and a secretary who exchanges memoranda with the Secretary of the Commission for the Environment. Technical reports asking for decisions, statistical reports giving five yearly data on population, GNP per capita, energy consumption per capita, air pollution and food production, and special reports on environmental developments are delivered to the Councils at frequent intervals. The years from 1975 to 2000 are announced by a tape-recorder and every five years there is a news bulletin of recent events.

The following extract from Technical Report 15 indicates the scope of the simulation.

"To: Advisory Council

From: Secretary, Commission for the Environment, WEU.

Date: November 13th 1995
Ref: TR 15
Message: Mediterranean Crisis. Please recommend whether proposal A or proposal B should be supported at the coming Pacem in Maribus conference.
Reply: We recommend proposal A/B (delete as appropriate)

Technical Report 15

1. There is evidence that the Mediterranean Sea may become eutrophic from end to end with the next 10 years; two proposals for averting this disaster have been made and are to be discussed at the coming conference Pacem in Maribus 5.

(Paragraphs 2–5 give a pollution "history" of the Mediterranean including algal blooms, fishing problems, development of sewage treatment plants, algal growths fouling the Costa Brava, etc. There is also a brief description of eutrophication.)

6. The present near eutrophic conditions are due to three main factors: (i) sewage effluent of 180 million people; (ii) animal sewage effluent of about 100 million beasts; (iii) nitrates leaching from the soil of farmland.

7. Two proposals have been made: (A) Divert both human and animal sewage to farmland and reduce drastically the use of nitrate fertilisers; (B) Enlarge the Straits of Gibraltar by nuclear explosions in order to "flush out" the Mediterranean with Atlantic water.

8. To provide a sewage grid system for farmland on a 2 km square pattern would require of the order of 100,000 km of piping and cost of the order of $1,000 million for the Mediterranean basin. The result would be that the condition of many agricultural soils would improve by increase in humus content and would retain nitrates more readily. Less nitrate and phosphate fertiliser would be required.

9. The Woods Hole Oceanographic Institution showed in 1970 that there is a complete turnover of Mediterranean water every 80 years through the present Straits of Gibraltar. For a cost of less than one thousandth of the sewage control proposal it would be possible to blast away the sill at Gibraltar, allowing much greater exchange with the Atlantic. Professor Paul Mittischmidt (1994) estimates that cutting a channel of a further 300 m depth and 4 km width would ensure that about 50 per cent of the Mediterranean water would be replaced within five years. Two obvious side effects are that the Mediterranean temperature would drop (10°C is the estimate) and radiation levels would rise due to the thermonuclear explosion."

Information given in the technical reports dated 1972 and earlier is real; later material is based on reasonable and "surprise free" projections. Other problems include the development of coherent policies for Energy, Population, Water and Agriculture; possible legislation such "that all manufacturers be required to register quantitative data on the life history of each of their manufactures which exceed a gross annual value of $100,000 —such to show for the raw materials, products, by-products and waste products where they leave natural ecological cycles and or static states of resources, and where they re-enter. . ."; a proposed ban on chemical insecticides; nuclear reactor dangers and a proposal to dam the Bering Strait and warm up the Arctic Ocean.

Inevitably the simulation appears somewhat naive because the technical reports only contain limited amounts of data which are used for momentous decisions, but when participants complain that the data is inadequate and the time for decision making too short, I feel that they are getting the real message. It is urgent in the extreme for the European Community to limit energy consumption, curtail population growth, resolve the water shortage, discover ways of conserving mineral resources and of protecting the soil from deterioration, as well as deciding what to do with nuclear wastes. Is it possible for the Community to generate environmental policies which will safeguard the quality of life for future generations?

The simulation is published by the Conservation Trust for the Conservation Society and is available in book form at 40p from 21 Hanyards Lane, Cuffley, Potters Bar, Herts.

Michael Bassey

Friends of the Earth

Water

No one gazing upon the Manchester Ship Canal, or the river Tame, or on the river Calder, or indeed on Father Thames, can seriously doubt that Britain has a water-quality problem. But for those who would sooner see it on the printed page than on the grim face of the waters, there is now evidence aplenty that the situation must be confronted—soon. Twenty years ago and again ten years ago Parliament passed the Rivers (Prevention of Pollution) Acts of 1951 and 1961. But from 1970 onwards the official documents have underlined that it is easier to pass Acts on "prevention of pollution" than it is to act.

In 1970 the Working Party on Sewage Disposal, under the chairmanship of Mrs Lena Jeger, MP, in their report *Taken for granted* (HMSO) pointed out that of some 5,000 sewage treatment plants in Britain upwards of 3,000 were discharging effluent inadequately treated, because the plants were either ageing to the point of senility, or inadequately maintained, or undermanned, or just simply overloaded beyond their intended capacity. The so-called "dirty jobs" strike of autumn 1970 underlined the Working Party's comments, as millions of gallons of sewage were discharged untreated into many of Britain's rivers. Officialdom nodded approvingly at the Jeger report, agreeing with virtually all of its recommendations; but nearly three years later there is little sign that the report has had any impact beyond the rhetorical.

The Royal Commission on Environmental Pollution, set up in 1970 under Sir Eric Ashby, devoted a substantial portion of its First Report (HMSO) to discussion of the pollution of rivers, estuaries and coastal waters. By the time it published its Third Report this problem was so urgent that the entire Report was devoted to it.

The Department of the Environment and the Welsh Office in 1970 undertook a joint River Pollution Survey of England and Wales. The first volume of the Report of this Survey was published in 1971 (HMSO). It graded rivers into four classes according to the quality of their water: Class 1 rivers were the cleanest, Class 4 the dirtiest. Unfortunately the Report used river mileage as a basis for its statistics, making both the statistics and the terms of reference somewhat suspect: five miles of Class 1 river high in a mountain valley are not strictly comparable with five miles of the Mersey.

Much more important are the statistics in terms of flow-rate; that is, in terms of water-volume per unit time. Be that as it may, the second volume of the Report on the Survey appeared in 1972 (HMSO), taking as its subject the reasons for the water quality—or lack thereof—described in the earlier volume. Many pages of the second volume read like an arithmetical shell-game, in which an array of numbers are shuffled backwards and forwards until the baffled onlooker loses sight of the fact that there is nothing—or at any rate precious little—underneath. The worst offences of this kind relate—surprise, surprise!—to trade effluent.

The Rivers (Prevention of Pollution) Act 1961 takes a stern view of potentially harmful discharges to rivers, and lays down elaborate regulations for their control. The penalties for contravention of the Act's provisions are, however, hardly commensurate with the potential consequences of contravention. Fines on summary conviction do not exceed £100; and, although on indictment an offender is liable to an unspecified fine, the courts seem to interpret this as extending at most to three figures.

On the other hand—and this is where the story really begins—the Act lays down, in Section 12, equally elaborate regulations concerning the disclosure of information about the contents of effluents. Anyone who finds out about the contents of a trade effluent for the purpose of administering the Act is stringently forbidden to disclose this information without the express permission of the "person making the discharge in question": and such disclosure without permission makes the offender—who is, after all, likely to be not a corporation but an individual—liable on summary conviction not only to a fine of one hundred pounds but also to a *prison sentence of three months.*

Section 12, betraying as it does the doubtful priorities of the nation's legislators vis-à-vis water quality, has long since become an embarrassment to officialdom. The reorganisation of Britain's water-authorities, now being debated in Parliament and nationally, has looked like an ideal opportunity to get out from under the embarrassment. However, the much-discussed reorganisation has itself fallen foul of internal power struggles, and there seems little likelihood that the tangle will be soon resolved, so we are likely to be stuck with Section 12 and the rivers will go on getting craddier.

However, it must not be assumed that Friends of the Earth, and other environmental and amenity organisations have a monopoly on concern for water quality. On the contrary: it is far more true to say that the great majority of local authorities, water undertakers, and industries have taken and are taking every step available within their circumstances to ensure that the quality of Britain's water is not only maintained but improved. Local authorities in the main have given great attention to the provision of adequate treatment for sewage, considering always that the funds available have been limited. As the Jeger Report pointed out, sewage treatment is today "taken for granted" by the community at large. Over a period of time this has led to the political cliche that there are "no votes in sewage". As the Royal Commission on Environmental Pollution says in its Third Report, this cliche is over-due for retirement.

Accordingly, Friends of the Earth are now involved in discussions: with Members of Parliament, with other environmental organisations, with informed journalists, with local authorities and—most particularly—with responsible industrialists. It is our hope that it will be possible to draft a Declaration of Intent concerning water quality, and discharges of sewage and effluent, to blow away the fogs of counterproductive secrecy which presently obscure our mutual interests. The problems involved in using, reusing and re-reusing our water will not be easy to solve; trying to solve them in the dark will be even harder. Light itself is a well-known purifier; if we can let in some light perhaps well-watered Britain will not be in such danger of finding itself with water, water everywhere, nor any drop to drink.

Walt Patterson

Demo-technology

Paper waste and recycling

Although there are signs that paper and board consumption in this country is picking up, the collection of waste paper, particularly of the lower grades, is steadily decreasing. Imports of paper and board products manufactured from waste paper are in excess of 400,000 tonnes per year, yet local authorities appear to be disillusioned by waste paper collections.

Even to a layman, the economics of exporting 100,000 tonnes of waste paper, only to have four times as much converted by foreign mills and shipped back as finished products, would seem to be highly suspect, particularly as all the products are capable of being manufactured by our own mills.

The decline of local authority collections, which initially started as a labour problem, is now primarily due to collection costs. The end of "totting", where dustmen were allowed to sell all waste and pocket the proceeds, initiated the fall-off in collections. Employees refused to collect paper separately from general waste, unless a separate vehicle and collection service was initiated. As this was uneconomic, many collections ended there.

Collections from offices and large commercial centres, have been strangled by traffic regulations which make collections possible only outside normal working hours—involving overtime payments to the personnel involved. The amount of paper contaminated by plastics, foil, bitumen, etc ("pernicious contraries"), means that up to 30 per cent is unusable.

Total figures for waste paper collection have remained remarkably buoyant considering the economic difficulties over the past few years, averaging slightly less than two million tonnes. This achievement must be due in no small part to the energies of waste paper merchants, who are responsible for some 56 per cent of this total.

The leading company in this field, and one which any Scout will know, is J. & J. Maybank Limited of Charlton. Supplying 38 per cent of home demand, and 22 per cent of export sales, Maybank's have emerged as the "saviour" of conservationists and charity organisations alike.

With 33 member companies, including four overseas, the company now employs 2,000 people directly involved with the collection, sorting and transport of waste paper, metals and fabrics. A fleet of 250 lorries and trailers carry this sorted waste to mills, foundries and factories throughout Europe at a rate of 16,000 tonnes a week. Additionally, from their wharf at Charlton, ships leave every other day for overseas ports, exporting 3,000 tonnes of waste paper a month.

Primary sources of waste paper are printers, converters, publishers, factories, offices, large stores—and local authorities. There is, of course, the domestic arising, but for the merchant this source is uneconomic to collect, and it is this sector of the market which is covered by voluntary groups who sell loads directly to merchants.

Commercial concerns sell their arisings either bagged, baled or bundled as office records, shavings or mixed waste. On arrival in the merchant's premises, material is hand sorted into the various component fibres and all contraries are removed and dumped. This results in uniform bales of sorted materials, as each grade is packed separately. Mixed Waste grades, where the contents are so diverse as to preclude economic sorting, are cleaned of contraries and packed as Mixed Papers, an assortment of fibres ideal for making folding board.

Newspapers, books and magazines are used either as a filler in board making or are de-inked to be used in newsprint manufacture.

Other grades are used mainly in paper making, when the papers are defibred and the colour or print counteracted by chemicals in the Mill.

Voluntary groups, including Scouts, Boys' Brigades, Guides, Churches, Lions' Clubs and Hospital Friends sell 1,000 tonnes of waste papers per month to the Maybank group, earning well in excess of £4,000 in the process. The company negotiates a fixed price contract with organisations, which is normally £4 a tonne for collected waste, or up to £7 if the load is delivered to a member company.

If anyone interested in beginning a local collection of paper in their district would like further information, and the address of their local Maybank company or agent, it can be obtained from Ron Thompson, J. & J. Maybank Limited, Maybank Wharf, Herringham Road, Charlton, London S.E.7., telephone 01-858 6100.

Arthur J. Puffett

Feeding the hogger prior to baling

Books

Now or never

THE ISSUES OF SURVIVAL by D. F. Fleming. George Allen & Unwin, £2.50; WORLD FOOD by Nance Lui Fyson. B. T. Batsford Ltd., £1.30; NITROGEN METABOLISM AND THE ENVIRONMENT edited by J. W. Campbell and L. Goldstein. Academic Press, £4.50.

It was the development and deployment of modern weapons of war that first alerted man to the possibility of his own imminent extinction through suicide. Awareness of the deteriorating state of his global environment came later and of the erosion of the foundations of his industrial economies most recently of all. They cannot be separated, for all are products of the same philosophical and political systems. It is possible to trace clear links between the anti-bomb, anti-war and environmental movements, just as it is possible to trace many of our ecological difficulties to the military-industrial complexes of the rich nations.

Professor Fleming regards these complexes as man's main opponent. If we are to survive, their power must be broken. Only when this has been achieved will we be able to reform nations internally and strengthen international institutions so that the economies of the planet—using the term in its widest sense—may be brought into balance.

He outlines the political history of the cold war years and it is here that he is at his best. He writes boldly, passionately and with great confidence. Yet he recognises that today it is the natural systems of the planet that are in jeopardy. He argues that the rich nations must achieve zero growth, of population and of their industries. His reasoning is sound but could be supported with stronger evidence than that which he presents. It is unfortunate that he should have chosen some of the less reliable warnings from the early eco-writings.

The Issues of Survival performs a useful service by treating as one the political-military and political-ecological aspects of the human dilemma. It may sway some of those on the political left who have not yet made the connection for themselves.

If the two problems can be differentiated it is because one is potential and the other actual. The bomb may fall or it may not; the world food problem is with us here and now. Nance Lui Fyson has written an excellent introduction to the subject for 12 to 14 year olds.

World Food begins by describing what food a man needs and by showing how he has obtained it through history. This leads logically to a consideration of the present availability of food in the world and of the relationship between population growth and food supply.

There is a slight bias in favour of highly technological solutions to speed the production of food but this does not disturb seriously the balance the book is at pains to maintain. The research has been very thorough and for so short a book *World Food* is very comprehensive. There are sections on health foods and concern over nutritional quality and on the environmental effects of modern agriculture.

I have no hesitation in recommending it to young people who wish to begin to understand the most basic biological limit to human numbers.

We may learn much about our chances of survival if we can discover the ways in which we adapted to our environment in the first place. As life migrated from the seas to fresh water and to land one of the most difficult problems to be overcome was that of disposing of waste nitrogenous compounds while maintaining an adequate water supply within the body and within the cell. *Nitrogen Metabolism and the Environment* describes some of the most recent research in this field. It is based on papers presented at a symposium held in Indiana in August 1970, and it deals with the mechanisms by which organisms excrete nitrogenous wastes and with the effects on them of nitrogenous pollutants introduced into the environment by man. All of the papers are written by and for research scientists and are highly technical.

Michael Allaby

Eating the countryside

FOOD FOR FREE by Richard Mabey. Collins. £2.50.

For those who take their survival training seriously, Richard Mabey has written a useful manual. His intention was less solemn, to be sure. The countryside offers much to stimulate the jaded palate and for the conservationist, "the most complex and intimate relationship which most of us can have with the natural environment is to eat it." He lists several hundred shellfish, nuts, fungi, edible roots, vegetables, herbs, fruits and spices that may be won for the effort of collecting them. He gives hints on preparing and serving them and assures us that no item appears that he has not tasted for himself. He lists his entries A, B or C according to their palatability and ease of location and identification and he is careful to warn his readers not to pick rare or threatened species.

That his book should strike us as novel is a sign, if sign were needed, of the extent of our urbanisation. We have moved far from our hunter-gatherer origins, but the tradition lingered long. Prior to the middle of the industrial revolution the diets of most people were supplemented or flavoured with the produce of field, hedgerow, wood or shoreline, and at times of emergency the custom has been revived. Those old enough to remember World War Two may also remember the herb committees and the gathering of plants for dyes and drugs as well as for food. Yet each revival grows more difficult as the knowledge, not just of the plants themselves but of how to render them palatable, has to be rediscovered and communicated to a public trained to eat only food that comes in packets. The books published during the war years are long out of print, so Mr Mabey need fear no competition from them. In fact, his is better than those I have seen. It is more detailed, the list is longer, the background information more complete and there are more historical anecdotes to add colour. There is colour, too, in the eight coloured plates by Majorie Blamey that complement her line drawings.

Nevertheless, I remain slightly uneasy. I was taught that there are very few wild plants that are so poisonous that one revolting mouthful will result in death, or even serious illness, yet I am less than fully confident that I could identify species just from Mr Mabey's description of them. Professor Dimbleby, a distinguished botanist, once said that should it become necessary to live off the land we might all wish we had studied the subject.

Still, nothing ventured nothing gained, so the first fine day next spring may find me with my basket tramping the rights of way in search of my supper.

Michael Allaby

Classified adverts

JOIN THE FUGITIVES from the technological bedlam for a unique holiday. Our 77-acre nature reserve in Exmoor National Park has red deer, buzzard, etc. Nature trials, hides, wildlife garden amidst glorious oak woodland. Recreational facilities, ecological demonstrations and discussions. Secluded environmentally designed caravan site with all amenities—6 caravans. Limited B. & B. accommodation. Organic produce. Environment and wildlife conservation dictates our planning and way of life. 10% discount for Friends of the Earth. S.a.e. brochure, Cowley Wood Conservation Centre, Parracombe, North Devon. Parracombe 200.

PARTNERS sought prepared to drop out, buy and re-establish old village in S.W. France on basis of recycled economy. Box PD1.

ROBERT WALLER has residential caravan—two double beds and bunks for kids—at Blakeney, Norfolk to let from April to October. Apply for details to 84 Portland Street, Norwich. Norwich 60463.

THIRD-YEAR STUDENT of architecture, more interested in people/ecology than in Corbusier/office blocks, seeks job with similar interest in practical training year. Please contact Box PD2.

ADAPTABLE young geography graduate, keen to find work which is interesting and useful to all, with understanding of our environment. I'm interested in conservation, social planning and "alternatives". Box PD3.

PLANT A TREE '73. Wanted: Ideas for action to make our towns greener. Suggestions for personal action, political and financial incentives, etc., all welcomed by Michael K. Fletcher, 70 South Street, Reading, Berkshire.

Letters

Herbal remedies and meditation

Sir,

In his excellent piece, "The Medicine of Industrial Man" (*Ecologist*, October 1972), John Powles underlines the need for a medical counter culture, based on non-technological principles, and among other things he says, "Health foods, herbal remedies and meditation are responses that are gaining in popularity".

I should like to confirm this statement. From what I observe, an amazing number of people are getting actively involved in alternative health management and healing which the majority either dismiss as fringe nonsense, or know nothing about. That doesn't matter. More than once in the recent past yesterday's fads have suddenly turned into tomorrow's norms. And there's a built-in safeguard in unorthodox methods: if they don't work, they fade out pretty fast.

There are more and more people who know—from personal experience—that herbal medicine, practised by qualified consultants, achieves quite remarkable successes, especially with chronic complaints which orthodox doctors cannot cure; that a sensible wholefood diet can make a great difference to one's well-being and vitality; that yoga and meditation not only provide a stronger inner balance which eliminates the need for tranquillisers, sleeping pills and anti-depressants, but that in certain cases they can also cure stress-based physical illness.

Ironically enough, the chief "shortcoming" of these methods is their utter simplicity. Technological progress has created an artificial, negative atmosphere in which medicine must be highly complicated and, to the layman, mystifying, to appear valuable; it must also try to "conquer" nature instead of working with it. This mentality prefers synthetic sleeping drugs with unpronouncable names to herbal tisanes which make you sleep like a baby—even though the capsules leave you dopey and the tea doesn't. And so on, all along the line.

The subject is huge and vitally important. Perhaps ecologists will give it the serious attention which the orthodox medical establishment denies it.

Yours faithfully,

Beata Bishop,
34 Esmond Road,
Bedford Park,
London W4.

Breast-feeding

Sir,

Congratulations on your article in the November 1972, *Ecologist* advocating breast-feeding. This, I feel sure, will increase the husband-support essential to successful breast-feeding. But most women with small babies fall prey to discouragement, due to lack of information and advice favourable to breast-feeding. A valuable manual of practical advice is *The Womanly Art of Breast-feeding* published by Tandem, 14 Gloucester Rd., London SW7, 25p. This book should be given to every mother who intends to breast-feed by her doctor or health visitor, as most women obey doctors rather than instinct.

Yours sincerely,

Frances Howard (Mrs),
Diggaport,
Bridestowe,
Nr. Okehampton, Devon.

Sir,

Many thanks for your article "Breastfed Babies Are Healthier", published in the November, 1972, issue. I hope I am not too late to comment usefully . . . it caught us just as we were moving house . . . plus Christmas.

The article touches upon one point which has become almost a folk myth in our culture, namely the apparently mysterious relationship between impoverishment and success at breast-feeding. Some observers have even been tempted to postulate a cause and effect relationship between malnutrition and lactation. The real reason for "their" success and "our" failure lies in another quarter and is so simple as to have been overlooked. If the baby is put to the breast every time it peeps *for whatever reason* then lactation will persist at a level adequate for the child's survival even whilst its mother is starving.

Our relative wealth and easy option for bottle feeding enable us to make on infant feeding a moral battleground and/or educational arena where no feed can be given until a list of questions have been correctly answered by mother and child: has there been a sufficient number of hours since the last feed? Could there be some other reason for the baby's cry such as an insidious bid for unwarranted attention? Has the infant perhaps already had his prescribed six minutes per nipple so should be satisfied? (It is also frequently inferred that breasts or nipples will be overworked by permitting the baby to feed longer or more often) Has Mother received the eight hours of uninterrupted sleep to which she has an inalienable right? Only after correctly answering these and many other questions having to do with matters of age, feeding of pureed solid foods, appearance of the last bowel movement or emission of a suitable amount of "wind" can the modern and enlightened infant feed with a clear conscience.

If the breast is offered as a first rather than last resort it becomes able to operate within the supply and demand system for which it is designed. The baby must suck more than "enough" in order to keep on giving the necessary message to the glands to keep producing. In other terms, the breast must be utilised to meet the baby's emotional as well as nutritional needs or it will soon fail on both counts. Far from "tieing mother down", this approach to baby care is liberating to mothers because the baby becomes co-operative and confident and is, of course, healthier.

These insights are due to the efforts of La Leche League, an international group of women who help each other to breast-feed. Working together and with many sympathetic medical people we have developed appropriate answers to most of the problems which beset women who would prefer to feed their babies naturally. These answers even include ways to dress attractively yet

feed the baby modestly as many mothers, myself included, prefer to avoid ruffling the fine sensibilities of restaurant owners or museum guards.

Most sincerely,

Joann S. Grohman,
La Leche League,
Lattenden Farm,
Ashburnham,
Nr. Battle, Sussex.

Eco-cycles

Sir,

I am interested in making a small complete eco-cycle in my studio, and wonder whether any readers with practical or other experience would care to give me some advice.

Yours faithfully,

Hazel Rank,
University of London,
Goldsmith's College,
School of Art,
Lewisham Way,
New Cross, London SE14.

Linguistic minorities

Sir,

R. G. Jones' article on the "Dilemma of a Linguistic Minority" (August, 1972, issue) is self-contradictory. On the one hand he argues that survival of its language is essential to the morality and independence of a minority; yet on the other he demonstrates that such survival is not really necessary for these things at all. As he points out, in the case of Scotland, Gaelic is not now spoken by more than two per cent of the population, but the nation certainly has not suffered any moral disintegration or loss of identity as a result. Scotland still possesses many of its own institutions—separate legal and educational systems, for example—and has a strong nationalist party. Indeed, in many ways Scotland has much more independence than Wales. Survival of the language, on his own evidence, is not as important as Mr Jones would have us believe.

Having said that, however, I would agree that the continuation of Welsh as a language would be (to use Sellar and Yeatman terminology) "a good thing". But the antics of some supporters of the language could make this difficult of achievement. There are Welsh fascists and racialists who, amongst other things, want the creation of "Welsh Only" areas and the reserving of jobs for Welsh-speaking Welshmen only. The activities of these people merely add to the already great pressures on the Welsh language and in the long term may be one of the very factors that could bring about its disappearance.

Yours sincerely,

H. Tewdwr,
"Gwelfryn",
Penparcau,
Aberystwyth,
Cardiganshire, Wales.

Sanitation for Conservation

Sir,

A mis-statement occurred, in your November, 1972, issue, in Mr Lawrence Hill's otherwise interesting article. It is incorrect that "the closed cycle" farm unit, which formed part of the Haughley Experiment, "produced a steady fall in yields". On the contrary the yields remained surprisingly constant throughout the life of the Experiment (20 years, not 30). In fact for the last two years (1968 and 1969) the majority of the crops, and the livestock products, gave a higher yield than the mean for all the previous years.

A comprehensive digest of the history of the Experiment is in the course of preparation. I recommend that any would-be commentator on the results of the experiment should wait until this is published.

Yours etc.,

Eve B. Balfour,
(Co-founder of the Haughley Experiment)
4 Rattla Corner,
Theberton,
Leiston, Suffolk, IP16 4SD.

Epping Forest

Sir,

Your editorial on Epping Forest (*Ecologist*, September 1972) is, unfortunately, probably nearer the truth than suspected and the cartoon as well.

I used to take groups of children to Epping Forest regularly, between 1948 and 1960. There were deer and badgers in, what seemed, endless stretches of forest and a real wilderness of silent greenery.

When I went there, last autumn, it seemed not to be the same place at all, and had changed beyond recognition.

A wide motor-road, with endless traffic, had been routed across what had been grassland and woodland; plastic ice-cream and drink cartons littered the once pleasant landscape; cars were parked everywhere and the air was full of motor exhaust fumes. Too many feet had transformed grass verges to bare patches of soil, etc.

One felt very disillusioned and wondered how long it would take before even what was still left of the Forest would disappear—for good.

Yours sincerely,

Miss P. Cantor,
16 Alexandra Court,
Chase Road,
London N14 4RE.

Plastic recycling

Sir,

I refer to the "Ecotechnics" article by Arthur J. Puffett in *Ecologist* of April 1972, drawing attention to the recycling plant developed by Regal Packaging Ltd of Newmarket.

One of the largest Group Hospitals in East Anglia has recently changed over to using plastic milk bottles instead of glass ones and I gather that these are disposed of by the local authority using bulldozers.

We had hoped to obtain Regal Packaging's assistance in collecting these used containers for processing through their own plant, but Mr Roy Paske, Regal's chairman, has written to explain that they are unable to undertake this service, and from this I gather that their interest is mainly in selling plant as capital equipment.

If any readers know of the availability of recycling plant where free waste plastic would be useful and could be collected at the operator's expense, I would be very grateful to hear of it.

Yours faithfully,

M. G. Graham-Cameron,
Beechcroft, Over,
Cambridge CB4 5NE.

Starting as they mean to go on

A great many infants in Britain are overweight because they are given solid foods too soon. According to the *British Medical Journal*, a team from Birmingham University led by Professor Charlotte Anderson examined 300 babies from Dudley, Worcestershire, and found that almost 50 per cent were overweight on their first birthday and almost 17 per cent were obese (defined as more than 20 per cent over the correct weight for their height). All of them had been of normal weight at birth.

Very few of the babies had been breast fed and less than 6.5 per cent were still on the breast at 12 weeks. Virtually none of the mothers had been strongly encouraged to breast feed either by a doctor or a nurse. All but a few of the bottle-fed babies were given a proprietary dried milk. More than 80 per cent had been started on a solid food such as cereals by eight weeks.

Professor Anderson criticised the trend of the past 20 years to early weaning on to cereals. As a result of it many three month old babies in the survey were being overfed by about half too much. The high protein content of many of the solid foods meant that many of the babies had strong-smelling urine and nappie rashes.
Times, 1.12.72.

Plastic in the blood

Blood stored in plastic bags can become contaminated by the plasticiser and enter the body during transfusions, according to Dr R. J. Jaegar and Dr R. J. Rubin of John Hopkins University, Baltimore.

Blood storage bags are now commonly made of PVC, to which is added a plasticiser, DEHP (di-2-ethylhexyl phthalate) to make it softer. It has been found that DEHP leaches into the blood from the plastic bags at a rate of 0.3mg a litre a day.

Thirteen patients who died soon after receiving multiple blood transfusions were examined by the doctors, and eight of them were found to have the plasticiser in their fat, livers, lungs, and spleens. The lungs were worst affected as the blood must pass through them on its way to the rest of the body. One patient received 600mg of DHEP. Another, who survived both a heart operation and the transfusions, was found to have traces of plasticiser in his urine for five days afterwards, some of which must also have come from the plastic tubing of a heart-lung machine.

It is not known whether DHEP is toxic to man, though similar compounds have been found to be toxic when tested on chicken heart cells. *New England Journal of Medicine*, 30.11.72.

Corrigenda

Concorde: they said the same thing about the H-bomb by John Adams (November 1972, page 16). The speed of the train entering a tunnel should read "40 mph", not 70 mph.

Low energy housing by Andrew MacKillop (December 1972, page 4). Left col., p. 7, 4th line from bottom of 2nd para.—should read "loss to", not loss of. Right col., p. 7, 12th line—should read "250 kW" not 250 kWh. P. 8, 10th line from bottom—should read "5 lbs", not 51 lbs. P. 9, Table 3,—col. 6—col. heading should read "6=5/3"; delete "5/3" below "Gross efficiency".

In our next issue

The logic of growth by Lord Gladwyn. A consideration of the likely fate of Europe, the United States, India, China, Japan, Africa, the Communist Bloc, etc., if growth persists.

Foulness, alias Maplin. London's third airport need not be built and should not be built. We are publishing two articles, one by Mollie F. Drake on the ornithological importance of Foulness, the other by the Essex Branch of Friends of the Earth on all the other reasons why an airport there would be economic idiocy and an environmental disaster.

The Galapagos: islands in the balance by Soames Summerhayes. Goats, pigs, and men threaten these beautiful and fascinating islands.

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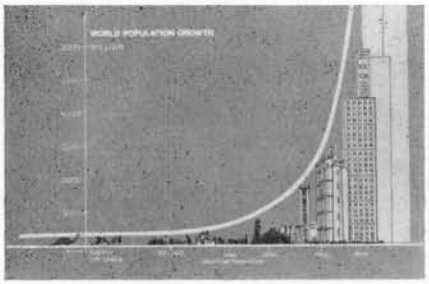

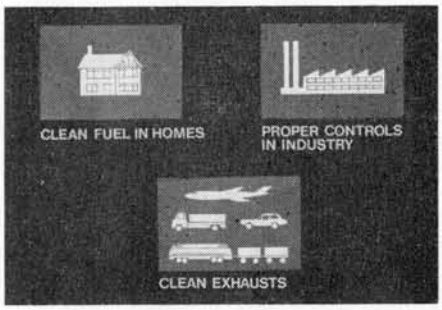

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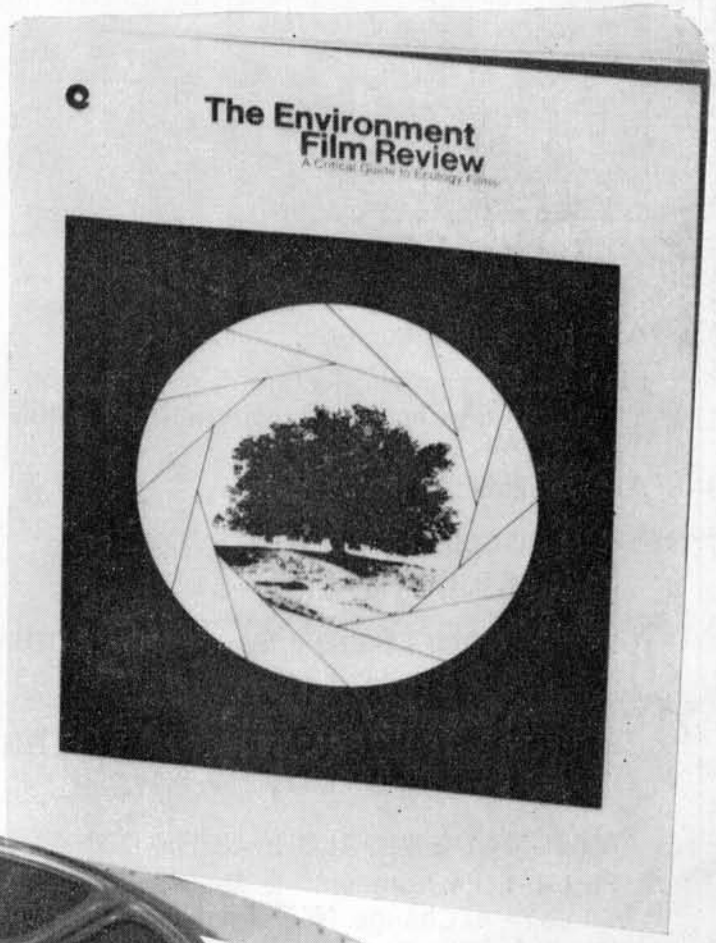

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